

# project planning and management series

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## ACKNOWLEDGEMENT

The Project Planning and Management Series consists of a set of manuals and associated modules presenting practical approaches, tools and techniques for project planning and management. (See list on back cover). A product of the Government of Jamaica/USAID National Planning Project (1976-1980), the series was developed by the Project Development Resource Team (PDRT) of PAMCO for use in "action-training" workshops and reflects extensive experience in training and project development. All present PDRT members are contributing authors and have worked together in writing, revising and publishing the series. Special credits are due to Dr. Merlyn Kettering for design and development of the series; Dr. Bruce Brooks for writing final versions of many modules; Mrs. Marjorie Humphreys for assuming primary editing and production responsibility and for organizing draft papers into more useful materials; Mr. Lascelles Dixon, head of PDRT since 1979, for designing the cover and improving many of the illustrations; and Mrs. Christine Hinds and Miss Linette Johnson for typing the drafts and final manuscripts. Any comments on the series and its usefulness are welcome.

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## MODULE 19

FINANCIAL ANALYSIS 1  
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## A. PREREQUISITES:

REFERENCES:      MODULE 20 - Cash Flow Analysis  
                      MODULE 21 - Discounting  
                      MODULE 22 - Net Present Worth Analysis  
                      MODULE 24 - Benefit-Cost Ratio  
                      MODULE 25 - Internal Rate of Return  
                      MODULE 28 - Project Accounting

## B. DISCUSSION:

Every project has financial dimensions and all projects whose output is distributed or marketed have commercial features. The test of the feasibility and soundness of a project idea requires an evaluation of the cost of the investment for undertaking its scheduling, financing, and budgeting; and for the necessary input procurement, shipment and other output marketing aspects. In other words, the "financial" and "commercial" characteristics or requirements of the project's inputs and outputs need to be analysed and appraised to determine whether the project, as planned, is financially sound in these respects. Project planners and evaluators must be familiar with the technical vocabulary of financing and marketing analysts, which includes precise accounting definitions, procurement terms and specialized analytic techniques. Of fundamental importance is an understanding of the objectives of financial and commercial analysis and of the main elements that receive attention.

Financial analysis is not strictly defined but has to do with the financial plans, cost estimates, or forecasts for the project as a whole and its components. This includes projections of annual financial statements and/or capital and operating budgets (with foreign exchange components shown separately), and cash flow. Depending on the project, it involves analysis of institutional support including regulatory and budgetary measures, and ancillary credit facilities. In the case of a new educational facility, for example, such as a regional vocational school or technical institute, the analysis should consider the community or society system of financing education and the project's place in that system, and the capital and operating budgets for the construction, maintenance, and operation of the proposed facilities and student support costs, as appropriate, in

foreign exchange and local currency components (if foreign exchange costs are involved). In the case of a mining project, the analysis would include a profitability analysis of the mineral production taking into consideration estimated production costs and prices on an ex-plant, f.o.b., c.i.f., and world market basis.

The analysis also must relate to the organizational arrangements for carrying out the project. To illustrate, if a semi-autonomous government agency is to run an irrigation project, a forecast of the revenues and expenditures of the agency, including its income (payments received from farmers in the form of water charges and receipts from the government in the form of subsidies) is needed. On the other hand, if a government irrigation department is directly responsible for carrying out and managing the project, it is necessary to estimate separately the revenues that are likely to be forthcoming from farmers and the payments that the government will have to make over and above the annual appropriations that cover the expenses of the department.

In the case of irrigation projects of this kind, the financial analysis would consider indirect elements. Such payments include the government customs foregone, if import substitution were a result of the irrigation investment.

If a common check-list were constructed, the main questions would pertain to sources of capital, the return to capital, and the year by year liquidity position; also, the reliability of the cost estimates and forecasts.

It is desirable to distinguish between projects that produce revenue or income and those that do not (e.g., free public health facilities, free junior secondary schools), which are important in financial planning at an early stage. This determines whether the project will be revenue-producing, generating cash flows, to the project or to the entity of which the project is a part. Projects that must pay interest, dividends, or make other payments have to generate sufficient revenues to make this possible if they are to remain viable. The size of the cash flow may or may not be intended to cover full costs of the project; the latter is the case of some projects which charge users for the project benefits mainly for the purpose of regulating project use and not to cover costs.

So-called "self-liquidating" projects generate sufficient funds to retrieve or "liquidate" debt without endangering their financial soundness. The term, "self-liquidating", is often used imprecisely. To cover full cost, including a return on equity or non-debt capital, a project would have to be more than self-liquidating.

*Cash Flow Analysis* (SEE MODULE 20 - CASH FLOW ANALYSIS)

The objective of the analysis of the probable yearly cash flow situation over the life of the project is done to determine whether the project will generate sufficient funds from operations or other sources to achieve a relatively stable and satisfactory liquidity position.

The key questions include: (a) How much funds will be required initially and over the early years of the project's full operation? (b) When will the needs for the funds develop? (c) How long is the need expected to continue? (d) How are the needs for funds to be met? (e) What degree of reliability can be attached to the cash flow forecast requirements? and (f) In what way would incorporation of alternative assumptions about the pattern of project operation change the forecast?

Obviously, projects that are not revenue or income producing will not be generating funds from operations and will have to rely entirely on outside sources to meet annual budget expenditures.

If the expected cash flow position each year is based on market prices, what does the analyst do about changes in price levels arising from *monetary inflation* and interference with "normal market prices"? The only sensible answer is to consider the possible impact of inflation and other price factors on the cash flow outlook in future years. Sensitivity analysis can be usefully applied. The impact of price changes on ratios of profits or costs to sales or of other indicators of performance, can provide clues to methods for meeting such conditions. It may be worthwhile, if only for purposes of management review, to introduce procedures for revaluation of balance sheet items in order to come up with more realistic figures.

The *cash flow forecast*, together with the *investment plan* on budget of the project, translates the project plan into financial or monetary terms. They estimate or forecast the impact of the project plan on the need for funds. The *investment plan* summarizes the investment requirements in monetary terms and provides a time schedule indicating when these funds must be available and the sources of the funds.

The investment schedule becomes the basis for financing planning and policy-making. It should always specify, in case of projects using foreign currencies, the amounts of such currencies needed since the foreign exchange component may be a limiting factor; the foreign exchange data will be needed to estimate the effect of the project on the country's balance of payments.

The cash flow forecast and the investment plan and schedule are interrelated. It is only after a determination has been made with respect to how much capital will be needed and from which sources, that cash payments or outlays such as annual interest payments, repayments or capital, provisions for depreciation, can be determined. In examining these and other interrelationships, the analyst may find that it may be more desirable from the viewpoint of the project investors to pay interest on credits than dividends on new shares. It may be possible to obtain tax concessions through interest deductions from taxable income. On the other hand, interest and fixed payment of financial obligations (interest and amortization) may weaken the project's financial position at a time when it must convince financing sources, external to the project, of its fundamental financial soundness. The cash flow forecast, for example, may show that the credit capacity of a proposed enterprise is likely to reach a saturation point early in the life of the project and raise doubt that the enterprise would be able to borrow in an emergency. As a result of such analysis, it may be established that a different type of financing structure may be more appropriate.

One object of the cash flow analysis is to establish the *source of capital* and the most likely terms and conditions.

Capital is obtained from various sources, e.g., foreign institutions, local development banks, private commercial banks, insurance companies, and equity capital both public or private.

Sources of financing (domestic, foreign and joint) may be viewed with respect to their form and access. When they are "external" to the project (i.e., not generated by the project), they may take the form of equity capital, loans, grants or contributions. Equity investment may come from domestic, foreign and joint sources, both public and private, and usually take the form of share capital, e.g., common or preferred stock, cumulative preference shares, preference participating shares, etc. Loans come from similar sources and differ in duration (current, intermediate and long-term). Access to equity financing may be through direct sales of shares to the public with or without financial intermediaries, e.g., banks, insurance companies, brokers, etc. Grants and contributions may come from government funds, international agencies, foundations and other non-profit organizations, and private sources.

Financing comes from "internal" sources ("own resources") when a project has undistributed profits, depreciation and obsolescence reserves, reserves for depletion of resources (e.g., in the case of mines, forest holding, etc.), pensions or trust funds, etc.

If the project is developed by existing enterprises, such funds may be available at the start. Otherwise, the internal financing may come at a later stage of the new undertaking.

As indicated, foreign equity investments may take a variety of forms. A foreign or multinational corporation may set up an enterprise in its own name or in the name of one of its subsidiaries. It may decide to purchase shares in an enterprise to be largely owned by domestic investors. It may participate in a joint venture. A machinery supplier or construction contractor may decide to participate as an equity investor which might result in a conflict of interest. The equity investment may come from an international agency such as International Finance Corporation, an affiliate of the World Bank. The IFC generally invests in private enterprises in developing countries by means of loans which usually carry rights to conversion to stock. They may invest in a local institution such as the Development Venture Capital which is a part of the Jamaica Development Bank.

As mentioned, foreign loans or credits can come from several private sources, government, and international agencies. Examples are private international finance companies, foreign banks participating in loans made by some other institution (e.g., the World Bank), and suppliers of machinery and services. International agencies that supply credits include the World Bank and its affiliate IDA and IFC, the Inter-American Development Bank, the Agency for International Development, the U.S. Export-Import Bank. The projects they are prepared to consider will depend largely on the size of the loan request and the loan including the terms, grace periods, interest rates, repayment schedules and currencies, duration, international purchasing, government loan guarantees. In recent years international regional development banks have emerged as an important source of capital.

The use of foreign capital has both advantages and disadvantages which need to be evaluated when determining project financing plans. For the nation, foreign investments may relieve foreign exchange shortage and inflationary pressure resulting from diverting local productive resources to capital investment. It may make possible a level of investment not otherwise attainable. It may make loan capital available at a lower rate of interest than would be the case with local borrowing. If the proportion of loan capital from abroad is sizeable, the pressure on local interest rates may be reduced. Technical and management skills, in which a country or region may be short, may accompany foreign loan capital. Moreover, the use of foreign capital may increase the likelihood of raising more money locally.

On the other hand, foreign sources may impose conditions or "attach strings" which may not be in the best interest of the project or the country. Credits made available by suppliers of machinery equipment or services may not serve the best interest of projects because of their short duration, high interest rates, and perhaps other factors.

Association with large multinational corporations has raised questions that go beyond the scope of financial analysis. For instance, whose interest does corporate policy reflect? Does it reflect that of the host country? The country of origin of the multinational corporation? The multinational corporation, with a loyalty only to itself? How these interests are perceived influences the bargaining positions of the multinational corporation and the host country with respect to financial, management, technological, commercial, and other aspects of the project under consideration.

When establishing the sources of the capital for a project, the analysts should keep in mind that each source of loan capital will have its own amortization and interest arrangements. The equity capital will enjoy whatever profits remain after all costs are paid. Taxation needs to be allowed in estimating equity profits and in doing so, an estimate has to be made of the depreciation allowances.

C. *PURPOSE:*

The primary purposes of financial analysis is to ensure that the sources and flow of funds are adequate for the life of the project in all of its phases and to assemble control information that will be useful to the project management in soundly implementing and operating the project.

The financial analyst asks, "What financing is required for the inputs as represented by the "physical flow" plan (i.e., the flow of physical resources into the construction and operating phases) as drawn up by the engineers or other technical specialists?" They will also ask, "What are the financial requirements on the output side? (e.g., production and distribution)."

D. *USE:*

The financial analyst or appraiser seeks to ensure that the financial conditions for sound implementation and efficient operation of the project are met. This objective, with respect to sources and adequacy of funds, applies to expected or anticipated changes in conditions. Examples of these are:

- (1) annual sales decline more than anticipated;

- (2) prices need to be reduced to meet unexpected conditions or changes in government policy (e.g., a decrease in utility rates);
- (3) construction costs rise faster than anticipated;
- (4) the project break-in period is longer than expected;
- (5) operating costs are higher than estimated; and
- (6) other cost elements depart from expected trends.

The financial analyst should try to estimate the quantitative magnitude of exceptional changes and endeavour to bring to light financial weakness resulting from such changes.

## E. TOOLS OF FINANCIAL ANALYSIS

### 1. *The Criteria of Project Worthiness*

The criteria of project worthiness conventionally emphasizes the testing of financial worthiness of projects. These criteria can be broken down into two categories:

- (1) The basic indicators which should be calculated for all projects.
- (2) The optional indicator which can be applied on projects specific base is determined by the information needed by the project and by the decision makers.

### 2. *The Basic Financial Worth Indicators of Projects*

These indicators which will apply to most projects are:

- (a) INTERNAL RATE OF RETURN (SEE MODULE 25)
- (b) NET PRESENT VALUE (SEE MODULE 22)
- (c) BENEFIT-COST RATIO (SEE MODULE 20, 21 AND 24)
- (d) NON-DISCOUNTED MEASURES OF PROJECT WORTH
  - (i) Pay back or recoupment period
  - (ii) Present value of net benefit per unit of capital investment
  - (iii) Cost per unit of output

- (v) A break-even point,
- (vi) Ratios.

These optional indicators can be expanded to include commercial indicators often applied to on-going commercial firms such as:

- (a) Liquidity ratio.
- (b) Debt ratio.
- (c) Present value of net benefit per unit of cost.
- (d) Working capital ratio.
- (e) Return on investment ratio.

#### F. DISCUSSION OF DISCOUNTED MEASURES OF PROJECT WORTH

##### 1. Internal Rate of Return (SEE MODULE 25)

The Internal Rate of Return measures the rate of discount for a project, rather than assuming a certain rate of discount as in Benefit/Cost calculations. The Internal Rate of Return is defined as the rate of discount (R) which equalizes the discounted benefits (X) with the discounted costs (C).

$$X - C = 0$$

Alternatively, it can be expressed as the rate of discount (R) which will equalize the stream of net benefits (B) and the stream of capital costs (K).

$$B - K = 0$$

The internal rate of return has gained general favour over other indicators and is widely required by private firms, international banking institutions and commercial analysts. It has become the primary criterion for assessing the financial and social worth of development projects. This is primarily due to the distinctive quality that it avoids the task of selecting a suitable discount rate and in its final form it can be compared with the prevailing rate of interest. Its disadvantage is that it does not reflect the opportunity cost of capital of the earning power of the marginal project and as such the internal rate of return may not reflect the true return to capital. Further, there may be more than one rate of return for a project, depending upon a number of substantial assumptions made in the calculations.

2. *Net Present Value* (SEE MODULE 22)

The Net Present Value is a particularly useful indicator as it provides a comparative measure of the scale of alternative projects. It is calculated from the cash flow by discounting benefits (B) and costs (C) over the life of the project and subtracting the capital investments (K) from their difference.

$$NPV = (B-C) - K$$

3. *Benefit-Cost Ratio* (SEE MODULE 24)

This indicator expresses in the form of a ratio (B) the sum of discounted net benefits (B) with the sum of discounted capital costs (K).

$$B = \frac{B}{K}$$

Capital costs include both fixed and working capital. The ratio can also be obtained by considering the annual equivalents of the stream of net benefits and capital costs. When the ratio is above unity, the project is considered to be economically justified. Sometimes an attempt is made to find an optimum scale, where the difference between the discounted net benefits and discounted capital cost is at its maximum. The disadvantage of this ratio is that a discount rate must be established for the comparison of projects before the calculations can be made.

G. *DISCUSSION OF NON-DISCOUNTED MEASURES OF RETURN:*1. *Payback Period*

The payback period or recoupment period shows the number of years required (P) for net benefits (B) to equal the capital cost of the project (K).

$$(P) B = K$$

The advantage of the indicator is its simplicity and though its use is now limited, it is useful where there is an emphasis on the early recovery of capital because of financial constraints. It is often used in the case of risky investments owing to technological progress or commercial and political uncertainties. The main shortcomings are that it gives excessive weight to quick yields and ignores the importance of net benefits beyond the Break-even Point of project.

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10

2. *Single Rate of Return of the Entrepreneur:*

This is the rate of return at which the entrepreneur (investor) increases funds that he advances to the project after paying corporation taxes. It reflects all earnings above the fixed return on the borrowed sum which theoretically accrue to the investor. The larger the margin of return, the less is the risk involved. It is the net margin decided by the amount of capital invested.

3. *Cost per Unit Output:*

This indicator is useful to compare relative costs of producing particular outputs. It is calculated from the capital and operating costs necessary to create the product. It must be calculated over the project life. It is the total cost decided by the units of output.

4. *Break-even Point:*

The Break-even Point is a common indicator showing at what point the returns from a project are equal to the fixed and variable costs incurred, i.e., the point in the life of a project at which, theoretically, profits can begin to accumulate.

5. *Ratios:*

To these direct financial indicators, a number of additional commercial indicators of profitability and liquidity could be added to test the worthiness of projects which are expected to make profitable returns on investments.

These could include the following kinds of Ratios: (SEE MODULE 28)

- (a) Liquidity Ratios, such as current ratio, quick ratio, inventory turnover and receivable turnover.
- (b) Debt ratios, such as debt to net worth, debt-equity ratio, etc.
- (c) Working Capital ratios, such as inventory to working capital ratio, net sales to working capital ratio, long-term liabilities to working capital ratio, etc.
- (d) Coverage ratios, such as earnings before taxes and interest, overall coverage, and prior and cumulative deductions methods.
- (e) Return on Investment ratios, such as present values

of benefits per unit of investment, average or book return on investment, etc.

This list is not exhaustive, but suggests that a wide range of worthiness criteria for projects could be applied. Though these criteria are more frequently applied in the analysis of on-going operations, they may provide useful information in project appraisal and control, depending upon the needs of the appraisers and decision-makers.

NOTE: This discussion of Financial Analysis leads into a more complete discussion of the tools which follow this module and are referenced at the beginning of this module. A more complete discussion of ratios is also done in MODULE 28.

<sup>1</sup>The primary source for this module is A.J. Creshkoff, "the Project's Financial and Commercial Aspects", unpublished lecture notes, Graduate School of Public and International Affairs, University of Pittsburgh, Pittsburgh, Pennsylvania, 1974.

Earlier PDRT working papers relevant to this topic include "Financial Analysis", A. Hyde, 1977. (9 pages).  
"Financial Analysis", M. Kettering, 1977 (45 pages).

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1. Defining Project Objectives (Objective Trees)
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4. Activity Description Sheets
5. Project Organization
6. Linear Responsibility Charts
7. Project Scheduling - Bar Charts
8. Bar Charting for Project Control/Scheduling
9. Project Scheduling - Network Analysis
10. Milestones Description Charts
11. Resource Planning & Budgeting
12. The Role of PAMCO
13. Project Technology Analysis
14. Demand Analysis
15. Market Strategy Analysis
16. Project Area Analysis
17. Project Costs & Benefits
18. Project Profile
19. Financial Analysis
20. Cash Flow Analysis
21. Discounting
22. Net Present Worth Analysis
23. Cost-Benefit Analysis
24. Benefit-Cost Ratio Analysis
25. Internal Rate of Return
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27. Economic Analysis of Projects (including Border Pricing)
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