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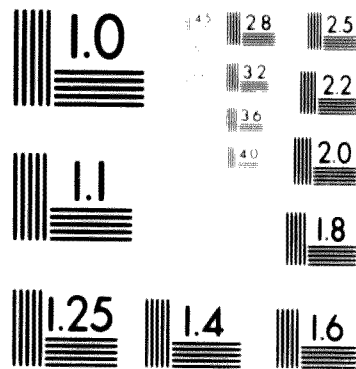
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Guidelines

to

Industrial Project Development

Including

Industrial Project Implementation .

and

Outline For

Basic Requirements for the Successful
Operation of Industrial Enterprises in
Developing Countries

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Khartoum: March 1974

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Industrial Project Development

Including

Industrial Project Implementation

I- Introduction

The process of developing an industrial project, passes through several stages, which - for several reasons - could hardly be systematized in an standardized system. However, a basic functional outline, could be drawn in a logical sequence, among which the "Industrial Project Implementation occupies its position.

Such basic functional outline could be sequenced as follows:

- 1- Identification of the Project Idea.
- 2- Project Preparation (Pre-Investment Studies).
 - 2.1- The Preliminary Selection Stage (Opportunity Study or Pre-Feasibility Study).
 - 2.2- Formulation Stage (Complete Techno-Economic Feasibility Studies, or Partial Study in Fields such as Technical, Management ... etc.).
- 3- Project Evaluation and Decision.
- 4- Investment Promotion.
- 5- Project Implementation.
 - 5.1- Contracting.
 - 5.2- Preparation of Invitation to Tender (Request for Quotation).
 - 5.3- Loan Application Dossier.
 - 5.4- Engineering Work (Project Designs, Construction and Start-Up).
 - 5.5- Preparation of Manuals.
 - 5.6- The Physical Construction of the Plant.

The development of an industrial project normally passes through these stages, and it should be realised that they are inter-related and should be considered as a Continuous whole. successful project implementation, for example, depends for a great part, on the adequacy of studies made in the "formulation stage". If the complete techno-economic feasibility studies are not properly done, unrealistic estimates of cost, resources and infra-structure requirements would result, and, in turn, would handicap the project implementation at the beginning. Pre-Investment Studies (Preliminary Selection and Formulation Stages) are inevitable means by which Project Evaluation and Investment Promotion Stages could be processed, and this is another proof that all the above-mentioned stages are inter-related and, in the process of industrial project development, should be considered a continuous whole.

Although this report will be mainly devoted to the specific subject of "Industrial Project Implementation", yet, because of the close inter-relationship between the above mentioned stages of the "Industrial Project Development", it may be necessary to give, hereinafter, a brief comment on each of these stages.

II- Brief Comment on the Industrial Project Development Stages

1- Identification of the Project Ideas

Usually, and in many cases, the project idea comes out of a response to a need arising within the context of the industrial development planning. They also may start as a notion or desire to produce specific product, or to utilize specific resources, and may be identified from surveys of existing industrial establishment from sectorial and inter-industry analysis, from geological surveys, from demand studies...etc.

2- Project Preparation (Pre-Investment Studies)

2.1- The Preliminary Selection Stage:

2.1.1- The function of this stage is to make a decision about the following:-

- a- Whether the objectives of a project idea comply with the objectives of the Government policy.
- b- Whether the project idea is technically and economically promising enough to deserve detailed

study: that is, a technical solution can be expected at a cost commensurate with the benefits.

- c- What aspects of the project deserve special attention in the course of further examination.

2.1.2-In order to be able to make a decision on the soundness of the project idea an Opportunity Study (Pre-Feasibility Study) should be made, covering the following main subjects:-

- a- A description of the market (estimation of consumption, market trends, present supplies ...etc).
- b- Brief description of the alternative technologies and information on the availability of major technical inputs (mainly raw materials).
- c- Tentative (profile-type) estimation of the investment and operating expenditures.
- d- Rough estimates of the commercial profitability.

2.1.3-The "Preliminary Selection Stage" is being examined by an investor or a shadow investor (promoter).

The "Opportunity or Pre-Feasibility Study" is to be prepared by an Industrial Economist or Industrial Engineer with a background in planning.

2.1.4-Once it is proved that a project idea deserves detailed study, an investor should be found, who would be interested in following it up (should not the promoter himself be the investor).

2.2- The Formulation Stage:

2.2.1-The function of this stage is to study (from the technical, economic, financial and managerial aspects) all alternative ways of accomplishing the objectives of the project idea, and to present the findings and supporting data in a systematic and logical order.

This may be done, either through.

- Partial (technical management ...etc.) study

or through.

- Complete techno-economic Feasibility Studies.

The main purpose of the complete techno-economic feasibility studies should be to evaluate the technical and economic feasibility of all variants of the project, and to select, define and thoroughly evaluate the best variant and outline a tentative implementation programme.

2.2.2-The presentation of this study could be outlined in the following way:

- a- Specifications of the product(s) made (technical description, utility value).
- b- Market and Production (information on the domestic and export demand and market- anticipation output of the plant broken down by years and product - steps to be taken in order to enter the market successfully such as pricing policy, sales organization ... etc.).
- c- Engineering presentation including: Plant design and layout, operation and construction.
- d- Location (indication of particularly important locational factors - adopted location and its advantages - site evaluation).
- e- Economic presentation, including annual domestic and foreign sales - annual operating expenditures and profits- investment expenditures - financing proposals and cash flow.
- f- Evaluation, including commercial profitability evaluation and national economic cost benefit analysis.

2.2.3-In the case of large scale projects the complete feasibility study, may be preceded by separate detailed studies of specific partial problems such as Market Studies (to be prepared by industrial economist or engineers closely associated with the product), Technical Feasibility Study to be prepared by a team of engineers and chemists specialized in the branch laboratory research institute), and Regional Location Study (to be prepared by industrial economists and civil engineers).

2.2.4-The complete techno-economic feasibility studies are being prepared by a team of engineers and economists, preferably from a consulting company specialized in the branch.

3- Project Evaluation and Decision

- 3.1- The function of this stage is to decide whether the project is to be implemented or not and what should be its more important technical and economic parameters. Whenever a ranking system is applied, the evaluation should be expressed in quantitative terms according to the criteria of project ranking.
- 3.2- The findings of the Evaluation Report may contain:
- a- Comments on the coverage of the pre-investment studies (the formulation stage).
 - b- A criteria review of data estimates and comments on the evaluation and recommendations as presented in the pre-investment studies.
 - c- A recommendation on the position to be taken (or statement on the decision which has been made).
- 3.3- The project evaluation is to be made by the investor himself and/or the body whose approval is a pre-requisite for implementation.

4- Investment Promotion

Industrial investment promotion may be defined as activities to secure financing for the implementation of the project. It should be noted that these promotional activities should ideally be carried out after the formulation stage of the project (para 2.2 above) and its positive evaluation (para 3 above). In principle, however, they may start at any stage which would arouse the interest of the parties concerned. Practically, it means that these activities can start immediately after the preliminary selection stage (para 2.1 above).

5- Project Implementation

The function of this stage is to physically construct and complete the industrial plant, starting from the preparation of tenders and call for quotations, until, ultimately, the start-up of operation, trial runs, handing over and supervising the full scale production for a period of time amounting to few months. In between the starting and the final tasks mentioned, the process

passes through several stages such as analysing offers, negotiation with potential suppliers, issuing supply orders on contractual basis, inspectorate, preparation of implementation plans and programmes, preparation of blue-prints, construction plans and detailed engineering designs, supervising erection setting systems for scheduling, coordination and control, supervising trial runs and arranging for handing over procedures.

5.1- Contracting

The implementation of the project should be fixed by legal obligations (contracts) all through. Negotiations should take place to achieve contractual agreements with several agents such as:

- The banks for financing.
- The administration for locations, fiscal incentives and other matters related to administration authority.
- An industrial consultancy firm for technical matters and supervision.
- The suppliers of equipment and suppliers of know-how.
- The architectural and structural consultancy firms for construction designs.
- The civil and buildings contractors.

When these contracts, and, may be others, are signed, the implementation process becomes legally fixed, technically and timewise.

5.2- Preparation of the "Invitation to Tender (Request for Quotation)"

5.2.1- The main purpose of preparing such document is to specify the techno-economic parameters of the offer and the commercial and legislative conditions of a contract, or contracts to be drawn with suppliers or contractors or consultant engineers. The preparation of this document is of particular importance in many ways, and hence it should be designed and prepared with considerable care.

5.2.2- Six main chapters in addition to annexes, usually constitute an "Invitation to Tender". These are:

a- Introduction

One of the important information to be stated in the introduction is the "type of tender", be it:

- or - Lump sum, turn key, or
- or - Fixed fee for contractor's home office services, and fixed material costs. All construction costs open.
- or - Fixed fee for contractor's home office services. Material and construction costs open.
- or - Any other type of tender.

b- Description of the Project (Extract from feasibility Studies)

This chapter contains the following:

- Objectives of the project (production)
- Engineering presentation.
- Location
- Economic Parameters.
- Time schedule.
- Any other information necessary for describing the project.

c) Goods and Services to be Tendered:

This chapter contains the following:

- Equipment as specified in an annex.
- Site preparation.
- Inspection of materials to be delivered to site (inspectorate).
- Know-how licenses and patent protection to be offered by supplier/contractor (if applicable).
- The project's schedule with: penalties for "over-run" and/or bonuses for earlier completion and maintenance period after completion.
- Construction (management, reporting, construction and operation documentation, subcontracting, trial runs ... etc.).

d) Commercial Terms:

The chapter contains the following:

- Required format of contract.
- Pricing.
- Payment conditions.
- Guarantees (e.g. design, performance, materials).

e) Legislative conditions:

This chapter contains the following:

- Liability for defects.
- Solution of disputes and arbitration methods.
- Local laws to be adhered to (labour, import regulations, currency regulations ... etc.).

f) Special Instructions to Tenderers:

- Time limit for tendering.
- Guarantee deposits.
- Any other instructions.

g) Annexes:

- Specifications of machinery and equipment
- Chemical & physical properties of raw materials.
- Properties of the site.
- Available construction facilities in the country.
- Any other necessary annexes.

The above mentioned six chapters and annexes are by no means rigid or standardized. They are only presented here as a guideline and could be increased, reduced or re-designed, depending on the type of tender, the supplier, the contractor, the consulting firm and the type of material or service to be quoted.

5.2.2- The preparation of the "Invitation to Tender" being of particular importance to the successful and economic implementation of the project, should be carefully made by a specialized and competent consulting firm.

5.3- Loan Application Dossier:

When stepping into industrial development, almost all developing countries face the difficulty of shortage of capital, and in particular, the foreign currency component. In such a situation the necessity arises for attracting financing institutions to finance or participate in the project. Loan application Dossiers should thus be prepared for this purpose.

Such document aims to providing a financing institution with information on the project, its economic and financial viability and on the investor, his consulting engineers and his technical partners (if any).

5.3.1-The document normally contains:

a- General information (history of the project, financial standing, reputation and competence of investors).

b- Information on the project (taken from the feasibility studies), such as:

- Market and production.
- List of alternative production methods, and description of the alternative selected, with detailed specification of investment and operating costs.
- Commercial profitability.
- Social benefits.
- Financial soundness (financial structure adopted, ability to repay loans ... etc.).

c- Other information, such as:

- Proposals for guarantees to be offered to the bank.
- Information on steps taken and formalities complied with to carry out the project.
- Information on technical partners considered or selected.
- Information on local laws and regulations granting security for foreign capitals or foreign loans.
- Any other necessary information.

5.3.2-The preparation of the "Loan Application Dossier" should be carefully made by specialized Investment Financing Expert or Experts.

5.4- Engineering work (Project Designs, Construction, and Start-up).

5.4.1-The engineering of the project implementation, consist of several activities, such as:

- Participation in the analysis of offers and negotiations with potential suppliers and/or contractors.

- Preparation of blue prints (site plans, machinery layout ... etc.).
- Preparation of detailed plant designs.
- Preparation of construction plans (or architectural, structural and the rest of civil work).
- Site preparation and construction.
- Inspecting deliveries (inspectorate).
- Supervising erection of machinery, and equipment and installation of wiring ... etc.)
- Supervising trial runs and handing over procedures.

Such list of engineering work should only be considered a guideline in the contracting stage, as its component activities differ according to type of contract (whether turn-key project contract or contract for bidding of individual machinery units ... etc.).

From the above it is obvious that the functions of the engineering work are to prepare, in a proper scientific manner for the physical construction and completion of the industrial plant according to the technical, economic and time parameters of the project, on legal contractual basis.

5.4.2-The above-mentioned "Engineering Work" should be made by specialized and competent consulting firms or engineers.

5.5- Preparation of Manuals:

5.5.1-To secure the best possible efficiency in the future regular operation of the industrial enterprise, a manual or several manuals should be prepared including policies and systems to be adopted or applied by the enterprise. Such manual or manuals may include the following:

- The most suitable organizational structure for the enterprise, describing work relations and work mechanism (informal organization pattern) and clarifying communication channels downwards, upwards and sideways authority and responsibility of each function

should also be defined and "Standard Procedures and Systems" should be detailed.

- Manufacturing and Performance Standards for industrial operations and office activities.
- Financing, marketing and raw materials procurement policies.
- Production planning, coordination and control systems.
- Financial and cost accounting systems.
- Stores and storage systems.
- Policies and systems for wages and salaries, including incentives.
- Quality control network and systems.
- Other policies and systems to be adopted or applied to secure the highest possible efficient operation.

5.5.2-The preparation of the above mentioned manuals, being of vital importance for securing an efficient future techno-economic operation of the industrial enterprise, should be considered an essential assignment to be carried out by a specialized consultancy firm or specialized multi-discipline team of experts.

5.6- The Physical Construction of the Plant:

As mentioned before, the function of the "Project Implementation" is to physically construct and complete the industrial plant in such a way that it becomes finally an economic production unit. The preparation of "Invitation to Tender", the tabulation and analysis of offers, the issuing of supply and purchase orders, the inspection of machinery and equipment, the preparation of "Loan Application Dossiers", the preparation of blue prints and detailed plant designs, the preparation of construction plans, the supervision of erection of machinery and of the trial-runs and fixing all these activities on legal contractual basis..... all these

tasks are essential components of the rather complex structure of "Project Implementation". However it should be realized that such tasks are in essence preparatory work for the physical construction of the plant.

- The preparation of "Invitation to Tender", the tabulation and analysis of offers, the inspection of machinery and equipment and the issuing of supply and purchase orders followed by custom clearance and inland transportation and insurance.... are preparatory tasks for receiving the machinery and equipment on plant site.
- The preparation of blue prints and detailed plant designs and the preparation of construction plans ... are preparatory work tasks for constructing industrial buildings, civil work and necessary housing in addition to erection of machinery and buildings.

All such preparatory work is being done in order to lead to the physical construction of the plant, a task which is carried out by specialized construction and building contractors under the supervision of the consulting firms or engineers who prepared the designs and whose duty at this stage, is to see to it that the physical execution of the buildings, civil work and erection of machinery and equipment precisely conforms with their designs.

A well designed organization structure should thus be established at the stage of the project implementation whose duties would not be restricted to recruiting such construction and buildings contractors, but to act as a planning, coordinating and control machine for the whole process of the "Project Implementation". Such organization structure should be established prior to stepping into any of the implementation stages outlined above in this report.

A separate report will be prepared dealing with the subject of "Organization for Project Implementation".

III- Problems and Difficulties Encountered in the Process of Project Implementation in Developing Countries:

In the course of Industrial Project Development, in general, and during the stages of Industrial Project Implementation, in particular, developing countries encounter problems and difficulties of various origin. The major ones of which may be grouped as follows:

- 1- Failure to realise -at the planning stage- the necessity of building up the complete and qualified administrative institutional and managerial structures needed for carrying out and promoting the process of project implementation. Experience indicates that inadequate administrative machinery for example results into sustaining the implementation process of the project.
- 2- As previously stated the industrial project implementation depends to a great extent on the proper preparation of the project (pre-feasibility study in the preliminary selection stage and complete techno-economic studies in the formulation stage). If such pre-investment studies are not properly prepared unrealistic estimates of cost, resources, and infrastructure requirements would result, leading to a serious handicap in the project implementation at the beginning. The inadequacy in the "project preparation" thus, inevitably leads to an adverse effect on the process of industrial project implementation.
- 2- Failure to recognise and appreciate the management process as a discipline or science, (especially the management of the implementation of a project). This also is a problem leading, in developing countries, to a serious handicap in the process of industrial project implementation.
- 4- Lack of effective techniques for "Programming", "Scheduling" and "Control" of the implementation of the project geared with some control system to secure the effective use of such techniques, results also in a difficulty encountered in developing countries in the course of project implementation.

The nature of such problems and difficulties, obviously is directly related to the intricate and complex process of creating and developing the know-how and experience.

necessary for the successful and economic implementation of the industrial project by means of local multi-discipline teams. Under the well known conditions of developing and least developed countries this, inevitably needs years of planned and programmed continuous teaching, training, demonstrating and practising. This should be done, however, lengthy and fatiguing this process is, but it should be planned, programmed and processed in a continuous manner.

Several important queries, here, should arise...such as:

Q-1- Could developing and least developed countries, autonomously and independently set such plans and programmes and process them.. or would they need outside assistance..??

A-1- The logical answer, confirmed by experience, is that outside assistance would be needed, and should continue to be provided until these countries acquire the experience and build up trained cadres out of their own local resources.

Q-2- If so who or which institutions would provide this long term planned and programmed teaching, training, demonstrating and practicing? And who would finance such a long term and expensive operation..??

A-2- To provide an answer to this question it should be born in mind that in many of developing and least developed countries there usually exists a relatively slim bracket of highly educated scientists in different fields of professions, including engineering, chemistry, electronics, economics, cost accounting, marketing... etc.. However, many of these, are usually engaged in the teaching profession in colleges and high institutes or in fundamental research. The high level of academic qualifications of a great number of them is usually not complemented by considerably enough careers in engineering development (from inception to commercialization), and/or in applied field operations. Also, in most cases, they are not professionally qualified in the practical application of the science of organization and management.

However and in spite of the above, such qualified groups of scientists, if properly mobilized and organized, can form a suitable link with the imported experience to be

provided by specialized international organizations professional foreign institutions and industrial consultancy firms.

In the specific case of the Sudan, there is, in addition to such groups of qualified scientists, local institutions such as the "Industrial Consultancy Corporation" which could act as nuclei on which imported experience could be built, and become the normal pathway to the Sudan for such experiences.

IV- Main Sources for Supplying the Know-how in the Field of Project Development, Particularly, in Project Implementation.

- 1- The planned and programmed continuous teaching, training demonstrating and applying could be provided from several sources, among which the following could be stated:
 - a- The UNIDO being the United Nations specialized Agency in the fields of industrial development. Financing in this case, is to be provided either by UNDP (if a project of this nature is included in the Country Programme within the country's IDP) or from the voluntary contributions to UNIDO, or other financing sources which could be arranged by UNIDO.
 - b. Specialized institutions in foreign developed countries, based on bilateral Government agreements. Financing arrangements in this case, are included among the terms of such agreements.
 - c- Professional specialized international or regional industrial consultancy firms according to well prepared contractual agreements. Financing in this case, should be provided by Governments out of their national industrial or economic budget, or by the benefiting party of such training, if the industrial project is in the private sector.

Several other sources in this respect could be stated, but the above mentioned three suppliers are -in our opinion- the most important and more available than others.

2- The Role of UNIDO.

As the financing in most developing and least developed countries is usually a difficulty, the procurement of such training from United Nations specialized agencies (UNIDO in particular) becomes more attractive, than the two other sources.

However, it is noticed that, UNIDO assistance is mainly rendered in the following:

- a- Project Preparation Phase (pre-investment studies), mainly in the preliminary selection stage (opportunity studies or pre-feasibility studies), and with conditions, in the formulation stage (complete ~~techno-~~ economic feasibility studies).
- b- From the Project Implementation Phase, stages as early as the preparation of Invitation to Tender.

Obviously, the UNIDO assistance in the field of "Industrial Project Development" focusses on the "Project Preparation Phase", but does not offer much in the "Project Implementation Phase". It gives little assistance, if any at all, in the engineering work including implementation plans, blue prints, construction plans, detailed engineering designs, periodic progress reports, test reports etc.

For this reason, it might be justifiable to suggest here that UNIDO substantive sections in the HQs would be supplemented and consolidated by programmes and expertise in industrial project implementation, to the extent enabling them to render assistance to developing countries in the form of long-term planned and programmed teaching, training, demonstrating and practicing in all aspects and techniques of project implementation. The detailed constituents of such planned programmes are not the subject of this report, but could be dealt with in a separate paper,

V- Basic Requirements for the successful operation of Industrial Enterprises in Developing Countries:

The operation of an industrial enterprise is to be considered successful if its socio-economic functions are achieved at the expected level. Both functions contribute to the welfare of the community and share in the national overall development. However both sociological and economic functions should balance together without any of them defeating the other. In other words, the elements of the "value added" as a result of an industrial investment should include a reasonable figure of profit and any argument against this, should not be accepted.

Based on this criterion one may state that, without prejudice to the sociological and humanitarian functions in the operation of the industrial enterprises their successful operation should result in a reasonable profit.

In order to achieve such result, a network of interwoven basic requirements should be fulfilled. It is not intended to go into any detailed discussion or any lengthy explanation of all or part of these requirements in this concise expose, but the aim is limited to drawing attention to the more important ones of them.

Before classifying or enumerating any of such basic requirements one should bear in mind that industry like any human being loses life if removed from an "environment" suitable for its life. As much "clean fresh air" is necessary for the life of a human being, a certain suitable "environment" is just as necessary for a healthy and economically feasible life of industrial investments. Such "environment" should be created and propagated to, ultimately from the "Industrial Community" characterized by being respectively dominated by "Industrial Mindedness". Governments, institutions as well as individuals should actively and wisely reciprocate and play relative roles in this act, and if they don't, no "Economic operation of Industrial Enterprises in Developing Countries" can take place. Government planning and programming for industrial and socio-economic development and Government legislation, policies and strategies if properly and scientifically designed can create such "environment" and can build up the "Industrial Community" with all favorable environmental conditions for industrial investments. Institutions and individuals should positively cooperate with their Governments in this respect as without such cooperation, any viable government planning for development, legislation, policies and strategies would go astray and

lose their value. The educational, cultural and sociological restructuring of a nation is an essentiality in this respect and there is much to state about this subject in a scope much wider than this limited report. However, it should be concluded here that one of the essential and basic requirements for the successful and economic operation of industrial enterprises in developing countries, is to create the proper "industrial environmental conditions", the "industrial mindedness of the Community". National socio-economic development planning, Govt. legislations, strategies and policies should be aimed to this target.

In addition to the above mentioned essential requirements the successful operation of industrial enterprises in developing countries, could only be achieved, in the presence of other basic requirement on a national scale among which the following could be listed:

- The existence, above a certain minimum level, of "Infra Structures", including:
 - a- Adequate, well trained industrial minded labour force, middle management and top management.
 - b- A satisfactory network of paved roads and highways connecting raw materials supply areas, processing plants, local consuming markets and shipping outlets to foreign markets.
 - c- Adequate means of communication and transportation (telephone, telegram and telex systems - railroads, trucks, navigation waterways, airtransport, etc.).
 - d- Adequate facilities in ports, harbours, airports and railroad stations.
 - e- Adequate housing and recreational facilities in production areas and manufacturing plants.
 - f- Adequate supply of utilities such as power and water.
 - g- Adequate network of stores, depots and cold-storage.
 - h- Suitable educational system, particularly technical education.
 - i- Consolidated and well organized banking and financing organizations.

- j- Powerful and effective network of information centres and extension services.
- Establishing and maintaining Central National "Industrial Technological capacities", and "Industrial Consultation Bodies" for projects preparation, evaluation and implementation and for following up of new technological developments with due adaptation to suit local conditions of developing countries.
 - Establishing of adequate capacities of "engineering design", repair and maintenance facilities", "manufacturing of spare parts" and gradually setting up a "machine building industry, including machine tools".
 - Establishing institution for the specialized studies of scientific and measuring instruments for industry and scientific research which covers electrical, electronic, mechanical, optical and glass equipment with due attention to the importance of building up of repair and maintenance of existing instruments and equipment.
 - Elaborating on establishing standards and specifications for raw materials and finished products and building up a consolidated national system for "quality control". Rules and regulations for governing transactions in raw materials and finished products, based on standard specifications should be issued and carefully applied. For this reason, a network of control analyses and testing laboratories should be established.
 - Elaborating on establishing institutions for teaching and training in the fields of "Industrial Engineering and Management" for top and middle management personnel in industrial enterprises.

The above are among the more important "basic requirements" which should exist in order to pave the way for the successful operation of industrial enterprises in developing countries. As such existence should be on a national scale, they may all be considered as constituents of the "industrial infrastructure" and they all assist in the creation of the "industrial community" and the "national industrial mindedness". Together, they compose the suitable "climatic conditions" in which an industrial investment could be protected to enjoy the healthy living and to achieve its bilateral socioeconomic

function for the welfare of the community and for its role in the overall national development. They facilitate the management task of those who are responsible for the successful and economic operation of industrial enterprises.

However, there are other "Basic Requirements" which should exist within the industrial enterprise for securing its successful operation. Among these, the following are considered more important:

- Tailoring the most suitable "formal" and "informal" patterns of organization complete with its "organization Manuals". In this respect both "line" and "staff" functions should be clearly identified and "standard procedures and systems manual" should be available to all personnel. The formal organization chart should be announced and explained to all workers and everybody in the organization should know to whom he reports and who reports to him. Extent of responsibility and authority of each one should be known and both should be equivalent. A coordination and control department or section should be established within the organization as a body responsible for the "work mechanism" including scheduling, routing and follow-up and to be directly attached to the top executive director. Integrated studies for the vertical development of the enterprise should be carried out in a continuous manner by means of a specialized department attached to top management.

In general, "organization and management" should be well taken care of and continuous teaching and training programmes in this field should be arranged for all levels of responsibilities from top to bottom. The top management should be highly qualified as "professional managers" and should always be ready to transfer their experience in this field to their subordinates.

- All activities of the enterprise should be "planned, programmed and budgeted" ahead of time, and a very close followup of implementation results should continuously take place. Deviations from the original plan should be detected immediately and remedial actions are to be taken without delay.
- Adequate autonomy should be secured for the industrial enterprise, and top management should be granted as much authority as the responsibilities they bear. Control of superiors over the work of subordinates should not result into inhibition.

These are few of the basic requirements that should exist within the industrial enterprise for securing its successful operation and they all relate to the art and science of "Industrial Organization and Management". The limited scope of this report has no room for any further elaboration on the subject, and it may only serve the purpose of drawing the attention to the fact that the successful operation of an industrial production unit depends to a great extent on the proper application of this science, not only within the structure of the enterprise, but also to the overall organizational structure of the Government body, from the top authority of the Cabinet (Council of Ministers) down to the level of a production unit in the "Public Sector". Any mistake or wrong application of the established theories and rules of this science would have a serious adverse effect on the operation of the production unit. This is an important matter, which should be taken care of by relevant authorities who should also be qualified and trained in this field.

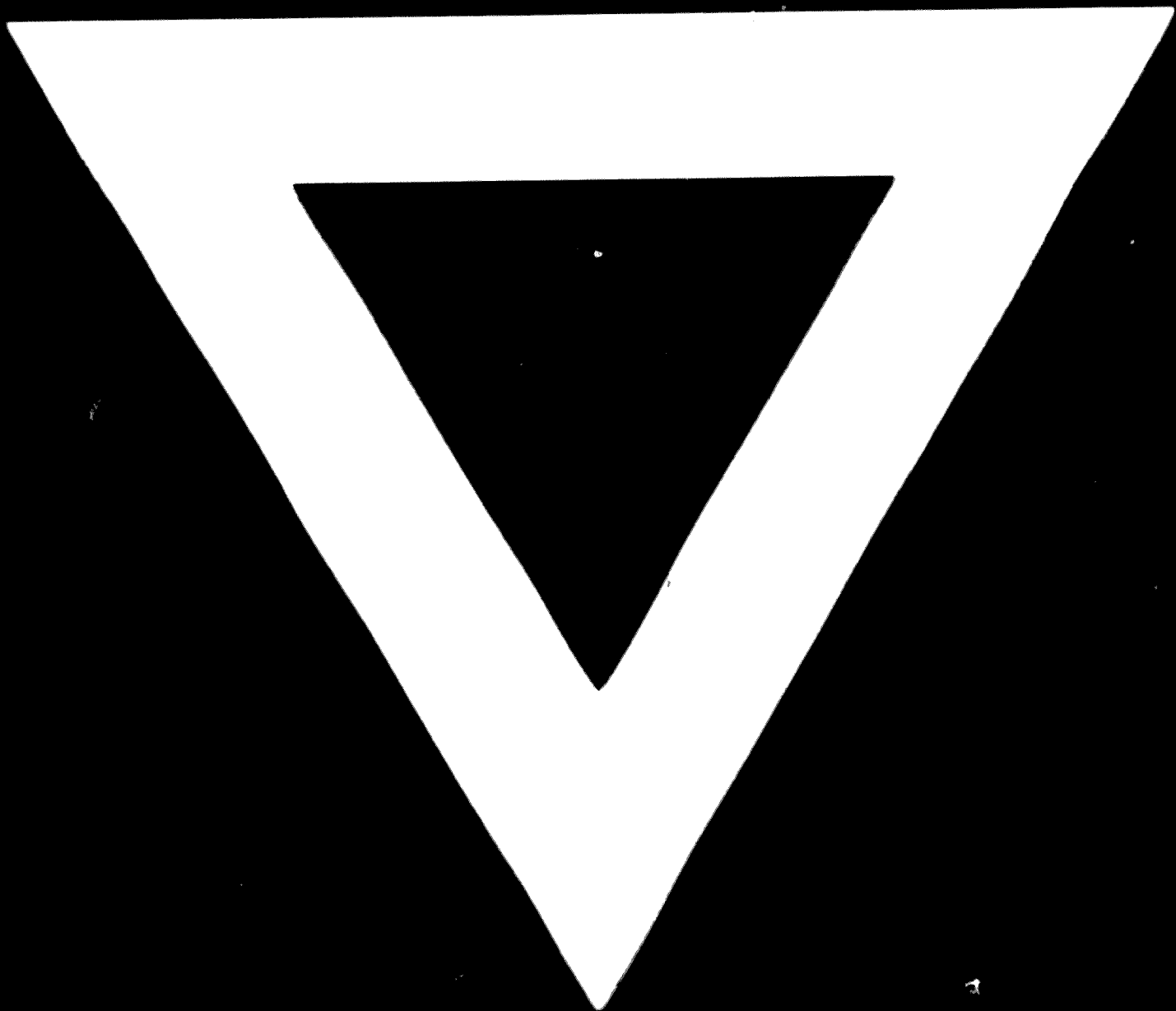
In addition to the above, it should be realized that the following should be considered important "Pre-requisites" for the future successful operation of an industrial enterprise:

- The careful "Project Preparation" at the "Preliminary Selection Stage" i.e. at the pre-feasibility study stage and at the "Formulation Stage" i.e. at the complete techno-economic feasibility studies stage.
- The careful economic evaluation of the project, prior to its implementation.
- The careful selection of the plant location based on all known factors governing such selection.
- The proper systematic "project implementation" based on scientific principles as previously outlined in this report.

These "Pre-requisites" if neglected, or carelessly carried out or prepared, may result into failure in the future operation of the plant.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche

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