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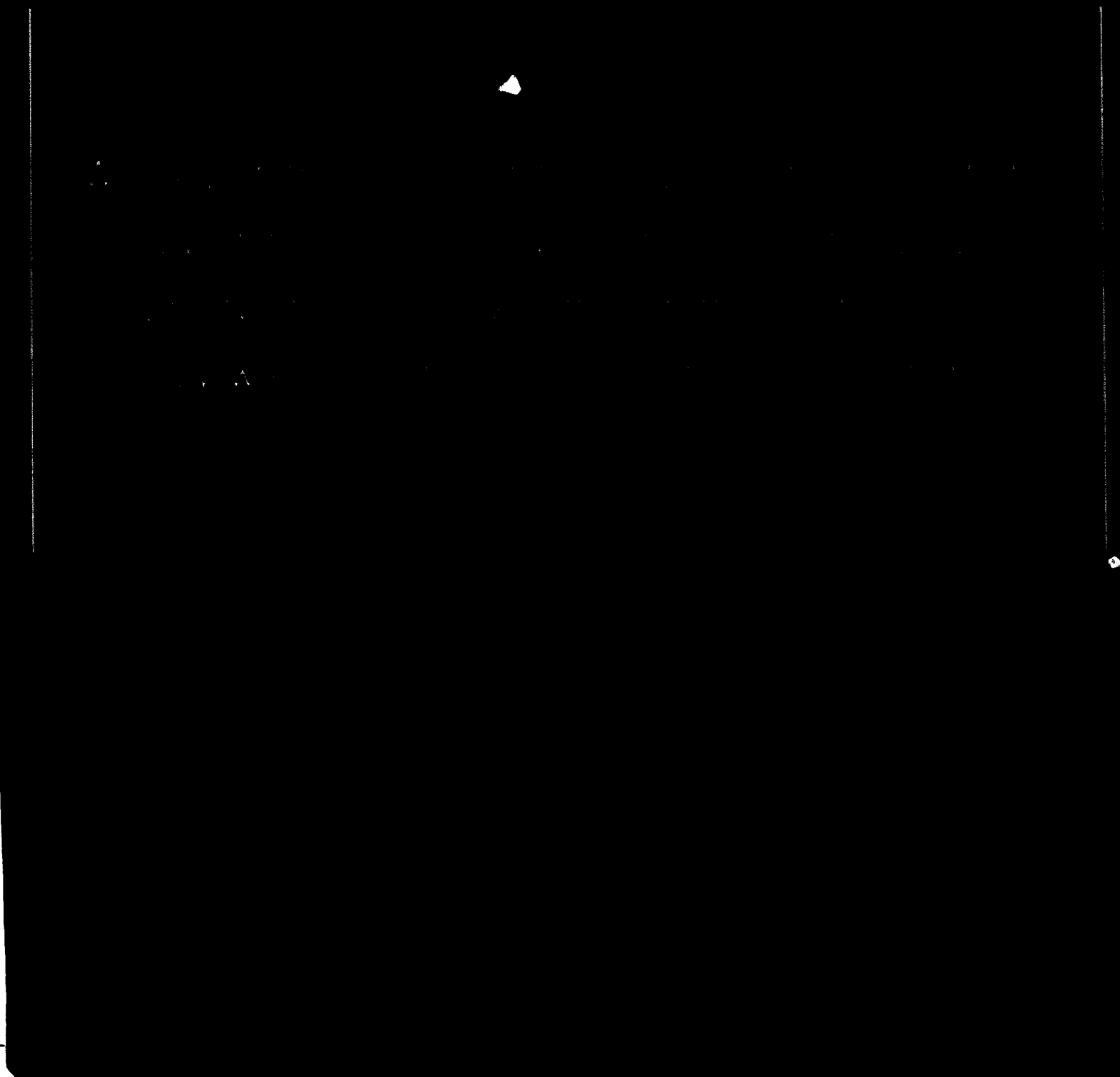
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SUMMARIES OF PAPERS SUBMITTED
TO THE INTER-REGIONAL SYMPOSIUM
ON INDUSTRIAL PROJECT EVALUATION

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Reference: CID/IPE/A.1

Title: PROJECT EVALUATION - DATA AND OTHER INFORMATION REQUIRED FOR
THE PURPOSE

Author: K.C. MITRA

The post World War II era has witnessed a keen desire for economic development among developing countries. Inadequacy of domestic savings, shortage of foreign exchange, technical and managerial skills and raw materials are serious obstacles in their way. It is essential that the scarce resources are put to the most productive uses possible. Appraisal of projects by development banks, set up to assist in this task, enables the identification and evaluation of investment opportunities and selection of projects, which apart from being attractive to the entrepreneurs, are also beneficial to the economy as a whole. This involved a systematic scrutiny from the individual and national angles, of data presented in the feasibility report so that improvements, where necessary, are made and unsound projects weeded out.

A healthy sceptical approach is necessary in appraising the technical, economic, managerial and financial aspects. The project should be soundly conceived in its technical and engineering details with due attention to the size of the plant, the process and consultancy and supervisory services. Investigation of the market for the product would indicate the competitive strength and economic viability of the project. However, no project can succeed without good management. Deficiency in management can be overcome by proper arrangements for the training of personnel and the association, initially, of experienced foreign organisations or specialists. Financial appraisal would reveal whether the method of financing the project is appropriate and earnings sufficient to give an adequate return after servicing debts. Finally, the project should be capable of making a significant contribution to the national economy.

This paper considers in detail the nature and content of feasibility reports on a project, the data and information required for its proper evaluation and their limitations and shortcomings in relation to the conditions prevailing in developing countries, and is largely based on the experience in project appraisal in India.

Reference: CID/IPE/A.2
Title: THE IMPLEMENTATION OF INDUSTRIAL DEVELOPMENT PROGRAMMES
USING CRITICAL PATH NETWORK THEORY.
Author: P.C. FERNANDO

The complexity of industrial development planning and programming processes is contrasted with the even greater complexity of integrated, dynamic implementation of such plans, and a serious "implementation gap" between planners and implementors, is exposed.

The paper purposes to point toward possibilities for bridging the "implementation gap" using Critical Path Network Theory, and motivate its application as a pilot project in some developing country.

A hypothetical regional development problem and a programme for industrialization are postulated. The requirements of implementing a sugar industry project within the programme are outlined. Basic concepts pertaining to aggregate activities, events, arrow-diagram networks and dummies are presented, and ten basic steps for applying critical path network theory to the implementation of the Sugar Industry Project are illustrated, explained and discussed in detail. The desirability of involving the next lower level of supervision in the network-planning process is discussed. An evaluation of the applicability of networks in dynamic implementation processes follows. The possible use of computer programmes to expedite the analysis of large networks is pointed out, but only after network analysis is thoroughly mastered by manual means, eventually effecting a possible major breakthrough in implementation systems and processes.

The acceptability at the top level of planners and implementors is emphasized as absolutely essential. The publication of a Handbook on the Use of Networks in Implementation, based preferably on actual experience on a pilot project is presented as the best means for educating at all levels.

Some possibility for treating the various interdependent projects in any programme as a network of interlocking investments, each with its own

possibly uncertain and variable gestation period, is pointed out as a possible fruitful avenue for further research with aggregate simulation models, accompanied by model-experimentation with alternative policies and resource-allocation strategies for evolving and setting up sound dynamic implementation systems and processes. An appendix illustrating an Integrated Implementation Network concludes the paper.

Reference: CID/IPE/A.3
Title: PROJECT EVALUATION AND THE CONSISTENCY OF THE PLAN
Author: G. CUKOR

A project generally deals with one single commodity, a group of commodities or services, produced by one given plant; it emphasizes the efficiency of the single project without the appraisal of its relations to the rest of the economy. The development plan is centered on the economy as a whole, or some major part of the economy (e.g. some industrial sector or region), with emphasis on the interconnections of the economy, that is on the consistency of the plan.

From the social point of view, efficiency means the optimal allocation of resources, optimality being understood within the limits of available resources and given demand for goods and services and subject to the accepted efficiency criteria. This optimal allocation cannot be achieved exclusively on the basis of the evaluation of single projects in an isolated way, but only taking into account their complex interrelationship to the rest of the economy. This interrelationship is reflected in and can be investigated with the help of the development plans, plan consistency being a necessary, although not sufficient precondition to efficiency. On the other hand, a consistent plan is not necessarily efficient; efficiency can be ascertained by the evaluation of different projects, in order to make the right selection.

From the point of view of the single projects the main problem is to evaluate projects taking into account the effects on the remainder of the economy; direct effects - relatively easy to evaluate - and indirect (backward and forward) linkage effects. These are created often through several links, in sectors of the economy not directly affected by the projects.

Three types of resources - labour force, capital and foreign connection with the linkage effects.

Out of several methods to deal with the interrelationship of efficiency and consistency, one - outside the framework of planning - is based on a

special set of prices, using the concept of opportunity costs. These prices are different from the official or market prices, and should express the true or social costs of resources, such as would prevail in the theoretical model of a market economy with perfect competition, after the investment programmes had been put into effect. On a more practical level, this method consists in correcting the official prices of labour (wages - generally downwards), of capital (interest rate - generally upwards) and the foreign exchange rates.

Linkage effects of projects can be taken into account in the multi-stage process of planning with balances. This, however, is a very time-consuming process and hardly feasible for numerous single projects, especially if a higher degree of precision is required. One method based on the inverse-matrix - utilising a set of pre-determined coefficients - backward linkage effects can be computed easily, although with a limited precision.

Mathematical programming can give results for the development plans of single economic branches, the results being - within the limits of the system - at the same time efficient (through optimisation of the objective function, which is the efficiency criterion here) and consistent satisfying special balance. There is already considerable experience in working out such sectoral programmes, which, however, do not take into account linkage effects outside the system. Theoretical proposals have been made and experimental computations are going to integrate sectoral programmes into an overall consistency at the same time for the economy as a whole.

Reference: CID/IPE/A.4
Title: ORGANIZING PROFESSIONAL CADRES FOR INDUSTRIAL PROJECT
EVALUATION, SELECTION AND FOLLOW-UP
Author: J.D. Nyhart

Good project appraisal does not stop with the acquisition of sound techniques of evaluation. The problem necessarily includes making the best possible use of a professional cadre composed of men and women with greatly diverse skills and outlooks - economists, accountants, engineers, and lawyers. A discussion of industrial projects is incomplete without a consideration of the ways by which these professionals shall proceed once they have acquired the basic skills of their profession as applied to development.

Among the critical issues are those subsumed under the following questions: 1. Does the professional cadre of the development finance institution have clear responsibility for project development, evaluation, and follow-up? 2. Is a balance kept between cost consciousness and development determination? 3. Do the professional staff members work as a team in making an evaluation? 4. Are the methods for acquisition of data used by the professional cadre at each phase sufficient, but **not excessive**, to their purpose? 5. Can the selection process be improved by strengthening its collective nature? 6. Should the selection process be moving toward single officer responsibility? 7. Is the evaluating staff directly involved in the selection stage? 8. Is the importance of follow-up recognized in the institution's procedures, organization, and allocation of professional personnel? 9. Are different professionals assigned to follow-up a project? 10. Does the organisational structure capitalize on the flexibility of team arrangements? 11. Should a separate department for follow-up be created? 12. Are those who co-ordinate evaluational efforts not responsible for advancing the negotiations on projects?

Eight phases are identified as part of the identification and evaluation, selection, administration, and follow-up stages of a project. These phases provide a framework for examining the above issues.

Reference: CID/IPE/A.7
Title: STRATEGY OF INDUSTRIAL DEVELOPMENT - STUDY PROGRAM FOR THE
EEC ASSOCIATED COUNTRIES
Author: ANDRE HUYBRECHTS

It becomes clearer every day that the industrialization of the Third World is a must for all those who wish to promote the growth and ensure a self-contained and well balanced economic and social development of the developing countries.

The European Economic Community is aware of this need with respect to the 18 African and Malagasy countries affiliated with it. The Second Association Agreement provides for economic diversification and industrialization of the associated States. Financial help from the EEC (European Development Fund) will thus progressively have to go to the financing of industrial projects. An overall survey programme regarding the industrialization potentialities of the associated States is being carried out now. It will extend over a whole year and will be implemented by three teams made up of experts trained in different disciplines (economists, agronomers, industrial experts). These teams are to specialize by geographical areas, but they will follow one and the same method, and their efforts will constantly be coordinated.

The arbitrarily selected working hypothesis is that of industrialization based on import substitution and bearing on consumer (hard and soft) and capital goods, since industrialization of this kind seems to be such as to guarantee the most worthwhile developments and the sharpest growth rate increases. Other industrialization areas are to be approached next, since it goes without saying that "import substitution" was chosen as a starting point for purely methodological reasons, as inspired by the need to limit the field if a modicum of effectiveness is to be achieved, and that it implies no restrictive judgment on the industrial aspirations of Africa.

An important feature of this study programme is its sharply multinational or regional approach, since its promoters understood that it was required to rule out the overlapping inherent in unduly narrow national frames of reference, and to generate the market and localization conditions that must be provided for industrialization, by going beyond national borders.

Reference: CID/IPE/..8
Title: A NEW APPROACH TO TRAINING MANAGERS FOR INDUSTRIAL DEVELOPMENT
Author: ARTHUR D. LITTLE, INC.

Management training for government administrators is a vital element of successful industrial development - an element that in the past has received too little attention. Industrial development itself has only recently been recognized as a distinct process within the overall phenomenon of economic growth with unique requirements for planning, administration and implementation. With this recognition has evolved awareness of the need for special training for government administrators responsible for managing the industrial development process.

The management of industrial development demands of the government administrator an unusually wide range of knowledge, skills and techniques. The industrial development manager must have the basic disciplines and techniques of industrial management and business administration. At the same time his function is broader than the businessman's. Therefore, his training must also reflect his wider public responsibility for the national interest, including a concern for balance between private and public industrialization, foreign and domestic investment, and for managing the industrialization program within the framework of the nation's overall economic development plan.

This paper describes an experimental training program at Arthur D. Little, Inc., in Cambridge, Massachusetts, U.S., designed to meet the special needs of government administrators responsible for industrial development. Aimed at providing a rigorous and intensely practical blend of professional, academic and on-the-job training that is closely related to the responsibilities that participants will assume on their return to duty, it begins with a thorough review of management fundamentals and goes on to include advanced courses in the industrial management disciplines of marketing, finance, production, administrative practices, corporate planning and business-government relations. These courses are based on case method training and stress analytical techniques, problem-solving and decision-making experience.

The major emphasis is on practical training in industrial development management taught by means of industrial development simulation cases - a new training technique developed for this program - based on actual experience in developing countries. In each case, participants encounter the same obstacles, deal with the same problems, and are required to make decisions and recommendations in much the same manner as originally experienced by the field staff. In addition, this program provided on-the-job training experience with members of the training organization's own industrial development staff. Courses in economic development and international trade and investment, give participants a broader perspective of the industrial development process and the international framework for development. Participants are also exposed to well-managed industrial plants, financial institutions and public agencies involved in industrial management through meetings, presentations and seminars at these organizations.

The conceptual framework of the experimental program, together with its scope, course content and special training techniques, is described in detail in this symposium paper. In addition, the paper evaluates the results of the program and its implications for further development of this new and emerging field of management training.

Reference: CID/IFE/A.9

Title: ESSENTIAL ELEMENTS IN THE PREPARATION OF INDUSTRIAL PROJECTS

Author: ARTHUR D. LITTLE, INC.

The starting point of this paper is the prior selection of an industrial project for preliminary examination; it proceeds to a broad discussion of the elements that must be considered and the steps taken to permit the project to be systematically developed to a point of final decision and, if the project selection criteria are satisfied, to construction and operation. The many people and numerous institutions that have a wide variety of roles to play in the unfolding of well-planned industrial ventures are described. The importance of relevant industrial experience and the availability of many different skills is stressed.

Topics considered include the preparation of technical and economic feasibility studies and economic projections for evaluation by financing institutions and organizations charged with responsibility for directing or planning national economic development. Finally, attention is given to the preparation of engineering project reports and the supervision of construction and initial operation.

No attempt is made to catalog all the essential elements in the development of a successful industrial project or to examine any of them in detail, but the paper does seek to cast the process into perspective and to demonstrate the essential unity of the diverse activities involved. Although prepared in the light of experience acquired in competitive economic systems, the paper concentrates on the fundamental process of industrial project development that transcends considerations of economic social organization.

Reference: CID/IFE/1.10
Title: STANDARD DESIGNING IN INDUSTRIAL CONSTRUCTION IN CMEA MEMBER-COUNTRIES AND ITS EVALUATION
Author: SECRETARIAT OF THE COUNCIL FOR MUTUAL ECONOMIC ASSISTANCE

Introduction of economically effective methods of industrialisation of construction, i. e. turning construction into a flow process of assembling and erecting buildings from large prefabricated parts and elements with a high degree of prefabrication, assures rapid growth of the volume of capital construction in the CMEA member-countries.

The economic effectiveness of industrialization of construction largely depends on typification of units, standardisation in particular, of building designs and technological equipment.

Standard designing of buildings and structures on the basis of the Single Modular System operating in all CMEA member-countries and the unified volumetrical-planning parameters of designs, make it possible to introduce large-scale and serial production of parts and structures as well as modern methods of building and erecting.

As a result, standard building and standard designing are successfully gaining ground in all CMEA member-countries, largely promoted by various forms of cooperation of these countries within the framework of the CMEA Standing Building Commission. Mutual work of CMEA member-countries in this field includes exchange of experience and designs, creation of the unified standards common for all countries and even specialisation and division of labour in working out standard designs for industrial building.

In 1963, the use of standard designs in certain countries made up from 11 to 45 per cent of the overall volume of industrial construction. In housing, for instance, in Hungary it reached 64 per cent, in Czechoslovakia 75 per cent, in the German Democratic Republic 82 per cent and in the USSR 95 per cent. It improved preparation of the building process and raised the effectiveness of capital construction.

Coordinated research and designing work on standardisation of designs and units used in different branches of industry and within each specific branch, in application of mathematical methods and computers, in designing on the basis of catalogues, etc. is underway at present in all CEE member-countries.

Increasing cooperation of CEE member-countries in the standardisation of designing in industrial building provides for mutual use of technical and economic achievements of all countries, raising the general level of industrialisation of building and the economic effectiveness of capital investments in industrial building.

Reference: CID/IPE/A.11
Title: PROJECT EVALUATION AND INDUSTRIAL DEVELOPMENT PROGRAMMING
Author: NUNO FIDELINO DE FIGUEIREDO

The present brief report deals with the relations between the evaluation and selection of projects and the formulation and application of an industrial development strategy. Since this is a highly controversial subject on which insufficient empirical knowledge exists as yet, especially in the developing countries, the intention here is merely to put forward questions for discussion at the technical level, not to establish evaluation and formulation procedures on a more permanent basis.

Two other limitations of the analysis which follows must be mentioned at the outset. In the first place, attention has invariably been focused exclusively on the situation of the under-developed countries. Most of the comments made would be inapplicable to industrialised countries. Secondly, the specific experiences on which many of these comments are based all relate to Latin America. How far the inferences drawn would be valid for the developing countries as a whole is a question that might be considered in the course of the discussions at the Symposium.

In the first place, mention is made of the various levels at which industrial development programming takes place in Latin America and the nature of the industrial strategy corresponding to each, with special reference to the trend towards the adoption of a middle way, represented by the formulation of sectoral industrial development programmes within a more or less explicitly defined framework of overall development programming (see section 2).

Three problems or groups of problems are next analysed in turn, in the context of the application of criteria for the evaluation and selection of projects, as they relate to industrial programming in under-developed countries or areas:

- a) The role of profitability criteria in the establishment of the sectoral targets in which a given industrial strategy is reflected (see section 3);
- b) The difficulty of influencing private-sector investment decisions in the light of social profitability criteria (see section 4);

c) The less reliable character of profitability tests in developing countries, and the difficulties resulting therefrom in connexion with the channeling of industrial development (see section 5).

Attention is drawn to the advantages, as regards the solution of the foregoing problems, that might attach to systematic application of sectoral programming with a substantial technological content and based on an integrated approach, the nature of which is expounded (see section 6); and procedures for the application of such programmes are then analysed in some detail, emphasis being laid on the problem of projecting future efficiency levels, which is of basic importance in any project for the modernization of existing industry and is implicit in projects for the establishment of new activities in a given industrial environment (see section 7). To illustrate the application of such programmes, allusion is made to a specific example relating to the metal-transforming industry in Uruguay (see section 8).

Lastly, after pointing out that the usefulness of project evaluation and selection must also be envisaged from other angles, unconnected with investment decisions in the frame work of an industrial strategy (see section 9), the report presents a few considerations on the much-discussed problem of the shortage of projects, for which it suggests an interpretation differing from that in common currency (see section 10).

Reference: CID/IPE/...12
Title: REQUIREMENTS FOR D.T. AND OTHER INFORMATION FOR EVALUATION
OF INDUSTRIAL PROJECTS
Author: ZDENKO BLAZEK and VIKTOR LORENZ

When evaluating industrial projects our essential aim is to estimate the economies of social labour brought about by the new investment.

To apply this general principle to concrete methods of evaluation we need especially in the field of economic evaluation a wide usage of the value indices. Their reliability for the purposes of evaluation and mutual comparison of various industrial projects depends on the function of the price.

There is at present no classical functioning of the price in the meaning that price would be elastic in following the movement of the value; from such a tendency the price is deflected either by means of economic and political intentions petrified in the plan of socialist countries or by means of monopolistic and oligopolistic interests in the capitalism of today. It is therefore necessary to respect such restrictions and make the proper selection of suitably constructed indices when evaluating a project technically and economically; it may be further necessary to apply coefficients of correction and to define accurately the scope of their usage.

The distorting influence of prices is least shown if we compare and evaluate alternatives of the same investment task. In similar cases, however, problems of prices must also be solved if the time factor enters alternatives using construction in stages with time lag as against alternatives without a lag of time.

The price problem is clear to appear when methods are used for evaluation of a project - especially a long lived project - by means of discounting the future development.

Some methods use formulae of compound interest, others use simple or mixed interest formulae. To do justice to the true development, an analysis of a possible technical progress is necessary first of all; such an analysis should be based on the level of the most progressive projects and

on research, on the time necessary for realization of new equipment at a scale necessary to satisfy the decisive demand as well as on the movement of prices which is likely.

Methods of a direct comparison and evaluation of projects must be supplemented by other methods enabling us to include into the comparison basis non-economic effects such as have no direct or only an indirect influence on production or on the service of investment proper.

Of a particular importance for evaluation of projects is the relation to foreign trade where the price problems are even more complicated due to the problems of the rate of exchange.

Effectiveness of a project must be calculated for the duration of economic life of the investment, this being dependent on the expected trends and on the speed of technical progress.

To evaluate the technical and economic standard of a project, value-indices of both the synthetic and the computation type have to be used; however, the other side, i.e. the non-economic effects of the investment must not be forgotten either. In a number of cases such effects may have a deciding influence. Moreover, an estimate of development of the technical progress must not be left out of consideration, this being of vital importance for computing the time factor and the price development.

Reference: CID/IPE/B.3
Title: UNCERTAINTY IN INDUSTRIAL PROJECT EVALUATION WITH
SPECIAL REFERENCE TO EXPORT INDUSTRIES
Author: M.V. PEJOVIC

Project evaluation must be based on a dependable documentation and on reliable proofs in respect of all basic elements.

Experience has shown that there are often cases when considerable differences arise between the planned and the actual effects in the construction of an industrial project. Shortfalls have especially unfavourable effects on export-oriented industries.

Errors of any kind of calculations are possible and often a regular phenomenon. These are made in estimates of capital costs (both for fixed assets and working capital), production costs, and of selling prices. Miscalculations as regards these elements (sometimes even of minor importance) have a considerable influence on the level of the planned effects, so that the very rationality of the already constructed new industry may be jeopardized. This is a matter of vital importance for developing countries with scarce capital, particularly when considering projects of export-oriented industries.

Besides reliable and accurate calculation there are other factors which influence project evaluation. Economic policy measures influence to a considerable extent the expected economic results of the project.

It is very important to secure the required personnel to work in the factory and to manage it. This point should in no case be overlooked in the evaluation of the project. Unskilled personnel causes losses during the period of trial production of the new industry.

The analysis of the domestic and foreign markets is a complex job; most frequently it is a matter of reliance on past experience and forecasting.

The most optimal degree of processing is dictated by economic considerations, but actual limits are set by financial possibilities.

In the case of export-oriented industries, it is necessary to study failures due to an erroneous evaluation of factors justifying export orientation and of failures resulting from a faulty evaluation of pre-conditions for development. Failures of this kind create difficulties for the export-oriented industry, sometimes placing it in an absolutely hopeless position.

Reference: CID/IPE/B.4
Title: SKILL REQUIREMENTS IN MANUFACTURING INDUSTRIES
Author: M. ZYMELMAN

As a result of limited tests, we assert that a reasonable hypothesis is that there is a relatively high correlation between a specific type of production method (and therefore technology) of an industry and the occupational structure of that industry. Thus, the productivity of an industry is linked to a specific occupational distribution. To test this hypothesis, state data of the United States were used.

The extension of this relationship to international data is not automatic. There are many difficulties concerning the comparison of occupational classifications among different nations. There are numerous difficulties in comparing productivities among nations. Despite these difficulties data are presented for a number of nations to illustrate the existence of a distinct relationship between productivity and occupational structure.

This relationship makes it possible to use the techniques of input-output in planning manpower requirements. The use of this tool in manpower planning may help quantify programmes that previously were considered on generalities only. An additional aspect of input is the skills of the nation's labor force. While not denigrating the role of formal education, it is noted that workers acquire skills not only by education but by a combination of education, training and experience. It is not the educational level but the skills of a nation's workforce that seems most important.

It is our conclusion that tables of industrial occupational structures, and their corresponding productivities will provide manpower planners and general planners with the ideal tool for testing the practicability of a development plan. These data will also aid in improving manpower forecasts and may permit the verification of productivity statistics.

Reference: CID/IPE/B.5
Title: REQUIREMENTS OF SKILLED PERSONNEL FOR INDUSTRIAL PROJECTS
AND THEIR APPRAISAL.
Author: S. COHEN

Many of the developing nations have suffered a rise in open unemployment despite a record of significant economic growth. This fact alone would seem to be an ample argument for more cooperation between government agencies concerned with employment problems and the project authorities who actually employ labour. The need to develop such cooperation is an important background consideration in an analysis of the industrial project's manpower requirements.

In determining the amounts and types of skills that will be needed, project authorities can refer to international or intra-national experience in comparable industries. Comparisons of this type can give direction but they cannot be completely determinative. In the last analysis, each project must justify its own staffing pattern which is likely to be unique in some respect because of factors peculiar to the project. Various methods can be used to forecast project skill requirements at future points of time but none is reliable to the extent that it can be regarded as an infallible policy guide.

Industrial projects may be able to deal with immediate skill shortages to some extent through the recruitment of persons whose skills are being underutilized or unused in their present employments and through the recruitment of foreign specialists. Over time, a substantial amount of skill capacitation will have to occur if industrialisation is to progress. The shortage of management talent, particularly of the type needed to organize and administer large industrial units, may prove to be a serious bottleneck since there is no simple or obvious method of relieving the existing supply scarcity.

Appraisal, by financing or planning agencies, of the skill staffing patterns proposed by industrial projects would have the immediate benefit of forcing projects to prepare their manning plans more systematically. An

appraising unit might also serve as the much needed link between industrial projects and macro-economic planning. An appraisal should be concerned with the technical accuracy of the project's estimate of necessary skill stocks and with the relationship between the estimate and various factors external to the project.

Reference: CID/IPE/3.7
Title: MANAGERIAL REQUIREMENTS AND THEIR APPRISAL IN INDUSTRIAL
PROJECT EVALUATION.
Author: W.H. NEWMAN

No matter how sound a project may appear, unless good managers are available to run it, the project is doomed to failure. Four basic steps are involved in appraising the adequacy of managerial talent for a new project.

Every evaluation of management must rest on a clear understanding of what executives of the specific enterprise are expected to do. Therefore, an imaginative analysis of their various tasks -- technological decisions, maintaining sound external relationships, internal administration, and integrated action -- is a necessary first step.

Then a tentative organization that combines these tasks into managerial positions can be prepared. Recognition of feasible compensation levels, of possible part-time positions, and of the need for successive refinements helps to make these plans realistic statements of needs.

Appraisal of potential executives involves translating job descriptions into usable man-specifications, gathering data about individuals and deciding how they measure up to these specifications, estimating the likelihood of attracting men who are qualified to take positions in the new enterprise, and summarizing gaps between needs and available personnel.

Finally, possibilities of filling gaps in manpower by executive development, use of foreign consultants as trainer-executives, or use of nationals on a part-time basis should be carefully examined.

Throughout all this process the cultural background of the evaluator -- his functional orientation, his institutional background, and his national values and traditions -- will significantly influence his conclusions. Consequently, a cosmopolitan view is needed to assure that qualified executives will be available.

Reference: CID/IPE/B.8
Title: INDUSTRIAL PROJECT EVALUATION AND THE ENGINEER
Author: M. OWING

The purpose of the paper is to outline certain procedures and practices in the evaluation of industrial projects which have been found essential from the standpoint of the engineer or technical expert. In considering the role of the engineer as compared to that of the economist or financial expert, it should be recognized that the complexities of the average industrial project automatically bring about an integration of responsibilities and functions in the evaluation process. The close cooperation and contributions of all three are required to produce a complete evaluation.

Since any proposed industrial project must show evidence of economic and technical soundness the development of a viable project must begin with some form of feasibility study. The feasibility study is, therefore, a fundamental document in the project evaluation and approval process. The preliminary engineering contained in such studies must be adequate to show that the project is technically feasible and to form the basis from which a reasonably firm estimate of cost can be made. When combined with the results of economic, financial and other studies, it should constitute a clearcut exposition of the reason why, insofar as technical soundness, economic benefits and costs are concerned, the project is feasible.

The engineering aspects of the evaluation process, including essential financial aspects, are treated under the following headings:

1. Nature, size and location of the project
2. Funding of the project
3. Estimated capital cost
4. Working capital requirements
5. Production costs - including distributing and selling
6. Profitability
7. Design and engineering
8. Utilities requirements
9. Raw materials
10. Engineering and construction plans
11. Organisation and management of operations

Problems Frequently Encountered in the Evaluation Process discusses the need for thorough study by prospective borrowers to develop good projects for ultimate financing. Presents three hypothetical cases wherein a lending agency is approached for development loans by government agencies or private firms which have varying capabilities in the preparation of loan applications and supporting feasibility studies.

General Limitations of the Paper points out that the paper is concerned primarily with project evaluation from an engineering standpoint.

Reference: CID/IPE/B.9
Title: GENERAL CRITERIA FOR INDUSTRIAL PROJECT EVALUATION
Author: A.K. SEN

The paper begins with a discussion on the estimation of commercial profitability. For this the appropriate set of market prices are used, and the time series of net returns thus obtained can be converted into one profitability figure either by estimating the internal rate of return, or the 'present value' at the given market rates of interest. The latter is a better indicator than the former, but is also based on some special assumptions, which are explored.

The difference between commercial and 'national' (or 'social') profitability is then explored by raising considerations of (a) external effects, (b) market imperfections, (c) the welfare of the future generations, and (d) income distribution, i.e., going beyond Pareto optimality which is what market profitability is geared to, at best. The methods of bringing in these corrections of market profitability are then discussed including the principles involved in using accounting as opposed to market prices. Some pitfalls in unwary applications of this are also discussed.

In section VI, the movement from commercial to national profitability is discussed in detail in terms of specific corrections that are likely to be important in industrial project evaluation. Two of these are discussed further in the next two sections, *viz.*, correcting the market rates of interest and the wage rates. The first also subsumes the problem of the time horizon. The relations between the social rates of discount and the shadow prices of labour are also demonstrated in the context of an economy with surplus labour.

In the final section, we discuss the advantages of the insight obtained from general principles of industrial "strategy" as well as the limitations of being guided exclusively by such principles. An illustration is given of the latter, and it is claimed that there is no real substitute for detailed calculations of national profitability. This paper was an attempt to clarify the principles involved in this detailed evaluation.

Reference: CID/IPE/B.11
Title: CRITERIA OF DISTRIBUTION OF INVESTMENTS BY SECTORS/
BRANCHES OF THE ECONOMY
Author: Z. ROMAN

A correct project evaluation from a macro-economic point of view must be based on measuring total costs and benefits at intrinsic social values. This requires first of all the adequate consideration of inter-industrial and time aspects. The paper deals with problems and methods of analysis and evaluation of interindustrial relations and impacts of the projects from the point of view of social and nation-wide criteria. The consistency of the projects may be analysed by direct analysis of interindustrial linkages, by use of material balances, by means of input-output methods and by mathematical programming methods. Inter-industrial aspects of the efficiency of the projects may be investigated by direct analysis of interindustrial effects, by use of accounting prices - both for inputs and outputs - to evaluate efficiency at the given stage of the production process, by simultaneous selection of projects and assigning of accounting prices, by evaluating the "bundle of activities" touched by the project with help of input-output methods - total primary input coefficients - and by mathematical programming - maybe combining economy-wide and sectoral programmings. The paper reviews and analyses the methods above mentioned and concludes that for developing countries primarily wider use of input-output methods may be recommended. From this point of view, possibilities of the application of a standardised input-output matrix will be treated also. Further, an intermediate project evaluation at sector level will be recommended, its methods and criteria analysed first of all as for preliminary distribution of investment funds and pre-selection of projects by sectors/branches of the economy.

Reference: CID/IPE/B.12
Title: SOME CONSIDERATIONS ON THE RELATIONS OF INDUSTRIAL PROJECTS
WITH TRANSPORTATION SERVICES
Author: G. SIRI

Analysis of some of the relations that link an industrial project with transportation services, particularly in areas in the process of development and integration - with specific reference to the case of Central America.

General considerations concerning the degree in which industrial development depends upon transportation means and, specifically, with regard to the factors that must be taken into account in the evaluation of industrial projects.

Influence of the availability and cost of transportation in the optimum location of industrial projects. General effects of the various transportation means on the different types of industries and in the selection of the optimum levels of production. Importance of giving special attention to the variability to which the transportation services are subject in countries in the process of development.

Some characteristics and significant factors of the Central American Common Market and of its industrial development, and their dependence on transportation services. Certain perspectives of the countries' industrial development and criteria relevant to future investments in transportation infrastructure.

The study includes a brief graphic analysis that sketches some of the limits that the various levels of cargo transportation rates, imposed on the configuration of the market areas surrounding the Central American capitals. The total income of the population in each of the market areas constitutes an index of their respective purchasing power, useful for the formulation of a series of general conclusions in connection with the most favourable location within a region of different types of industries.

Reference: CID/IPE/B.13
Title: CAPITAL BUDGETING AND PRICING TECHNIQUES
Authors: J.R. MEYER and L.M. COLE

This paper presents some techniques which could be used in confronting complex capital budgeting and pricing problems. Our suggestions differ in several significant aspects from more conventional capital budgeting procedures. We assert, for example, that capital budgeting should not be accomplished in isolation from pricing considerations, and we suggest a paradigm wherein pricing problems and budgeting are more closely integrated. Additionally, we recognize pricing policies as instruments for planning which can be used directly to help achieve some stated objective for the capital facility. Another attribute of our capital budgeting and pricing model is that broader issues and variables in the social and political context of the proposed capital facility, variables perhaps not susceptible to facile quantification, can nevertheless be considered explicitly at specified decision points within the decision-making process.

After discussion of some theoretical and practical limitations, especially as applied to benefit measurement, of basic economic demand and supply functions, we describe our set of computer algorithms which were programmed for preliminary testing. Although our routines were programmed for computer manipulation, we have kept their component functions sufficiently simple so that equivalent computations can be accomplished easily by hand.

It is evident that certain objectives will require some form of price discrimination for users of the capital facility or system. In this paper, we explore two types: 1) interconsumer price discrimination, wherein different consumers are charged different prices for use of the facility within any one time interval but the various price levels remain unchanged over time, and 2) intertemporal price discrimination, in which only one price is charged all users in a time interval, but that single price may change over the total planning period. Which pricing scheme is identified by the model as the one to be preferred depends upon the contextual parameters and objectives used in the analysis, together with the pertinent non-economic issues which are incorporated within the decision process.

Reference: CID/IPE/B.14
Title: CRITERIA OF ECONOMIC INTEGRATION IN THE INDUSTRIAL
PROJECT EVALUATION IN DEVELOPING COUNTRIES
Author: V. CERNIANSKY

The paper discusses briefly some of the problems emerging in industrial project evaluation from the viewpoint of integration of developing countries with particular emphasis on the principles and methods that ought to be applied in the evaluation process.

The first two sections deal with the importance of integration for the industrialisation of developing countries, the problems which have to be solved in the course of integration, and offer some suggestions for the solution of these problems. Developing countries cannot achieve an effective industrialisation without integration, and coordination of their development plans should be considered the most important component of the entire integration process - these are the principal ideas contained in the first two sections.

The basic principles of project evaluation and the procedure recommended for the distribution of industries within the integrating developing region are discussed in the third section. The core of the principles to be applied in the distribution of industries within an integrating area is to secure reciprocal advantages, the "quid pro quo" principle, special treatment and aid for the relatively less developed countries.

The fourth section suggests two methods of international comparison of prices and production costs which might be applied in project evaluation on an international scale. The first is the method of direct international comparison of prices on the basis of average basket of goods and services originally elaborated in detail in the ECLA Secretariat. The method has been adjusted to the effect that the prices under comparison are decreased by duties, indirect taxes and fees and increased by subsidies, in an attempt to avoid considerable distortion of prices occurring in developing countries due to varied taxation.

The other method offers a possibility of international comparison of production costs indirectly, through average world prices. The indirect nature of the method lies in the fact that comparison is made not of the indices expressing ratios of domestic production costs and world prices, but of the deviations of such indices from the average national indices. The proposed formulas represent an attempt to find such methods of international comparison that would attract as much credit of the governments concerned as possible.

Reference: CID/IPE/B.15

Title: A STUDY OF ENVIRONMENTAL CONSIDERATIONS IN INDUSTRIAL PROJECT EVALUATION, WITH SPECIAL REFERENCE TO THE PRODUCTIVITY OF LABOUR.

Author: V. MALIK.

The productivity of labour in a new industrial enterprise is, to a considerable degree, determined already during the stage of projecting. The project influences this productivity of labour both from the technological and organisational point of view and from the viewpoint of the working environment.

The working environment is formed by a series of factors of various kinds and of varied intensity. Out of the whole complex of the conditions of the working environment, in the design it is possible to influence first of all the factors of technical and physical-chemical character. These refer especially to the climate-atmospherical, sound and optical conditions, as well as the plant lay-out, the safety and hygienic factors, etc.

Creating an ideal standard working environment entails preventive measures, i.e. removing or restricting the negative factors of the environment and positive measures creating factors which improve the conditions of the workplace and make the stay there more pleasant. The way of making these ideal standard conditions is shown in the diagrams.

The basic reason for the shortcomings appearing in designing the working environment is insufficient qualification, neglecting the complex approach and underestimating the importance of the aforementioned measures.

The design of the working environment must be organically embodied into the whole projecting process to ensure harmony between the technical and human factor in production.

An ideal working environment is desirable not only because of the humane factor involved, but also since it has a marked economic effect. The direct relation between the working environment and the productivity of labour has been proved both by laboratory experiments and by general practice. An ideal

standard working environment eases the performing of work and decreases the exertion in work, so that to produce every single product, less working energy is needed than before. This increased productivity of labour results in savings on labour costs and on overhead expenditures.

Apart from economical results which can be easily expressed in numbers, making ideal standard conditions brings along a number of subsidiary consequential effects which are somewhat difficult to evaluate but have been discussed briefly in the paper.

To determine the economical effectiveness of making ideal standard conditions, we may use the usual methods of estimation. However, it should be realised that the means for expressing and determining the economic effectiveness of a sound working environment differ from those involved in estimating the utility and economic advisability of investments of production-technical character.

Reference: CID/IPE/B.17
Title: FINANCIAL PLANNING OF INDUSTRIAL PROJECTS AND THEIR APPRAISAL
Author: J. DEAN

American corporations have developed some effective methods for the financial planning and appraisal of industrial projects which public agencies can also use. Industrial projects must fit into an overall capital management programme entailing (1) development of long-range (usually 5 years) and short-range capital plans, and (2) a creative, continuing investment-opportunity search. Three measures are commonly used in evaluating industrial projects: (1) payback period, or time a project takes to produce gross earnings equaling total expenditure; (2) average lifetime project income as a percentage of capital outlay; and (3) discounted cash-flow, which relates the net cash inflow over the project's lifetime to investment outflow, taking into account the time pattern of investment and earnings, effect of taxes, depreciation allowances, and capital wastage. Payback ignores inflows after the payback period, provides no maximum acceptable payback period, and penalizes projects involving initial losses. Average rate of return fails to consider the timing of returns, and variations in its use can produce differing results. The discounted cash-flow method, instead, is unambiguous, deals consistently with the project's entire earnings lifetime, and properly accounts for the time shape of earnings and investments. In measuring a project's investment worth, four economic dimensions are important: amount and timing of outlay and of the added stream of earnings, duration of the earnings, and the risks involved.

Finally, the investor needs investment criteria to choose between projects. A good financial criterion is the investor's cost of capital; projects not expected to generate outlays over this cost of capital figure need strong justification on other grounds.

Reference: CID/IPE/B.19
Title: SURVEY OF LITERATURE ON COST-BENEFIT ANALYSIS FOR
INDUSTRIAL PROJECT EVALUATION
Author: ARNOLD C. HARBERGER

This paper attempts to take a positive and constructive approach, focusing on issues which remain at least to some extent unresolved in the existing literature on cost-benefit analysis in private-enterprise or mixed economies, and attempting to bring them somewhat closer to resolution. In Section II, the questions of discount rates and evaluation procedures are examined, and it is concluded that the marginal productivity of capital in the private sector is the optimal discount rate to use in cost-benefit analysis. In Section III, attention is drawn to the importance of taking into account expected changes in prices and costs over the life of the project, particularly because of the likelihood that wage rates will rise faster than product prices. It is concluded that all cost and benefit elements should be projected on a year-by-year basis over the life of the project, not "annualized" as is often suggested. In Section IV, the problem of estimating accounting prices for use in cost-benefit analysis is examined, and procedures are suggested for key prices such as wage rates and exchange rates. In Section V, questions of the timing of investment projects are considered, and procedures for determining the optimum construction time for a given project are suggested. The problem of how to adjust for risk and uncertainty is also explored. Finally, Section VI considers interrelations among projects, both from the standpoint of the separability of components of a given project, and from the standpoint of decision-making when some or all of the projects under consideration are interrelated.

Reference: CID/IFE/B.20
Title: USEFUL PROCEDURES SUGGESTED FOR DEVELOPING COUNTRIES
BY THE DISCOUNTED CASH FLOW TECHNIQUES
Author: J.H. McARTHUR

It is very important that the developing countries find a way to rapidly industrialize their economies on an efficient enough basis to ultimately assure that their enterprises become more or less competitive when measured against international standards. This means that the key people involved in planning the industrial development of the developing nations must have an appreciation of the importance of capital productivity. While a measure of capital productivity is certainly not the only important factor that should be evaluated in an investment analysis, it is important enough that it should not be lost sight of.

Many different analytical methods of measuring investment rates of return can be found in microeconomic theory and in practice. The discounted cash flow technique represents one of these methods. From a conceptual or theoretical standpoint, the discounted cash flow technique is a more reliable investment analysis framework than other methods because it accounts correctly for differences in the economic life and cash flow patterns associated with an investment. Two variants of the discounted cash flow approach are discussed. Although one of these two variants is technically better than the other, either is probably good enough in practice given the crudeness of the data one has to work with.

Turning from the conceptual virtues of discounted cash flow, experience shows that this method is very difficult to use effectively in practice. It assumes the existence of statistical and accounting data that often are not available. It almost certainly requires the availability of a well-trained professional corps. When these conditions are not easily met, the introduction of as sophisticated an analytical method as discounted cash flow quite often causes confusion, misdirection of planning effort, and in extreme situations the evolution of a sort of complex numbers game.

This is not to say that because of these practical limitations, the discounted cash flow method is of no value in the context of the developing nations. At the very least, it presents an important and systematic way of thinking about investment decisions. It may also be of more direct value to top level economic planners in government and in a few major enterprises in some countries. But above all, discounted cash flow is a technique. It certainly presents no panacea for developing countries or companies. Sustained long-term business success revolves around such general management activities as goal setting, strategy formulation, and effective planning and control of current operations. It is helpful to have as reliable an analytical framework as is practically feasible within a given organisation, but primary attention should be focused elsewhere.

Reference: CID/IPE/B.21
Title: STUDY OF INDUSTRIAL PLANT SYSTEMS
Author: ELC - ELECTROCONSULT

Industrial plants form a very complex system; they have in common the market on the one hand, and the procurement sources of raw materials on the other, and they contribute in total towards overall economic development of the particular region.

When undertaking feasibility studies in connection with the establishment of new industries, it is essential that their influence on the system of existing industries be checked, so as to be able to estimate, beforehand, the positive and negative consequences which are to be expected.

In the study of the economic development of a region, whether this is governed by a market economy or by a centrally planned economy, one is faced with the technical difficulty of having to take into account a very large number of parameters, the variability of which is not always known *a priori*.

In dealing with this type of problem, ELC resort to the most advanced techniques, making use of operations research methods, mainly through mathematical models of the deterministic or stochastic types.

Examples are given hereafter of hydroelectric systems which have been studied, with gratifying results, by means of digital computers.

Each problem is usually laid down in terms as general as possible, as this procedure allows the solution of apparently different problems by means of similar mathematical models.

In the field of industry, the methodology adopted maintains its validity even if the object is shifted from hydroelectric projects to industrial plants serving a different purpose.

In other fields, for example, it was found possible to utilize the same algorithms in the study of 3-dimensional frameworks and problems of rock mechanics, in job organisation and in urban traffic problems.

With regard to the concept of optimization, it is preferable to supply those who are called upon to make decisions with as clear and complete a picture as possible of technically feasible alternatives, on the basis of which the selection of the most appropriate solutions can be made.

Reference: CID/IPE/B.22
Title: APPRAISAL OF FINANCIAL NEEDS FOR NEW INDUSTRIAL PROJECTS
Author: C.M. WILLIAMS

This paper argues that careful financial planning is of great value to the new industrial enterprise and that an effective forecast of financial requirements provides essential elements for construction of a viable financing plan for the venture.

The task of assessing financial needs and how they can best be met, is seldom an easy one. Development financing agencies should prepare themselves to lend expert advice and counsel to management of new firms in the task of formulating accurate forecasts of their needs for funds and in the shaping of plans as to how these needs will best be met.

The major techniques of forecasting financial requirements, the projected balance sheet method and the forecasted cash flows approach, are reviewed, the former in some detail. A thorough understanding of the major considerations that shape the size of investment required in fixed assets, inventories, receivables and liquid assets is necessary for effective forecasting of funds needed. Accordingly, key determinants of the need for these assets are identified and discussed. Particular stress is placed on those areas in which alternative management judgments and policies will boost or reduce the net need for funds. The process of forecasting funds needed and of modifying operating plans for the firm in order to minimize financial requirements, is illustrated by an example. Methods by which potential sources of funds can be evaluated and utilized are also reviewed.

The paper identifies widespread weaknesses or problems in the actual financial forecasting of new industrial firms and suggests ways whereby those deficiencies can be reduced. Important among the weaknesses or problems are:

1. Inadequate emphasis by management on the planning process
2. Limitations on the capacity to plan future operations

3. Failure to make the projections reflect the distinctive circumstances and policies of the particular project.
4. Widespread tendency toward underestimation of financial needs.
5. Widespread tendency to underestimate the financial pressures stemming from expanding volume
6. Failure to provide sufficient uncommitted reserves of financial strength.

Development financing agencies are urged to become skilled in identifying opportunities for the new firm to minimize its need for funds while carrying out its essential mission. The financing agency should work up detailed lists of methods, devices or policies by which capital requirements can be held in check without damage to the project. Included is a list of queries that may prove useful in exposing possibilities of reducing needs.

References: CID/IFE/B.23
Title: PROBLEMS AND METHODS OF RESEARCH INTO THE EFFECTIVENESS
OF INVESTMENTS IN POLAND
Author: M. RAKOWSKI

In Poland, as in other socialist countries, the research into the effectiveness of investments is to contribute through the choice of the best plants to be constructed, extended or modernized, to the obtaining of maximum increase of national income from the economic resources which are at our disposal at the given stage of development, chiefly investments and labour-force resources.

The development of research methods in the field of economic comparison of plants evolved from using the partial techno-economic indicators, through generalised indicators of capital intensity of production and net costs to a synthetic investment effectiveness indicator.

The synthetic investment effectiveness indicator used in Poland to analyse the plants to be constructed takes into account the permissible from the point of view of maximisation of the national income investment outlays for the decrease of net costs, economic losses resulting from freezing of the investment outlays during construction, and the advantages and losses to the economy brought about by the extension of the exploitation period, introducing the term of the economically optimum exploitation period. The rationality of the calculation according to the synthetic indicator requires the prices used in it to correspond as closely as possible with the proportion of labour outlays for particular products.

The use of the effectiveness calculation is at present extended to such fields as modernization, international trade and programming the development of whole branches of production and the branch inter-relations. The methods used for the evaluation of new plants are specially adapted for those problems due to the complexity of the problems involved. In the present economic situation of Poland and other socialist countries where it is necessary as well as possible owing to the considerable development of

the productive resources to change over from a rather extensive to a more intensive type of reproduction, the effectiveness calculation becomes especially important as a factor contributing to the maximisation of the increase in the national income with the required structure.

Reference: CID/IPE/B.24
Title: THE ECONOMIC EVALUATION OF PRODUCTIVE INVESTMENTS IN HUNGARY
Author: M. TURANSZKY

Parallel to practical computations, efforts were made in Hungary for several years to elaborate a scientifically well-founded method suited for the evaluation of the economic efficiency (effectiveness) of investments. As a result of this work, methodological instructions were issued in 1953 by the National Planning Office for the evaluation of the economic efficiency of individual projects.

In 1964, this methodology was further developed in the light of practical experiences. The author, who took part from the beginning in the elaboration of the methodology, expounds its theoretical foundations and practical bearings.

After the nationalization of the industrial enterprise and the introduction of centrally regulated fixed prices, the profit of individual firms was no longer suitable as a basis for the estimation of the economic efficiency of either the production or the investments. The quotient of the expected results and inputs is applied as the indicator of economic efficiency. Both are evaluated from the aspect of the national economy as a whole.

The productive investments are, according to their direct objectives, divided into two groups: labour saving and production expanding investments.

The main problem is the evaluation of input from the aspect of the national economy. Among the elements of input which have to be taken into account are the investments necessary for the establishment of the plant which produces the finished product, the accessory ("consequential") investments securing material and power supply, the working capital and the costs of continuous production PER ANNUM.

For the joint evaluation of the input of investments and the costs of production, the so called "economic efficiency coefficient of investments" is applied, whose value was, for a long time, considered by projectors as being practically equal to the current rate of interest.

The study propounds the correct determination of the values of the economic efficiency coefficient from the aspect of the national economy. The value of the coefficient depends - in the opinion of the author - primarily on the labour situation of the country, the employment situation, the availability of capital and the pattern of the actual price system. Since these conditions may deviate considerably in different countries, it is wrong to decide upon the magnitude of the "rate of interest" to be applied in economic efficiency calculations, independently of space, time and prices.

It is an often recurring mistake to determine the value of the efficiency coefficient of investments not from the aspect of the national economy but according to the interests of single plants, at a lower rate than would be justified. The consequence is that the more capital intensive industries are developed and more capital intensive technologies and technical solutions are chosen than would be reasonable. Such procedure causes waste in the realisation of investments, particularly in countries short of capital, on the one hand, and having considerable manpower reserves on the other.

Reference: CID/IPE/B.26
Title: EVALUATION OF INDUSTRIAL AND INFRASTRUCTURE METHODOLOGY
AND PRACTICAL EXPERIENCE
Author: T.E. KUHN

The basic purpose of development planning is to provide decision makers with scientific information on the effectiveness of available action means in relation to stated policy ends in a given social-institutional environment. Methodologically, this calls for systematic comparisons of inputs (costs, resource sacrifices) to outputs (revenues, benefits) within a carefully defined framework. Good and bad examples for study terms of reference are given.

Most pertinent to the analyses themselves is the continuous input-continuous output formulation in economic investment theory. Many choices of production techniques, input and output mixes, their magnitudes and timings, are possible. Each configuration is best treated as a discrete project and appraised by means of the decision guide "maximisation of net revenues", or by more complex standards when non-monetary values are present, as will often be the case. The time dimension can be taken care of by discounting to present values, and project interdependencies - very important phenomena in development work - by further analytical steps. An important conclusion is that there can be no single, infallible success criterion that suits all circumstances in development work. Two hypothetical problems, an industrial plant proposal and a comprehensive area development scheme, illustrate the methodological discussion.

Practical experiences in development planning and research are related in the last part of the paper. Empirical studies of time lags and disbursement patterns show that eight or more years may elapse between project idea and physical project completion. Development is probably a much slower process than is commonly believed. A review of 81 field studies revealed serious deficiencies, in particular exaggerated benefit claims, unrealistic cost estimates and use of unsound analytical techniques. Appended to the paper are research proposals and further discussion points.

Reference: CID/IFE/B.27
Title: FOREIGN TRADE CRITERIA IN INDUSTRIAL PROJECT EVALUATION
Author: ROBERT SCHMELZ

An intensive process of industrialization is underway in the developing countries within the scope of the construction of their economies. Its progress is rendered difficult owing to the latter's dependence on the prices of raw materials and foodstuffs they export. Foreign exchange difficulties resulting from their unfavourable trend of development and the need to maintain a high level of machinery and food imports compel the developing countries to expend their funds earmarked for economic development most economically and efficiently.

In view of the importance of foreign trade to the developing countries it is expedient that its criteria are also taken into consideration in capital construction.

Theoretically, the relation of investment to foreign trade has been thus far dealt with only in connection with general theories of economic development. Today, the majority of national economic theorists agree that economic progress of the developing countries can be ensured only by reinforcing the State's role as an organizer of and direct participant in the economies. Of utmost importance is its function in the determination of priorities of economic development which must be determined according to the individual needs of each country.

This problem has received somewhat more attention on the part of the United Nations regional commissions under the compulsion of everyday economic activities. The respective literature is concerned primarily with the construction of sectors whose production is designed to substitute import (import-substituting sectors).

Regional commissions recommend to the developing countries to evaluate industrial projects first from the point of view of the overall economy and secondly from that of the sector and the range of production on the basis of the so-called social benefits with a view to future foreign exchange savings.

Growth of the share of domestic production in overall consumption in the developing countries is an evidence of the successful progress of the efforts for import substitution.

Documents of the United Nations regional commissions recommend that in capital construction, attention be given to the possibility of future export of a part of the output, particularly in countries having smaller home markets.

Czechoslovak economists have also been studying this problem for some time. In their view, the State's function and the instruments of its economy policy, namely the long-term development plans (programmes) constitute an essential precondition of the whole economic development.

In their studies of the question of efficiency, Czechoslovak economists stress the principle of value in its diversified manifestations and recommend the application of some special indicators such as recoupment of funds, export equivalent, etc. in variations according to individual countries' needs.

Reference: CID/IFE/B.28
Title: PROJECT EVALUATION IN THE PRESENCE OF ECONOMIES OF
SCALE AND INDIVISIBILITIES
Author: DR. THOMAS VIETORISZ

Presently available project evaluation techniques are based directly or indirectly on notions of economic equilibrium that breakdown in the presence of "non-convexities": fixed costs, economies of scale, indivisibilities. In this paper a technique is developed that permits an approximate evaluation of the effects of non-convexities in two-level planning systems.

A diagrammatic representation of decomposition models for linear programming problems is first presented. The details of the Dantsig-Wolfe method of solving such problems are followed graphically with the aid of the diagram. Thereafter, fixed costs are introduced that make the decomposition model non-convex. The diagram allows finding the exact solutions of such models in simple illustrative cases and indicates the kind of approximations that are available for larger problems that cannot be handled graphically.

The main conclusions are the following:

(1) Projects are to be evaluated in complexes rather than in isolation. These complexes are groupings of projects; sectoral plans, in turn, are put together from such complexes.

(2) Economy-wide master plans formulated in terms of a limited number of connecting resources can be effectively utilized in non-convex systems. While the interrelation of master plan and sectoral plans is not as simple in the non-convex case as in the linear case, it is possible to formulate approximate ways of handling this interrelation.

(3) In a system that is convex in the large and has only relatively weak local non-convexities, a linear approximation that consists in averaging the complexes together with their fixed costs will yield satisfactory results. The linearised master plan will then determine prices that can be used for selecting sectoral complexes so as to minimize the combined cost of connecting resources, similarly to linear decomposition techniques.

(4) In a system that is characterized by a few large sectoral indivisibilities, the empirical identification of sectoral complexes is a relatively simple matter and the crux of the problem becomes finding a solution to the master program that must now be formulated in integer programming terms.

(5) In systems of the intermediate kind, or systems characterized by one kind of non-convexity in one group of sectors and another kind in another, the two approximations are best used in combination; in this case they will produce upper and lower bounds on the optimal solution to the system.

(6) Once the optimal solution is identified, either exactly or in an approximate way, quantitative control instruments are required for assuring that the individual sectors will in fact behave consistently with this optimal or approximately optimal solution. Prices are still essential for facilitating adjustments near the quantitatively prescribed range whenever deviations from the plan occur in execution.

Reference: CID/IFE/B.29
Title: SHADOW PRICES IN INDUSTRIAL PROJECT EVALUATION
Author: J.S. FLEMING and M.S. FELDSTEIN

Shadow prices are appropriate for evaluating project benefits and costs when (i) market prices are inappropriate measures of social values because of market imperfections or rapid economic change, (ii) indivisibilities preclude identifying an appropriate unique market price, or (iii) external effects are important.

Accounting and incentive prices are administrative tools related to shadow prices. Application may be to privately operated projects and to those wholly in the public sector.

Shadow prices for project outputs may be determined by reference to (i) market prices paid for substitutes already sold under suitable market conditions; (ii) social costs of substitutes already used; (iii) minimum cost of alternatives not already used; (iv) prices consumers would be willing to pay; and (v) physical productivity of project outputs that are producers' goods.

Problems of shadow pricing project inputs arise when: (i) project purchases alter market prices; (ii) inputs are subject to taxes and subsidies; (iii) input markets are substantially imperfect; (iv) project inputs would otherwise be unemployed. In addition to direct project inputs, indirect social costs (external diseconomies) must be evaluated.

Benefits and costs occur at different points in time so that project evaluation requires inter-temporal choice. The social time preference rate relates values of present and future consumption. A shadow price for the social opportunity cost of funds diverted from private investment may be calculated as the present value of the consumption that would otherwise have been enjoyed. When agency budgets are constrained, a shadow price of these funds must be calculated in terms of their marginal ability to produce additional net social benefit.

Three technical notes discuss: (i) the shadow prices defined by the linear programming dual; (ii) the use of import-export prices; (iii) iterative multistage factor shadow pricing.

Reference: CID/IPE/B.30

Title: PRICING PROBLEMS IN INDUSTRIAL PROJECT EVALUATION

Authors: MARIAN OSTROWSKI AND ZDZISLAW SADOWSKI

In the paper two main approaches to the problem of pricing in industrial project evaluation are distinguished: the computation approach concerned with the techniques of computing value parameters, and the policy approach, preoccupied both with the methods of inducing individual decision-makers to use the centrally established parameters, and of counteracting the possible disturbances such as can result from inadequate computation techniques. In scrutinising the essential problems implied in the computation approach, attention is directed towards tracing the intricacies of the economic meaning of shadow prices. These are shown to be strictly dependent upon the chosen type of the development programme, and the adopted level of aggregation. Moreover, they are shown to be closely linked to the chosen shape of the accounting formula for project evaluation. It is pointed out that a certain degree of substitution exists between the latter and the price set used in project evaluation. The practical impossibility of arriving at a perfect shadow price solution leads to the necessity of approximation: these are termed accounting prices. Different methods of estimation of the accounting prices, either suggested or actually used in various countries, are briefly discussed. The predominancy of partial solutions and highly aggregate accounting prices is found to be a common rule of approximation. In the final part of the paper the general problems of the policy approach are reviewed. In particular, the impact of the institutional set-up on the use of accounting prices in project evaluation is analysed in terms of different kinds of relationship between the central planning body and the individual decision makers.

Reference: CID/IFE/B.31

Title: A SYSTEMS METHODOLOGY FOR EVALUATING INDUSTRIAL PROJECTS IN THE CONTEXT OF NATIONAL STRATEGIES

Author: EDWARD B. ROBERTS

Analysis of existing methods for evaluating industrial projects suggests eight classes of faults. Present evaluation methods: (1) assume a static rather than dynamic view of the project; (2) contain no basis for integrating various factors; (3) allow nonrigorous qualitative estimates; (4) are inflexible, requiring complete redoing of the evaluation if changes occur; (5) do not reveal sensitivity of the project desirability to various factors; (6) require that each new evaluation be started without advantages accumulating from previous evaluations; (7) ignore feedback effects of intermediate changes on the project; (8) encourage a passive approach of evaluation in response to the proposals of others, instead of the more active role of design of project opportunities.

A new approach to industrial project evaluation is proposed that is based on consideration of the complete life cycle of the project establishment process. Three roles are seen as dominant in an industrial project: the principal project implementer, a financier and a government sponsor. These roles interact throughout the ten activity phases of a project life.

The complex requirements of realistic project evaluation suggest a method based on explicit mathematical modelling of the project structure and environment. Computer simulation techniques provide a flexible basis for producing time histories of performance of the industrial project being evaluated. The detailed considerations needed for a project life cycle model are described for the case of an African textile mill.

Finally, application of the systems approach to evaluation of large projects or of an industrial project complex is discussed. A related evaluation of water-works projects in the Susquehanna River Basin of the United States serves to illustrate the use of the proposed methodology.

Reference: CID/YPE/B.32
Title: METHODS OF INDUSTRIAL PROJECT EVALUATION IN THE
CZECHOSLOVAK SOCIALIST REPUBLIC
Author: OTAKAR FERFECKY

The evaluation of industrial projects in the Czechoslovak Socialist Republic has specific features which follow from the substance of the planned control of national economy and from the evaluation of effectiveness of the whole socialist reproduction.

The evaluation of industrial projects, as well as the evaluation of effectiveness of investment, is carried out within the frame of the whole development of national economy involving both economic and social fields. The social ownership of the means of production which belongs to the whole society can be utilised in a planned way to the best profit of this society.

The extent of satisfaction of present and future needs of the socialist society and carrying out of investment serve as a summary criterion of effectiveness of investment. It is therefore necessary to follow the system of methods of industrial project evaluation from the broadest economic and town-and-country planning aspects and design preparation up to the evaluation of effectiveness in operation.

Methods of estimating economic effectiveness of investment involve:

A/ General considerations, in which important criteria are economic, political and social assets of industrial projects for the respective region; and so-called investment necessitated by the development and indirect investment are being followed too; further

B/ A system of indices, which serves as a tool for technical and economical evaluation of interchangeable solutions. This system is based on indices expressed in kind and in value. As the application of indices expressed in kind is considerably limited, the so-called complex indices indicating the value both of investment and operational cost are used to a substantially larger extent.

The main complex indices are the following: specific investment cost, specific cost price of production, and coefficient of economic effectiveness.

At present the principles of the planned control of national economy are being intensified, particularly as regards the utilisation of the influence of the law of value, which creates new conditions for the evaluation of economic effectiveness.

The effectiveness of a project within the frame of investment represents the only problem, which cannot be separated from the planning of national economy. The evaluation of this project is connected with the distribution of investment into branches and production sectors from the preparation of plans and designs up to the realisation of construction and its setting into operation.

Reference: CID/IFE/B.33

Title: NATIONAL AND COMMERCIAL PROFITABILITY

Author: C.D. FOSTER

There are difficulties in the way of defining an optimal growth path for an economy. Some of these can be subsumed in the notion that a government should choose a social rate of time preference. Others result from the desire to achieve atemporal income redistribution objectives. But quite apart from the moral problem of choosing intertemporal and atemporal income distribution objectives, there are purely political and administrative habits in the way of a government defining these objectives. These are not decisions which governments are not accustomed to make; and their decision presumes that governments anyway speak with one voice, which is obviously untrue. So however shaky the intellectual foundations, one had better start with the assumption that the target growth path is optimal.

When a decision of this kind is accepted then the definition of the appropriate investment criteria should be a matter of logical deduction. But unfortunately no existing planning techniques, whether of the older iterative kind or using programming methods, are well enough developed to make it possible to work out systematically and consistently the implications of the investment criteria for project evaluation. It follows that the establishing of a set of shadow prices to guide investment can at best be only a rough approximation to those needed to secure the desired growth path.

Various partial investment criteria are considered: first, those that resolve into recommendations to conserve a single scarce factor. It is shown how these tend to be assimilated to one criterion, the net savings criterion. Quite apart from the underlying assumption that consumption is to be given zero weight in most circumstances, there are operational difficulties which suggest that it would be better to use investment criteria implying the use of some shadow prices. On the other hand there are severe practical difficulties of making the set too complex. Any set chosen must allow for the possibility of feedback to achieve overall feedback. Two methods of doing this are

discussed.

In the last section there is a brief discussion of the problems facing someone who has to work out a project evaluation, given an investment criterion.

References: CID/IPF/B.34
Title: CRITERIA FOR EVALUATION OF INDUSTRIAL PROJECTS IN AN OPEN ECONOMY
Authors: LASZLO CSAPO and MIKLOS MANDEL

Twenty years of experimentation in Hungary seems to prove that formulation of criteria for industrial project evaluation is extremely difficult. There are no general criteria applicable in any country or in any time. Criteria are relative by nature. Criteria of project evaluation depend on development strategy and on economic situations and possibilities. Since these factors are changing criteria should change too. Mathematical programming models are built to find optimum size of activity. Programs however optimum are determined by those limiting factors decided upon by development strategy. The optimum is always relative depending on criteria.

The economy has an open character when actual and potential scarcity of natural resources and conditions makes it impossible to utilize the existing and expected capacities in the long run, at a full extent, on the basis of domestic resources. The basic feature of the open economy is its foreign trade sensitivity. In an open economy growth is a function of export ability. Therefore the basic criterion of project evaluation is the expected maximum net foreign exchange earnings of a project in the long run. Methods of efficiency computations should be determined by this basic criterion. Output and input should be calculated on world market price level and expressed in foreign exchanges. For this purpose input-output technique and special foreign-exchange rates should be formulated. With the help of a "world market price" model we are able to elaborate long term investment programs. In the open economy uncertainty should be counterbalanced by concentrating on "leading sectors", on up-to-date technology and by ensuring "strategic reserves". In an open economy balanced growth cannot be achieved at full employment of all the resources (capacity, labour, raw material, foreign exchange).

The preparation of sound projects requires a very detailed preliminary analysis of expected foreign markets, world price trends, prospective changes of technology and research, import possibilities, expected reserves, integration and international cooperation possibilities, domestic resources, etc. Optimum

variants should be calculated by programming. Description of "two level planning model" and the "shadow price" method. Before model building the following preliminary steps should be undertaken: calculate the technical-economic parameters of the product; choose technological variants, machinery; analyse purchasing possibilities of main machines and appliances; measure construction capacity; estimate optimum size capacity; estimate required infrastructure, etc.

Present methods of efficiency calculations are rather rough estimates than exact computations. Because of various difficulties originating from: institutional methodological, price, etc. problems presenting quotients of efficiency are not reliable. Mathematical methods and input-output analysis should be used, and also a description of present efficiency formulas and their criticism. In the stage of decision measurement risk-taking is one of the most important problems to solve.

Reference: CID/IPE/B.35
Title: MATHEMATICAL METHODS OF EVALUATION OF INDUSTRIAL PROJECTS
Author: O.A. MIHAJLOV

During the last few years the mathematical methods, such as linear and dynamic programming, correlation and dispersion analysis etc., have been increasingly introduced in the designing and evaluation of industrial projects; broad implementation of these methods was made possible as a result of the emergence of electronic computers, which are capable of storing in their memory large quantities of digital information (material) and of controlling and processing it at the level of several thousand operations per second.

If it is determined in the process of evaluating several projects or its variations that one of them is the best of all under consideration, it does not mean yet, that this project is optimum; i.e. it is the best possible way. To determine really optimum variations, it is necessary to find an application of mathematical methods of solving so-called extremes; in some cases, it is possible to bring together the inter-dependence under consideration to the mathematical problems on maximum or minimum (there are some examples in the report); however, the problems of that kind more often can be solved only by the methods of mathematical programming; approximate fields of application of these methods are shown in the report.

To the basic industrial problems, which are solved by the programming methods, belong the problems for determination: optimum parameters of production units (capacities) one of the major problems, which arises when the evaluation of industrial projects is made; optimum load and the use of equipment (including unique), a more useful variation of the use of resources, e.g. by the more rational cutting of industrial materials (in machine building and other industries); composition of mixtures, of complex raw materials and semi-products, (e.g. charge in metallurgy); the rational distribution of different kinds of operations between the production units, (machine tools, rolling mills, etc.); optimum planning of transportation of similar kind of materials, including determination of optimal dimensions, of warehouses in industrial projects, etc.

The report considers in detail the example for the application in the USSR of the method of solving multipliers for the choosing of rational distribution of technological units in the heavy industries. Mathematical methods are being increas-

ingly implemented for the modelling of industrial processes, which make it possible during the evaluation process of industrial projects to consider the processes and effects without making the experiments using industrial equipment, which often are followed by a decrease of unit production cost, since it is necessary to change artificially the production parameters for the creation of "other equal conditions". There are some examples in this report of using for the above mentioned purposes, of methods of multiple correlations. The report considers the questions of the application of mathematical methods for the mechanisation and automation of mass calculations in planimetric, including the questions of using of approximation (changing of pure mathematical procedures for the scheme of an approximate solution).

Reference: CID/IFE/B.37

Title: ECONOMIC CRITERIA FOR CHOICE OF TECHNIQUE IN SOCIALIST
ECONOMY / THEORETICAL FOUNDATIONS /

Author: K. LESZCZYNSKI

The author undertakes an attempt to explain the theoretical foundations of the economic choice of technique in the socialist economy. It has been demonstrated in the paper that the choice of the most effective technique should be carried out first of all in the process of elaborating the central plan. Only the central planning board may directly determine, of course, within the limits of the possible, which of the existing techniques in the national economy are most effective and which are ineffective and will be either discarded /in investments/ or removed /previously produced means of production.

The process of the choice of technique in the central plan is at the same time a process of determining the economic indicators for the operational levels; prices of products, norm of rentability, norms of the differential rent, wage rates and depreciation rates.

On the basis of these economic indicators enterprises / industries/ may determine the degree of effectiveness of the respective techniques of production and adopt the technique which is most effective to the national economy. The motives of such a behaviour may be created through a system of economic incentives connected with the magnitude of the saving of social labour in comparison to the price. This magnitude will increase income of the employed of the enterprise /industry/. With such combination of incentives the most advantageous technique to the national economy will at the same time be most advantageous to an enterprise industry.

The economic importance of the time factor in the choice of technique was also considered in the paper. It was shown that the planned price of all products, and also of investment projects, are ceteris paribus directly proportional to the time of production/construction. The methods for determining the time of exploitation of investment projects with different techniques were also defined.

Finally, the economic significance of natural conditions in the choice of technique was considered.

Reference: CID/IPE/B.39

Title: METHODS OF THE TECHNICAL-ECONOMIC FOUNDATION OF THE INDUSTRIAL CENTRE'S DEVELOPMENT

Author: ENRID ALAEV

An industrial centre (industrial knot) is the most rational form of industrial location reflecting the general tendency of the production concentration. It represents a territorial-productive complex efficiently using the benefits of the rational concentration of mutually connected enterprises on a compact territory.

This form of industry location secures a supplementary effect for the national economy (in comparison with the isolated location of enterprises) at the expense of: combination and joint location of the co-operating and interconnected enterprises; joint building of the enterprises on neighbouring sites; centralisation of construction and energy capacity, water supply, transportation and warehouses; concentration of auxiliary branches, research and design establishments and technical schools; combination of enterprises with different character of labour in order to achieve more complete use of man-power resources; savings in the housing and social construction.

The most remarkable signs of an industrial centre are:

- its specialisation in the national economy (which is determined by the leading branches of industry in the centre with the products to supply the whole country or any extensive region);
- its complexity (which is determined by the rate of inter-connections between the different branches of production as well as between the production as a whole and the local conditions and resources).

There are many types of industrial centres according to their specialisation, size and rate of complexity; and each type requires a special approach.

Methods of technical-economic foundation of an industrial centre apply the solution of the following questions:

1. General evaluation of the conditions of the development, determination of industrial centre specialisation and reasonable limit of its expansion.

2. Working out variants of combination of different production branches in the centre.
3. Drawing an economic model of the industrial centre.
4. Calculation of various balances required (raw materials, fuel, energy, water, man-power resources, foodstuffs and transportation).
5. Calculation of supplementary benefits and working out related undertakings.
6. Calculation of general investment and drawing a plan of balanced development of the industrial centre.
7. Regional laying out.

Regional laying out as well as economic model embrace both the territory of the centre itself and the district of its economic gravitation (area of settling man-power employed, suburban agricultural zone, vicinity of special purposes-preserving sanitary zones, recreation zones and reserve territories).

Reference: CID/IFE/B.40

Title: MANAGEMENT AS A FACTOR IN PROJECT EVALUATION

Author: STONEHAM

The paper deals with the problems of management in developing countries from the point of view of the financial backer of industrial projects. It makes the point that, provided an acceptable feasibility study shows that a project is likely to be commercially viable, it is relatively easy to find the finance for it provided the proposed management is of the highest quality. From the point of view of the lender of money to a project, management is of more importance than the security taken on the assets of the project. Whatever the security, the project stands or falls by the quality of the management.

The best method of obtaining management is to marry technical expertise of the industry concerned with local experience of the country, with both parties having as large as possible financial investment in the project. The managing agency method gives differing results in different parts of the world, but in general is held to be inferior to the above method. The turnkey project is considered to be very expensive and usually brings with it relatively poor management. The recent trend in which projects are put forward at grossly inflated prices but with prima facie very attractive repayment terms is condemned as conferring doubtful benefit on a country and leading to indifferent management.

Good management begins at Board level, but its focus is the project manager. He must be allowed to manage, and enjoy the full support of his Board. Expatriate staff is extremely expensive, and all progressive projects will have a vigorous training programme for local personnel at all management levels.

Reference: CID/IPE/B.41
Title: SKILL FORMATION IN JAPAN
Author: M.S.D YOKOMIZO

Firstly, efforts were made to find numerical relations between economic development and educational demand. Through economic development - industrial structural changes-occupational structural changes - and changes in educational demand sequence, the importance of lower secondary education in all stages and increasing demand for upper, secondary and higher education along with economic development was made clear.

Then, the historical development of education and vocational training in Japan was reviewed. As it is well known, Japan laid more stress on education in comparison to her economic development and one of its results has been rapid economic growth. Vocational training was mainly left to individual enterprises connected with their life-time employment system. The role by governmental authorities has been to set forth regulations to protect apprentices; to provide training facilities to assist the employment of the unemployed, and to enact general standards of training.

Finally, three cases of vocational education and training in enterprise are examined. The first two cases are those of independent vocational training and the last one, a cooperative type of training. One independent case shows a well arranged educational and training system. The other presents a training system vividly adjusted to changes in circumstances. It can be said from these observations that (1) spiritual education through a training system has a very important effect in Japan; (2) the combination of off-the-job training with on-the-job training is essential and (3) because the Japanese educational system lacks education for technicians (a kind of manpower between engineers and skilled workers), many individual companies established special schools to train technicians for their own needs. (However, recently the Ministry of Education established several advanced technical professional schools for such needs).

Reference: CID/IFE/B.42

Title: CHOICE OF LOCATION IN INDUSTRIAL PROJECT EVALUATION

Author: ZBIGNIEW ZAJDA AND STANISLAW ZAWADZKI

In the paper the authors do not intend to discuss either various theoretical approaches to locational analysis in industrial project evaluation or practical solutions adopted in some countries. Their considerations and proposals are, however, based on their studies on locational efficiency of industrial plants location in Poland. It is the authors belief that their considerations and proposals are based on assumptions relevant also to developing countries. They assume that the locational decisions are taken or controlled by the state, that comparative studies on locational alternatives are necessary, that the target is to minimise the investment outlays and operational costs of an industrial plant, that main economic aspects should be considered in the quantitative locational analysis etc.

The choice of location is an integral part of an investment decision. It is necessary to make an attempt to separate the investment outlays and the economic effects of a given location. The possibilities and difficulties of such a calculation are discussed and a scheme of this calculation is presented. Several alternatives of an industrial location should be considered and comparative studies should be made. The locational analysis and economic calculation of locational efficiency should be carried out from the point of view of a given industrial plant, an industrial branch, an economic region and of a given locality and the national economy as a whole. There may be some differences between these calculations since they differ in scope and extent.

The proposed economic calculation should be dynamic. It should take into account all foreseeable developments within and outside an industrial plant. Consequently it is necessary to look at the locational analysis within framework on an industrial, regional and national planning.

Reference: CID/IFE/B.43
Title: ASSESSMENT OF FACTOR ENDOWMENTS IN INDUSTRIAL PROJECT
EVALUATION
Author: KOICHI BABA

From our standpoint, factor endowments are equivalent to actual resources which constitute physical, social and human factors required to produce goods and services useful to us. It may be said that an industrial project is a process of transforming inputs into some desired outputs under given techniques. The inputs to the process of production are flows or fractions of resources as we refer to in the text. Economic development implies, in short, an increase of production which depends upon an increase of supply of factors of production, which are in turn derived from resources or factors endowed. Part I of the text deals with problems of resources under a broader context, and draws a conclusion that whether a nation can economically and industrially develop to the full extent does depend mostly upon technological advancements which enable efficient utilization of her resources.

Part II is mainly devoted to discussions on locational factors and conditions to be examined before formulating and materializing any industrial project, because a project should be designed and located so as to get a gain from its locational advantage.

Part III contains three illustrative case studies all based on the past and present experiences in Japan. Case 1 stresses importance of manpower resource for machinery industry which is estimated to have a very important and strategic position in the process of industrialization. Case 2 gives a brilliant example of utilizing efficiently domestic resources in producing vynilon textile by using the techniques developed originally by the Japanese. Case 3 shows a method of figuring out regional differences in advantages in some locational factors for industrial complex projects using petroleum and its derivatives.

Reference: CID/IPE/B.44

Title: INTEGRATION OF ACCOUNTING AND ECONOMIC CONCEPTS OF COSTS AND BENEFITS IN EVALUATION OF INDUSTRIAL PROJECTS

Author: ARTHUR D. LITTLE, INC.

The purpose of this paper is to develop further and describe the calculus by which accounting methods normally used within the private sector can be adapted to provide an optimum technique for the comparative evaluation of the net economic benefits of alternative projects to which a nation's resources might be allocated. The paper begins by arraying the full range of factors which should be incorporated into an evaluation from the standpoint of the private sector. It then describes the adaptations of the private sector calculus that can be made to produce measures of economic cost and benefit from a national point of view, identifying factors often thought noncomparable but which can be included in the calculus. The paper then explores the possibility of isolating and gauging the benefit to a nation of a project embodying resources provided by more than one nation. It also indicates that essentially the same calculus is appropriate whether the project is public, private or mixed.

In comparing the analysis of a project from the alternative points of view of the entrepreneur and the nation, the paper notes the utility of employing the concept of private gain, the concept of social or economic price as a refinement of market price and of the alternative opportunity cost concept. It discusses the relevance to the calculus of the concept of the nation as a social entity possessing economic resources rather than a geographic area in which resources are physically situated. In suggesting measures of social benefit, it considers that increment which the project will make to gross national (or social) product, the excess of value produced over resource cost in terms of the best alternative and the importance of the distinction between economic development and increasing the level of resource use. Attention is also paid to relationships with the balance of payments and to the possibility of using rate of benefit as a device for the integration of otherwise noncomparable costs and benefits. In converting market prices to accounting or social prices the paper deals separately with the problems posed by wages, unemployment, governmental and institutional influences on market wage

rates, interest rates, profits as an indicator of net benefits, factors supplied by other nations, the value of sales to nationals and sales abroad and suggests methods of adjustment to eliminate distortions occasioned by subsidies and taxes. In considering the significance of indirect costs and benefits the paper deals with employee training, income multiplier effects, accelerations in the economy and utilisation of infrastructure. Finally, a simulated model of the recommended calculus is presented and its limitations discussed.

References: CID/IPE/B.45
Title: COMBINED CRITERION FOR INVESTMENT IN MANUFACTURING
INDUSTRIES IN DEVELOPING COUNTRIES
Author: THE RESEARCH DIVISION - CENTRE FOR INDUSTRIAL DEVELOPMENT

Criteria for investment decision-making in the developing countries have been based on underlying assumptions with regard to their factor endowments and growth objectives. As such they have stressed the role of capital as the scarce factor whose contribution to total product is to be optimized by equating it at the margin in the various choices. These formulations imply a high degree of malleability for capital while this does not hold in the industrial production functions utilizing modern technology. Not only are there very limited possibilities for substituting labour for capital, but there is strong evidence of complementarity between skilled labor and capital. Furthermore, high productivity is generally correlated with both, capital intensity and size.

If on the other hand industry is conceived as the dynamic carrier of technological progress, which it embodies in the products, equipment and production and management methods utilized, there can then be only limited choice as between capital-intensive vs. labour intensive or small scale vs. large scale industry.

Some preliminary empirical evidence is presented on the skills and capital intensities characterising manufacturing industries, as well as on the correlation between size and productivity as part of an extensive research project of international comparison being undertaken by the Research Division of the Centre for Industrial Development at the present.

A tentative combined criterion for investment in manufacturing industries is proposed which is based on this evidence, and uses the ranking of manufacturing industries on the basis of several single criteria, i.e.: capital intensities, skill requirements, returns to scale and the growth pattern of industrial development.

It is finally concluded that the underlying rule is one of optimizing per-capita output (i.e. labour productivity) and that investment in manufacturing industries in developing countries should be based on the optimal utilization of

the complex of resources: capital-skills by its allocation to those uses most conducive to high, long run sustained growth.

Reference: CID/IPE/C.1
Title: FOLLOW-UP PROCEDURES AND PRACTICES
Author: H.T. PAREKH

The essential concept of follow-up is partnership between the development bank and the company financed by it to bring the project to successful fruition. The framework of follow-up work is the appraisal document and the heads of agreement governing a project.

While an appraisal makes an estimate of the cost and working of a project, such estimate is based on assumptions which might in fact not turn out to be correct, and the evolution of the project in practice might turn out to be on considerably different lines to those estimated. The difficulties encountered in execution of a project relate mainly to delays in implementing it, cost overruns, management problems and later during the production phase - problems in developing production, inadequate supplies of raw materials and marketing problems. While some of these difficulties are transient, some may not be so short-lived.

ICICI is keenly aware of the problem of overruns and delays and keeps a constant vigil on cases which are likely to face difficulty in this regard. With known problems and genuine difficulties, ICICI has relaxed its procedures and has assisted projects either by providing the additional finance or by re-arranging the amortisation schedule. The basic requirement for this is to anticipate problems before they become serious and to provide a flexible response to overcome them.

One of the by-products of follow-up work is to provide a feedback for improved appraisal procedures. The validity of the appraisal estimates would be enhanced to the extent it tries to incorporate in its procedures the experience gathered in the follow-up work.

Reference: CID/IPE/C.2
Title: FOLLOW-UP
Author: B. BERKOFF

The principal function of follow-up activity is, without derogating from the project management's autonomy, to keep the "financing institution" informed of progress and performance and in a "partnership" relation with the management. Incidentally, it provides a check on appraisal methods, it may be instrumental in obliging management to install effective financial and operational controls, and it creates conditions favourable to "after-care" activity by the financing institution.

A good follow-up system will include the creation of a personal link between financing institution and project management (nominee director or visiting representative, supplemented by occasional "social" contacts at a higher level); and a system of regular reports, at first on the progress of the factory construction and later on the results of its operations. Analysis of the reports by the financing institution will extract key indications of progress showing whether the project follows agreed lines, falls within agreed estimates and operates profitably and effectively. These will sometimes provide lessons for the management or about its efficiency, checks on the financing institution's appraisal methods and information which can be usefully employed in later project evaluations.

All follow-up work must be put in its proper context. Each report should be viewed in the context of the business as a continuing organisation. The financing institution should define its requirements with care and request no more information than is really needed for its purpose. Carefully devised follow-up activity can be beneficial to all; but demands for unnecessary information create burdens on management and involve the financing institution in fruitless expense.

Reference: CID/IPE/D.1
Title: CASE STUDY: CONVERSION OF MALTA DOCKYARD
Author: A.H. CAMILLERI

For a long time Malta served mainly as a naval base. Malta's economy was largely based on work in the Dockyard which, together with its ancillary industries, had at one time accounted for one third of Malta's labour force. Dockyard work was not merely the primary occupation of the Maltese; it also contributed to the economic, educational and social structure of the country. Existing skills, wages and salaries originated mainly from the Dockyard.

In 1958-59 it was felt that a naval base in the Mediterranean was no longer justified and it was decided to convert the Dockyard into a commercial concern and to contract severely the military services expenditure in Malta. The need was immediately felt to diversify the production sectors and to concentrate mainly on industrialisation and tourism. Two development plans were launched, one for period 1959-64 costing £29-1/4 million, while the second plan for period 1964-69 involved an investment of £38.4 million.

Notwithstanding the £6 million provided for the conversion of the Dockyard into a commercial concern, it proved to be quite a difficult undertaking. Though the fixed assets and a trained labour force were already in existence, the new Company had to undertake an extensive programme of development and modernisation to repair huge commercial ships. The existing redundant labour force and the decision to reduce it through natural wastages presented serious difficulties.

Following the change-over, management was re-organized on commercial lines and modern methods of technique, education and welfare schemes were introduced. Maltese personnel were promoted to responsible positions and new apprentices were recruited.

Future planning includes the construction of a giant drydock and more berths to take up tankers of 150,000 tons d.w. or over. A World Bank loan would probably finance these projects.

Reference: CID/IPE/D.2
Title: ARGENTINA'S EXPERIENCE IN INDUSTRIAL PROJECT EVALUATION
Author: J.L. VIETTI

The paper begins with a quantitative and qualitative description of the economic features of the Industrial Sector. Against this background consideration is given to the items included in the agenda proposed for discussion at the meeting.

Within the governmental organisation there is a Planning Institute at the national level, and its function is primarily technical and advisory. In addition, there are a number of executive agencies charged with the achievement of the goals established by the Planning Institute.

It should be noted that this coordinated and united work is a recent development. A comparison of the existing organisation and system for the analysis and evaluation of projects with the procedures followed a few years ago, gives clear evidence of progress in the technique of economic planning.

As for the strategy of industrial development, the irregular but gradual growth should be noted, proceeding from the epoch when investment decisions responded without control to impulses of the domestic market or external influences, to the present in which goals and objectives of the sector are precisely defined in national programming.

The criteria for investment and the proposed methodology for evaluating projects are indicated and it is worth noting that they conform to the characteristics determined by the "diagnosis" of the present National Development Plan.

Reference is made - without the degree of precision required by the complexity of the subject - to the difficulties of analysing and evaluating projects caused by the increase in the general price level and the relative distortion of internal prices.

In matters of international trade, Argentina's membership in LIFTA is noted along with the severe restrictions which limit its flexibility in the short-run in the external sector.

Finally, there is a list of the agencies responsible for the industrial development process, a description of those functions pertaining to each within the organisation of the government administration, and the existing body engaged in industrial promotion.

Reference: CID/IFE/D.3
Title: NOTES ON PROPOSED EXPANSION OF THE CHIMBOTE (PERU) STEEL PLANT
Author: N.M. CAMPOS

The following points are presented in the paper:

1. A market study for iron and steel products is presented, the outcome of which has been one of the weightiest factors in favor of implementing the overall expansion project.
2. A survey of the technological production alternatives, assuming maximal operational capacity with the equipment currently installed, as compared with the maximal operational capacity following the addition of the new plate rolling facility.
3. Determination of the investment and projected operational expenses after completing the expansion, allowing for proper depreciation, maintenance and overhead.
4. Development of cash flow projections at various productive levels, reflecting the short term situation, for the purpose of so setting the SOGESA capacity as to provide for debt retirement.
5. Analysis of the production tables drawn up by SOGESA, extending from 1965 through 1970, this latter year being that during which the facility would reach maximal capacity, guaranteeing such a profitability of operation that it can comply with its financial commitments related to expansion and, at the same time, achieve complete import substitution with the relevant favorable repercussions on the country's balance of trade payments.
6. Finally, revolving fund tables, showing a tentative evaluation regarding the financial solutions likely to be given to the problem of implementing the project.

Reference: CID/IPE/D.4
Title: GLOBAL PLANNING AND PROJECT EVALUATION IN CUBA
Author: MIGUEL ALEJANDRO FIGUERAS, M.A.

Sustained long range economic growth can be achieved only provided it be based on a constant increase in the productivity of human labor. This must be kept in mind at all times by those responsible for a study of the avenues of development for poor countries and the framing of proposals to implement their thoughts. There is a danger that the planning and evaluation techniques be not used with a full understanding of the reasons for which all efforts at development are aimed, thus turning the process into an entelechy.

The planning and evaluation of investment projects are wholly complementary. One can select the most important criteria, the degree of scarcity of the resources and the medium range objectives to be achieved with certain investments only provided there exists a general planning system, embracing all aspects of the economy. Evaluation, in turn, is the instrument which makes it possible to make the general industrial development plan concrete and to guarantee that said resources yield the efficiency expected of them once the whole programme was drawn up.

Long range plans include distribution by foreign trade areas and the general breakdown the gross national product should show. These points will later be put to work in the evaluation tasks, affecting the development and determination of the selection criteria to be used.

Reference: CID/IPE/D.5
Title: IMDBI's CRITERIA FOR AND EXPERIENCE IN PROJECT EVALUATION
Author: M. REZA

Industrial and Mining Development Bank of Iran (IMDBI), a private development finance company whose present financial resources amount to \$74.4 million, was established in October 1959 in order to develop, encourage, and stimulate private industrial, productive, mining and transportation enterprises in Iran. The Bank has achieved these purposes by rendering services and granting loans to, and investing in about 100 industrial enterprises during the past 5-1/2 years.

In selecting industrial projects for financial assistance, the Bank considers two broad criteria: the national economic profitability and the commercial profitability. The first criterion, which forms the basis for giving a project priority, stipulates that the project :

- has a low capital requirement per value added
- utilizes domestically produced raw materials
- provides employment, but not by lack of mechanisation or poor labour utilization
- contributes to the regional development and a balanced industrial growth
- saves foreign exchange
- contributes to the cumulative growth of the industrial sector.

The second criterion requires that a project is sound economically, technically and financially and that it provides a reasonable return on the investment.

The Bank's professional staff of economists, engineers, accountants and financial analysts evaluate each project by:

- conducting market surveys on raw materials and finished products
- analysing the choice of site, types of construction, process machinery and equipment
- evaluating the managerial capabilities of the proposed management

- making estimates of capital and production costs and by preparing forecasts of financial statements and cash flow.

Due to lack of data, insufficient technical knowledge and know-how, and the entrepreneur's unfamiliarity with the modern industrial set-ups, IDBI officers encounter numerous difficulties in project evaluation. However, by using their knowledge, experience and initiative, they are able to gather sufficient information to appraise projects and make sound recommendations.

In order to accelerate the rate of industrial growth in the country, IDBI has decided to promote and launch joint stock companies in which the general public will be able to invest. To that end, IDBI selects high priority projects, prepares complete feasibility reports, finds competent management and secures the share and loan capital. The Bank's experience in its first promotional activity has been satisfactory.

Reference: CID/IPE/D.6
Title: INFLUENCE OF LOCAL CONDITIONS IN PROJECT EVALUATION
Author: A.M. EL BARBARY

Limitations in funds, especially in hard currencies and in skills, compel developing countries to take exceptionally strong measures in selecting projects for implementation. Regular feasibility studies are quite essential, but often provide limited guidance to the final decisions for project approval due to lack of necessary information and statistics.

Local conditions have decisive influence on the acceptance or refusal of projects for implementation in developing countries, and their consideration is often a policy issue that governs the final decision irrespective of the results of the regular appraisal study. The relative importance of the local conditions and the inter-relation between them varies from one country to another and are not the same for the various projects in any one country.

The paper touches on some of the most pronounced of these factors and explains their probable influence on project implementation, citing some examples in the U.R., where one or the other of those factors was the decisive influence in the acceptance, refusal or the fixing of the scope of execution of certain projects in the approved industrial development programmes.

Certain recommendations for the newly developing countries may be obtained from the discussion of the various factors and, it is hoped that such recommendations will prove beneficial in their future development programmes. A general recommendation, however, is that the feasibility of a project in a developing country can only be decided locally, with the prevailing conditions in the forefront of other feasibility factors, for what may prove feasible and profitable in a developed country, might not prove so in a developing country, while the latter can hardly experiment with investment in development or afford to take a risk by neglecting local conditions or giving them secondary importance.

Reference: CID/IPE/D.8
Title: FOUNDRY FORGE PROJECT : CASE STUDY
Author S.D. JOSHI

The paper outlines the stages through which a project has to pass till its completion. These stages are:

- (a) Conception stage
- (b) Investigation stage
- (c) Decision stage, and
- (d) Execution stage

Peculiarities and problems involved in each of the stages have been examined on the basis of the practices prevalent in Indian background. In the above context, as an illustration, the case of Foundry Forge Project, Ranchi, India has been evaluated. Giving a brief historical background of this project, the paper deals with a review of the present programme and the targets achieved so far. It then deals with the various aspects of planning for completion of this Project. The economical features of the Project in various stages, i.e. in stage of formulation and evaluation, have been illustrated emphasising the criteria with respect to commercial profitability, earning forecasts, return on capital, pricing policies, etc. On the basis of the experiences during the execution of the project so far, certain recommendations by way of conclusions have been made in the spheres of development of human resources, site locations, accuracy of preliminary data for preparation of the project plans, formation of central project evaluation body, financial controls, centralised coordination, etc., for the benefit of future projected evaluation work in the country.

Reference: CID/IPE/D.9
Title: GOVERNMENTAL ASSISTANCE IN ESTABLISHING INDUSTRIAL
PROJECTS IN THE PRIVATE SECTOR
Author: PAKISTAN INDUSTRIAL CREDIT CORPORATION LTD.

The Governments of several under-developed countries are seeking to promote industrialisation through private enterprises. For this purpose it is usual to grant concessions and incentives of various types with a view to assisting private enterprise in gaining strength and to smoothing the difficulties encountered by them. In pursuit of its objective of industrialisation within the framework of private enterprise systems, Pakistan has also experimented with a variety of such measures and acquired much first-hand knowledge. This paper seeks to present some of the salient lessons based on Pakistan's experience in this connection.

It is now recognized that economic development cannot be brought about by merely injecting in the economy the various physical factors of development. On the contrary, conditions must be first created which encourage and are conducive to economic growth. In other words, a healthy investment climate has to be created requiring the formulation of a balanced and enlightened industrial policy. In this connection the problems of a protective tariff policy, rates and types of taxation, monetary policy, controls on consumption, price and distribution, the importance of agriculture and the availability of foreign capital are briefly discussed.

It is unlikely that industrialisation through private enterprise can be promoted by measures designed to create a suitable investment climate alone. These must be supplemented by measures of immediate impact and specific assistance to private enterprise. This is warranted on grounds of urgency of economic development, weakness and inexperience of private technological backwardness and inadequacy of capital resources.

The various steps that can be taken in this connection include the establishment of development banks, development corporations, the publication of an Industrial Investment Schedule, pre-investment advice and the establishment of investment centres in foreign countries to bring together local and foreign entrepreneurs.

Reference: CID/IPE/D.10
Title: PROJECT APPRAISAL IN PICIC
Author: S.U. DURRANI

An objective and searching project appraisal must form the basis of financial decisions of an Industrial development bank. The exact scope and nature of the exercise would differ from project to project and country to country. However, having regard to the economic conditions generally prevailing in under-developed countries, it can be said that project appraisal should not be concerned merely with conventional matters like cost, profit, terms of loan, etc. Instead, it should be broad in scope and cover aspects such as impact of the project on the economy, development of a sound entrepreneurial class, growth of new industries, economic utilisation of resources, etc. Business risks in under-developed countries are usually larger than in advanced countries. The project appraisal should reflect a balanced attitude towards risk-taking; merely because a project does not come up to norms and standards established in advanced countries should not condemn it for rejection. Development financing rather than mere financing for profit should be the keynote of the bank's operation. Finally, the emphasis in appraisal should not be on finding weaknesses of the project as of correcting them. A positive outlook rather than negative screening, is essential if development banking is to be successful.

PICIC which is the leading Industrial Development Bank of Pakistan has sought to follow these objectives in its project appraisal. This paper seeks to outline PICIC's technique, problems and experience of project appraisal of medium and large sized industrial projects.

The basic purpose of project appraisal is to ascertain whether the project is sound and to effect such improvements as would enhance its viability. This involves a careful examination of all the aspects of the project. Special attention is, however, paid to the following considerations which are discussed in the paper: namely, market and marketing arrangements, technical soundness of the project, the financial prospects, the management aspect and the final economic impact.

Reference: CID/IPE/D.11
Title: SOME PROBLEMS REGARDING THE ECONOMIC EFFECTIVENESS OF
CAPITAL INVESTMENT IN THE POPULAR REPUBLIC OF BULGARIA
Author: IVAN IVANOV

The economic effectiveness of capital investment is always an acute national problem. It is of the greatest importance for a nation that the means employed for industrial development show maximal effects. The greater the effect, the more justified the measures taken.

This report analyzes the ways and means we employ in order to find an optimal solution for our economic and technical problems. It shows the link of planned capital investments with the balance of national production and accumulated national income. The report outlines a difference between economic effect and economic effectiveness and stresses that economic effectiveness is both general and specific.

Instances are examined where a search for the general effectiveness of capital investment is made, showing methods and formulae for its calculation.

The problems of comparative effectiveness of capital investments are examined in more detail. Examples are shown of how the search for this comparative effectiveness is conducted. Presented are the standards of fixed time and efficiency, regarding both the overall and additional capital investments. The fact is emphasized that relative effectiveness presupposes a correlation of more than two variables for the solution of one and the same problem. Stressed is the need to find, first of all, the effectiveness of the general capital investment and, after the general plan has been found suitable for adoption, only then should the search start for additional effective investment, in deciding which of the possible alternatives is most expedient for implementation.

Methods are presented for the computation of comparative effectiveness and formulae are given to aid in this calculations. The report also deals with several problems of capital investment in foreign trade examining two basic indicators - the budget and currency returns. In this connection, methods are shown for the computation of the production available for export.

The author hopes that the questions he raised will be of interest to this Symposium.

References: CID/IPE/D.12
Title: SYSTEM OF APPRAISAL OF INDUSTRIAL PROJECTS IN YUGOSLAVIA
Author: M.V. PEJOVIC

The system of administrative control of the economy has been abandoned in Yugoslavia and the principle of workers self-management introduced. The decentralisation of resources for enlarged reproduction has been introduced and it is still being carried out in such a manner that during the distribution of national income the greatest part of these resources is left to the enterprises, i.e. direct producers. The role of banks is becoming stronger; the banks cease to be distributors of resources given to them by the social-political communities and are becoming institutions working in accordance with economic principles. The investment decision is made by the enterprises and this decision is not subject to any other approval by government organs.

Therefore, the enterprises-investors and the banks make the appraisal of projects and are responsible for the consequences. In addition to this, the banks make the selection among several similar projects in cases when credits are requested.

The investors make investment decisions on the basis of the investment programme, i.e. a document enabling them to examine the justification of the investment project. In view of the important role which they play, the banks must prepare themselves for that role in advance. Their main orientation is the preparation of general studies on individual industrial branches, preparation of special analyses for making decisions on principle on credit granting as well as preparation of special studies on parameters for individual economic branches.

The banks grant credits by means of competitive bidding or direct negotiation. The competitive bidding is an instrument which enables insight into all potential applications for credit and to meet the needs for some special products by selecting the best projects, existing in a certain period of time.

The criteria for appraisal are: profitability, influence on the country's balance of payments, capital coefficient, productivity of labour and other criteria.

The determination of project viability by the banks is made by method of comparison and method of dismemberment according to a special procedure consisting of detailed examination of the contents of the investment programme from the economic, technological and technical point of view.

The criteria for selection of the most favourable projects are the same or similar to those used for appraisal of the projects, whereby the credits are granted only to applicants meeting these criteria to a higher degree.

The banks follow the construction of the project and they also follow the results achieved after completion of the project.

Reference: CID/IPE/D.13
Title: EXPERIENCE IN INDUSTRIAL PROJECT EVALUATION IN NIGERIA
Author: G... F. TOYE

One of the main problems of the developing countries is industrialisation which is the only way by which they can raise the standard of living of the people and produce a substantial proportion of their basic requirements. Governments and people connected with industrial development planning should have specific targets for their plans, be able to identify problems that may obstruct their success and establish only such projects as will, other things being equal, contribute to the economy.

Direct government interest in development projects was not particularly noticeable until the attainment of independence when all the governments of the Federation were faced with the stark realities of the modern age and the complicated problems of funding for their people. Nigeria has accepted the challenge and efforts so far made have been encouraging. Each Regional Government as well as the Federal Government now has not only institutions for project development but also those for evaluating and financing projects.

Although Nigeria is a free enterprise economy where private investors, having satisfied themselves that certain projects would be viable, establish industrial projects and recruit their own technical staff, the governments, nevertheless, assess the contributions that these projects, especially those requiring incentives, can make to the country's economy and have training programmes for the supply of their man-power requirements. Efforts are being made to encourage projects which will up-grade local raw materials and earn foreign exchange as well as will lead to import substitution.

Reference: CID/IPE/D.14
Title: COLOMBIAN EXPERIENCE IN INDUSTRIAL PROJECT EVALUATION
Author: I. PARRA-PENA

The Colombian Government is reluctant to be directly engaged in goods production. The bulk of the industrial projects are designed and promoted by the private sector.

There are two agencies, closely associated with the government and acting in the design of industrial projects: the Industrial Development Institute (IFI) and the Technological Research Institute (IIT).

The main sources of financing of long-term capital for industrial projects are the Private Investment Fund (FIP) and the Financing Corporations. Their evaluation of industrial projects is focused on the appraisal of the commercial profitability from the viewpoint of private enterprise.

The Superintendence of Foreign Trade serves to allocate the available resources of the country. The evaluation of industrial projects in this instance is focused on the measurements of the foreign exchange benefits derived from the projects.

The Specific Projects Group located at the Colombian Planning Office, has so far concentrated its efforts in analysing those projects in search of foreign financing. Most of these projects have been of the infrastructure.

The objectives of the different Colombian agencies in evaluating industrial projects are not always the same; the aspects evaluated by each one of them, therefore, do not always coincide.

Evaluation of projects in government agencies do not always include a detailed analysis of the characteristics and effects of each one upon the economy. The technical staff is not sufficient. The information available is not always sufficient or adequate.

It is in the Specific Projects Group of the Planning Office where a comprehensive and detailed evaluation of projects ought to be done. The difficulties here are:

- a) Most projects submitted to the Group have been in infrastructure where objective evaluation is often difficult.
- b) Most of the projects sent to the Group for evaluation do not really compete with each other for a share of the limited resources. Budgetary allocations are made to governmental agencies on the basis of programmes which reflect political considerations rather than sound projects. This boils down to the fact that studies are made to improve or revise projects rather than to approve or disapprove them.

Reference: CID/IFE/D.16

Title: APPRAISING AN INDUSTRIAL PROJECT IN INDIA

Author: ICICI

The essential factor in project evaluation is to arrive at an independent assessment of the viability of the project, and, on this basis, to arrive at a financing decision. The basic consideration for a privately-owned development bank like ICICI, operating in a mixed economy and financing enterprises in the private sector, in assessing the viability of a project is to determine its commercial profitability in the market situation prevailing in the economy. However, the range of commercial profitability can be considerably wide; this enables the development bank to take into account other factors in determining its financing decision.

An important function of a development bank is to strengthen any weak links in the project. In ensuring adequate means of financing the project, ICICI has, as a general rule, preferred a strong equity base for a project, both to keep the burden of interest payment low in the construction phase of the project and to enable the project to have a reserve borrowing capacity in case the financial requirements of the project increase. Market estimates, even in a planned economy, tend to prove wrong and need to be cross-checked.

A development bank has its own policy framework within which it seeks to operate. For example, in the case of ICICI, policy objectives seek to favour the financing of non-traditional industries and of new entrepreneurs: in both these respects, ICICI objectives are in conformity with the aims of the industrial licensing policy in India.

Development is a long drawn process and as it proceeds it continually brings within the ambit of viability other projects. A development bank, therefore, has to take a long view of development.

Reference: CID/IPE/D.17
Title: STANDARDS APPLICABLE TO THE SELECTION OF INDUSTRIAL PROJECTS
IN CUBA
Author: C.P. ANGEL PERNAS

The problem of standards applicable to the evaluation of industrial projects from the point of view of the need for a prospective development strategy defining the critical factors limiting the development of an economy is outlined. Starting from this premise, and showing the significance of the objective factors which cannot readily be quantized, as well as some subjective ones, the main role of a "rational" analysis in the final selection is reviewed.

A study is made of the case of Cuba, explaining the features of its economy and the world economic trends suggesting specialization. The factors which limit development are the following: a) a scarcity of foreign currencies; b) technical and organizational investment capabilities; and c) the scarcity of qualified labor.

The overall selection process is criticized, leading to the choice of an evaluation system based on a mixed criterium, in which a preliminary priority order is set, allowing for a main evaluation factor, which is modified according to the other partial factors and rational analysis:

The proposed factors are:

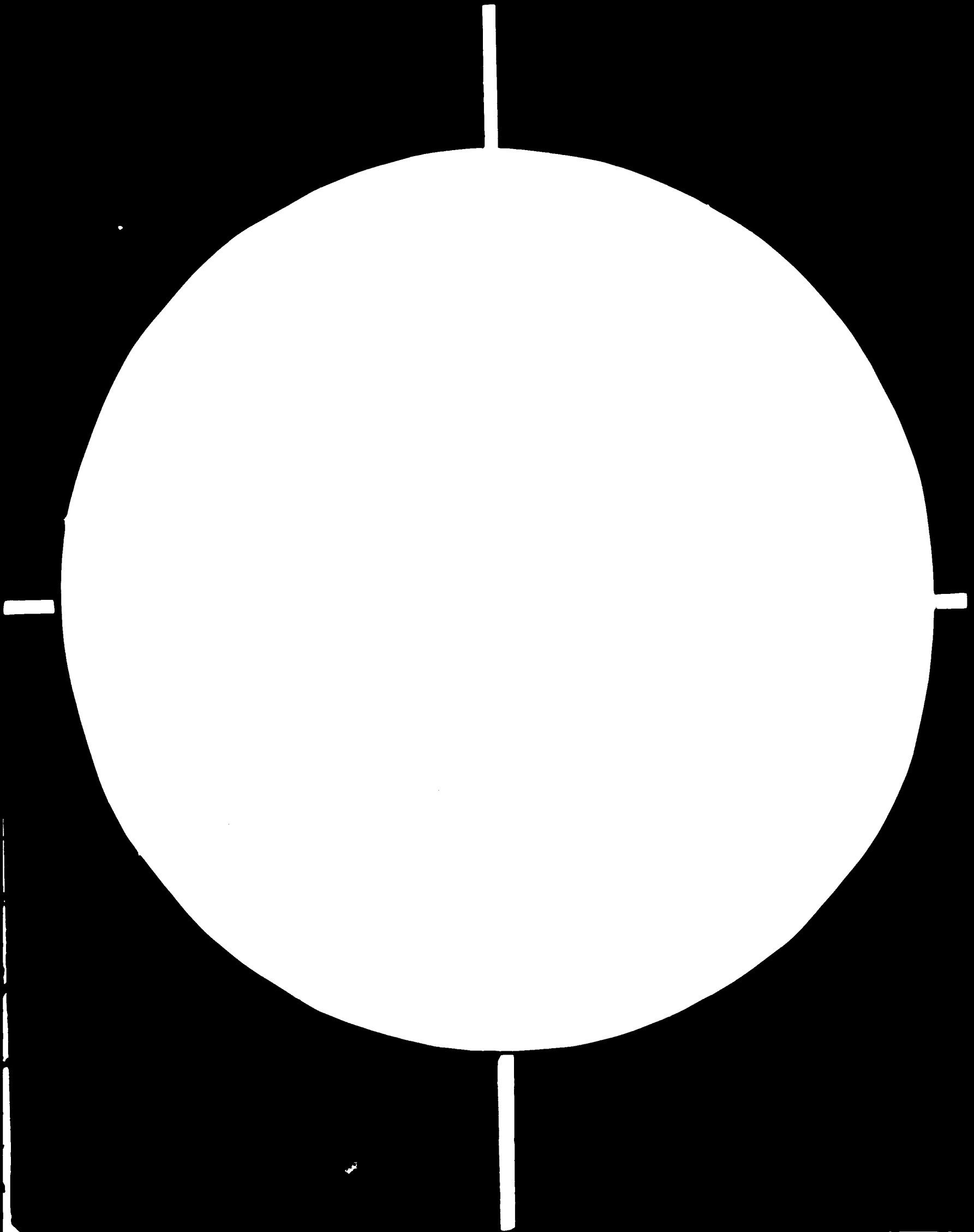
- time available for paying the foreign exchange investment
- plus value due to specialists
- value added by intensity of investments in civil engineering and assembly work
- total investment for spared foreign currencies
- investment productivity
- labor productivity.

Finally, practical solutions are given for the evaluation of projects related to the theme of social control over an economy, and it is recommended that an overall economic analysis be conducted, in order to avoid misapprehensions in the determination of the elements restricting development, in view of their variable nature.

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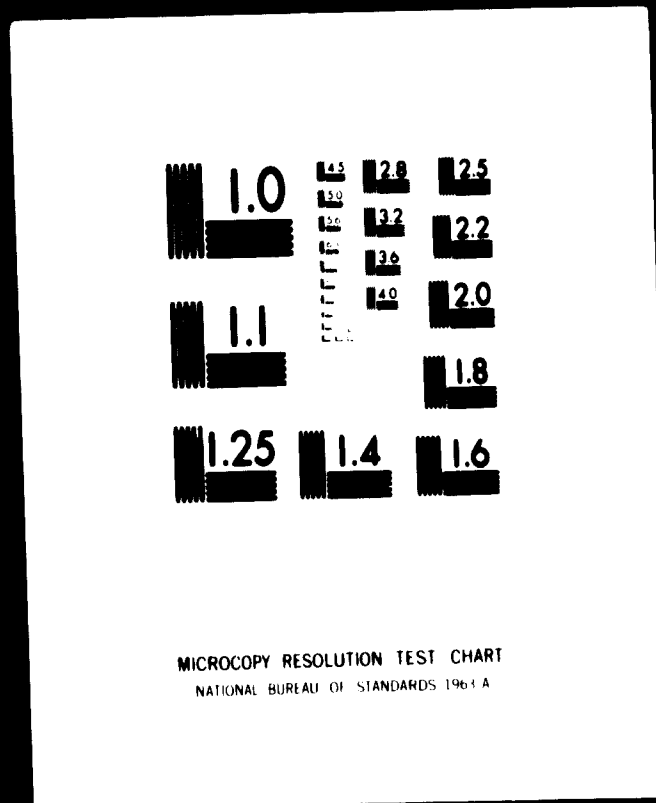


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Reference: CID/IPE/D.16
Title: IRAN'S EXPERIENCE IN INDUSTRIAL PROJECT EVALUATION
Author: K. IRAVANI

The industrialisation programme of Iran was started about 35 years ago by Reza Shah the Great. The First and Second Seven-Year Plan were undertaken during the years 1948 to 1962. The Third one is a Five-Year Plan, ending in March 1968. The objective of the Third Plan was to achieve a growth rate of 6% per annum of gross national product throughout the plan period.

Total allocation of public funds for the Third Plan was \$2,666 million, of which \$292 million was for industry and mines. Private investment for industry and mines was estimated at \$550 million and will be supplemented by the transfer of allocated public funds through Government agencies.

The function of planning during the three plan periods was the responsibility of the Plan Organisation. However, during the year 1964, the Government transferred this responsibility to the individual ministries and the authority of coordination and allocation of funds was left with the former. Accordingly, the Research Centre for Industry and Trade was established in the Ministry of Economy with four divisions. One of these is the Industrial Project Evaluation and Preparation Division.

In the ultimate analysis, it is the consumers who decide the success or failure of an industry. The quality of products and their presentability is, therefore, the dominating factor in project evaluation. Other factors are also important, such as: a) social benefits; b) utilisation of waste-products; c) utilisation of existing skill, and d) introduction of labour-intensive industries, etc.

The Industrial Project Evaluation and Preparation Division seeks the assistance of UN advisers in evaluating large-scale new projects. Iranian technicians have carried out projects on sugar and cement industries, for which they have already acquired the technique. Project evaluation for some of the basic industries is also undertaken through consulting engineering firms.

Particular attention was given by this Division to the evaluation of industrial projects for a regional development programme. All the available statistical data are being used systematically for project evaluation work. Difficulties are being experienced, however, in obtaining itemised import statistics and comprehensive market survey data on different industrial products.

Reference: CID/IPE/D.19
Title: PROJECT EVALUATION AND DEVELOPMENT PLANNING
Author: S.B. AKGUR

In Turkey, preparation and evaluation of industrial projects are carried out in accordance with principles and criteria indicated in the Plan. The Plan has been prepared to cover the economy as a whole in which the public and private sectors function side by side.

Investment targets for the public sector will be readjusted according to the volume of investment actually made by the private sector.

- i Basic investments, power supply, irrigation, dams, must be made by the State
- ii Productive investments: The public sector will readjust their programmes to assure the realization of the necessary investment, if the private sector does not invest in an expected field. The establishment of mixed enterprises will not in principle be encouraged.

The objective of sectoral development will be to use natural resources, invested capital, and manpower in the most economic way, to lay the foundations of sustained development, to prevent imbalances and bottlenecks in inter-sector relationships, to promote the development of sectors producing export goods and those producing import-replacing goods.

In order to determine production targets by sectors, a fifteen sector input-output table was constructed. Specialised sector committees were set up to collect basic data for the Plan. After calculating the additional capacity to be established in order to meet the demand which existing capacity is not able to satisfy, the optimum capacity of production units was established and broken down by years in order to make it consistent with demand. In determining the units to be added to production, project proposals were collected from state organisations and evaluated separately in relation to sectors. Since resources such as capital and foreign exchange are more limited than others, their allocation to projects had to be based on a system of priorities.

In industry, the yearly average rate of growth is expected to be 12.9%. The aim is not to manufacture every kind of product in the country. Production will be developed in fields where comparative cost analyses appear to give favourable results. Industrial locations will be selected with a view to increasing total productivity and promoting a balanced interregional development. Accelerated depreciation will be applied. Encouragement will be given to raising the percentage of domestically produced components.

Investment will be made in accordance with general and far-sighted criteria by taking into consideration technological possibilities and progress. While doing so, inequalities among the regions shall be minimized. The State will make strategical investments in the fields in which the private sector will not participate. Priority shall be given to the industrial investments which will contribute to the social and economic development of the region, as well as to industries which will produce capital goods and export goods.

Reference: CID/IPE/D.20

Title: THE GROWTH OF THE INTERNAL MARKET IN RELATION TO THE STRATEGY OF ECONOMIC DEVELOPMENT

Author: ROMOLO ARENAL

There is no economic development scheme that is valid for each of the underdeveloped countries, in view of the great diversity of situations. Nevertheless, certain schemes can provide useful references for the identification of the essential elements that are present in many situations of underdevelopment.

This report assumes as a primary objective, in the case of a very underdeveloped country, the expansion of the internal market, by giving priority to the establishment of selected industrial plants intended to promote those economic sectors for which the country displays a growth potential based on natural resources, tradition or other relevant factors.

The take-off operation should be achieved not by the introduction of regular and evenly-divided investments and efforts throughout the entire country, but by creating strategically situated development poles, even if they do not immediately affect all areas of the country.

A development pole founded on a number of basic plants must naturally be carefully planned as regards its intrinsic structure of economic production; its institutional framework must also be conceived for the training of management and technical cadres from which the managerial class of the country must of necessity derive.

The institutional structure of the agency entrusted with the direction and control of the development pole should be based on a mixed formula that assures, on the one hand, participation and control by the State and on the other, the collaboration of private capital.

Reference: CID/IFE/D.22

Title: OPERATIONAL PLANNING OF A SPONGE IRON AND CONTINUOUS
CASTING ROLLED STEEL PRODUCTION PROCESS

Author: H.A. H. VEMMANN

The need to adjust the technology of steelmaking to available raw materials and to economic requirements and market conditions suggests strongly alternative processes for industrially emerging countries.

The paper outlines principal features of the Hyl-Sponge iron process which uses instead of metallurgical coal, natural gas as reducing medium. It traces briefly the development of this novel process as an example for indigenous industrial development with the help of international technical cooperation. It suggests the application of continuous casting as a further means to achieve the objectives of small capital and production costs besides technical suitability.

The report after conveying information on operational performance of continuous casting machines, discusses problems of integration of melting and casting operations. After introducing the conception of availability an iron balance is set up for a process model composed of the reduction, the casting and two finishing stages, whereby for each recoverable and non-recoverable losses are taken into account. Possible rates of production based on individual operational parameters are derived with the help of partly analytical and partly graphical representations. They allow to harmonise casting and melting operations with respect to individual capacities and operational scheduling.

An appendix contains the derivation of relations quoted earlier and offers an example of operational production planning of components of the reducing and the continuous casting sections of the process.

Reference: CID/IPE/D.23
Title: INDUSTRIAL PROJECT EVALUATION IN JORDAN
Author: SAMIR K/W.R

Industrial development in Jordan has been phenomenal. Income originating in mining, manufacturing and electricity has increased from JD 4.2 million in 1954 to JD 11.7 million in 1963. Since 1954 a number of medium and large size industries have been established. Between 1954 and 1962 the number of industries (employing 5 persons or more) has increased from 421 to 1412 and persons engaged in these establishments increased from 8200 to 14,900. Average labour productivity in 1963 was JD 1011.

The private investor has been developing a keen appreciation of technical and economic viability considerations. The Chamber of Industry has become an effective coordinator between the private and the public sectors.

The Government role in industrial development is essentially regulatory and promotional as to protect the public interest and foster actively industrial growth.

The Ministry of National Economy, the Custom and Excise Department, the Jordan Development Board, the Industrial Development Fund, and the Ministry of Finance are the Government Organisations which are concerned with industrial development.

These organisations work with limited staff with limited experience. This situation results in improper project evaluation. This has been improving through higher education and practical training. In seeking immediate solution to this problem, the Government has sought the assistance of national and international agencies.

In medium and large size industries, managerial and technical know-how is provided by the suppliers of machinery or by foreign organisations and for small size industries local expertise provide the technical

know-how. Foreign research institutes usually carry out feasibility studies for Jordan industries.

Lending policies pursued by the IDJ allow the financing of 30-40 percent of the total cost of the project.

In some cases, Government participation is sought by stock companies.

In appraising industrial projects, the Government applies the following considerations:

1. Whether or not other similar industries exist and limitation of competition.
2. Volume of production and volume of local and external demand.
3. Savings and/or earning of foreign exchange
4. Commercial profitability
5. Contribution to national product and employment.

The Seven Year Plan for Jordan's Economic Development was prepared to achieve the following objectives:

1. Reduction in the balance of trade deficit.
2. Increase in per capita income.
3. Reduction in the level of unemployment

Technical assistance programs provided by national and international organisations constitute an important vehicle to train local personnel.

On the institutional and organisational levels, the Seven Year Plan proposed the following measures with a view to improving project evaluation procedures and practices:

1. Establishment of an Industrial Policy Advisory Council representing all concerned departments
2. Restructuring of the Ministry of National Economy
 - a. The Industry Section
 - i. Licensing and Statistics Division
 - ii. Advisory Division
 - b. Foreign Trade Division

3. Creation of Standards Bureau
4. Creation of shares committee responsible for Government held shares in Industry
5. Reorganization of Customs and Excise Department
6. The Creation of an Industrial Development Bank

Reference: CID/IPR/D.25
Title: PROJECT EVALUATION IN BOLIVIA
Author: ALIPAZ ALCAZAR, M.A.

Three basic aspects of any project are taken into consideration when evaluating projects in Bolivia: a) the economic factor, namely a justification of the use recommended for the resources; b) the technical aspect, namely a justification of the proposed technical alternative; and c) the timeliness, making for ready implementation.

In addition, priority criteria appear when dealing with a rational plan, since there is a need for relating social interest considerations to those of private interest. This accounts for the importance of achieving a proper balance between the profit earning capacity concept, which dominates the evaluations made on private criteria, and the views featured in socially oriented projects.

It is clear from the above that project selection is very important with due allowance, in the first place, for the main objectives of the National Plan and, then, public and private interest.

In order to achieve this result, we apply various criteria, the main ones of which may be mentioned:

- a) Economic feasibility, namely the extent of the profits to be derived from a project. The use of this criterion tends to bring about the highest possible profit from each unit of capital invested in the project.
- b) Capital turnover rate, a factor used in an attempt at measuring capital productivity in a given time, not in terms of profits, but rather of a ratio to the gross produc. value.
- c) The plus value per unit of investment committed, a yardstick designed to measure capital productivity in terms of the National Product. This criterion, which gives a measure of the product-capital relationship, is very important socially.
- d) Capital intensiveness, referring to the greater or lesser use of capital required for the purpose of the project.

- e) Amount of employment created per unit of invested capital.
- f) Increase in labor force productivity.
- g) Marginal social productivity of the capital, in terms of its contribution to the National Product

- h) The foreign currency factor, making it possible to strike a balance between incoming and outgoing foreign currency, as a result of the economic process whereby there is a tendency to the substitution of the National Products for imports, and to an increase in exports. This is an important factor, for which considerable allowance always is made.

- i) Benefits-cost relationship. Unlike the criteria mentioned above, which bear on isolated factors, this criterion endeavors to weight them according to social requirements, in an effort aimed at maximizing total production, while using a minimum of the resource complex.

In reality, these pre-established criteria are complemented by others such as:

- a) Preferential treatment for the projects which return their investments in a short time. Its application is of interest in countries such as Bolivia, where capital is scarce and Bank rates are very high.

- b) Project completion. This criterion gives priority to the completion of projects that were initiated and remained paralysed for the lack of resources.

- c) Complementary nature of some projects.

Reference: CID/IFE/D.26
Title: PROJECTS FOR INDUSTRIAL DEVELOPMENT IN IRAQ
Author: BASHIR AL-DABOUNI

Iraq is an agricultural country but it possesses many natural resources for industrial development. Prior to 1958, a wide programme was set by the Development Board to determine industrialisation possibilities.

Numerous industries were recommended for establishment, including the following:

(1) Rayon plant, (2) Textile mill, (3) Sulphur recovery from natural gas, (4) Paper plant, (5) Steel furnace, (6) Fertiliser plant, (7) Dates industry, (8) Petrochemical industries, (9) Caustic soda, (10) Glass factory, (11) Pharmaceutical, and (12) Building materials.

Unfortunately the full programme was not carried out except for the following:

(1) Sugar factory at Mosul, (2) Textile factory at Mosul, (3) Cement factory.

After 14 July 1958, the Development Board was abolished and a new programme was developed in which the USSR participated in supplying and supervising the construction of the following industries:

(1) Antibiotics and Pharmaceutical plant (expected to be finished in 1966) (£6 million); (2) Agriculture machinery (under construction); (3) National shoe factory (£1 million); (4) Canning factory in operation (£3 million); (5) Bulb factory; (6) Sewing factory; (7) Woollen textile; (8) Glass factory, (£6 million).

The rest of the programme was carried out under conventional procedures and a number of international firms have been selected to construct the following plants:

- (1) Rayon plant (under construction) £12 million
- (2) Fine textiles - £7 million
- (3) Paper plant - £10 million
- (4) Sulphur recovery plant (under construction) £8 million
- (5) Fertiliser
- (6) Petrochemical (consulting services)
- (7) Power stations, 300 megawatt
- (8) High tension line

Reference: CID/IFE/D.27
Title: A STUDY OF THE FEASIBILITY OF A MEN'S HOSEIERY
MANUFACTURING FACILITY FOR NIGERIA
Author: ARTHUR D. LITTLE, INC.

For the Federal and Regional Governments of Nigeria and the U.S. Agency for International Development, Arthur D. Little, Inc. is conducting an industrial development assistance program. In conjunction with this program we have examined the feasibility of manufacturing men's and children's hosiery for domestic use in the country.

In assessing the demand for hosiery in Nigeria, we investigated the size and composition of the market, the material, design, quality and price of the products consumed, probable competition from exporters, and the existing pattern of sales and distribution in Nigeria. On the basis of import statistics, interviews with major importers and market sampling, we estimated what portion of the market is constituted by men's and children's hosiery, defined two basic types of knitted products and three qualities of socks being imported into Nigeria, estimated the export origin and volume of each grade and projected market structure and size to 1974.

Using the market analysis as a basis for defining the product quality and volume most appropriate to Nigeria, we outlined the manufacturing process for an integrated mill capable of producing 150,000 dozen pairs of socks per year. We presented a flow diagram, described in detail each operation involved in the process and prepared machinery investment schedules for two plants, one producing a looped-toe sock on double-cylinder machinery and one producing a seamed-toe sock on single-cylinder machinery.

Based on an annual production of 150,000 dozen pairs of socks on a two-shift, 300-day basis, we prepared estimates of the costs, sales price and profitability for both plants. In addition to the commercial feasibility of the hosiery plant, we analyzed the economic benefits of the factory to Nigeria and described the investment climate of the country.

Arthur D. Little, Inc. concluded that a hosiery factory would be both feasible and desirable for Nigeria. We recommended the establishment of a factory to manufacture men's and children's socks on a combination of double and single-cylinder machinery. We suggested that manufacturing emphasis be placed on double-cylinder knitting machinery, but that the exact ratio between double and single-cylinder machinery be decided at the time the factory is established.

Reference: CID/IPE/D.28
Title: A STUDY OF THE FEASIBILITY OF A CASSAVA STARCH INDUSTRY
IN NIGERIA
Author: ARTHUR D. LITTLE, INC.

For the Federal and Regional Governments of Nigeria and the U.S. Agency for International Development, Arthur D. Little, Inc. is conducting an industrial development assistance program. In conjunction with this program, we have analyzed the technical and economic feasibility of establishing in Nigeria a cassava starch industry to supply world markets. This study is an outgrowth of a previous report on international markets for cassava products in which we concluded that world market potential is sufficient to justify cassava starch manufacturing.

The analysis focused on two problems: 1) assessing the existing and potential supply of cassava and 2) evaluating the economics of starch manufacture in Nigeria. Detailed consideration was also given to possible location of the industry, problems of land tenure and acquisition, and Nigeria's investment climate.

In assessing cassava supply, we studied the availability, dependability, and suitability of supplies from local farmers and also the feasibility of plantation-grown cassava. In evaluating supplies from farmers we considered: 1) present markets, prices, and distribution patterns; 2) agricultural practices, farm size, yields, and starch content; and 3) the location and concentration of cassava-growing areas with respect to an export-oriented industry. In evaluating the feasibility of growing cassava on a plantation scale, we considered the capital investment requirements, operating costs, agronomics, and profitability of a cassava plantation used as either an alternate or a supplemental source of supply.

In evaluating the economics of a cassava starch plant, we analyzed the capital requirements, operating costs, and probable profitability of such a plant. We obtained process information and equipment costs from principal manufacturers of cassava starch processing equipment, and prepared investment and operating cost statements, cash flow analysis, and return on investment analysis for various conditions of production volume, raw material costs, and starch selling price.

On the basis of our analysis, Arthur D. Little, Inc. recommended that the Nigerian Government encourage the establishment of a starch industry with pioneer status and provide assistance in the following operations: 1) locating and improving suitable factory and plantation sites; 2) organizing both a cassava plantation and a local farmer procurement system; and 3) making electric power available at favorable industrial rates. We also suggested a location for primary consideration based on its low land-clearing and water transportation costs, labor availability, and present volume of production exceeding food requirements.

Reference: CID/IPE/D.29
Title: A STUDY OF THE FEASIBILITY OF MANUFACTURING OPPORTUNITIES
FOR CONSTRUCTION PRODUCTS IN NIGERIA
Author: ARTHUR D. LITTLE, INC.

For the Federal and Regional Governments of Nigeria and the U.S. Agency for International Development, Arthur D. Little, Inc. is conducting an industrial development assistance program. In conjunction with this program, we examined the current condition and future prospects of the building and construction industry in Nigeria to: 1) relate the expected demand for all types of materials to Nigeria's resources and capabilities; 2) identify products which can reasonably be considered for manufacture, either in whole or in part by private investors within Nigeria; and 3) determine the engineering and economic feasibility of manufacturing specific products or groups of products that meet the screening criteria.

We conducted our research in two phases. The first phase involved a full examination of the current condition and future prospects of the building and construction industry in Nigeria, coupled with an examination of more than 30 product possibilities. We screened such basic construction materials as glass, metal, clay, wood, plastics and concrete plus a broad range of fabricated products derived from these materials and then selected specific products for possible manufacture. The second phase involved an evaluation of the market, raw materials, engineering, and over-all economic feasibility of manufacturing the selected products, giving due consideration to typical building practices and to construction alternatives acceptable to the Nigerian environment.

A large number of potential new business opportunities were screened, but most were eliminated because they did not have the potential to contribute to the economic viability of an indigenous industry. In several cases in which negative conclusions were reached after some degree of quantitative analysis, we included a discussion of the problem in the report, indicating the rationale for all conclusions.

Market estimates were developed from data such as import statistics and construction cost and activity estimates, supplemented by qualitative information on typical structure and design details and building costs relevant to different

regions. Recognizing that markets for an individual product are generally quite limited in size, we prepared manufacturing cost estimates for minimum-sized facilities in most cases. Locally relevant operating cost factors were used wherever possible and plant design and labor requirements for proposed operations were based on efficient, normally acceptable operating practice.

As a result of our screening process, market surveys, and economic feasibility analysis, we selected four products offering potential for moderate-sized manufacturing operations - lime, welded pipe, crushed aggregate, and pre-cast concrete products. For each potential venture, we prepared detailed analysis of market potential, possible location, mode and capacity of operation, labor requirements and costs, investment and operating costs, and profitability. Our analyses were sufficiently detailed to permit the potential entrepreneur to make an investment decision without extensive additional study and were supplemented by a detailed discussion of the investment climate in Nigeria.

Reference: CID/IFE/D.30

Title: INDUSTRIAL PROJECT EVALUATION IN THAILAND

Author: KRIT SOMBATSIRI

The promotion of industrial expansion in Thailand is a principal objective of the National Economic Development Plan. This is sought mainly through private initiative. The Government has the main task of creating conditions conducive to investment in industry by private entrepreneurs, both domestic and foreign. While the industrial state enterprise still exists, it is not intended to add to its number. Industrial promotion, however, is carried out by many governmental agencies, such as the National Economic Development Board, Ministry of Industry, Board of Investment, and Industrial Finance Corporation.

The major factors for judging the soundness of industrial projects according to the experience of Thailand are:

1. Analyse and estimate the national economic profitability.
2. The economic prospects of the industrial project, showing the percentage of returns on total investment and owner's equity.
3. The technical soundness including the proven reliability of plant processes and equipment to assure that the plant will produce the quantity and quality of products specified, on a continuing and dependable basis.
4. The financial aspect considered as an important factor for evaluating the profitability of the project.

Reference: CID/IPE/D.31
Title: A STUDY OF THE FEASIBILITY OF PRODUCING HARDBOARD AND
PARTICLE BOARD IN GREECE
Author: ARTHUR D. LITTLE, INC.

Xelopan Industries S.A. is a proposed corporation for the manufacture and sale of hardboard, particle board, insulation board, and laminated board in Greece. Arthur D. Little, Inc.'s assignment was to review the market, production, financial, economic and management factors bearing on the establishment of a hardboard and particle board mill in order to express our opinion on the overall feasibility of the venture.

Our research effort was directed toward separate analysis of the hardboard and particle board segments of the wood products industry, with emphasis on ascertaining the market, assessing available processes, and preparing financial estimates for the production of each product. Detailed consideration was also given to evaluating the required resources - wood, labor, chemicals, fuel and utilities, transportation, site and management.

In evaluating market size and growth, we made use of available statistics and information obtained from importers and wholesalers. For both hardboard and particle board, we calculated an average price per ton, described the end-use applications and product specifications and outlined an appropriate pattern of distribution for the proposed plant. For the purpose of assessing the major process alternatives, we developed selection criteria by which to judge which process should be employed in production. Financial estimates were prepared for a 70-ton-per-day hardboard plant (expandable to 100 tons) and a 30-ton-per-day particle board plant (expandable to 50 tons). This data included detailed breakdowns of initial plant investment, working capital for seven years, and production cost estimates for both 1964 and a 10-year period.

Arthur D. Little, Inc. concluded that the proposed Xelopan enterprise to produce 70 to 100 tons per day of hardboard and 30-50 tons per day of particle board near Salonika is a sound business venture. On the basis of an investment of \$6.38 million, we estimated that the Xelopan enterprise should earn a true return of 15% compounded annually on all funds employed, return 20% plus after taxes and interest on total funds employed, recover fixed capital of \$4.93 million from

depreciation and earnings in 6.8 years, and accumulate \$3.5 million within 10 years in excess funds available for dividends or reinvestment after the payment of loans. We recommended that priority be given to hardboard production and that a long-term purchase agreement be negotiated with the Ministry of Agriculture to assure Xelapan an adequate supply of wood at a fair cost.

References: CID/IPE/D.32
Title: A STUDY OF THE FEASIBILITY OF AN INTEGRATED FISH-PROCESSING
PLANT AT GRAND RAPIDS
Author: ARTHUR D. LITTLE, INC.

Concurrently with our study of the fresh-water fishing industry in Manitoba, Arthur D. Little, Inc. was asked by the Manitoban Department of Industry and Commerce to determine the feasibility of establishing an integrated fish-processing plant in Grand Rapids. Since our study of the fishing industry as a whole indicated the need for considerable industry reorganization and long-range planning, we predicated our feasibility study on the assumption that our previous recommendations for improving the fishing industry would be implemented.

Data collection and analysis was carried out by a marketing specialist, an economist, and a specialist in fish production and processing and was directed toward an assessment of supply, market potential and the economics of the enterprise itself. In evaluating supply, we analyzed both the structure of the primary fishing industry and the process of procurement. The primary fishing industry was examined in terms of actual fish resources, the supply of fishermen and the techniques, gear and equipment available to them, taking into consideration the effect of using improved practices, equipment and facilities. To evaluate the system of procurement in Manitoba, we investigated the organization and sanitary conditions of buying stations and the transport system from station to processor.

The market survey focused on an investigation of existing and potential demand in the United States and Canadian markets. Demand for various types of fish was evaluated separately under the broad categories of edible and low priced, the edible fish being analyzed by species and the rough fish by end use. Our analysis of the economic feasibility of the plant at Grand Rapids involved an evaluation of the location and raw material supplies in the area and the preparation of volume and cost-price estimates for the proposed plant.

As a result of our investigation, we concluded that an integrated fish-processing plant at Grand Rapids would be feasible if established within the previously recommended fish management area with exclusive processing rights on all commercially caught fish. Arthur D. Little, Inc. recommended that: 1) processing

plants be located in such production areas in order to reduce production and processing costs, improve the utilization of fish resources, eliminate duplication of services, and provide employment to underemployed fishermen; 2) consideration be given to the feasibility of offering an amalgamation of existing fish companies the opportunity to establish such plants in management areas provided fisherman rights are protected by the establishment of the previously recommended marketing board; 3) construction at Grand Rapids awaits establishment of management area boundaries; and 4) efforts be made to introduce utilization of modern fishing gear and techniques and to improve the quality of processed fish.

Reference: CID/IPE/D.33
Title: A STUDY OF THE FEASIBILITY OF A FIXED-NITROGEN FACILITY
IN THE PHILIPPINES
Author: ARTHUR D. LITTLE, INC.

In 1958, Philippine consumption of fertilizer was largely supplied by imports. Benguet Consolidated, Inc. was interested in establishing a fixed-nitrogen plant in the Philippines and asked Arthur D. Little, Inc. to examine the feasibility of such an operation.

We directed our efforts toward assessing both the market situation and the economics of the proposed plant. In evaluating the world market situation, we determined the areas in which production exceeded consumption and analyzed the effect these might have on the Philippine market. We presented consumption and production trends and estimates for the United States, seven European countries, Japan, India and Southeast Asia, analyzing in detail possible competition from exporters in Japan and the Western United States.

In evaluating the local market, we were assisted by the Engineering and Development Corporation of the Philippines which, under a separate contract, submitted a separate report on the fertilizer requirements of Philippine agriculture. Thus we confined our discussion of the Philippine situation to a summary of the overall problems associated with the establishment of a local fixed-nitrogen industry - present versus potential supply and demand and the types of fertilizer and system of marketing required for a successful operation. Our economic analysis was based on the requirements of a plant producing 100 tons per day of ammonia, 100 tons per day of urea, and 170 tons per day of ammonium sulfate. We evaluated available production processes for each product and prepared estimates of the operation's investment requirements including working capital and organizational and pre-operational expenses. Raw material needs, sources and prices were analyzed and separate estimates prepared of the manufacturing costs involved in the production of each product. Using selling prices which reflected possible price pressure from over-supply areas in the Far East, we also calculated return-on-investment and payout for the proposed plant.

Arthur D. Little, Inc. concluded that an integrated plant producing ammonia, urea, and ammonium sulfate would require a total investment of about \$14 million and would yield a 14.1% return on investment. It would supply enough locally produced nitrogenous fertilizer to save the Philippines a minimum foreign exchange of about \$6 million per year. We recommended the establishment of a plant producing 100 tons per day each of ammonia and urea and 170 tons per day of ammonium sulfate near either of two refinery sites in the Philippines. We also suggested that during facilities construction the company purchase the products proposed for the plant in order to begin developing the market and marketing organization that would be needed to handle the plant's output at capacity.

Reference: CID/IPR/D.35

Title: TECHNICAL EDUCATION AND APPRENTICESHIP IN THE WEST INDIES;
A PROJECT PROPOSAL

Author: V.A. RICHARDSON

This paper deals with Technical Education and Apprenticeship in the West Indies. Its main concern is with education for the broadly defined engineering industry, i.e. building, manufacturing, maintenance, electricity supply etc. Though it applies specifically to conditions found generally in the West Indies and includes a pilot investigation for St. Lucia it is hoped that its general approach is applicable to other developing countries where similar social and economic conditions exist.

References: CID/IFE/D.36
Title: EVALUATION OF INDUSTRIAL PROJECTS IN CEYLON
Author: G. GUNATILLEKE

The need for conscious direction of the industrial sector and the need of much more detailed industrial planning and programming, has been accepted as a pre-requisite for adequate project evaluation in Ceylon whether it be in the public or private sector. The structure which is being established for project development and project evaluation seeks to ensure adequate study at different levels:

- a) The procedure for project evaluation itself is based on the formulation of an Industrial Plan, within a National Plan.
- b) Such an Industrial Plan will provide among other things a forecast or projection of the requirements of industrial goods at the end of the plan period, in relation to such factors as the desired rates of economic growth, the desired standard of living and the desired volume of investment and consumption.
- c) Within the plan objectives which are based on national criteria, the selection of projects for investment would be based on criteria which will maximise the utilisation of scarce resources, and would be built into the Industrial Plan at the level of National Planning.
- d) Project evaluation itself will derive part of its accuracy and reliability from the evaluation of the performance of existing industries.
- e) The techno-economic aspects will need the most vigorous scrutiny and verification and this aspect will receive the attention of the Industry panels.
- f) Criteria of evaluation that will be employed will include what one might term 'Sectoral' criteria, as well as 'project' criteria. 'Sectoral' criteria will be those which have an impact on related investments, and the capacity to stimulate and accelerate industrial growth. At this point, project evaluation will be closely linked with project development.

Project criteria will be those which are limited to the economics of the project itself.

The machinery for planning and evaluation in the Industries Ministry described in this paper is being designed to achieve these objectives.

Reference: CID/IPR/D.37
Title: PLANNING AN INTEGRATED STEEL MILL IN A DEVELOPING COUNTRY
Author: ROBBING and BERCHEN

Considering the situation prevailing in India during the years 1950-1953 the reasons for setting up a domestic steel industry are briefly discussed. The various possibilities of a realization of this goal are described using the case of the construction of an integrated steel mill for going into a more detailed discussion. The derivation of the location of the plant and the factors involved in reaching this decision are outlined before an explanation is given as to the form and principles of planning and execution of this project as laid down in the agreements of the contracting parties. Alternatives are discussed. The technical outlay of the plan had to provide for a considerable increase of the capacity installed over a range of 500,000 to more than 1 million tons of steel p.a.

The agreement between the contracting parties resulted in a specific distribution of responsibilities. This distribution of responsibilities, however, resulted in a specific way of an execution of the drafted plans.

The steel plant, which has been established in a formerly unindustrialized part of India has social implications both with regard to the labourers employed as to the surrounding community. Questions of planning residential areas living quarters for the construction personnel, of planning for skilled and unskilled manpower needs and of teaching the skills required are discussed with reference to the specific situation. Different possible lines of approach are evaluated.

The various problems of planning and executing this project lead to a consideration of alternative lines of approach and a suggestion of modifications for future projects.

Reference: CID/LPE/D.39

Title: EXPERIENCE OF THE WEST PAKISTAN INDUSTRIAL DEVELOPMENT CORPORATION
IN DEVELOPING THE INDUSTRIAL POTENTIAL IN PAKISTAN

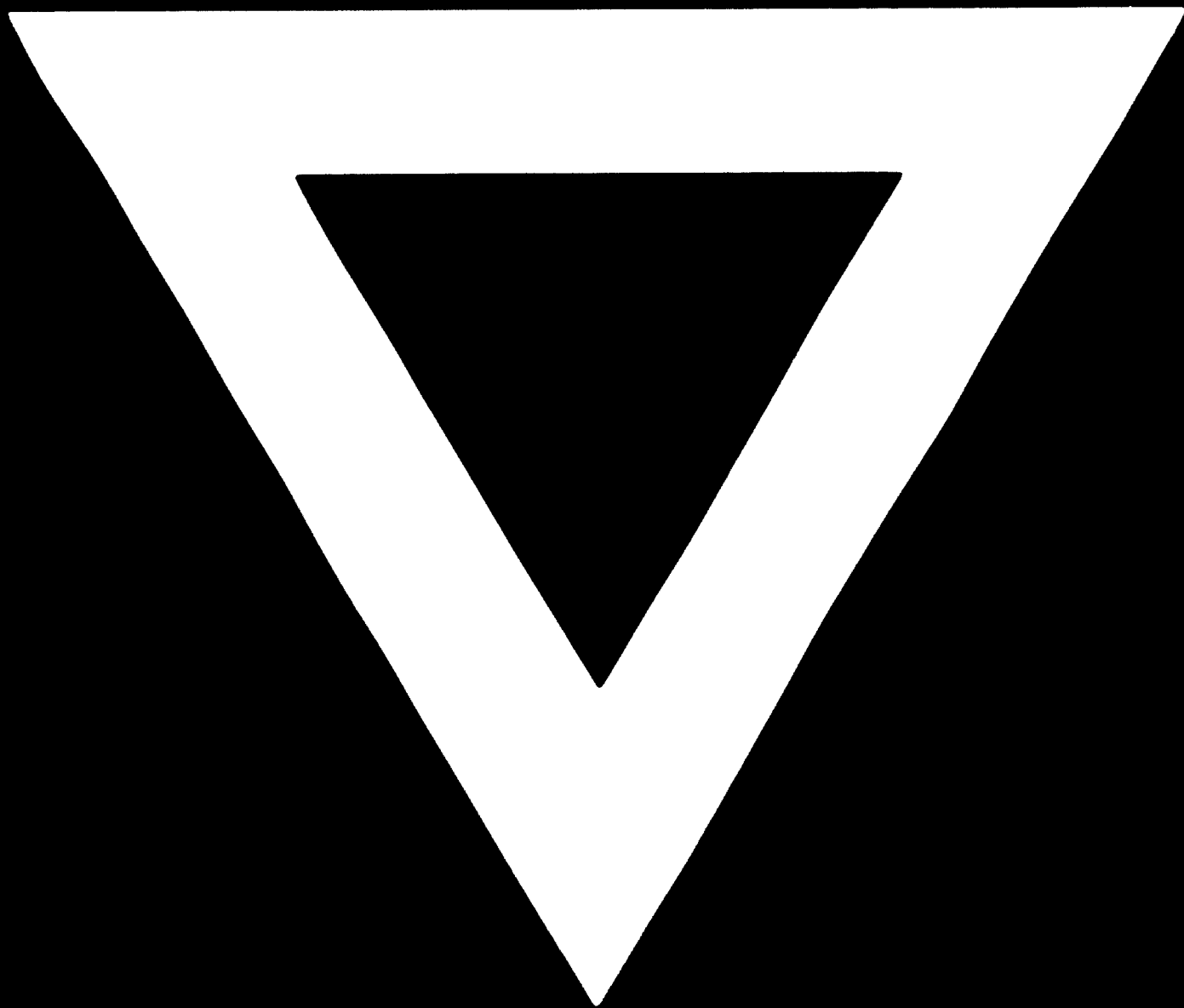
Author: A.M.K. MAZARI

The injection of Government's initiative and money through the agency of public sector, in order to give speed and a sense of direction to the development process, met with such a degree of success, especially in industrial field in Pakistan, that initially the Pakistan Industrial Development Corporation and, subsequently, the bifurcated Provincial Corporations namely, West Pakistan Industrial Development Corporation and East Pakistan Industrial Development Corporation came to be recognised as an important link of the developmental machinery of the country. Their contribution towards national growth is evident not only in the industrial capacities created or employment provided by these Corporations, but also in the manner and extent to which the private enterprise was induced to participate in the industrial programme of Pakistan..

The former PIDC saw the country through the first stage of industrial development by setting up consumer and intermediary goods industries. WPIDC, continuing the momentum generated by the PIDC, has now taken up the second phase of development i.e., creation of capacities in basic and capital goods industry.

The evaluation of the performance of public corporations like the WPIDC, merely in terms of financial returns does not tell the whole story. For a truer picture, full weight has to be given in the evaluation process to other objectives and targets (social, political, etc.) that are simultaneously achieved by the Government through the operation of such Corporations. It is only when the evaluation is done in its right perspective that a complete picture of the effectiveness of a public corporation in uplifting the economy of a developing country can be correctly re-constructed.

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