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Developed by
Industrial Promotion and Technology Branch (UNIDO)
in cooperation with the Inter-Regional Centre for Entrepreneurship
and Investment Training (EDII, Ahmedabad)

Overview



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INVESTMENT PROJECT PREPARATION AND APPRAISAL

IPPA Teaching Materials

Overview

Module 1

Developed by

Industrial Promotion and Technology Branch (UNIDO)

in cooperation with

The Inter-Regional Centre for Entrepreneurship and Investment Training
(EDII, Ahmedabad)



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna, 2005

The preparation of this teaching materials has been conceived, initiated and partly financed under the project US/UT/INT/96/207 – Inter-Regional Centre (IRC) for Entrepreneurship and Investment Training, located at the Entrepreneurship Development Institute of India (EDII), Ahmedbad, India. IRC was established by UNIDO with funding support from the Government of India.

IRC provided technical support in the establishment of the “Arab Regional Centre for Entrepreneurship and Investment Training (ARCEIT)” attached to the UNIDO Investment and Technology Promotion Office (ITPO) in Bahrain as well as in the establishment of the “Advisory Centre for Industrial Development (CADI)” in Mozambique. IRC continues to provide similar support in other countries and organize, inter alia, international training programmes on Investment Project Preparation and Appraisal.

Preface

INVESTMENT PROJECT PREPARATION AND APPRAISAL

Although the transition of many of the formerly centrally planned economies has created *new* demand for training in market-based investment analysis, the experience over the past three decades has revealed a pattern of deficiency in the adequacy of investment appraisal in the developing world at large. This observation is supported by the extremely high rate of business failures extending even to those industrialized countries with long commercial experience.

Aside from the often imponderable external factors that can sweep aside “the best laid schemes o’ mice and men”, such as political and economic upheavals, one of the major causes of business failure is the inadequate planning of the enterprise and assessment of the opportunity prior to the investment commitment. The world is littered with the vestigial remnants of business ideas gone wrong.

To promote a more efficient global utilization of investment resources, the United Nations Industrial Development Organization (UNIDO) has been conducting training programs in investment project preparation and appraisal in many developing countries. The need for a compact, comprehensive, well-coordinated and cohesive set of teaching materials for short courses in Investment Project Preparation and Appraisal has become evident. To meet this need, UNIDO has developed a set of teaching materials covering the subject.

These training materials are intended to supplement, and to be used in conjunction with, existing UNIDO publications that deal with project design and appraisal. The *Manual for Preparation of Industrial Feasibility Studies*, 1991, is a guide to identifying investment opportunities and carrying out studies and analyses to determine their viability. Other UNIDO manuals deal more specifically with economic aspects of projects: *Guidelines for Project Evaluation*, 1972); *Guide to Practical Project Appraisal – Social Benefit-Cost Analysis in Developing Countries*, 1986; *Manual for Evaluation of Industrial Projects*, 1986, which emphasizes the value-added approach to project assessment; and *Practical Appraisal of Industrial Projects – Application of Social Cost-Benefit Analysis in Pakistan*, 1980.

The teaching materials cover analysis and appraisal of new and expansion investment projects from the point of view of direct stakeholders such as investors, financiers, guarantors and suppliers and also a project’s impact on the regional or national economy. The view of investment analysis is comprehensive, linking the commercial and larger external environment in which a project is to function.

This set of teaching materials can be applied to in a variety of training applications. Participants can be investors and entrepreneurs, bankers, consultants, project planners, project managers, staff members of regulatory and licensing authorities. If the group is homogeneous the materials can be presented selectively.

The teaching materials are organized in **7 Modules**:

- Module 1 – Overview
- Module 2 – Market Analysis and Marketing
- Module 3 – Technical Analysis
- Module 4 – Financial Analysis
- Module 5 – Economic Analysis
- Module 6 – Expansion / Modernization Projects
- Module 7 – Project Appraisal

Modules 1 to 4 and 7 can be considered 'basic' materials for project analysis when (a) the project is either a new investment or one that can be isolated from other business or investment activity and (b) the circumstances do not appear to warrant the effort of performing economic appraisal. In regard to the latter, almost invariably the broader external environment has some consequences for successfully carrying out some features of an investment project. In its widest sense gaining the social/economic perspective is to understand how the project fits into the local environment so that any factors that may adversely affect the outcome can be mitigated in advance. This is called prudence.

The materials consist of a set of visuals (PowerPoint slides) accompanied by text related directly to each slide, explaining its significance and applicability. The scope and depth of the presentation is defined primarily by the visuals. Where greater depth in any topic is desired, ancillary materials (explanations, examples and exercises) are included that are referenced in the basic text. These materials are in text and spreadsheet form.

MODULE 1 – OVERVIEW

- Project Development Process
 - Investment Project Cycle
 - Pre-investment Studies
 - Project Identification
 - Project Preparation
 - Project Appraisal
 - Project Promotion
 - Project Implementation
- Macro-Micro Contexts

MODULE 2 - MARKET ANALYSIS AND MARKETING

- Introduction
- Market Analysis
- Demand
- Market Research
- Export Market Research
- Data Collection
- Demand Forecasting
- Marketing Strategy
- Elements of Marketing Strategy
- Market Assessment Report
- Marketing Programme
- Production Programme and Plant Capacity

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- Technology Concepts
- Technology Choice and Selection
- Product Analysis
- Production Process and Methods
- Plant Design
- Materials and Energy Balance
- Project Inputs
- Machinery and Equipment
- Plant Capacity
- Production Programme and Plant Capacity
- Human Resources
- Plant Organization and Overhead Costs
- Location and Site Selection
- Environmental Analysis
- Implementation Planning and Budgeting

MODULE 4 - FINANCIAL ANALYSIS

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- Investment Costs
- Finance
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- Financial Statements
- Static Indicators
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- Criteria vs. Indicators
- Risk Analysis

MODULE 5 – ECONOMIC ANALYSIS

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- Economic Pricing
- Economic Cost Benefit Analysis (ECBA)
- Value Added Analysis
- Supplementary Indicators
- Externalities
- Non-market Externalities

MODULE 6 – EXPANSION / MODERNIZATION PROJECTS

- Introduction
- Context
- Method of Analysis
- Forewarning Signals
- Modernization Methods
- Implications
- Framework for Financial Analysis
- Incremental Effects
- Significance of Starting Balance
- Valuation of Existing Assets
- Possible Scenarios

MODULE 7 – PROJECT APPRAISAL

- Introduction
- Perspectives of Participants
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- Sponsor's Perspective
- Partners' Perspectives
- Foreign Investors' Concerns
- Macro-Micro Appraisal
- Appraisal Report

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The editors wish to acknowledge the invaluable contributions of many individuals who, through formal presentations and informal discussions and communications, have added to the scope and depth of the materials, who graciously shared their knowledge and experience over many years to make these materials as effective as possible.

Of particular significance were the contributions of:

- Lech Kurowski, for many years a UNIDO staff member whose breadth of knowledge and experience provided many insights into virtually all aspects of project analysis;
- Janusz Lukasik, UNIDO consultant and now with OPEC Fund for International Development, who contributed to the materials on forecasting, market analysis and marketing;
- B. P. Murali, professor at Entrepreneurship Development Institute of India, who provided many ideas concerning markets and marketing approaches;
- Reino Routamo, marketing consultant, a contributor in the areas of futuristic forecasting, market analysis and marketing approaches;
- Umesh K. Menon, Faculty member of the Entrepreneurship Development Institute of India, a major contributor in the area of financial analysis;
- Andrej Mlotkowski, engineering consultant, who provided much of the ideas included in Technology and Environment;
- Klaus Pertz, who provided ideas in financial analysis;
- Maria Elena Scaffo, UNIDO consultant, a contributor in the areas of market and finance;
- Stanislaw Pigon, UNIDO consultant, a contributor in the area of financial analysis;
- A. D. Little, Inc., from whose paper 'Evaluation of the State of the Art in Benefits Assessment Methods for Public Policy Purposes, 1984, much of the material on non-market externalities was obtained;
- Robert Youker of Economic Development Institute of the World Bank, whose ideas greatly influenced the presentation on Project Development Cycle and Project Implementation;
- Alan Young of Syracuse University, who was the major influence in the area of project finance;
- David Sussman, editor and contributor in all areas;
- Mayank Upadhyay, distinguished visiting faculty, Entrepreneurship Development Institute of India, Ahmedabad, co-editor and a major contributor in all areas;
- Joseph Moongananiyil, UNIDO staff member, co-editor and major force in carrying this project to completion.

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The editors accept full responsibility for any errors or omissions, perhaps a consequence of either not heeding carefully enough the wisdom and knowledge of the contributors or persisting in maintaining views contrary to their advice.

MODULE 1 – OVERVIEW

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INTRODUCTION

INVESTMENT PROJECT DEVELOPMENT: IDENTIFICATION, PREPARATION, APPRAISAL, PROMOTION AND IMPLEMENTATION



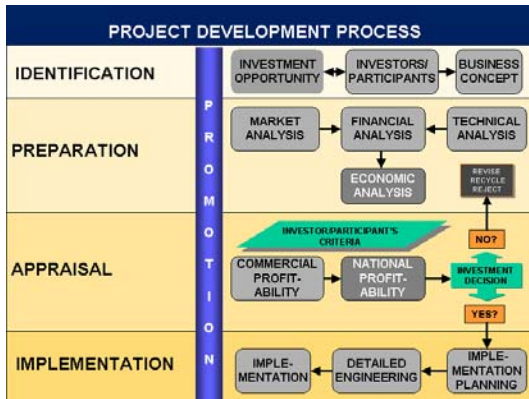
Economic development depends upon investment. New investment is a necessary condition for economic growth; in fact, investment is needed just to maintain the current level of economic activity as the productive capacity of the economy is diminished by technological depreciation over time.

Enhancing the value of produced goods and services that comprise a country's economy depends upon mobilization of capital. The private sector is generally the source of investment ideas, but government agencies responsible for development also have a role to play by informing project sponsors of national priorities and by stimulating investment through policies and incentives.

In countries where investment resources are scarce, there is a particular need to take care in their allocation. Project study and planning is the key to efficient utilization of these resources. Even in the industrialized countries many projects fail to meet expectations because they are poorly planned. A well-executed plan is a road map to successful investment. Without it a project sponsor is just as likely to take the wrong turn as the right one.

An investment project must be developed. It must be prepared by study - compiling and analyzing relevant information. The project is appraised according to the criteria of participants and other involved parties to determine if it is a worthwhile investment. Depending on the source of the project idea, it must be promoted either to attract investors or to acquire the necessary resources and other support. The project implementation involves planning, construction and commissioning to assure that it is ready to carry out the plan of production, sales and distribution.

PROJECT DEVELOPMENT PROCESS



The Project Development Process (PDP) usually involves a series of stages of preparation, essentially in a logical progression. In practice the process is iterative - accumulating information at later stages requires review and perhaps modification of approaches of prior stages. In fact, the sequence can be initiated almost at any point; only as information and ideas take shape can the entire project configuration crystallize.

Project promotion: Before outlining the PDP the role of project promotion should be understood. This is an effort that usually parallels the PDP. It is normally initiated early in the process, after the project has been identified and conceived by sponsors. Its purpose is to push the project forward. Investors, financiers who are willing to support the project and guarantors, if required, have to be identified and brought into the picture. Licensing and planning agencies have to be convinced of its efficacy in regard to their objectives. Technology suppliers and foreign partners have to be convinced that participation in the project is a good business decision.

As the project design progresses, the criteria of the supporting cast have to be identified and applied in the appraisal process.

Project identification: Project ideas can arise with the entrepreneur, from business associations or planning agencies, or from special studies conducted for identifying opportunities within a country or region.

Business concept: When an investment project is identified, a business concept should be developed that explains how and why the project will be successful. The investment project should be considered as an organism in an environment, needing a strategic plan to survive and grow.

Project preparation: The project is then prepared, or designed. The process of preparation in each stage of development (opportunity, pre-feasibility, feasibility) will be similar, if not the same. Only the depth of investigation will progress along with growing confidence in the project.

Market analysis: The market for the proposed product is studied to ascertain the extent of existing demand or the potential to create demand. A marketing strategy is developed as an outgrowth of the demand analysis - how potential consumers will be attracted and how their needs can best be served.

Technical analysis: A technical study identifies the technology, defines the production process and provides a plant design.

Financial analysis: Working from the technical configuration and market analysis, capital investment, operating costs and revenues are estimated. Flow of funds and related resources from the planning stage through implementation, operations and possibly decommissioning are estimated for each project period to the planning horizon. The project's capital structure, sources of finance and cost of capital are determined. Financial indicators are then calculated.

Project appraisal: The project is appraised, comparing characteristics and projected performance with the criteria of the various participants and other interested parties. Decision: If all criteria are met, the project may be accepted and proceed to detailed design, implementation and operations. For some types of projects decommissioning may be a factor.

Projects that do not meet criteria may be rejected, recycled, or modified to the extent that criteria of participants are satisfied.

Project implementation: Detailed engineering, organization and implementation plans follow on the heels of a decision to go ahead with the project. The plant is constructed and commissioned, organization and systems designed and integrated to the operating level.

INVESTMENT PROJECT CYCLE

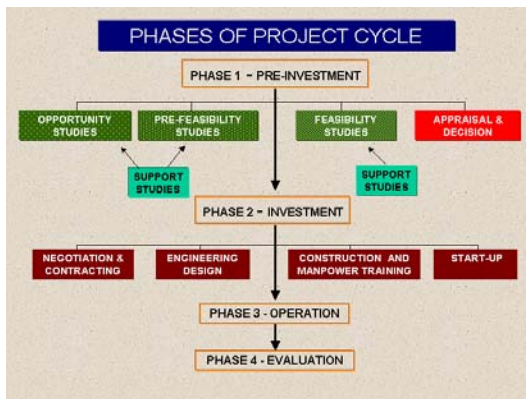


A project idea is conceived, from inspiration or perhaps from a general study of business opportunities in a country or region. Once the idea is germinated, investigation of its viability as an investment opportunity can begin. An investment project normally goes through a number of phases prior to becoming a reality and generating the intended output. The project cycle is the description of the sequence of phases from conception to the project's planning horizon - identification, preparation, promotion, implementation, operations, decommissioning when applicable.

At the end of the project or at the planning horizon, evaluation is anticipated that would lead to a decision on the future direction of the enterprise - to continue existing operations, expand, change direction or liquidate - how effective was the project and where to go from here.

In this sense investment is a *cyclical* process - the completion of one cycle of planning, implementation, operations and project evaluation after the plan has been executed, leads to another, building on the experience of previous cycles.

PHASES OF PROJECT CYCLE



Pre-investment phase: The pre-investment phase normally commences with identification of a business opportunity that can arise from a variety of sources: vertically related activities, area resource studies, etc. An opportunity study based primarily upon knowledge of the sponsor and secondary information is prepared. This gives some insights into the viability of the project. As confidence grows this may be followed by a more in-depth study in the form of opportunity study or pre-feasibility study.

An extensive study may follow when the confidence in the viability has risen to a sufficient degree in the view of the sponsor (feasibility study).

At any stage of the development special support studies may be required covering significant features of the project, such as test marketing, product analysis, carrying capacity of infrastructure services, etc.

Prior to an investment decision the project is appraised: estimated indicators of

project performance are measured against criteria of the various participants - investors, financiers, regulators, etc. After adequate study and build-up of confidence in the prospects for success, a positive decision to invest may be the result. Otherwise, the project may be shelved, perhaps for good or for another look at some future time.

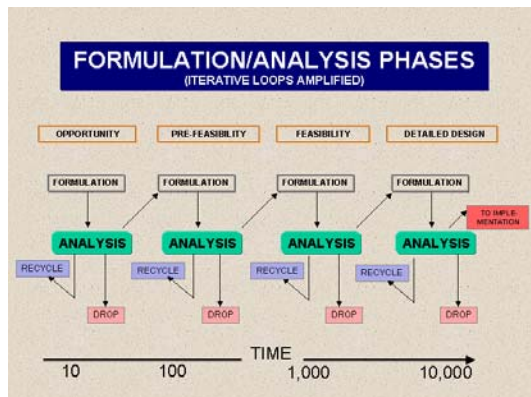
Investment phase: Once the decision is made to invest a project plan is prepared including detailed engineering. Then contracts are negotiated for construction and supplies and other financial and administrative arrangements are completed. Construction of the project follows with training of operating personnel, plant start-up and commissioning.

Some operational features are initiated during the investment phase - setting up the organization and operations systems, staff training, marketing efforts, test production and other preliminary operations.

Operation phase: During the operations phase products and services are produced and sold. The benefits of the investment accrue to investors and debt is repaid.

Evaluation phase: Evaluation usually occurs at the end of the project life, but can be seen as a continuous process to adjust the project to current conditions. Expansion, rehabilitation, modernization or dis-investment may become justified at any point in time.

FORMULATION/ANALYSIS PHASES



The project development process usually is a sequence of stages of formulation - analysis. When the project is in its early conceptual stage (opportunity study) the formulation is rudimentary, relying basically on the knowledge and information at hand and readily available secondary data. The investment in project study is minimal. If the opportunity seems promising on the basis of analysis with respect to the sponsor's criteria, the project may advance to the pre-feasibility stage, a study in greater depth and with

some attention to details that appear potentially problematic. Analysis of the results of this study follows. Similarly, if the project continues to show promise, a full feasibility study would be performed. Appraisal at this stage would lead to an investment decision (yes or no).

At any stage the decision may be to terminate consideration of the project or to "recycle" it, either placing the idea in storage for future consideration or rethinking the formulation and significantly altering the project idea to the extent that it requires a new round of development.

The size of the investment in project development increases approximately by an order of magnitude (factor of 10) from the opportunity stage to pre-feasibility level, from pre-feasibility to feasibility level and from feasibility level to the implementation phase.

PRE-INVESTMENT STUDIES



Careful study of the prospects for success of an industrial or commercial venture has not been the rule in throughout the world since the dawn of the industrial age. Even in the industrialized countries direct investment is often undertaken in haste, avoiding the trouble and cost of investigation, but increasing the risk of failure.

The world is littered with the decaying remnants of investment ideas gone sour often resulting from what appeared to be insignificant factors. A steel plant was constructed on the basis of using plentiful domestically available coke. After the factory was in operation it was discovered that the local supply of coke contained impurities that were incompatible with the quality specifications for the product for which the factory was built. In another case, a plant was constructed to produce non-foaming detergent soap for the local market. The sponsors had neglected to discover that the local custom was to use natural soaps with high foaming action. A plant for producing high quality wooden spindles faltered because it did not have a sufficient source of convertible currency to purchase the necessary spare parts.

The integrity of an investment venture can be regarded in terms of the links in a chain. The weak link often defines the fragility of the entire venture. Hence, the need to study - to design all of the links in the chain so that they are of adequate strength, and to identify those that may be most subject to internal weaknesses or susceptible to external threats.

OPPORTUNITY STUDY



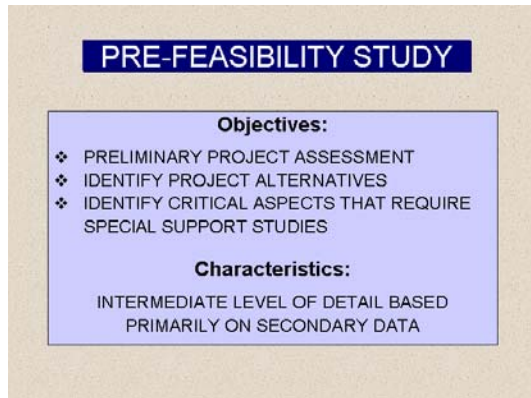
Promising industrial ideas can be refined by preliminary or Opportunity Study outlining the basic features, often derived from similar projects, from the sponsor's knowledge or from readily available, secondary sources. An important feature is the refinement of the business concept, explaining why the idea should work in the proposed environment and its basic operating characteristics.

Preliminary evaluation of alternative approaches in terms of marketing variables (product, price, promotion and distribution), technology, location and site, capital structure, should be attempted.

A preliminary assessment of the strengths and weaknesses of the business concept (and alternative configurations) should be included in the study.

Study at this level is usually based upon sketchy, readily available secondary information that may be aggregated estimates. For example, import data may relate to a broad category within which the product of interest is included.

PRE-FEASIBILITY STUDY



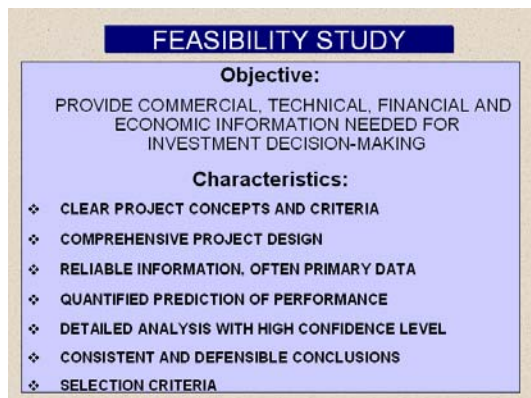
A pre-feasibility study comprises a moderately detailed but comprehensive assessment of the project's viability.

Alternative approaches to project features are identified. There are alternative ways of approaching virtually every aspect of a project's design - product, technology, marketing and distribution, capital structure. The strengths and weaknesses of each selected alternative configuration should be compared in regard to implementation and operating

characteristics to arrive at a tentative selection of the project design. The feasibility of the most favorable alternatives should be ascertained on the basis of available information. The project should be appraised against the criteria of participants.

Some project features may require special *support studies* by expert consultants, particularly those that are critical to project success. Primary data may be required, but the high cost involved suggests that discretion be applied in performing research of this type.

FEASIBILITY STUDY



A feasible project can operate successfully in its environment. External constraints that may exist are manageable.

The feasibility study is a detailed analysis of the project, in effect a descriptive synthesis that clearly defines the project and how it relates to the external environment. The level of depth in all areas (commercial, technical, financial, and their interfaces with the environment) provides information adequate for potential investors, financiers, guarantors

and licensing agencies to decide whether or not to go ahead with the project.

In a sense the title 'feasibility study' is a misnomer. A better title would be 'optimization' study - the proposed project approach should be not only feasible, but optimal (the best way).

Some of the characteristics of a feasibility study are as follows:

Clear project concepts: How the project will successfully be implemented and operate in its environment.

Comprehensive project design: A design of sufficient depth to permit detailed engineering designs to be prepared, to develop the organization and distribution channels and to set up operations once the project is approved. The design contains a comprehensive and detailed description of the project characteristics and describes how the various project components will interact successfully. Alternative configurations are assessed systematically and the selected configuration justified.

Reliable information, often from primary sources: The data upon which the analysis is predicated is from reliable sources, often primary data from surveys and tests, which should be measured for reliability and confidence intervals. Qualified professionals study areas requiring scientific expertise. The analyses are detailed and the level of confidence in the results indicated. The study's conclusions are defensible in the sense that they are consistent with the analyses. Often it is necessary to check data against alternative sources to assure consistency.

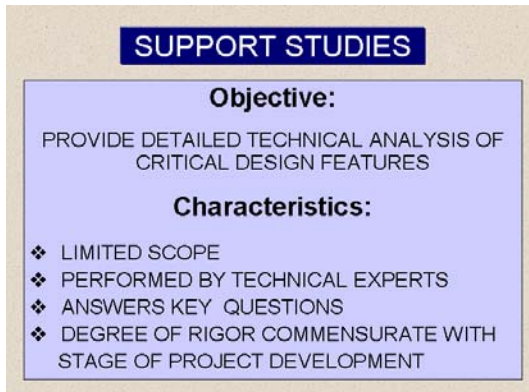
Quantified prediction of performance: The study includes quantified predictions of performance based upon reliable data and appropriate scientific methods of analysis. Quantified indicators of performance should be derived for operational aspects, including production levels and efficiencies and financial aspects. Indicators should address concerns of investors and other technical and financial aspects of which sponsors should be aware.

Detailed analysis with high confidence level: Analyses of the project design should be comprehensive and detailed, covering significant aspects of implementation and operating characteristics

Consistent and defensible conclusions: Conclusions concerning the feasibility of the project should be consistent with available information. There has to be a logical flow from the information provided to the conclusions that are drawn. In justifying conclusions the analyst should allude to information upon which the conclusion is based.

Selection criteria: It is insufficient to state that a project is acceptable unless the criteria upon which such a judgment is made are identified and compared with characteristics of the project design. Criteria may vary among classes of participants, so the conclusions in regard to various participants with differing criteria may also differ. As earlier stated, it may be necessary to prepare alternative studies for participants with differing concerns and approaches to project analysis, of which it behooves the analyst to be aware.

SUPPORT STUDIES



Project elements that are vital to its success and for which there is an unacceptable degree of uncertainty may be subject to special support studies. Such studies are highly focused, of limited scope, and provide a detailed technical analysis of sufficient depth to provide the necessary level of confidence in the results.

These studies are performed by technical experts, usually members of consulting firms specializing in the area of interest.

They are intended to answer key questions concerning the project's viability. For a project planning to exploit natural resources, for example, an expert might be called upon to assess the magnitude and quality of reserves and to identify any problems associated with their extraction and use.

The degree of rigor of such studies can parallel that of the various stages of project development. However, often the issue is sufficiently critical to the viability of the project that the support study would be performed rigorously, at a greater depth than other project information.

TYPES OF SUPPORT STUDIES



Special support studies can cover virtually any project aspect. Some examples are as follows:

Markets: An innovative product may require scientifically based test marketing.

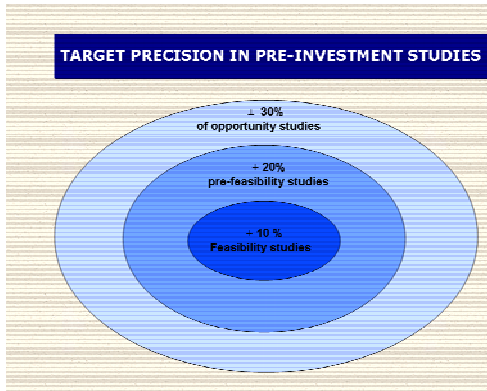
Inputs: Vital inputs, whether of domestic or foreign origin, may require studies of reliability of supply and price. In some cases quality may be an issue.

Location: Location of the production and distribution facilities may require special multi-criteria optimization studies.

Technology: The selection and configuration of technology alternatives may be of importance. Capital versus labor intensive alternatives or the degree of automation can be a selection factor.

Equipment: Equipment may require special testing if the design specifications do not correspond to actual operating conditions. Special adaptations may be necessary to deal with local operating conditions or with available input specifications.

TARGET PRECISION IN PRE-INVESTMENT STUDIES, IN PERCENTAGE OF TOTAL INVESTMENT AND PRODUCTION COSTS

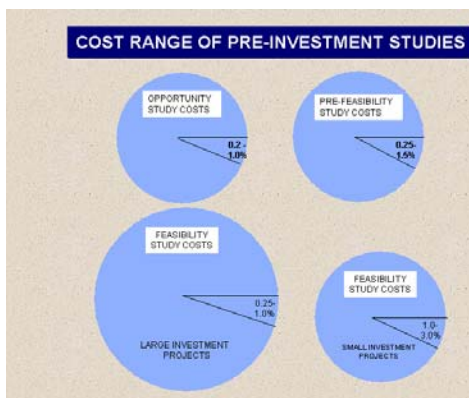


The development of an investment opportunity generally progresses through stages in which the project is increasingly refined in terms of configuration and the accuracy and precision of information and predicted results.

The combination of accuracy (systematic error) and precision ("random" error) is estimated at $\pm 30\%$ at the level of an opportunity study down to about $\pm 10\%$ for a careful study of feasibility (percentage of total investment and annual operating costs). These error ranges apply most concretely to quantitative factors such as the size of the market, the level of investment, cost of operations, etc, but qualitative aspects contribute to the error. For example, estimates of the qualifications of key personnel can contribute to the uncertainty. If the errors are all on the same "side" (i.e. cumulative), the effect can be to produce a gross miscalculation of the anticipated performance of the project. However, these factors generally tend to cancel one another, some on the high side and others on the low, so that the percentage can, in most cases, be practically considered as applicable to each of the separate factors.

For example, at the "Feasibility" level, the 10% error could apply to the level of investment, the return on investment and the cost of operations.

COST RANGE OF PRE-INVESTMENT STUDIES - APPROXIMATION IN PERCENTAGE OF TOTAL INVESTMENT COSTS



As the project progresses from conception through increasingly more definitive stages of development the depth of the study would increase accordingly. Greater accuracy and precision implies greater cost.

The estimates are predicated upon the total value of the investment package, i.e. fixed investment plus pre-operational expenditures plus initial working capital. The percentage cost for feasibility studies for large projects is reduced in relation to small projects to account for the economies of scale in performing studies for the larger projects. For example, market and technology studies for very large projects may be more costly because the dimensions of the market and the scope of technology are greater, but usually not in proportion to the size of the project. For this reason the estimated percentage of the investment package is lower.

The costs of study at each stage of project development accumulate. For example, the total cost of study through the feasibility level for a large project might be 1.8% comprised of OS - 0.3 %, PFS - 0.5%, FS - 1.0%.

Pre-operational costs other than study must be included as part of the investment package: Promotion, legal fees, licensing costs, plant commissioning, etc. In general, the total investment package will include cost of fixed assets, a variety of pre-operational expenditures (including the study costs) and "fixed" working capital, i.e., the base level of funding to cover 'permanent' current assets, net of current liabilities.

PROJECT IDENTIFICATION



Objectives:

Entrepreneurs seek business opportunities; controllers of capital seek opportunities to put it to work. Internally-generated ideas can be supplemented by observing opportunities identified by other bodies that may be interested in sharing their perceptions. Development promotion agencies can facilitate the process by helping to identify investment opportunities and by bringing together disparate pieces of an investment pie.

Perhaps the most creative endeavor in the investment project development process is the identification of business opportunities. It is often difficult to envision the needs of a population and how those needs can be satisfied in a viable manner. Potential investors continually search for ideas that can lead to promising investments.

One of the common ways of deciding how to invest is to follow the lead of others, a "me too" approach that is appealing for its simplicity. If one enterprise is successful producing widgets, then another will likely follow in its footsteps. This may be true if there is unmet demand and if the project is able to emulate the successful operating modes of its predecessor.

A much better approach to finding investment opportunities is to study the characteristics of the environment to decide what needs exist or can be created for goods and services. Existing enterprises can look toward expanding product lines. New investors can survey the field for niches to fill. Innovators can assess how their technology can fit into the life styles or operating modes of clientele with no prior experience in using the product or service. Investors or investment groups may study the environment to see if there are unfulfilled needs. Innovators seek to promote their inventions or conceptions. Business organizations can scan the field for opportunities. Government agencies can perform studies based upon their priorities or resource bases.

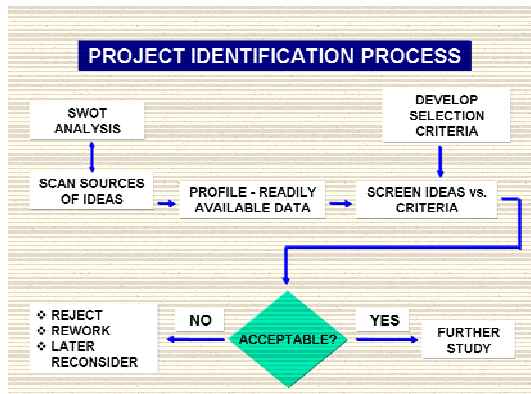
Each sector of the economy - consumers, industry, agriculture, commerce - can be scanned to detect what needs exist for different or additional goods and services.

Some of these ideas can be rejected out of hand because it is fairly obvious that a key element is either missing or will not function in the environment. The ideas are screened to sort out the most promising, identify those that may need further information, those that can be put aside for future consideration and outright rejections. In any case, the classification should be systematic so that all ideas are given the best opportunity for eventual realization.

Characteristics:

Often these ideas arise from information provided by promotion agencies of the government or international organizations oriented toward economic development, industrial and commercial organizations such as Chambers of Commerce and other trade groups. The information is usually preliminary or tentative, perhaps based upon perceived gaps in backward or forward linkages or changing market conditions.

PROJECT IDENTIFICATION PROCESS



Scan sources of ideas: Unless a project is taken on by an innovator or investment group with a specific objective in mind, a potential investor or group of investors need to scan the opportunities and lists such as ISIC, in which industries are listed categorically, to identify possible projects for further consideration.

Profile: To give serious consideration to a project idea a minimal amount of conceptualization should be performed using readily available data. This amounts to a project profile in which the basic idea of the project is proposed and some of the market, marketing, technology and financial issues are addressed. Although a business idea may appear promising at first glance, the configuration of a project should be outlined, at least in terms of available technologies, investment costs, availability and cost of production factors and some preliminary estimates of profitability. Investment promotion groups sometimes prepare sets of investment project profiles that are then used for promotion.

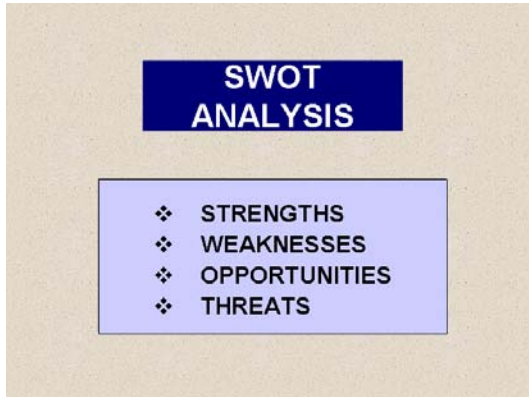
Develop selection criteria: The financial and other criteria should be defined so that projects can be realistically screened. Criteria may involve minimum or maximum level of investment, leveraging, rates of return and other indicators of performance.

Screen ideas vs. criteria: Projects should be screened systematically according to the criteria of the investor or promoter and placed into a number of categories, with the best prospects as basis for further study: acceptable for further study at the present time, or not. No plan should be considered as cast in concrete. As conditions change, it may be advisable or necessary to change the configuration of the project. The consequences of such changes should be as carefully assessed as the original project design. Whether by investment promotion groups or potential investors, a preliminary screening of investment opportunities should be performed.

The cost of investigation increases rapidly as projects are selected for more advanced study. The preliminary screening uses coarse measures of feasibility to reject those that are either untimely or obviously ridden with problems of implementation or operation. Some projects can be set aside for later consideration when conditions become more favorable. Others can be rejected outright because some feature will not work in the environment. A few projects can be considered for further study if the preliminary assessment is devoid of obvious pitfalls and if there

appears to be either an unfilled need for the intended product or service or one that can be created.

SWOT ANALYSIS



An investment project concept should be subject to SWOT analysis at all stages of development, with the degree of accuracy and precision increasing as the project proceeds from identification to implementation.

Strengths and weaknesses are internal, and to some degree, controllable factors (although, as previously suggested, there is often not a clear division between internal and external factors). Opportunities and threats are essentially

external factors.

Strengths are the internal factors that provide an advantage to the sponsors over the existing or envisioned competition. An internal factor might be the prior experience of the sponsor or a proven market in a related line of goods or services. Another could be a patented process of manufacture superior in terms of quality or cost to the competition.

Weaknesses are those internal project aspects which can not be realized with a high degree of confidence by the sponsors. A weakness might be the inexperience of available management personnel. Another might be an insecure line of short-term credit. The project site may lack suitable infrastructure (a quasi-internal factor) or the prospect of inadequate maintenance by public authorities.

Opportunities are existing or foreseen external conditions that are advantageous to the project. The region may be experiencing rapid economic growth with demand for the project's output created by higher levels of income. The project might benefit from incentives provided by the regional authorities.

Threats are existing or foreseen external impediments to the project's success. An example might be the imminent introduction of a substitute product of inferior quality but lower in production cost might be imminent, or introduction of a product in the pipeline with superior functionality. A volatile high-technology labor market might threaten loss of key personnel to competitors or sharp increases in labor costs.

OPPORTUNITIES VS. THREATS

OPPORTUNITIES VS. THREATS	
OPPORTUNITIES	THREATS
ECONOMIC GROWTH	OTHER AGENTS
GROWTH SECTORS	REGULATORY CHANGE
NEW MARKETS	POLITICAL CHANGE
COST PUSH	CHANGE IN IMAGE
REGULATORY CHANGE	RECESSION
POLITICAL CHANGE	DECLINE IN RESOURCES

A growing national economy or growth in the project's industrial sector are fortuitous factors. In the former case the assumption is that "the rising tide lifts all boats". In the latter, the growth of the sector usually indicates increasing demand for the product line attributable to improvements in product technology or changes in life-style. With economic recession the situation is reversed. If the sector is cyclical, i.e. demand for the product follows the general economic cycle, then some care should be exercised

to understand the current phase of the economic cycle.

New markets can result from newly established international trade relations, technological innovation or advancements in transportation technology or packaging. Cost push, or sellers' inflation, results from increases in factor costs not being matched by increases in productivity. The opportunity arises with more efficient processes replacing older technology. New projects have the advantage of not having to replace older but still serviceable equipment.

Regulation or deregulation both present opportunities. Regulation implies a degree of protection with regard to markets, but usually at the expense of controls on profits. Deregulation opens opportunities with regard to access to markets and pricing strategies. Political change offers both opportunities and threats. The political environment can become more or less favorable to private direct investment. Sectors can be opened up or closed, profit repatriation can be liberalized or restricted.

The image of an enterprise can be damaged by a venture which fails to meet expectations. This can occur if either the new product is not well accepted by the market or if the venture places strains on the operations or profitability of the company. The effect is seen either in terms of accessibility to capital sources or credit, and in the case of adverse social or environmental impacts in terms of more regulatory pressures.

Accessibility to resources can occur due to tightness in supply or, in the case of natural resources, exhaustion or contamination. For example, clean water is necessary for the production process may be contaminated by unforeseen upstream discharges. Estimates of the quantity and quality of available natural deposits may be faulty.

Anticipation of changes in the actions or attitudes of external agents such as financial institutions, regulatory bodies, suppliers or competitors should be attempted as part of the study process.

DESIRABLE STRENGTHS

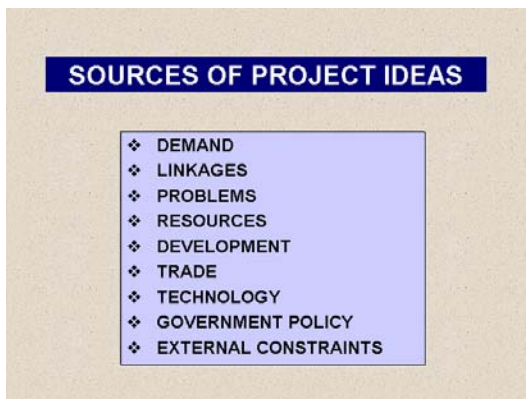


Strengths are those aspects of the project's configuration that are secure and reliable. Any project study is a simulation in which features are abstracted and synthesized into the functional organism. To the extent that the adequacy of internal and external features can be predicted with a high degree of confidence the reliability of the study is enhanced.

Capital markets do not like unpleasant surprises. One of the reasons that markets often react severely to negative surprises (e.g., lower than expected earnings) is that confidence in the ability of the management to understand the intricacies of their business is shaken.

This reaction is indicative of the adverse consequences of unanticipated weaknesses. Presumably if a project is undertaken, strong features should predominate. Weak features should be hedged in some way so that their effects are not to be disastrous.

SOURCES OF PROJECT IDEAS



A potential investor should look to his own experience, perhaps expanding an existing operation, adding a down- or upstream component; often, government regulators have investment priorities with incentives that can significantly affect the feasibility of a project. Opportunities may exist for exporting or import substitution (beware of trade restrictions that may be subject to political expediency). There may be valuable resources in the country which have not been exploited. In a growing economy there may be

opportunities based upon demographics or improved standard of living. Some sources of ideas for investment opportunities can be found by examining the following industrial areas:

Demand: Unsatisfied demand and the most effective ways to meet it.

Linkages: Upstream and downstream linkages, i.e. vertical integration - currently procured inputs or products for which the current enterprise is a supplier. There may be advantages in terms of quality, price or security of supply in vertically expanding the activities of an enterprise. Possibilities for substitution of existing products and services can be explored.

Problems: Problems/constraints in the development process due to shortages of essential facilities, services and materials.

Development: Need to complement development with support services, infrastructure, etc.

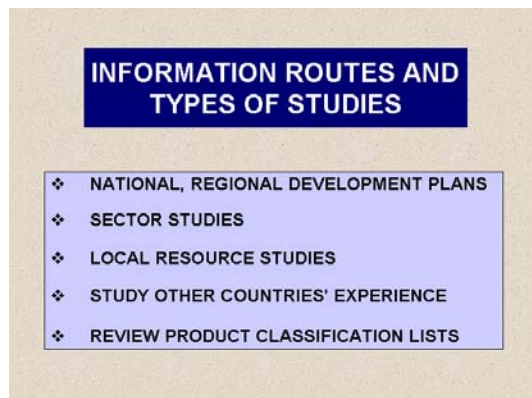
Trade: Possibilities for import substitution - international competitiveness may offer opportunities for substituting import of consumer or industrial goods. If the basis of the import substitution is protection, investors should be wary as these protections can easily evaporate. Some governments provide protections and incentives for infant industries; investors should be careful to ascertain how the enterprise would function in the absence of such supports. Export potential - such investments must be predicated on international competitiveness. Great caution should be exercised if protections and/or subsidies are necessary for feasibility of the project.

Technology: New developments offer ideas, particularly in regard to modernization projects. Peripherals to major product technology innovations is a possibility. Joint venture is a way to enter the business when the production technology is not otherwise accessible.

Government policies: Incentives to entrepreneurs - tax holidays, subsidies, grants for development in sectors or regions and planned allocation, although this should not be the sole basis for embarking on a business venture.

External constraints: External constraints lead government planners to adopt policies of self-sufficiency in food production, energy generation or other goods and services.

INFORMATION ROUTES AND TYPES OF STUDIES



Investment ideas can be generated by government-sponsored promotion agencies, by investment groups or by individuals. The usual approach of promotion agencies is to perform a broad-based study to identify a large number of possible projects that can then be subjected to further screening and promotion. Investment groups or innovators may seek to commercialize their ideas.

The degree of specificity with regard to areas to be covered in the opportunity study should reflect the client's interests. If not much is known, the investigator may be commissioned to identify all opportunities, from all sources available, in a region. The investors might limit the study to the opportunity to exploit known natural resources in the area, to a particular sub-sector or even product line.

Some types of studies that can illuminate the potential for industrial investment are the following:

National, regional development plans: Central planning agencies may periodically issue reports on industries to be promoted. They may grant incentives (e.g. tax breaks, subsidies, repatriation of profits) or set up special procedures to

ease the permitting process for targeted industries. A regional study is much broader and may include, in addition to natural resources, the industrial profile, infrastructure, human resource availability, economic advantages and disadvantages.

Sector studies: Economic development agencies or educational institutions may be commissioned to perform studies of promising sectors.

Local resource studies: Industrial promotion agencies may conduct such studies.

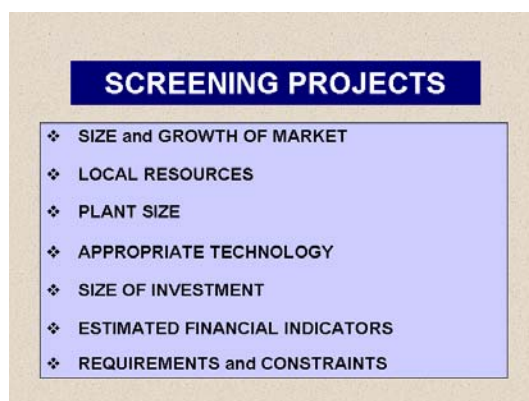
Other countries' experience: A *me-too* approach can be successful if experience from another country that has successfully implemented a project can be replicated in the host country. The nuances of difference must be examined carefully to ascertain if the experience is relevant. Cultural patterns may be significantly different.

Product classification lists: Industrial classification lists (breakdown of industrial sub-sectors) or lists of product classifications such as those of the International Trade Commission in Geneva may offer some ideas for new projects.

Whatever type of identification study is selected, terms of reference should be prepared that identifies what information is needed, the extent of the study, and how information should be presented.

Some caveats: Raw materials available in the country may be exploitable, but only if the quality is such that the contemplated product can be made to a specification acceptable to the local or export market. Another important factor is the elasticity of demand. If supply is tight due to existing market demand, the imposition of new demand can have a very significant effect on price. A study of natural resources for potential exploitation would include a compilation of information on quantity and quality of reserves and any problems associated with their exploitation, e.g. accessibility, environmental impacts. There may be an attempt to analyze the general level of demand, domestic and international, for product possibilities.

SCREENING PROJECTS



When there are a basket of projects to be considered a systematic method of screening should be employed to prioritize the ideas in terms of attractiveness. An effective way of doing this is to set down the general criteria and then to determine how well each project idea will satisfy them. A point system can be used. Each criterion can be weighted with a scale of perhaps 1 to 10 in terms of their significance or importance. Then each project can be rated on another scale. The sum of the products of the category

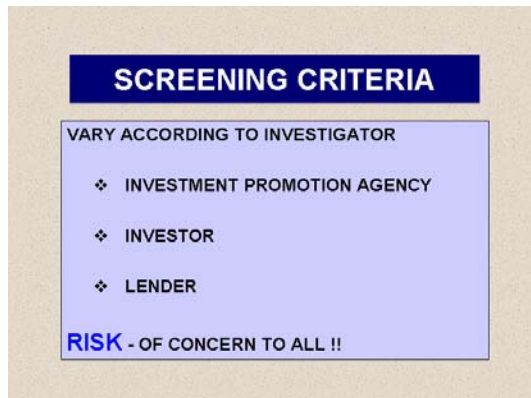
weights and ratings determine the points for each alternative.

Some projects will not be able to meet one or more criteria and would have to be placed into one of the "recycled" categories explained elsewhere.

Some of the criteria that could be included in the screening scheme are as follows:

- Size and growth of market - reliably adequate to justify investment?
- Availability of local resources - quantities, qualities and acceptable prices?
- Minimum and maximum plant size - economically acceptable range for project?
- Appropriate technology - available and compatible?
- Size of investment - within range that can be managed by investors?
- Estimated financial indicators - acceptable according to criteria, e.g. cost of capital?
- Requirements and constraints - any that preclude implementation or operations?

SCREENING CRITERIA



The parties or agents involved in a project each determine their own criteria according to their priorities (promoter, investor, financier, guarantor, government). Overriding all criteria is the element of risk.

Investment promotion agency: These (usually government) organizations are concerned with the likelihood of project implementation - the less imposing the hurdles, the more likely most promotion agencies will assign a high priority to the

project. There are often development goals of the country or region to be taken into account, which may be related to issues of security, economic growth, political stability. Socio-economic or distribution effects of the project may be an important criterion if distribution is difficult to deal with administratively for political reasons.

Investor: Projected profitability - higher return is better; payback - the projected time to recover the investment out of the project financial flows is for some an important criterion; growth potential - an expanding market and general economic prosperity; magnitude of investment- the project investment must match the capital constraints of the investor; risk - tolerance to risk varies by investor. Most are risk-averse, so want to see the threats to success minimized (although some investors/promoters may be challenged by difficult hurdles). Other criteria might be related to prestige (highly visible projects would tend to be viewed favorably) and conformance with personal commitments (some are obsessed with an idea).

Lender: Banks and other financial institutions sometimes do opportunity studies and screen the resulting investment ideas in regard to the structure of their loan portfolios. This is particularly true for development banks with mandates to promote economic development along specified lines. Criteria would include: conformance to development objectives or with institutional experience; likelihood of default in servicing debt; client relations (interests of preferred clients); magnitude of investment (if the investment is too large for the financier to handle, syndication may be an option, if too small, the cost of administering the loan may be too great).

WHAT CONSTITUTES A BUSINESS OPPORTUNITY?



A genuine business opportunity exists when the basic framework for successful operation are either in place or achievable. Both micro and macro factors are part of this framework.

The basic concept of the business must be sound. There should be an identified product or service, with willing and able buyers or consumers, and the ability to carry out both implementation and operations. In some cases decommissioning is important to consider

(will there be significant costs incurred in shutting down the facility at the end of its useful life?).

Risk overlies every assumption of a project idea, at the micro and macro level, and should be assessed at each stage of project development, even at the identification stage.

Micro elements:

Business concept: Involves the identification of a product or service, a strategy for marketing and distribution. Describes why the business will be able to survive and grow in the environment.

Investors: Most projects require investors willing and able to provide the necessary equity. Their history and qualifications should be sufficient to organize the project and to qualify for any additional financing required.

Market: People willing and able to buy have to be identified. They must be susceptible to any psychological transformations that are necessary to engender a need for the product. Consumption trends and the state of the product in its product life cycle must be conducive to acceptance by sufficient numbers of consumers. The market environment should support the establishment of a new enterprise.

Resources: Resources must be available as needed for proper functioning of the enterprise - managerial capacity and other labor; financial facilities; raw materials and intermediate goods and services; a technology appropriate to the environment; land in a suitable location.

Macro elements:

Business climate: The general business climate should be favorable (see Introduction, Macro-Micro, Investment Climate)

Business cycle: The state of the particular business cycle should be favorable. The cycle of some product lines are synchronized with the economic cycle (e.g. consumer durables). Others are asynchronous with the economic cycle (e.g. home maintenance products). Demand for some product lines is more a function of the product life cycle (e.g. cellular communications equipment).

Economic trend: Growing GDP and national income is propitious for business entry. A state of secular economic decline in the country or region would not bode well for a new business entrant.

From the development perspective, these are the very conditions that should stimulate planners to foster new economic activity. This is the only earth we have; prudence dictates that those responsible for maintaining the economic vibrancy of a country or region would attempt to restore healthy economic conditions by fostering economic progress in the face of adverse conditions.

KEY ASPECTS OF PROJECT IDENTIFICATION



Concentrate on best prospects: Promoters would do well to focus their attention on those prospects with greatest promise. Focusing attention on a limited number of project ideas is a better way to assure that pitfalls are avoided. There is also the issue of resources and cost. Planners and investigators can do a better job when their efforts are not diluted by having too much to do. There usually is a limit to the capital available for investment, so working on too wide an array of possibilities is unrealistic.

Quick negative decision better than delay: Particularly where there is a sufficient array of project ideas, it is better to quickly reject, or at least recycle, ideas that present difficult obstacles from the outset. These projects can be reconsidered at a later time. Meanwhile, attention can be focused, and resources concentrated, upon those projects that appear to be most likely to succeed.

Assure commitment of potential sponsor to implementation: Promotion organizations are often plagued with self-proclaimed investors who are really on a "fishing expedition". If the services of industrial planning agencies are provided without cost or risk to applicants for services, there is a great risk that much of the effort of the promoters will be wasted. By one means or another, promotion agencies should assure the commitment of sponsors to the project. An incentive approach might be employed, in which planning efforts would be subsidized only when a good faith effort is made to actually implement a project.

PROJECT PREPARATION



Project preparation is the study of an investment opportunity. A project is designed and its feasibility assessed.

The study of an investment project should take the 'ecological' view by considering the project in its environment. This means looking at the project as a living organism in a habitat, which will provide both its sustenance and its opportunities. A project should be defined as early as possible - its design and its interfaces with the environment - to what extent, for

example will subsystems be produced or bought; what are the market segments of interest?

The general methodology of conducting such an investment study (the preparation process) involves the following:

Set study limits: If a consultant is to perform the study, terms of reference should be prepared outlining the scope of the study - what is and what is not to be included. In any case, before embarking on the study its boundaries should be at least tentatively defined. It may be necessary to change the limits when new information is available.

Design the project: An industrial investment project design describes the creation and operation of the entity to produce, market and distribute the intended goods and services and how it interfaces with its environment. The design includes a description of the process for implementing facilities, organization, systems and operations.

Collect information: Data and other information are collected pertaining to all aspects of the project design.

Determine a project configuration: A project configuration or design and alternatives are described.

Study the project in its environment: The implementation and operation stages of the project are examined to understand how internal functions will interact with the external environment.

Analyze results of study: When the interfaces of the project and the environment are understood and the performance predicted, the design of the enterprise is analyzed to predict how it will perform its intended functions of producing goods and services and generating revenues and returns on investment. The results are assessed to determine if the project is feasible, i.e, that there are no apparent constraints that preclude successful operation.

Estimate performance indicators: These indicators are quantitative and qualitative measures of predicted performance, based upon analysis of the project design. As

the entity does not exist, the estimates are particularly subject to uncertainty and error. Indicators of investors and other participants and interested parties are estimated with their associated risks.

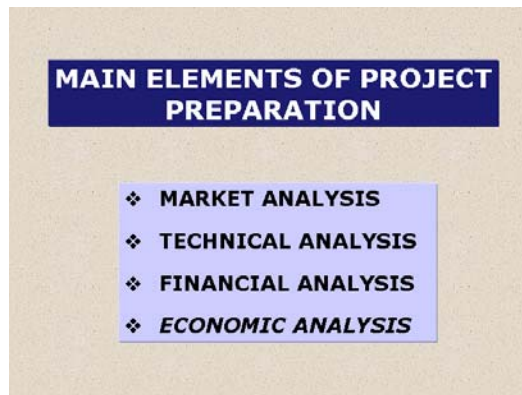
Assess risks: A crucial part of the analysis is the assessment of risk. While the nominal performance may appear to be satisfactory, when the elements of risk are taken into account in the form of risk-adjusted indicators, a project design may take on a different hue, perhaps leading to more careful consideration of an alternative design.

Test feasibility: A feasible project is one that can operate successfully within constraints imposed by external forces and by its own internal competencies. The feasibility of all proposed alternative configurations should be verified.

Select optimal configuration: An optimal project design should be selected, and the configuration justified on the basis of how well it meets the criteria of participants and other interested parties.

Provide recommendations: A consultant's recommendations should follow from the project study. The consultant may identify constraints that render a project infeasible, indicating what must be done to solve the problem. If the project is considered feasible, there should be a high probability of success, even when risk factors are taken into account.

MAIN ELEMENTS OF PROJECT PREPARATION



Market analysis: An investment project is developed for the purpose of producing goods and services to be consumed in the economy. A problem for the project designer is to identify the market - potential consumers: who they are, how many, where they can be found, what are their needs, the proportion accessible to the project, how these needs can be satisfied by the product design and how they can be required in regard to ability to pay. In a market-oriented environment what the project produces has to respond to these

consumer characteristics.

Once potential consumers are identified the problem remains concerning how they can be successfully approached - what messages must be conveyed to them, through what media - and how the product can be conveyed to the market efficiently. A marketing plan to implement the strategy is developed - determination of a production programme and plant capacity as well as sales revenue and cost projections for consideration in the financial analysis.

Technical analysis: Engineering and other technical parameters of the project need to be clearly defined. A production process must be designed; a technology and the related machinery and equipment selected; a site selected and developed; estimates of capital and operating costs provided for financial analysis.

Financial analysis: Financial analysis of an investment project provides the "bottom line" for investors, a prediction of what the project holds in store in terms of financial benefits and costs. It is linked to the analysis of markets that provide an idea of revenues (benefits) that can be generated, and to technical analysis that provides an idea of the necessary investment and operating costs.

Economic analysis: Economic analysis attempts to assess the total economic effects of an investment project on the national economy.

The integrity of an investment plan can be regarded in terms of a chain comprised of links. The weak link often defines the fragility of the entire plan. Hence, the need to study - to design all of the links in the chain and to identify those that may be most subject to internal weaknesses or susceptible to external threats.

MARKET ANALYSIS



MARKET ASSESSMENT:

Market analysis is the assessment of the potential for the project's planned output to be absorbed within the economy of interest. The project designer must comprehend the relationship between the product or service (hereafter product) and the needs of the market. To simply assume that consumers exist who are willing and able to purchase project output is a road to disaster.

Information is required - market research has to be performed. Target populations and segments that will supposedly be satisfied by utilizing the product, their characteristics, size and geographical distribution have to be studied. Their willingness and ability to purchase must be understood.

Then characteristics of the product have to be examined in relation to needs, wants or desires of these potential consumers. Functionality, appearance, price - are some of the product characteristics that will affect market appeal. How the product will fare against direct competition and substitutes has to be studied, perhaps indicating the need for refinement or modification.

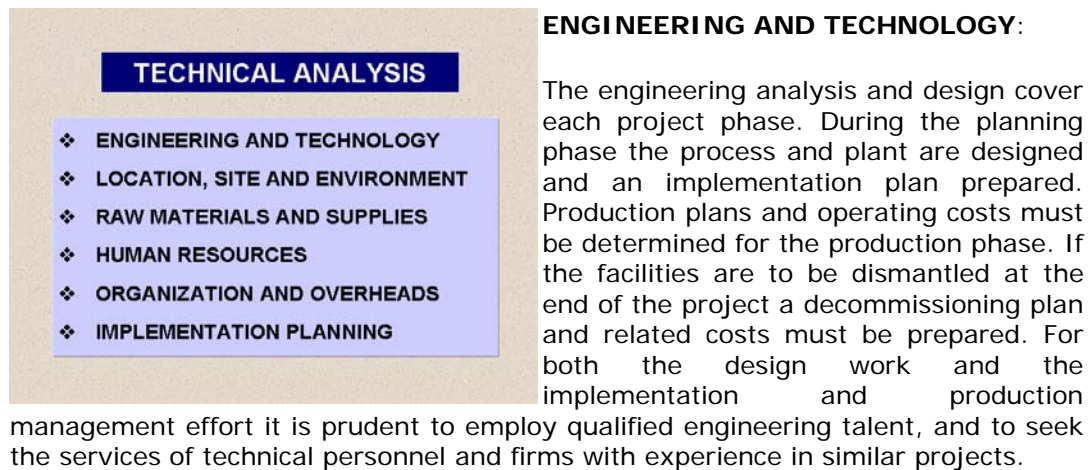
The scope of market assessment circumscribes the extent of the work. The extent can be defined in terms of geography, population segments, or product lines. The research team should be provided terms of reference that specifies the types and quality of the information to be collected and the analyses to be performed. Data can be collected from primary and secondary sources. Whether or not primary data collection should be undertaken is a function of the degree of progress in the project's development and the need for information. As the project progresses toward an investment decision, critical information if not otherwise available may have to be obtained from primary sources.

MARKETING STRATEGY

A plan for approaching the market so that (1) potential consumers are aware of the existence of the product, its features and how those features can satisfy real or perceived needs, (2) how the needs can be satisfied by the project or enterprise rather than competitors, (3) the most promising means of informing and influencing potential consumers, and (4) how the product can best be delivered to consumers - a marketing strategy - is virtually a requirement for any enterprise functioning in a market system.

This applies to enterprises regardless of size. Plans for developing and conducting a marketing program should be included in the study, which consists of promotion activities and carrying out distribution functions - servicing distribution channels as necessary and providing customer services.

TECHNICAL ANALYSIS



ENGINEERING AND TECHNOLOGY:

The engineering analysis and design cover each project phase. During the planning phase the process and plant are designed and an implementation plan prepared. Production plans and operating costs must be determined for the production phase. If the facilities are to be dismantled at the end of the project a decommissioning plan and related costs must be prepared. For both the design work and the implementation and production management effort it is prudent to employ qualified engineering talent, and to seek the services of technical personnel and firms with experience in similar projects.

When an investment project idea arises, it usually includes a conception of the way that the good or service will be produced. The choice of technology is one of the major decisions for project planners. Under ordinary circumstances there are available alternative methods for carrying out a production programme. The choice should reflect careful consideration of options and optimal satisfaction of the selection criteria. The issue is: what means of production will meet all of the desired product specifications and produce the necessary quantities reliably and safely at acceptable cost and with the least perturbation of the surrounding environment throughout the entire economic life of the project?

A systematic analysis of how each alternative satisfies criteria would provide the best opportunity to make the right choice. Layouts (site, plant, administrative facilities) should be widely employed in this process as a planning tool. Availability and operating costs associated with utilities should be considered.

LOCATION, SITE AND ENVIRONMENT:

Location is the region or area in which the project is to be commissioned. A site a particular parcel of land on which the plant is to be built. Some issues related to location and site selection are: cost of acquisition and development, operating costs,

assessment of preexisting natural and social conditions, impact of environmental emissions , regulatory issues, mitigation requirements.

RAW MATERIALS AND SUPPLIES: Material inputs are one of the major cost elements of production. Efficient material utilization can therefore have a very large impact on the feasibility of the project. In fact, in some cases it can represent the difference between success and failure. Material inputs can be in any natural form - solids, liquids and gases and any combination thereof. They can consist of raw materials, semi-processed materials, components and subsystems. Reliability of sources of materials and supplies is a concern to project designers, as is the difficult task of estimating future costs and trends.

HUMAN RESOURCES:

The project plan should include analysis of personnel required to operate the enterprise - qualified personnel in sufficient numbers, training when skills of available personnel are insufficient, services required to support the staff - and all associated costs to complete the plan and to estimate the financial implications.

ORGANIZATION AND OVERHEAD:

The project requires an organization to carry out the business plan. The organization should be defined from top management down to the lowest level factory worker. This will help to clarify the job classifications and numbers and lead to reasonably accurate estimates of costs. The organization will usually differ during each project phase (planning, implementation, operations, decommissioning if necessary).

IMPLEMENTATION PLANNING:

The implementation of the project includes preparation of the site, construction of all facilities and start up and commissioning of the plant. The project implementation must be planned in detail after the commitment to invest. In the planning stage a preliminary implementation plan is necessary for costing purposes and to examine the needs for materials, equipment and personnel to carry out the implementation.

FINANCIAL ANALYSIS



An investment project requires capital, accumulated resources that can be employed for the generation of future benefits. Capital is mobilized by the sponsors, usually in monetary form, and then used to acquire ownership or control of assets, which are then employed for generating goods and services.

Financial analysis is a simulation of the investment from the financial point of view. Projections of financial inputs –

capital assets and operating expenses, and of outputs - revenues from the sale of outputs, provide indicators of projected performance that are then compared against criteria of participants.

INVESTMENT COSTS: An investment project requires capital, accumulated wealth in the form of resources that can be employed for the generation of future benefits. An investment project mobilizes capital, usually in monetary form, which is then used to acquire assets that are employed for generating goods and services. The assets are capital items owned or otherwise controlled by the project sponsors. The Initial Investment Package represents the value of these assets that are initially committed to the project. Generally the procurement of these assets involves cash outlays, but sometimes they are provided by one or more of the investors 'in kind'.

The assets initially committed to the project generally fall into three categories: *Fixed assets, Pre-production expenditures and Working capital*. A part of the initial working capital is financed with long-term sources (Working capital margin). The balance is financed with short-term funding. The initial investment cost represents the total amount of financial resources necessary to implement the project.

PRODUCTION COSTS: The costs of production are the financial outflows for acquiring resources utilized in creating the project's output. The ultimate application of production costs in planning an investment project is to estimate outflows associated with procurement of goods and services required for production.

FINANCE: Any investment project requires financing. Financial assets, funds and perhaps other financial instruments that comprise the financial package, are primarily employed in exchange for some expectation of return. The sources of finance (whether funds, securities or in-kind) can generally be classified as debt or equity.

The primary challenges to project sponsors are generating funds in the amount and at the time required and achieving maximum amount of coverage for lender's risk. The issues for the financial designer of the project are (1) the sources of capital, (2) the methods for acquiring debt and equity capital, (3) the capital structure, and (4) the cost of capital.

INDICATORS OF FINANCIAL PERFORMANCE: Indicators of predicted financial performance of an investment project are required to assess its financial viability. Indicators can be classified into two broad categories: *static* and *dynamic*. Static indicators are essentially financial snapshots, or measures of the predicted state of the enterprise at discrete points in time. Dynamic indicators are temporally panoramic, taking into account in a single measure the predicted performance over the entire span of the project's life to the planning horizon.

Static indicators: These indicators are more familiar to most investors as they are utilized widely in capital markets for appraising the value of financial instruments, both debt and equity. Some of the static indicators are more appropriately applied to investment projects, particularly those associated with risk.

Dynamic indicators: Some of the most effective measures of financial performance for investment projects are indicators that take in the entire span of time from inception of a project to its planning horizon. During the planning stages, when the project does not physically exist, hypothetical snapshots are much more prone to error than measures that encompass the entire span of a project's life plan. Inaccuracies can be evened out over time to some extent, although it is true that

uncertainty in prediction increases with time. To alleviate this problem of increasing uncertainty with time the planning horizon can be shortened, but has the disadvantage of neglecting operations that could play a significant role in the investment decision.

FINANCIAL CRITERIA: Static and dynamic financial indicators that define predicted performance are derived from the financial analysis of the project, which is based upon the project design - the approach to the market, the technical configuration, the organization, in short the functional entity conceived by designers and how it will interact with the external environment.

The question now is: are the participants satisfied with what they see? Each of the participants has criteria - the goals and objectives of each individual, corporate entity or other party to the project may, and usually will, differ. Performance indicators are to be compared with criteria. If the criteria are met or exceeded presumably the project will be regarded favourably; if not it will either be rejected, or perhaps recycled in some way.

Determination of criteria is a crucial exercise; if criteria are not properly defined the decision process goes awry. In some cases there are a number of criteria that have to be regarded simultaneously. How they can be regarded in composite when only some are satisfied is an issue that confronts investors.

ECONOMIC ANALYSIS

ECONOMIC ANALYSIS

- ❖ **ECONOMIC (SHADOW) PRICES**
- ❖ **COSTS AND BENEFITS**
- ❖ **EXTERNALITIES**
- ❖ **SOCIAL FACTORS**
- ❖ **CRITERIA**

An enterprise created by an investment project is designed to 'live' in a commercial environment, in which it is expected to prosper and grow. There is also a wider domain of growing importance in which the project may be assessed, as resource constraints are encountered in an increasingly crowded world.

commercial or market prices.

Economic (Shadow) Prices: Constraints in the economy may result in values of project inputs and outputs that differ from

Benefits and costs: Commercial benefits are measured in regard to revenues or profits. Economic benefits are measured in terms of resources made available to the society. Commercial costs are the prices of factors of production. Economic costs are measured in terms of opportunity foregone when a resource is applied to the project.

Externalities: A commercial enterprise is generally concerned only with factors that affect revenues or that incur financial costs. In the wider domain the concomitant impacts upon the economy and physical and social environments are included in the analysis.

Social factors: How a project conforms to social policy in terms of distribution of the region or country's resources is a consideration in this type of analysis.

Criteria: Rather than focus on the 'top' or 'bottom' lines, net consumption, distribution and other benefits to society are criteria that are applied in economic analysis.

FEASIBILITY

FEASIBILITY

- ❖ PROJECT CAN 'LIVE' WITHIN ALL CONSTRAINTS
- ❖ JOB OF ANALYST IS TO TRY TO IDENTIFY CONSTRAINTS AND CONFIGURE PROJECT ACCORDINGLY
- ❖ REQUIRES ENTREPRENEUR WHO CAN SUCCESSFULLY DEAL WITH CONSTRAINTS AND BRING THE PROJECT TO FRUITION

Project can 'live' within all constraints: Prior stages of analysis (e.g. market, technical) will shed light on constraints.

Job of analyst is to try to identify constraints and configure project accordingly: Analyst must design the project so that it can function effectively within the constraint boundaries.

Requires entrepreneur who can successfully deal with constraints and

bring the project to fruition: The entrepreneur is the driving force behind the project. The role is to seize and promote the investment opportunity. The capabilities of the entrepreneur should match the demands of project. A sound investment opportunity will be realized with the involvement of an individual with the requisite energy and skills.

CONTENT OF A PRE-INVESTMENT STUDY

CONTENT OF PRE-INVESTMENT STUDY

- ❖ Executive Summary
- ❖ Project Background
- ❖ Market Analysis
- ❖ Technical Analysis
- ❖ Financial Analysis
- ❖ Economic Analysis [if applicable]
- ❖ Investment Appraisal

Regardless of the level of development the project study should include the full range of relevant issues. From Opportunity Study to full Feasibility Study the content should be basically identical; only the depth (accuracy and precision) should increase as the project moves toward a decision to invest.

A pre-investment study should be prepared considering the audience. It should respond to the issues of concern to the intended readers. It may be necessary

in some cases to prepare alternative versions of study reports, each focusing on issues of particular relevance to the intended audience.

The following is a suggested outline for a pre-investment industrial project study. Most important is that the full range of topics are covered using whatever format is appropriate.

Executive Summary: Outline of business concept, capital structure, financial performance indicators, principle risks (internal and external to project). Analysis of external business environment and internal strengths and weaknesses.

Project Background: Explanation of the genesis of the project; underlying concept - why it will work in the environment, main strengths and weaknesses, analysis of alternative configurations.

Market Analysis: Analysis of demand and target market; marketing approach in terms of marketing variables; distribution channels. Estimates of market share, penetration and sales levels.

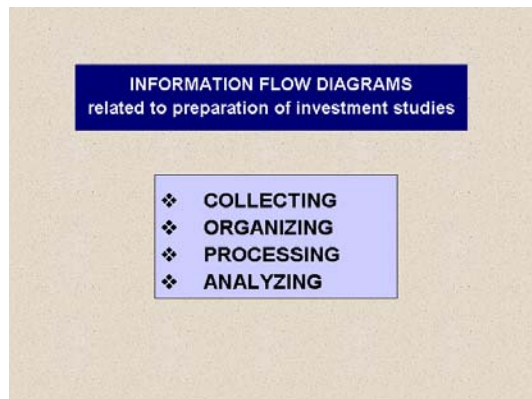
Technical Analysis: Analysis of raw materials and supplies, location, site and environment, engineering and technology, organization and overhead costs, human resources, implementation scheduling and budgeting.

Financial Analysis: Capital structure and sources of finance; pro-forma financial statements; estimates of financial indicators; analysis of financial risks and sensitivities.

Economic Analysis [if applicable]: Project performance based on economic prices.

Investment Appraisal: Comparison of risk-adjusted project performance characteristics and indicators with criteria of participants; capital budgeting considerations.

INFORMATION FLOW DIAGRAMS RELATED TO PREPARATION OF PRE-INVESTMENT STUDIES



To prepare pre-investment studies, the project analyst needs information concerning the project's external environment and about how the project will be designed, constructed and operated. Information is gathered, organized and then processed so that it is acceptable for analysis.

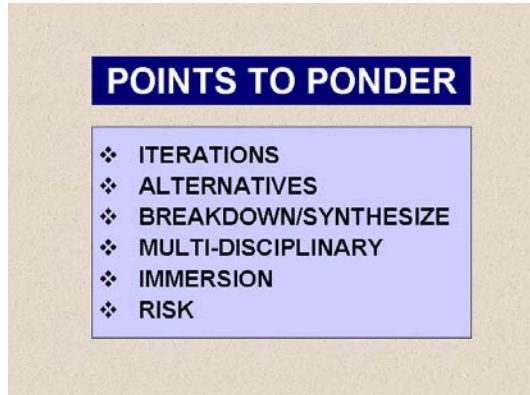
The analyst should try to determine early what information is required to cover all the issues relevant to an investment project. In the course of doing this, information may flow in a disorderly manner, not in accordance with a linear scheme. A system of accumulating, storing and then processing information should be set up, perhaps with files devoted to each type of information that can be identified. It may be necessary to cross-reference information that is relevant to more than one topic.

When data is analyzed it is useful to set up some form of flow chart to guide the work of the analyst and to inform others involved about what information was used, how it was organized and analyzed. An example is shown under Related Documents showing the flow of information for financial analysis. A similar approach can be used to somewhat systematize the analysis of other aspects.

In the private sector the objective of investing capital is the return - how benefits will be generated and how they accrue to the investors over time. The flow diagram

shows relationships between all types of information used in this analysis, which has links in this case to all project dimensions.

POINTS TO PONDER



POINTS TO PONDER

- ❖ ITERATIONS
- ❖ ALTERNATIVES
- ❖ BREAKDOWN/SYNTHESIZE
- ❖ MULTI-DISCIPLINARY
- ❖ IMMERSION
- ❖ RISK

Iterations: In the process of project preparation there interim solutions should be reviewed in later stages. As new information is unveiled it may be prudent to revisit aspects that have previously been analyzed. The process is rarely, if ever, linear. A project is in a very large sense a learning process, so that ideas and assumptions previously held, and upon which decisions were made, will usually have to be revised to some extent. This means that a previous decision may have to be changed to reflect the modifications in the information and assumptions upon which it was based. The basic objective of the study is to test project feasibility based upon the best information available.

Alternatives: Alternative project configurations or project components should be compared in the process of selecting the optimal solution, one that not only works but that represents the best design on hand in regard to criteria of participants. Rather than focus on one approach, alternative solutions should be considered from the early stages. Keeping promising alternatives open through the detailed study stage can be a bit more costly, but will more surely lead to the best configuration.

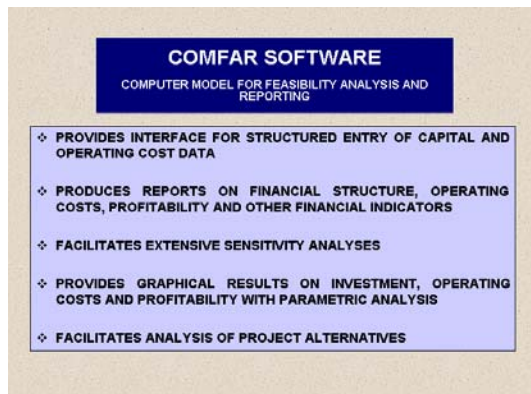
Breakdown/synthesize: Project elements (e.g. technical, market, finance) should be broken down into their component parts for study, but then synthesized (regarded systemically in their integrated form) to understand how each element functions within the entire system of the project.

Multi-disciplinary: Within a project analysis there are inevitably links between the areas of study. Project 'elements' do not really exist in isolation; each is somehow related to others. For this reason alone, in addition to the specialized knowledge required for each, a multidisciplinary team would be in best position to prepare the project.

Immersion: The analyst should be immersed in the project, but should avoid the sentimental attachments of the sponsor. The viewpoint of the analyst should be from the center outward rather than from the outside looking inward. Only in this way can the process of preparation be sufficiently internalized so that interactions with the external environment are comprehended.

Risk: Risk is an overriding consideration at any stage of the process. Uncertainties in projections are sources of risk to investors and other participants and is of primary concern to all of them. Still, a project has to be designed and implemented. The likelihood of success, the pitfalls that might stand in the way, and measures to avoid or spread risk should be the focus of attention of the analyst.

COMFAR SOFTWARE



COMFAR III Expert is a valuable aid in analysis of investment projects. The main module of the program accepts financial and economic data, produces financial and economic statements and graphical displays and calculates measures of performance. Supplementary modules assist in the analytical process. Cost-benefit and value-added methods of economic analysis developed by UNIDO are included in the program, with allowance made for the methods used by major international development

institutions. The program is applicable for the analysis of investment in new projects and expansion or rehabilitation of existing enterprises as, e.g. in the case of re-privatization projects. For joint ventures, the financial perspective of each partner or class of shareholder can be developed. Analysis can be performed using a variety of assumptions concerning inflation, currency revaluation and price escalations.

The COMFAR system distinguishes cash flows in domestic and foreign currencies while allowing for changes in exchange rates. A number of standard functions are available to compute net working capital, debt service, annual depreciation of fixed assets and corporate tax. From a variety of financial and efficiency ratios, the user may select those needed for project appraisal. Direct costing, allocation of indirect costs to profit centres and analysis in constant or current prices is also available.

Financial analysis (enterprise level)

For financial analysis, COMFAR III Expert produces, the following result schedules: Summary sheet, Investment costs, Production costs, Production and sales program, Sources of finance and debt service, Business results (financial cash flow, discounted cash flow, income statement, balance sheet (with ratios), data on direct costing and product profitability), Financial and efficiency ratios and Break-even conditions. User-defined sub-items may be displayed and printed within the standard schedules.

Economic analysis (macro level)

The economic analysis option allows the user to introduce shadow prices (to express project inputs and outputs in terms of economic prices) and to compute economic rates of return, value added, foreign exchange and employment effects. All results might be calculated including or excluding external economic effects. The economic analysis module of COMFAR III Expert supports methodologies described in the Guide to Practical Project Appraisal (UNIDO, 1986), in ("Little, I.M.D. and Mirlees, J.A."), Project Appraisal and Planning for Developing Countries (OECD, 1982) and in ("Squire, L., and van der Tak", H.G.), Economic Analysis of Projects (World Bank, 1984).

Graphic presentation of results: COMFAR III Expert gives the user the ability to generate graphic presentations of ratios as well as structures of cash flows, costs and revenues.

Sensitivity analysis:

With the help of sensitivity analysis, it is possible to show how net cash returns or the profitability of an investment alter with different values assigned to the variables needed for the calculation (sales prices, unit costs, sales volumes, etc.). COMFAR III Expert facilitates assessment of alternative project scenarios and determination of critical variables. A variety of graphic charts is available to analyze the structures of project inputs and outputs, e.g. the structure of annual production and sales programme, or variable and operational margins and break-even sales volumes.

Non-industrial investment projects

For appraisal of investment projects in other sectors of the economy, such as agro-industrial development, mining, infrastructure and tourism projects, COMFAR III Expert offers corresponding data input formats and output tables.

COMFAR III Expert allows the user to create his own project type based on the above mentioned standard types.

PROJECT APPRAISAL



The team that produces a plan for an investment project is generally comprised of professionals who apply their skills and knowledge to gather information about the project, which is then used to produce a design and analysis that are intimately related. The outcome of analysis is a description of how the design will likely function in the commercial and wider domains.

Appraisal is the process undertaken by interested parties - investors, financiers, guarantors, licensors - to determine if the project design is satisfactory. In performing their appraisal, the parties apply their own criteria to the indicators, or descriptions of project performance, as developed by the analysts. Each participant may apply their separate criteria and may arrive at different conclusions - accepting, rejecting or perhaps asking for further study.

WHY APPRAISE?



To understand the likely consequences of investment: Project preparation provides a design and a description of projected performance. This aspect of appraisal is the comparison of projected performance with criteria of participants.

To ascertain the risks involved: The project study should include identification of risk elements and the probability of adverse outcomes. Determining whether the risk-return relationship is acceptable

to participants is a major part of the appraisal process.

To decide if the investment should be undertaken: In the final analysis appraisal results in a decision on whether or not to invest, considering projections of performance, compatibility with other activities of investors and other participants, and the risk-return relationship.

RELEVANCE OF APPRAISAL



Under what circumstances it is appropriate to appraise an investment project?

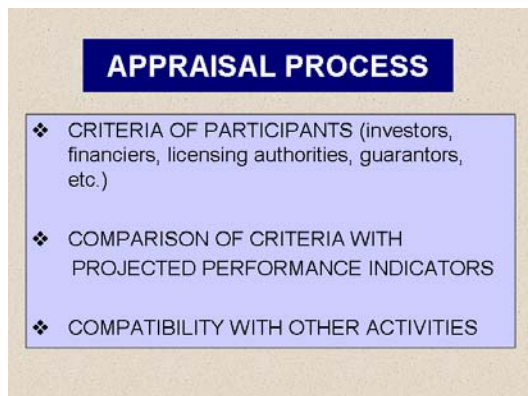
All sectors of economy: Study and appraisal is appropriate for all sectors of the economy - manufacturing, agriculture, mining, etc. In all cases the issue is the allocation of capital resources; investors in all sectors seek assurance that their capital is invested wisely.

Revenue and non-revenue projects: Both revenue and non-revenue projects need appraisal. Criteria for approval exist for any type of investment project. How well a project will satisfy the goals and aspirations of all participants should be examined. For revenue projects a major consideration is the commercial rate of return. In non-revenue projects the criteria can be least cost, maximum contribution to national income, income distribution effects and other economic and social outcomes.

All types of projects: Appraisal is appropriate in all types of investment projects: new investment, modernization, expansion, privatization, technology acquisition, and equipment replacement. The method of appraisal may differ for each type, but there are always criteria upon which to base a judgment to invest or not to invest.

Public and private investment: Appraisal is appropriate in both the public and private sectors. Investments in the public sector are often non-revenue projects with economic and social objectives. Performance indicators and criteria can sometimes be quantified, but often there are qualitative criteria and methods of measurement that are applicable. A transportation project, for example, could have quantitative goals measured in terms of increased tonnage of goods transported, but also qualitative objectives concerning adverse impact on inhabitants of the area where the facilities are to be constructed.

APPRAISAL PROCESS



Appraisal is the process of determining if the performance indicators satisfy criteria of participants - to decide if it is acceptable for investment or support. It is the final stage of project development, the point at which a decision to invest in the project or to put it on the shelf for future consideration or to discard it entirely.

Criteria of participants (investors, financiers, licensing authorities, guarantors, etc.): Each of the participants has their own criteria for accepting or rejecting an industrial investment project. Their perspectives are

different and so are their goals. An investor seeks to produce satisfactory returns on investment or to maximize terminal value. A banker wants to assure the servicing of debt. A guarantor seeks to assure that the terms of the guarantee are met. The project appraiser has to identify the criteria of interest, the levels of performance characteristics that must be achieved to meet with approval. For the project to go ahead with implementation, all essential participants must approve

Comparison of criteria with projected performance indicators: Performance indicators are derived from the project design. Their reliability has to be assessed and their values and other characteristics compared with the criteria of the interested parties to determine if they are acceptable. Projected indicators of performance and their acceptable levels and other characteristics usually differ for each type of participant.

Compatibility with other activities: Investors and other participants should consider the project in relation to other activities, e.g. consequences for the investment portfolio in regard to risk, investor capabilities or the expertise of prospective financiers and guarantors.

PROJECT PROMOTION



Sponsors are normally compelled to elicit support from individuals and organizations with potential interest in the project. The sponsor has several areas to cover: First the project concept has to be developed. From the earliest stages promotional efforts are needed, which continue until the project is approved and construction commences.

The intensity of promotion by the sponsor is perhaps greatest at the start. Inertia exists in all systems. It is difficult to move people and institutions in new directions.

The players have to be identified. Who are the investors and under what conditions will they invest? Who are prospective lenders willing to provide credit? What roadblocks stand in the way of the project from regulators and licensing authorities? What type of guarantees will be required? Who are the potential suppliers of technology and key inputs and under what conditions will they be willing to support the project?

When the participants are identified, their criteria have to be continually assessed and upgraded as new information becomes available in progressive stages of the project's development.

Key players have to be convinced that participation is in their interests. They have to be assured that their criteria will be satisfied. This requires comprehensive understanding of the project in all its dimensions.

PROMOTION OBJECTIVES



In the course of developing the business concept and the project design through progressive stages from conception to operating plant, project promoters have a lot more to do. The project will only 'get off the ground' if all of the necessary support structure is assembled and functions coherently.

Identify participants: Individuals and organizations whose support and/or participation are essential to the creation of the enterprise have to be identified.

This includes investors who are willing to supply equity capital, lenders willing to offer credit, guarantors who are willing to accept a large share of the risk of default,

regulators and licensors who must see some benefit from their mission perspective, and suppliers of plant, equipment and inputs who view the project positively in regard to their business plans.

Determine criteria: The views of participants should be clarified: what they seek to attain through their participation. It is useful to understand their positions with respect to the project so that their aspirations can be the basis for formulating constructive interactions.

Obtain commitments: It is one thing to express interest - much more important is commitment. Each individual and organization decides and commits in its own way. To the greatest extent possible, communications and arrangements should accommodate their modus operandi. The promoter should work diligently to secure commitments of key participants at the earliest stages. This can be used as leverage to gain the commitment of others.

PROMOTION CHANNELS



Although most businesses and business people operate as independent entities, there exists in most countries, or at least regions or cities, a business community. The community is not monolithic or homogeneous. It is comprised of a variety of groups that are organized formally or informally. There are interactions among the members, acting in their individual and mutual interests. To promote a project, it is very useful to gain the support of this community. There are a variety of reasons why each entity would

be interested in furthering or retarding progress of the project at hand. The sponsors job is to convince them, or at least some or most, that the project serves the interests of the individuals and the community.

Business associations: Enterprises in an industrial sub-sector organize into business associations to promote institutional support for their industry. They employ lobbying and advertising to gain the legislative and regulatory concessions.

Chambers of commerce: In some countries these are government-sponsored organizations that promote local businesses in regard to both consumers and institutions.

Lending institutions: Securing lines of credit for capital and operating expenditures can be a lengthy process. Preliminary contacts to introduce the project and gradually gain the support of loan officers are recommended. Building an understanding of the business practices of the prospective lender is a complementary benefit of early contacts.

Regulators and licensing authorities: Building support in these agencies can start from a low level, working upward to decision-makers. Understanding their mission and which features of the project are in accord with the mission, can be a powerful tool in gaining their support.

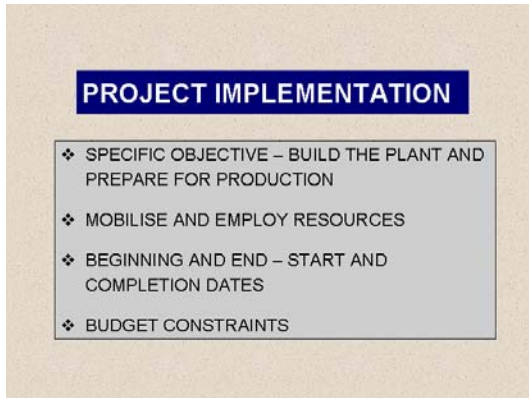
Planning agencies: These agencies exist in almost all countries, regardless of economic orientation. Even in the market-oriented industrialized countries planning agencies abound. Most of these are involved in regional, rather than national, planning. Their approbation can be a powerful influence on other members of the business community.

Development banks: The mission of most development banks is to further the country's industrial programme by financing projects that accord with the plan. These institutions will offer loans to large and small industries that would otherwise have difficulty in securing credit if they appear to mesh well with national aspirations. Gaining the support of the staff of a development bank, even if it is not in a position to finance the project, can be of value. The bank might be willing to intervene in negotiations with commercial banks, to secure short-term credits, for example, to finance working capital or exports.

International aid agencies: Agencies such as UNIDO promote industrial development in general, and specific projects when they are consistent with an integrated national development plan. They maintain wide contacts with business communities worldwide; through their networks they can be an instrument for broadly disseminating the project's profile to elicit interest.

Trade fairs: Expositions sponsored by development agencies or business groups are held periodically in many countries. This is a particularly effective promotion channel if the product or its application is innovative.

PROJECT IMPLEMENTATION



Project Implementation involves planning and constructing an industrial/investment project. Consistent with the characteristics of a project, the construction and implementation can be described as follows:

Specific objective: The objective is to define the activities and their timing to build the plant and prepare it for production.

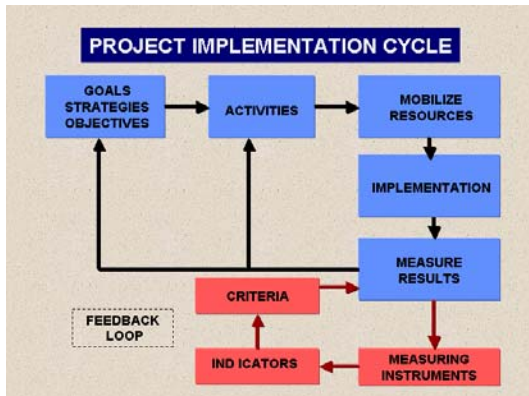
Mobilize and employ resources: The job is to mobilize the resources, human and material, necessary to complete all tasks in the proper sequence so that the result is a plant that is ready to operate according to specifications.

Beginning and end - start and completion dates: The implementation project has a start date, determined by the time necessary to organize after a decision to go ahead with the project, and a completion date, the time when the plant will be ready to commence commercial operation.

Budget constraints: The implementation project is conducted under fiscal constraint. A budget has been established, perhaps at the activity level, but more likely as a lump sum derived from the preliminary plan. Breaking the budget constraint is a very serious matter, as it was an important part of the basis for the decision to go ahead with the project.

Monitoring and corrective action: In addition to planning and mobilizing, implementation includes monitoring and taking corrective action to meet the goals and objectives. This is essential - as the work progresses there must be measuring instruments and indicators against which measurements are compared. The measuring instruments are designed to monitor the degree of adherence to the plan, the criteria, or milestones that are to be met according to the plan (in terms of completion and resource utilization). One of the major components of the implementation process is to take corrective action when necessary, to 'keep the ship on course'.

PROJECT IMPLEMENTATION CYCLE



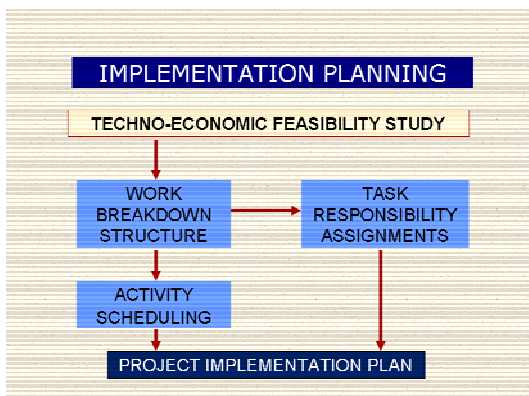
Management of project implementation can be considered as a cyclical process. Actually there are two cycles, both involving feedback used to indicate the need for corrective action.

In the primary cycle, goals and objectives are set with strategies for their achievement. In the case of plant construction and commissioning this is clear - build the plant within allotted time and within budget. Activities are planned to complete the job, and the necessary

resources mobilized. Project implementation commences in accordance with the planned activities. Proper management of the process requires measurements of compliance with the plan. The feedback loop involves necessary adjustments to goals and objectives and the achievement strategies that are indicated by the degree to which activities are successfully carried out. It is not unusual that results indicate the need for changes, even to goals and objectives.

The secondary cycle involves measurements of compliance with the plan. Measurement instruments are the means of determining the relationship between plan and actual experience. As an example in a construction project, a measurement instrument might be a method for recording labor costs for each task. An indicator might be the percent labor cost per unit of output, and the criterion the standard worker-hours for this type of operation. The feedback can be employed to identify problems in the primary cycle or to modify the measurement instruments if they do not appear to be providing useful information.

IMPLEMENTATION PLANNING



Planning implementation derives from the techno-economic feasibility study in which the production process and technology are defined.

A **Work Breakdown Structure (WBS)** is a description of all the activities that must take place to complete the construction and plant commissioning. It is a systematic method for identifying activities related to each component of the construction project. Construction of a building, for example, requires a series of

steps for completion: foundation, framing, exterior, roofing, plumbing, etc. Each of these in turn involves a sequence of tasks. Breaking down the entire construction and commissioning into tasks or activities is the purpose of the WBS. The WBS should also include estimates human and material resources needed for each activity.

After completing the WBS it is necessary to determine **task responsibility assignments**, who is responsible for completing each task. This can be systematically organised in the form of a responsibility matrix, essentially a device for assigning responsibilities to members of the implementation team and other individuals and organizations involved. The matrix can list the team members and other individuals and organizations on one axis and the tasks on the other. Levels of responsibility can be assigned, e.g. primary and support.

Activity scheduling can be carried out using one of the network approaches, Critical Path Method (CPM) developed by the Du Pont company or Programme Evaluation and Review Technique (PERT), developed by the U.S. Navy. More simplified critical path analysis methods have been developed that can be employed even without resort to a computer for relatively small projects.

The **Project Implementation Plan (PIP)** is developed from a combination of information provided by activity scheduling and responsibility assignments.

The Project Implementation Plan derives from the techno-economic feasibility study in which the basic project parameters are defined. Once the plan is reviewed and accepted by the project sponsors, the implementation team can be filled out.

The PIP covers preparation of the site, construction of all facilities, installations, start-up and commissioning. The timing and interrelations of all activities and events necessary to complete the project are included, with phasing of personnel and material resources and funding.

During the planning stage, before the commitment to invest, a preliminary implementation plan is useful for costing purposes and to examine the needs for materials, equipment and personnel to carry out the implementation. This plan does not require the breadth and depth of detail of the post-decision plan, but should be sufficiently accurate to predict timing of major activities and events, as a basis for financial planning and negotiations.

PURPOSE OF IMPLEMENTATION PLANNING



Two levels of implementation planning are usually required.

Preliminary plan: This plan is part of the project development process preceding an investment decision. A preliminary implementation plan is needed for cost estimations and for estimating the time to complete the construction and start-up. It also provides the phasing of resource needs and associated financial outlays. Its main purposes are:

Estimate time to complete project - This will have implications for financial planning and appraisal. The return on investment, for example, is dependent upon the amount of time that capital is tied up prior to the production phase.

Estimate start of production - The estimate of time of commencement of operations is a determinant of the streams of revenue and operating costs.

Financial negotiations - Preparing and negotiating the financial plan are dependent upon estimates of the construction schedule and start-up of production.

Detailed plan

The detailed implementation plan, to be developed after the commitment to invest, provides a planning tool for the organization jobs and resources necessary to complete the project and a "feedback" and control mechanism for the management of the project.

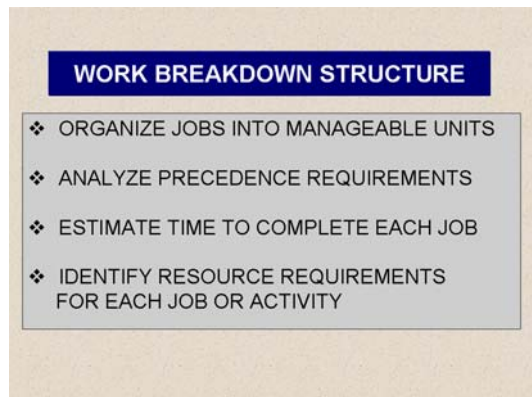
Activities and events - The sequence of events, the prerequisite activities of each and their interrelations that are necessary to complete construction and start-up

Resource planning - The quantities and characteristics of human and other resources are derived from the planning of events and their related activities.

Timing of costs and finance - Detailed planning provides more precise information concerning the costs and timing of resources and the appropriate sources and phasing of project financing.

"Feedback" and control mechanism - Detailed planning is a management tool. Goals and objectives are set, and means of monitoring progress and taking corrective action when necessary.

WORK BREAKDOWN STRUCTURE



One of the first steps in project implementation planning is the **Work Breakdown Structure (WBS)**, which describes the hierarchy of tasks necessary to complete the project. It is in the form of a simple network, with more detailed breakdown of tasks in each stage of the network. The idea is to organize the jobs into manageable units and to analyze precedence requirements, which defines which jobs must be completed before others can begin (for example, the foundation of a house must precede the

construction of the walls). Another important feature of the WBS is the identification of resources necessary to complete each task. These resources can be personnel, materials, equipment, etc. The time to complete each task is also estimated, which when combined with all the others determines the total time necessary to complete the project.

The process of decomposing the project into its job elements in a systematic way, the Work Breakdown Structure, is a useful endeavour in the preliminary planning stages and also for detailed implementation planning after commitment to investment. The early effort would be based upon educated approximations while the detailed analysis relies on firm job estimates.

Organize jobs into manageable units: The Work Breakdown Structure (WBS) decomposes the major jobs into a series of tasks or activities necessary to complete the project. The jobs are defined so that they are manageable. The WBS is in the form of a simple network, with more detailed breakdown of tasks in each stage of the network. Jobs are defined that they encompass the entire scope of the necessary effort. Jobs should include the entire scope of activities required from the investment decision to the operating plant - creating and building the enterprise into its operable condition, constructing the facilities and commissioning.

Analyze precedence requirements: Commencement of a job may be contingent on completion of other jobs. The precedence requirements are identified, i.e. which jobs must be completed before others can begin (e.g. the foundation of a house must precede the construction of the walls).

Time to complete: The time to complete each task is also estimated. The entire construction schedule for the project is dependent upon the time required to complete each job and how they are sequenced.

Identify resource requirements for each job or activity: Human and material resources required to complete each job or task are identified. This is necessary to plan procurement and for cost estimating.

WORK BREAKDOWN, JOB LENGTH, PRECEDENCE AND RESOURCES

WORK BREAKDOWN, JOB LENGTH, PRECEDENCE AND RESOURCES				Network code	Days to complete	Precedence	Labor required
1.0	+ SITE DEVELOPMENT	B	2	-	2		
2.0	- STRUCTURE						
2.1	+ Framing	F	2	B	4		
2.2	+ Interior finish	I	5	F,G	3		
2.3	+ Painting	K	4	J,M,L	2		
3.0	- ELECTRICAL AND PIPING						
3.1	+ Install panel	C	2	I	4		
3.2	+ Rough electrical and piping	O	4	F	2		
3.3	+ Finish electrical	M	2	J,C,G	3		
3.4	+ Finish piping	L	6	J,G	6		
4.0	- LANDSCAPING						
4.1	+ Preparation	A	6	I	4		
4.2	+ Planting	D	10	A	4		
4.3	- Fencing						
4.3.1	+ Build fence	E	3	A	3		
4.3.2	+ Paint fence	H	4	I	2		

A simplified example is shown of a **work breakdown** listing all tasks and subtasks necessary to complete the implementation. The jobs are coded for coordination with related jobs in the same category. There is also a Network Code to simplify the job designation in the network diagram (see Network Analysis of a Project). **Job length**, or days to complete each job are noted, estimated by discussions with contractors or from experience. Job precedence is indicated, all jobs or tasks that must be completed

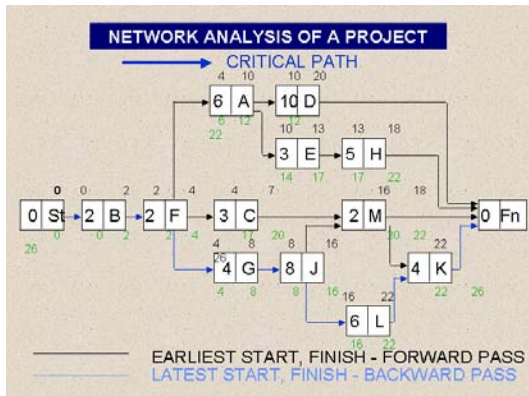
before each job can be started.

Resource requirements for each task are defined. In the example only labour is shown, but there would be similar columns for all other types of resources including materials, equipment and other facilities.

The Work Breakdown Structure lists all tasks and subtasks necessary to complete the implementation. The jobs are coded for coordination with related jobs in the same category, the days for completion are noted, and the precedence indicated. The precedence information is all the tasks that must be completed prior to the time that the job in question is started.

The resources required for each task are defined. In the example only labor is shown, but there would be similar columns for all other types of resources including materials, equipment and other facilities.

NETWORK ANALYSIS OF A PROJECT



A network method is used to analyse the Critical Path, the particular sequence of jobs that defines the amount of time necessary to complete the implementation. All jobs on the Critical Path have no slack, i.e. any delay in completion will affect the project termination date.

Computer programs, such as MS Project, are available to do this type of analysis. One advantage of using such a program is that the resource analysis can be done

with more ease and precision. However, a program may not be necessary in the preliminary analysis, when the network is not so complex and jobs are in more aggregated form.

The example is taken from the preceding work breakdown structure. Jobs are arranged in a network as shown, respecting all precedence requirements. The jobs are coded (A, B, C, etc.) and the number of days for completion of the job indicated (for example, job J needs 8 days for completion).

In the **forward pass** the earliest start and earliest completion for each task is determined. These times are shown at the top of the block representing each task. Any job can only start from the earliest date of completion for all jobs that must precede it. For example, job M can not start until (1) job C is completed in day 7 and (2) job J is completed in day 16. So job M can not start (its earliest start ES) is day 16. Then its earliest finish (EF) is day 18 because job M takes 2 days to complete ($16+2=18$).

The **backward pass** provides the latest start and latest completion for each job. Starting from the overall completion date determined in the forward pass, the latest start and completion dates are determined. For example, the latest finish (LF) for job A is determined with reference to jobs D and E, which can not start until the completion of job A. The latest start (LS) for job D is 12 and the LS for job E is 14. So the LF for job A is 12 (job D can not finish at day 14, for example, because then job D will not start on time).

CRITICAL PATH

CRITICAL PATH

- ❖ JOBS WITH EARLIEST START, FINISH SAME AS LATEST START, FINISH
- ❖ TO REDUCE IMPLEMENTATION TIME CRITICAL PATH JOBS MUST BE SHORTENED
- ❖ SCHEDULING OF NON-CRITICAL JOBS MAY BE AFFECTED BY RESOURCE ISSUES
- ❖ ASSIGNING ALL NECESSARY RESOURCES TO JOBS IS ONE WAY TO DETERMINE TIMING AND COST OF INVESTMENT

The Critical Path is the series of jobs that define the time to complete implementation. In practice, a network analysis is rarely static. It should be updated periodically as new information on job completions becomes available.

Jobs with earliest start (ES), finish (EF) same as latest start (LS), finish (LF): Once the forward and backward passes are completed, the ES, EF, LS and LF are known for each task. Those tasks for which the ES and EF are identical to the

LS and LF, respectively, are in the Critical Path. These are jobs for which there is no slack time. If they are not completed on schedule the completion date for the entire project is delayed. In the example the jobs that exhibit these conditions are jobs B, F, G, J, L and K. The total time to complete is the sum of the individual job completion times: $2+2+4+8+6+4=26$ days.

To reduce implementation time critical path jobs must be shortened: The only way that an earlier completion date can be realized is to shorten the time for one or more of the Critical Path jobs. If job durations are changed, however, the Critical Path may change. This means that any delay in the completion of these tasks will delay the completion of the entire project. Jobs that are not in the critical path have 'slack', i.e. they can be accomplished in less time than the interval between ES and LF. These jobs can be scheduled for any period between the ES and LF.

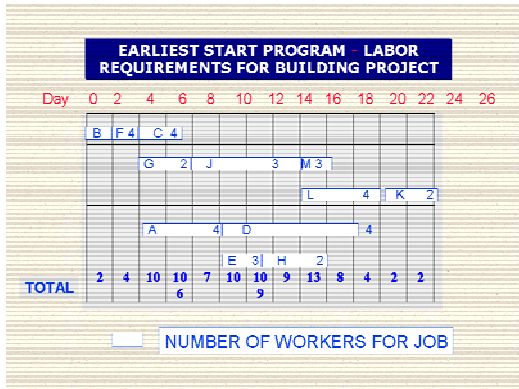
Scheduling of non-critical jobs may be affected by resource issues: Resource issues may affect scheduling of non-critical jobs. Those jobs that have slack time can be shifted so that the resources that would be assigned to them are available in other critical areas.

Assigning all necessary resources to jobs is one way to determine timing and cost of investment: The cost estimate for the project is the sum total of the cost of all jobs necessary to complete it. For this reason, one way to determine the cost and timing of the implementation plan is to assign all necessary resources to jobs and then do the cost and timing analysis from this information.

Once the forward and backward passes are completed, the ES, EF, LS and LF are known for each task. Those tasks for which the ES and EF are identical to the LS and LF are in the critical path. To reduce implementation period critical path jobs must be shortened. This means that any delay in the completion of these tasks will delay the completion of the entire project. The jobs that are not in the critical path have 'slack', i.e. they can be accomplished in less time than defined by the ES and LF. These jobs can be scheduled for any period between the ES and LF.

Scheduling of non-critical jobs may be affected by resource issues. Availability of resources can be analyzed to find the best time to schedule these activities. The cost estimate for the project is the sum total of the cost of all jobs necessary to complete it. For this reason, one way to determine the cost and timing of the implementation plan is to assign all necessary resources to jobs and then do the cost and timing analysis from this information.

LABOR REQUIREMENTS FOR BUILDING PROJECT - EARLIEST START PROGRAMME



The requirement for any particular resource can be analysed by plotting the requirement associated with each job or task on a bar chart. The chart shows the timing of the job and the number of units of the resource needed for the job. This example deals with the labour resource.

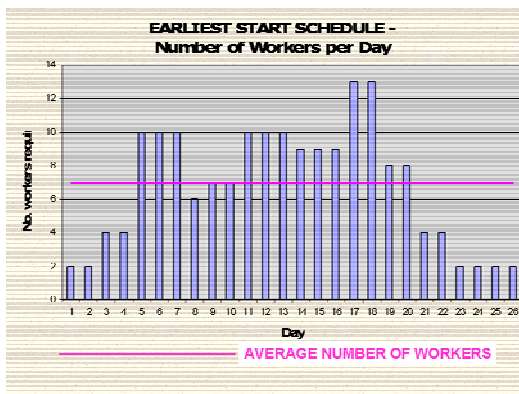
The resource demand over time is dependent upon the scheduling of jobs. Those jobs that have slack (e.g. job M) can be scheduled at any time between the earliest start (ES) and latest finish (LF).

This allows some flexibility in scheduling so that the resource requirements can be 'smoothed' to some extent.

The program assumed here is the earliest start (ES) for each job (other alternatives could be assumed for all but the critical path jobs). Job M, for example, can start after day 16 and could be completed by day 22 without lengthening the overall completion time. Summing up the number of workers for each job indicates the total needed on any given day. This can be compared with the maximum number required. In the example the maximum number of workers is 13, required on days 17 and 18.

The same type of analysis should be performed for each of the scarce resources required. However, the approach is useful for estimating the total cost and timing for all resources. The requirements for any resource during any period of the implementation program (in this case for each day) can be determined by a bar chart showing the timing of the job and the number of units of the resource needed for the job. In this example the labor resource is indicated. The program assumed here is the earliest start for each job (other alternatives could be assumed for all but the critical path jobs). Summing up the number of workers for each job indicates the total needed on any given day. This can be compared with the maximum number required.

NUMBER OF WORKERS PER DAY - EARLIEST START SCHEDULE



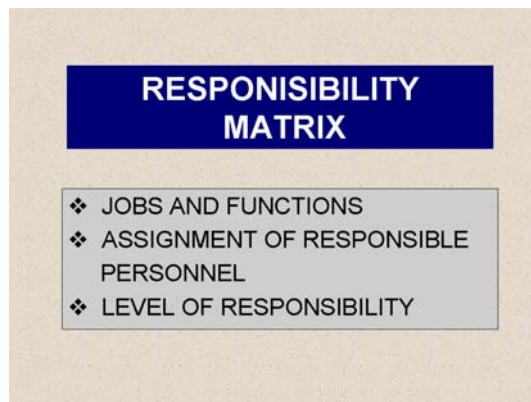
This bar chart shows the same information in the previous example, the number of workers for each day of the construction phase. Here it can be seen that there is a wide variation in the number of workers required on a day-to-day basis. It is usually more efficient to have a more uniform utilization of human resources.

This type of resource utilization chart can be developed using any assumption in regard to the timing of jobs that are not on the Critical Path (those that have slack

time). This provides a means of analysing the requirements in view of constraints on resources. The slack jobs can be shifted in time to reduce the total amount of resources required. This is an iterative process that can be handled most easily with computing facilities. It can be done manually with a little patience.

The objective is to achieve a more uniform resource demand so that costs can be minimized. Ideally the number of workers would be the average shown (about 7), but there usually will be some variation in labour demand.

RESPONSIBILITY MATRIX



Who is going to be held responsible for the accomplishment of each task and function? This can be systematically organized using a responsibility matrix. An example is shown in the related text file Responsibility Matrix. The matrix includes the following information:

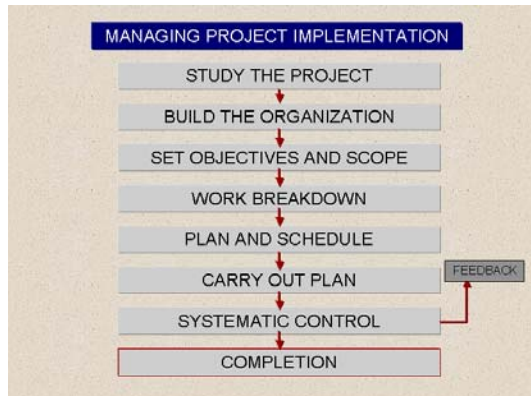
Jobs and functions: All jobs and functions necessary for completion of implementation are listed on the vertical axis. This includes, in addition to the actual construction jobs, all of the ancillary activities that enter into the creation of the enterprise. The jobs are taken from the Work Breakdown Structure.

Assignment of responsible personnel: Members of the implementation team and other individuals and organizations are assigned responsibility for completing each of the tasks and functions.

Level of responsibility: Level of responsibility can be assigned using a coding system. The levels might be as follows:

- **A** General responsibility
 - **B** Operating responsibility
 - **C** Specific responsibility
 - **D** Must be consulted
 - **E** May be consulted
 - **F** Must be notified
 - **G** Must approve
-

MANAGING PROJECT IMPLEMENTATION



The process for managing project implementation is similar, in most respects to other management challenges, but there are differences. Many of the relationships that need to be developed are short-term and often one-time, more like an infatuation rather than a marriage. There is a definitive termination time that is in sight from the beginning. A 'decommissioning' or clean-up phase has to be planned as part of the implementation project.

The diagram appears as a linear process; in actual practice the process is iterative. As the project progresses, inevitably corrective actions deriving from feedback will be required.

Study the project: A management contract, or scope of work, should define the manager's objectives, timetable and compensation. The first task for the manager is to understand the project. All of the documented information should be absorbed (including history and geneses), discussions should be held with the full range of participants.

Build the organization: An organization structure, showing all staff positions and basic responsibilities should be developed and job descriptions prepared. Personnel not yet available from the sponsor's organization are recruited and oriented to the project and their particular responsibilities and authorities. An indispensable component of the organizational setup is defining lines of communication, how information is to be disseminated, how directions are to be handed down, how recommendations are to be handled.

Set objectives and scope: The scope of work should be by agreement with project sponsors. Objectives should specify the state of the enterprise at the termination of the implementation project - what facilities, organizations, systems and materials should be in place and what should be their operational status.

Work breakdown: This is the breakdown of all activities necessary to attain the defined objectives. Activities cover planning and construction of facilities and setting up the organization, systems and materials stores in accordance with the objectives.

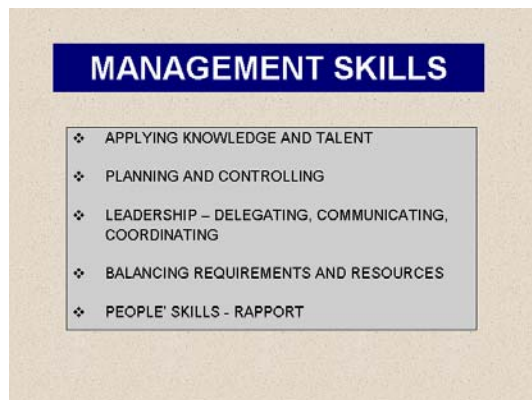
Plan and schedule: A plan should be developed, preferably using one of the network approaches that can be updated periodically. The plan should include the schedule for activities and mobilization of all necessary resources. The plan should include status indicators that are used to provide feedback information. The indicators measure performance against the plan.

Carry out plan: The plan must be carried out. The project manager has overall responsibility, but is well-advised to delegate both responsibility and authority to subordinates, who should be carefully selected so that they are capable of fulfilling their mandates. The project manager should arbitrate disputes as they arise, but maintain clear lines of communication and authority, that should be designed as part of the organization structure.

Systematic control: Management implies control. There must be feedback in the form of indicators of performance, that are monitored and that serve the as the basis for corrective actions when necessary.

Complete project: The project is completed when the facilities are commissioned, organization in place and functioning and systems operative, the site cleared of any facilities and materials not required for the operating enterprise, and the implementation team disassembled.

MANAGEMENT SKILLS



In the pre-investment phase that analyst should be aware of management skills required to carry out project implementation.

What are the abilities and characteristics of a good manager? The answer is probably culture-dependent to some extent. However, some can be identified with a fair degree of confidence that the absence of one or more may be an indicator of managerial shortcomings.

Applying knowledge and talent: A good manager should be able to recognize knowledge and talent and how it can best be applied. Skills and abilities should be matched to the challenge of the job. As in the consumption of physical resources, improper use of human resources can be counted as part of the waste stream.

Planning and controlling: A manager should understand the virtues of good planning and control. Planning sets the course, and monitoring assures that the course is being followed.

Leadership - delegating, communicating, coordinating: Autocratic management is not leadership. At times difficult decisions must be made at the top, but a true leader understands the benefit of delegating authority and responsibility, of communicating the goals and objectives throughout the organization, and coordinating activities of subordinates by avoiding overlapping responsibilities and uncertain channels of communication and decision-making.

Balancing requirements and resources: Resources, particularly skilled and talented people, often are in great demand. Balancing the application of human and physical resources with the tasks at hand often requires keen insight and comprehensive knowledge of what is happening.

'People' skills - rapport: A good manager understands people, has an inherent understanding of human nature - the fears and hopes that are part of every psyche. Empathy and rapport are needed to keep staff in a cooperative frame of mind.

PERCEPTUAL BLOCKS TO PROJECT RESHAPING

PERCEPTUAL BLOCKS TO PROJECT RESHAPING

- ❖ DIFFICULTY IN ISOLATING THE PROBLEM
- ❖ TENDENCY TO LIMIT PROBLEM AREA
- ❖ INABILITY TO SEE THE PROBLEM FROM DIFFERENT VIEWPOINTS
- ❖ STEREOTYPING - SEEING WHAT YOU EXPECT TO SEE
- ❖ SATURATION
- ❖ FAILURE TO UTILIZE ALL SENSORY INPUTS

Project managers are prone to certain human frailties, e.g. being locked on to an idea, particularly when it is one's own. In the planning stages and during implementation it is important to maintain as unbiased a view as possible toward the configuration of the project. Most of us in this frame of mind and under the stress of getting something accomplished have difficulty seeing the forest for the trees. Problems are often not what they seem.

Difficulty in isolating the problem:

Managers who are deeply immersed in details are often the last ones to identify the nature of the problem.

Tendency to limit problem area: The latest crisis may be the focus of attention and may limit peripheral vision to the point of missing either the real problem, or limiting it to what is in immediate reach.

Inability to see the problem from different viewpoints: Role playing is an effective method of avoiding this phenomenon - trying to see the problem from the point of view of others involved - subordinates, contractors, suppliers.

Stereotyping - seeing what you expect to see: Every human being has a history, which channels and shapes perceptions and thoughts to an extent that varies greatly among individuals and cultures.

Saturation: Overworked and overstressed managers can sometimes be unable to take on new crises. Denial is the result.

Failure to utilize all sensory inputs: Humans are islands, interacting with the surroundings only through sensory apparatus. Civilization has dulled human ability to employ all of its sensory equipment to the fullest extent. Managers beware.

EMOTIONAL BLOCKS TO PROJECT RESHAPING

EMOTIONAL BLOCKS TO PROJECT RESHAPING

- ❖ FEAR OF TAKING A RISK
- ❖ NO APPETITE FOR CHAOS
- ❖ JUDGING RATHER THAN ANALYSING
- ❖ INABILITY TO INCUBATE
- ❖ LACK OF MOTIVATION

What are emotions? Fear, love, hate, joy, sorrow. When emotion rather than logic drives decision-making the result, in the context of project implementation, can be counter-productive.

Emotions can block changing the configuration of the project when it is clearly necessary. Change can look chaotic, as the project is moving in a direction with a certain momentum. It is sometimes like trying to turn a super-

tanker, but it can also be compared to upsetting a bee's nest.

Project designers and managers should try to maintain an open mind and look at every moment as a new beginning. If what is already completed can be successfully built upon, then that is what should be done. But if it is sending good money after bad, then a new direction should be sought. If necessary, the sooner done the better.

Some of the manifestations of emotion-driven decisions:

Fear of taking a risk: There is the chance of looking foolish or even incompetent, and fear of being criticized if things then go wrong. Some may question and ridicule the idea of change.

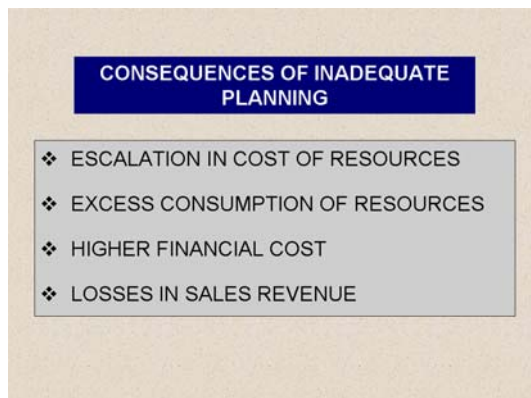
No appetite for chaos: Stress and saturation may leave the manager emotionally unprepared for the uncertainty and potentially chaotic situation that may result from change.

Judging rather than analyzing ideas: Stressed managers can force an idea through an emotional filter rather than take an objective, analytical view. Good ideas can be rejected out of hand from irrational associations.

Inability to incubate: When emotions control the mental faculties it is difficult to innovate. Emotions deal more with defense rather than offense, protection rather than exploration.

Lack of motivation: This is a manifestation of emotional block emanating from above. Someone up there creates a need on the part of the manager to assume a defensive posture. The natural predilection to explore and discover is thwarted.

CONSEQUENCES OF INADEQUATE PLANNING



Proper implementation planning is essential for the success of the project. Inadequate planning can result in:

Delayed commissioning: When the allotted time for tightly constrained activities are exceeded the effect is to delay the commissioning of the plant with negative financial consequences.

Escalation in price of resources: Improper implementation planning can escalate the price of resources, particularly in an inflationary environment, diminishing the attractiveness of the project.

Excess consumption of resources: Delays tend to increase consumption of resources. For example, construction personnel are less efficiently employed when activity durations are lengthened.

Losses in sales revenue: Prolongation of construction and commissioning schedules delay start of production with attendant loss in anticipated sales and profits.

Higher financial costs: Failure to adhere to planned implementation schedules may lead to higher financial costs.

Reduced profitability: If improper planning leads to cost overruns, the capital investment is higher and profitability lower.

Competent management of implementation is essential for the success of the project.

MACRO-MICRO CONTEXTS



Investment involves decisions at the micro level that are very much dependent on the macro situation. Macro-economic conditions such as the rate of growth of GDP represent a part of the external environment in which an investment project is to be implemented and operated. When macro-economic conditions are favorable prospects for a new project are enhanced.

Micro-economic policies dealing with prices and resource allocations can either stimulate or constrain what investors can do in their project choices and designs. Governments use taxes and subsidies and, in some cases price controls, to promote reallocation of resources. Investors should be aware of these policies and what changes may be anticipated in designing projects and in making investment decisions.

Aside from micro-economic policies, investors should be aware of the relationship of the project to the economy. The impact on both macro and micro economic phenomena increases with size of investment and the proportion of goods and services in a sector utilized by the project or made available to the entire economy. When the project's impact on the economy is large, either in terms of the sector or national indicators, governments will be inclined to help or hinder the project, depending on whether the impact is positive or negative. Even for relatively small projects, a positive impact on the objectives that the authorities have identified will usually result in favorable treatment in the approval process.

The job of the analyst is to understand these relationships and to utilize the information in the design and promotion of the project.

MACRO-MICRO ENVIRONMENT - Internal and External Variables



A project is like an organism that will interact with its macro/external environment. Considering the project as the microeconomic element, how it functions in the macroeconomic environment is largely a function of its internal characteristics. To understand the implications of the macro environment on its prospects it is useful to examine internal features as they interact with the external environment. This analysis should be an integral part the project development process. The internal and external environments are largely inter-linked.

MACRO/EXTERNAL VARIABLES

These variables are nominally external to the project, and to a large extent are outside its control. Some would identify these variables as "non-controllable", but that is too great a simplification - better to acknowledge that there are varying degrees of control that can be exercised by the project. That they are strictly external is only true if the project makes no attempt to interact synergistically with them, a modus operandi that will usually be fatal. Some ideas on how the project can interact with the external variables in terms of its mechanisms and resources are as follows:

Economic environment: The economic environment consists of the state of GDP per capita, its rate of growth, national income and distribution, current and trade balances, foreign exchange reserve status, inflation and interest rates. How these economic factors impact upon the project plan should be of concern to designers.

Government policies: Policies promulgated by government authorities that are relevant to prospects for the project include fiscal, monetary, investment promotion, trade, labour protection, etc.

Political and legal aspects: Understanding the political environment is important for the project designer. The project would fare better if it is harmonious with policies of political leadership. The project has to live within a legal framework, which should be understood early enough so that the project design is in conformity.

Physical environment: Infrastructure requirements should be identified and compared with existing facilities. The impact of climatic conditions on operations should be considered. As environmental impacts of industrial activities become better understood, it is prudent for project planners to be pro-active in relation to the environment, seeking ways to harmoniously interact with surroundings.

Natural resources: The project analyst should be aware of the availability of natural resources to be consumed. Efficient and sustainable use of natural resources can assure continued availability. Legislative and regulatory constraints can be anticipated on the exploitation of scarce natural resources, particularly those for which exploitation may result in environmental degradation.

Social and ethical constraints: Societal norms should be assiduously respected, particularly by outsiders. One of the problems encountered by investors new to a cultural setting is insensitivity to the accepted cultural values and procedures, a situation that can lead to hostility of potential clients and even active opposition. Migrations necessitated by the existence of the project should be carefully assessed and their effects mitigated or compensated to a level acceptable to those affected.

Level of technology: The analyst should be aware of the technological status of the country or region in which the project will be sited. The success of a project depends on the appropriateness of technology in regard to country-specific variables, such as government technology policies, available skills, cultural factors.

Human/institutional resources: The analyst should understand the level of skills and knowledge of the existing workforce and the institutions available to upgrade their skills. The ability of the workforce to undergo training should be considered.

Capital markets and regulations: Whether or not capital markets (debt and equity) are organized in the country is an important consideration. Regulated markets are usually more favorable for investors because confidence is enhanced by transparency and consistency. Rates tend to become rationalized as markets tend toward equilibrium.

Demand: The product demanded by consumers is, to a large extent, determined by demographic characteristics. However, demand is not completely an extrinsic factor. Marketers believe that demand can be stimulated through their appeals to psychological characteristics of the population. The forces shaping demand should be taken into account in the analyses and actions of the project analyst - economic (purchasing power, economic rate of growth), demographic (age distribution, rates of population growth and geographical patterns) and psychographic (personality traits among population segments).

Distribution structure: Existing channels of distribution for goods and services are often ingrained in the economic fabric of the community. A project-oriented analysis of distribution can easily lead to solutions which may be optimal in an ideal world without consequences, but it is prudent to design the distribution system so that it does not radically alter existing patterns, if that is possible.

Competitors: These will not usually stand still in the face of a new threat to their prosperity, if not their very existence. It is prudent to analyze the strengths and weaknesses of the competition, perhaps with the result of finding a niche that minimizes the risk of adverse countermeasures.

MICRO/INTERNAL VARIABLES

Analogous to the situation for external variables, the internal variables are largely, but not fully, "controllable". The analyst should consider how the influence of the external environment limits the degree to which internal variables can be controlled. To what extent these variables are controllable depends also on the strength of project management.

Production: A production program is largely under the control of project analysts. However, it must conform to market demand and the share and rate of penetration of the market that is constrained by competition and even regulation of capacity, in some environments. The project analyst also determines how factors of production, such as materials, utilities, labour and capital are to be employed.

Finance: The financial resources under the control of project sponsors can usually be applied according to their discretion. However, financial institutions can set conditions and constraints in regard to leverage and the investment program, e.g. debt/equity ratio and up-front equity contributions. Dividend and repatriation policies of both financial and governmental institutions can effectively constrain the discretionary powers of the nominal controllers of financial resources.

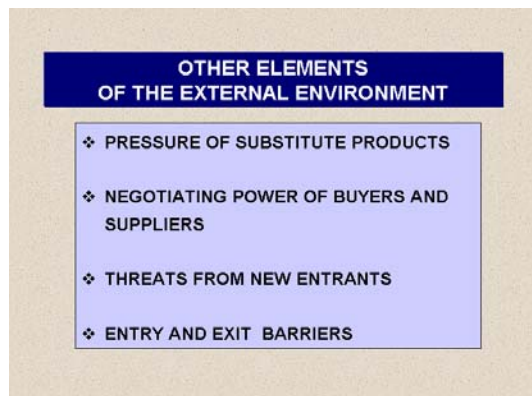
Personnel: The project can select and develop personnel to manage implementation and operations. It can frame personnel policies, including terms of employment, to attract and retain needed managers and workers. Often there are external constraints - labor legislation, workplace safety regulations and other constraints on personnel recruitment and compensation systems.

Location: The choice and use of location is essentially at the discretion of project analysts. Central planning agencies often limit access to operating licenses for regions that are favored from national strategic considerations.

Patents, licenses, technology: The project may own intellectual property that it seeks to exploit under protections offered by government authorities. However, respect for patents is not uniform throughout the world, so how effective are such protections should be of concern to project analysts. Licenses to manufacture can be either acquired from other entities or granted to the project for processes and products. Project analysts have usually discretion in the choice of available technologies. In some cases the choice is constrained by licensing authorities to conform to national regulatory agencies.

Public image: How the enterprise wishes to project its image to the market and to the business community is essentially under control of project management. The analyst has to develop a modus operandi that is consistent with the image that management wishes to project. However, the image should be compatible with the culture of the market if it is to be effective, and realistic in regard to competitors.

OTHER ELEMENTS OF THE EXTERNAL ENVIRONMENT



The project planners are required to analyse certain other key components of the external environment.

PRESSURE OF SUBSTITUTE PRODUCTS

Market conditions and technology are influences on project viability that are continually in flux. For example, when copper prices appeared to be affected by diminishing supply and more costly exploitation costs, Polyvinylchloride (PVC)

was adopted as the material for fabricating water and waste piping. A crucial factor to consider is what is "in the pipeline" concerning possible substitutes for the product under consideration, and how adaptable that product line is to the changing conditions. The position of the proposed product in its life cycle (Product Life Cycle discussed in Market Analysis) should be examined. Often the onset of the substitution process will trigger the phase of decline.

NEGOTIATING POWER OF BUYERS & SUPPLIERS

Pressure on the margins in a given sub-sector increases with the flexibility of buyers in choice of producers. A similar situation prevails in regard to suppliers - when an input is protected or supply is otherwise constrained, a "sellers' market" can be created by the monopoly or oligopoly. Analysis of negotiating power of buyers and suppliers provides inputs affecting the decision on the scope of the project and even the decision on whether or not to go ahead with the project. Creative approaches to circumventing such problems can be considered, for example, vertical integration.

THREATS FROM NEW ENTRANTS

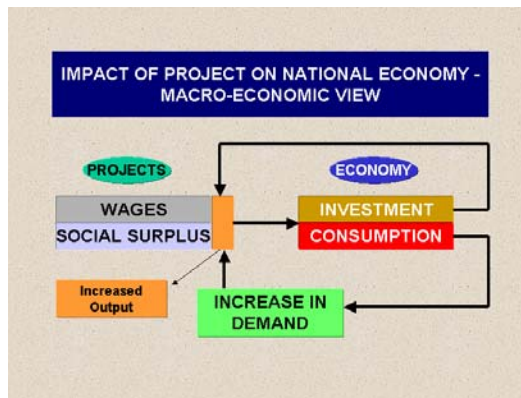
If the investment opportunity is found to be attractive there are possibilities of new entrants joining the train, bringing pressure on margins. A conservative approach to project design and indicators of profitability should be employed in this case.

ENTRY & EXIT BARRIERS

Even in an era of globalisation and liberalisation of economies, entry barriers prevail in many economies. Factors such as technology, minimum economic size, government policies represent barriers to entry and exit.

An exit barrier is a restriction on terminating or divesting an enterprise. When the exit barriers are high, intense competition in the sub-sector can be expected. Risk is increased with restrictions on terminating a project that may prove to be unsatisfactory.

MACRO-ECONOMIC VIEW - IMPACT OF PROJECT ON NATIONAL ECONOMY



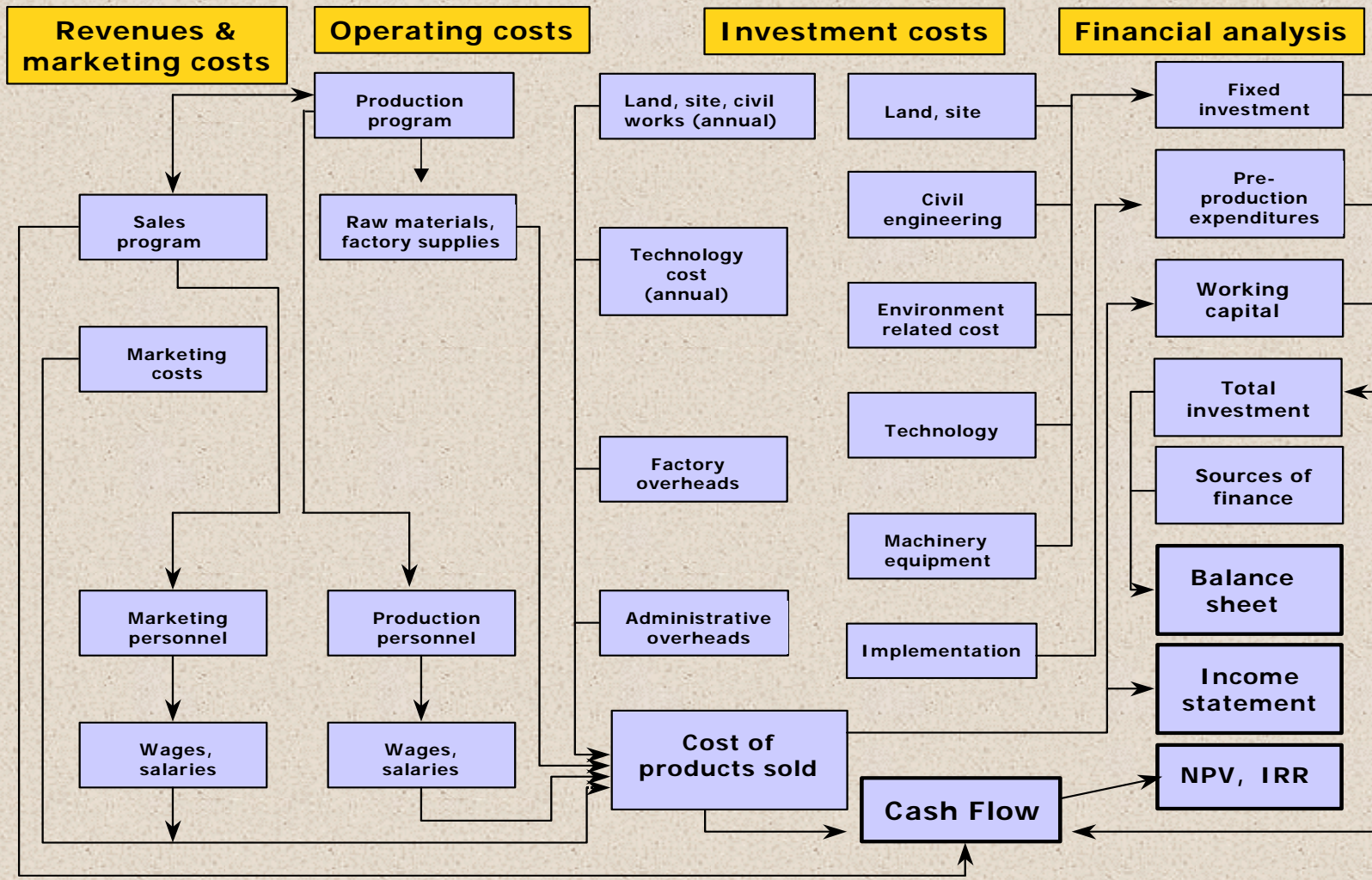
Understanding the project's impact on the national economy can be effective in promotional efforts.

The project's value-added contributes to the national income. Wages and salaries and social surplus (profits, interest, rents, indirect taxes, services) feed into consumption and investment in the economy. The portion provided to investment by value-added of the project in turn is a spur to economic development through increase in productive capacity.

Consumption also adds to the economy through increased demand for goods and services by producers that is satisfied by increased capacity.

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- 2** Market Analysis and Marketing
- 3** Technical Analysis
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- 7** Project Appraisal



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