CHAPTER - 1
INTRODUCTION

1.1. INTRODUCTION:

Projects are the building blocks used to meet the enterprise objectives. Project Management has now assumed a significant place in planning and implementing programmes with a view to improve the standard of living of masses. The importance of Project Management techniques in increasing production adopting latest techniques for modernisation, optimising use of scarce resources needs no emphasis. Project Management techniques have paved way for expansions of industrial organisations in varying forms. The simplest improvements in social conditions require so huge an effort on the part of the society that full awareness of this disproportion should be most discouraging and would thereby make any social progress impossible. The efforts must be prodigally great if the result is to be at all visible. It is not at all peculiar then that this terrible disproportion must be quite weakly reflected in human consciousness if the society is to generate energy required to effect social and human relations. For this purpose, one exaggerates the prospective results in to a myth so as to make them take on dimensions which correspond a bit more to the immediately felt effort.

Project Management is essentially involved in executing the projects. In the recent past it has been recognised as a management philosophy in addition to that of a discipline. Project Management as a discipline is one of the richest source of proven techniques for accomplishment of the goals, allowing organisations reduce the need for a strict control and heavy rigidity. It also embodies new methods of restructuring.
management responsibilities. By adopting techniques for the express purpose of obtaining better control and increasing overall productivity, it is possible to centre responsibility for work at the individual level. Perhaps some of the express reasons for the rapid growth of this discipline are:

- increasing importance of the financial controls,
- urgency for early completion,
- growing amount of statutory regulations,
- increased sophistication technology,
- increased inability of the architect/engineer's education and experience that only suit the design, not management of a project in totality.

In the field of industry and business huge funds are being invested to bring developments as well as fair returns for the investors. Several techniques are being used to give a scientific approach to attain these objectives. These techniques are being referred by various names such as Capital Investment Management, Capital Budgeting, Capital Expenditure Management and Project Management, etc. In our dissertation we have preferred to use the word Project Management since it covers both financial as well as non-financial commitments.

1.2. PROJECT MANAGEMENT/CONCEPTUAL ANALYSIS:

For understanding the term "Project Management", it will be appropriate first to define them separately and thereafter synthesise the definition of Project Management as the term "Project Management" connote two words, "Project" and
"Management" In its very simplest sense Project Management means management of projects. A project is a commitment of task(s) to be performed within well defined objective, schedule and budget. Webster New 20th Century Dictionary defined it as a scheme, a design, a proposal of something intended or devised. The Dictionary of Management refers it as an investment project carried out according to a plan in order to achieve a definite objective within a certain time and which will cease when the objective is achieved. A project according to Encyclopaedia of Management is "an organised unit dedicated to the attainment of a goal - the successful completion of a development project on time within budget, in conformance with pre-determined programme specifications." A project therefore conveys a simple meaning i.e., the objective but not a physical objective, nor is the end results - it has something to do with the going in between, which must be same, whether we build a high technology process plant or merely hold an election, to deserve a common name and to be termed as a project.

In a business setting, at least for the sake of its survival, an organisation must grow, whether it is in public or private sector. Therefore the organisation is always on the lookout for good business ideas which may require growth, either on the existing line of business or in diversified areas. But that idea must be technically feasible, economically viable, politically suitable and socially acceptable. When the ideas pass these tests, an investment proposal is made. When the investment proposal is approved, the project commences. So project is a combination of interrelated activities to achieve a specific objective. It starts from scratch with a definite mission, generates activities involving a
variety of human and non human resources directed towards fulfilment of mission and stops at once the mission is fulfilled. The Project Management Institute, of USA has a good definition for it. A project, according to the Institute, is a one-shot, time-limited, goal directed, major undertaking, requiring the commitment of varied skills and resources." It also describes a project as a "a combination of human and non-human resources pulled together in a temporary organisation to achieve a specific purposes." The purpose and the set of activities which can achieve that purpose distinguish one project from another.

Another galaxy of scholars has considered a project as a unique and non-repetitive activity aims to systematically co-ordinating inputs in the direction of intended outputs. According to E L Harrison, "a project can be defined as a non-routine, non-repetitive, one-off undertaking, normally with discrete time, financial and technical performance of goals. To quote few more definitions of the term 'project' connotes purposefulness, some minimum size, a specific location, the introduction of something qualitative new and the expectation that sequence of further development moves will be set in motion." The Manual on Economic Development defined a project as "the compilation to be made of the economic advantages and the dis-advantages attendant upon the allocation of country's resources to the production of specific goods and services. All these definitions of a project regarded it as an action oriented activity."  

To quote Professor Gupta, Management generally speaking, encompasses three elements, planning, executing and reviewing. Planning includes formulation of
object and policies, without defining specially the object and policy framework with which the object has to be achieved, no business activity can be undertaken.

Taking into consideration all the discussion, a simple and straight definition of 'Project Management' can be derived as "Project Management is an organised venture for managing projects. It involves scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and co-ordinating unique activities or tasks to produce desirable outputs in consonance with pre-determined objectives, within the constraints of time, cost, quantity and quality."

The foremost and the crucial stage in the Project Management is the Project Identification. In identifying a Project, first it is important to know who identifies the project and how they are identified. The important steps for project identification and preparation related to studying (i) imports, (ii) substitutes, (iii) available local raw materials, (iv) available technology and skills, (v) inter-industry relationship, (vi) existing industry. (vii) development plans, (viii) old projects etc. At the time of plan formulation all projects of every need to be identified properly. But in practice it is observed that the identification stage is the most neglected stage of project management. This is true specially in the case of project planning in the Government.

The Project formulation is one of the important stage in Project Management on which the success of the projects depends mainly. This is a pre-investment exercise to determine whether to invest, where to invest, when to invest and how much to invest. Certain things are kept in to consideration for successful formulation.
Product life cycle is an important factor that must be taken into consideration in any project planning or investment decisions. The concept stipulates that there should be another product to replace when profit from the product starts declining. Those who are responsible for project management in an organisation should take into consideration its commercial and financial feasibility soon after the project is conceived. Financial feasibility of a project is done through preliminary studies. These studies decide the availability of raw materials, location, techniques of production, etc. In project formulation, financial analysis is also done to know how to raise necessary funds for the project, which is a major step in project formulation.

It is necessary for the entrepreneur to know in advance the details of the technical and financial viability of the project, which is required for the smooth and profitable operation of the project. The financial institutions which intended to meet the financial requirements of the project also require complete information of the project regarding its economic necessity, managerial competence apart from its technical feasibility and financial viability. All these aspects pertaining to the project are included in a project report. A Project report is a written account of various activities to be undertaken to assess their technical, financial, commercial and social viabilities.

1.3. PROJECT APPRAISAL - WHAT, WHY & HOW:

This study aims at examining the application of project appraisal techniques which have assumed great significance in view of the increased awareness about the use of
resources and returns obtained. It is therefore considered necessary here to discuss the basic concepts and jargon of the project appraisal techniques.

Appraisal of project is an essential requirement which no project can escape, specially when multifarious choices are available for satisfying the need without being heavy on budget. Selection of a project implies comparison of pros and cons peculiar to various programmes. The process of appraisal undergoes some series of steps viz., classification, tabulation, presentation and analysis of the available opportunities. The project appraisal process is performed in two distinct ways:

- **Classification of the effects of a project:** While the effects of certain actions are relatively easy to predict such as the impact of hydropower plant on total electricity production of a country, some other actions are less amenable to prediction such as the effects of a new school curriculum on the cognitive activities of the children.

- **The assessment of these effects:** Whether an identified effect of a project is desirable or not depends on the goals pursued by the sponsor, Government or society. It is possible that same effect can be a benefit as well as a cost at the same time. For instance, an increase in agricultural output is the benefit if the overall growth is considered as the major goals of a society. Conversely, the same increment of production might be the cost if the inequalities of income distribution is a major drawback of the society. This vermicular effect is not a contradiction, rather it is consequence of evaluating a single phenomenon under different perspectives which may not be compatible to a given situation.
Project appraisal process is an essential tool for judicious investment decisions and project selection. The basic objective of the project appraisal process is to decide whether to accept or reject the investment proposal. But it is also an essential part of the process to recommend the way, if project is not designed properly in which the project required redesign or reformulation so as to ensure better technical, financial, commercial and economic viabilities. Project appraisal may be defined as a detailed evaluation of project to determine the technical feasibility, economic necessity, financial viability of the project and managerial competence required for its successful operation.

The fundamental objectives of appraising a project are:

1. to determine future expected contribution of project alternatives,
2. to determine various costs and benefits of those proposed actions,
3. to design conceptual framework that helps monitor and evaluate the actions.

In order to meet the above objectives a project appraiser should seek an appropriate methodology. The methodology should be able to:

1. provide an integrated framework towards all types of goals namely economic, political, social, commercial etc.,
2. provide an organic link between goals pursued and alternatives considered,
3. explicitly state values implied by goals and assumptions made,
4. define the means of verification of theory and assumptions made,
5. set a general adaptable framework that is tailored to various characteristics of a project actions,
vi focus on information that helps in determining securities of the project outcome to proposed assumptions,

vii disseminate information to identify key variables that need close monitoring during project execution,

viii provide necessary flexibility in the project design to adapt the projects to unforeseen developments or to new insights in the development process,

ix apply the information on the development of a project at micro level,

x focus on the significance of the effectiveness of policies by providing necessary information to export evaluation on the effects of a project,

xi install an information system that provides a detailed project experience and gives feedback so that future projects can be fine tuned

1.4. PROJECT APPRAISAL TECHNIQUES:

Over the years, various techniques of project appraisal have been developed. The traditional technique of project appraisal focus purely on quantifiable logic of cost benefit analysis or cost effective analysis to identify the worthiness of a project. The modern technique of appraisal lay a greater emphasis on the new dimensions quality of life as well as standard of living in terms of concentrating on issues like environmental pollution and social cost-benefit analysis. A comprehensive appraisal of a project can be performed by covering all these perspectives. The various techniques can be classified as depicted in Fig. 1 1.
Fig. 1.1. Techniques of Project Appraisal

Project evaluation techniques help in ensuring that cost and benefits derived from the project are equally matched. Webster's New 20th Century Dictionary define the term "evaluation" as to determine the worth of, to find the amount or value of, to appraise. Evaluation is to examine and judge the worth, quality, significance, amount, degree or condition of any given thing. "There are variety of objectives of the project evaluation. Russell D. Archibated listed the objectives of project evaluation as:

1. To provide visibility, as clearly as possible, of the inter-relationship between cost, schedule and technical-performance across the entire project.

2. To identify problems before they occur to the extent possible, so that they can be avoided or their effects minimised.

3. To identify opportunities quickly for schedule acceleration, cost reduction, or technical advance, and to exploit them before the opportunity is lost.

There are several methods now available in practice used with a view to evaluation of a project. It is not possible to prescribe any standard list of methods for
evaluation for all the organisation. It depends on the nature, size and complexity of the project. The simplest method of evaluation of any project may be obtaining first-hand information regarding progress, performance, problematic areas etc. of a project. This is a simple method of evaluation and can be applied only for evaluation of simple project. If the project is complicated in nature, huge in size and geographically scattered then this method will not serve the purpose. The other method by which evaluation may be carried out is based on the obtaining Formal/Informal Periodic Reports of a programme/project from the personnel entrusted with the responsibility of evaluating the project. But this method has its own limitations. It is possible that written report may not reflect and also not indicate any trends or current problems concerning with the project. Project may also be evaluated with the help of diagrammatic and graphic presentation of facts and figures related to the project. It is relatively easy method of evaluation to understand even for a lay men in the subject. However, the method is relatively costly and time consuming affairs. In some organisation Standing Evaluation Review Committees have been set-up by including experts and specialists as members of the committee. The members of the committee meets regularly or at frequent intervals, identify problems requiring immediate attention, explore alternatives and in turn suggest remedial measure to the Project Manager for smooth execution of the project. Preparation of the Project profiles is yet another method for evaluation of a project. It is a relatively scientific method under which the investigating teams prepare models on the basis of standardised guidelines. On the basis of these models intensive studies are carried out right from the inception stage to completion.
stage of an individual project. In some cases the method of setting up control points is also being used for evaluation method. Looking to the need of hours, such control points for the purpose may be set up for an individual project or for overall organisational operations keeping the following objectives in view:

1. Provide a single location for concentrated display of relevant information about the project (or projects).

ii. Serve as a physical representation of the project reminding all concerned of its existence, status, state of health and importance.

1.5. PROJECT APPRAISAL IN INDIA:

With the advent of planning in India, the size of public sector has increased over the years and consequently public investment has also increased. The investment is heavily concentrated in railways, telecommunications, major and minor irrigation, electric power and other infrastructural facilities. The share of public sector in net domestic capital formation is around 55 per cent.

The project is scrutinised by several agencies. It consists of a Committee of secretaries known as Public Investment Board (PIB). Its members are Secretary of Expenditure (Chairman), Secretary of Economic Affairs, Secretary to the Planning Commission, Secretary of Industries and Secretary to the Prime Minister. The Secretary of the Administrative Ministry which sponsors the proposal is also an ex-officio member when the proposal is discussed. The Project Appraisal Division (PAD) of the Planning Commission and Bureau of Public Enterprises (BPE) also scrutinise the projects.
While making economic appraisal of the industrial projects the methodology followed by PAD is the modified version of the Little-Mirrlees approach. The key elements of PAD methodology are:

- Traded inputs to be valued at border prices
- Transfer costs i.e. taxes and duties are to be ignored
- Non-traded items like power and transport to be evaluated in terms of marginal cost
- Foreign exchange to be valued at specified premia
- Social wage rate (Shadow wage rate) to be applied for unskilled and semi-skilled labour
- The mume' raise is to be defined as savings in domestic rupees

The PIB is assisted by various agencies. The Plan & Finance Division of Ministry of Finance scrutinises the proposal with reference to budgetary and plan provision. The BPE examines the construction costs, technical aspects and financial aspects. The PAD of the Planning Commission provides assistance in economic appraisal. The Financial Advisor in the sponsoring ministry furnishes the feasibility study and any other information required by PIB.

PIB was set up in September, 1972 to perform the following functions:

a. To examine broad aspects of investment proposal in the project formulation stage
b. Investment decisions on proposals for public investment to produce goods and services
c. To examine proposals for revision of cost estimates which exceed those approved at the time of investment decision.

The guidelines followed by the PIB in appraising investment proposals are as follows:

a. The contribution of the project to the economic and social objectives and adherence to the concerned policies of the government.

b. The advisability of undertaking the project in the public sector or the joint sector or leaving it to the private sector.

c. Availability of plan funds and desirability of diversion of plan funds to the new project from those already on hand.

d. The plan capacity and the timing of investment in the light of supply and demand balance including export possibilities of the product/service.

e. The economic benefits of the project as distinct from financial returns.

f. Crucial assumptions in the feasibility report that are likely to affect the performance of the commissioned project in relation to the claims made thereon in the feasibility report.

g. Major technological and constructional aspects which may have a bearing on the investment decision.

The institution of the PIB (and its technical arm, the PAD) represents an important advance in the process of public investment decision making in India. It has (a) promoted a more scientific appraisal of investment projects, (b) provided a forum for bringing to bear an integrated approach to project appraisal and selection, (c) expedited the
process of decision making, and (d) strengthened the hands of the government to resist pressures based on non-economic considerations to a certain extent.

The Project Appraisal Division (PAD) of the planning commission follows a qualified version of Little-Mirrlees approach of projects appraisal to sit through the social-cost benefit analysis. Therefore, the assumptions that are considered in the L- M approach stands valid even for the Indian conditions. In addition to the above, the PAD grouped the projects of national importance into three in order to safeguard from the ever changing tariff policies and eliminate trade-offs between growth of equity. These groups are:

- capital intensive industrial projects,
- infrastructural investments,
- agricultural and rural development projects

The capital intensive industrial projects are appraised and evaluated on the basis of 'efficiency' criteria. The efficiency criteria based its arguments on Economic Rate or Return (ERR) of a project. This approach is generally followed by all leading development financial institutions of the country such as ICICI, IFCI, IDBI.

The three important measures which are widely applicable to projects of national importance are:

i. Economic Rate of Return (ERR)

In order to compute the ERR, the world prices are considered instead of domestic market prices for all inputs and outputs other than labour. And for all tradable goods, international prices will be considered with CIF prices for inputs and FOB
prices for output. And for tradeable goods where the international prices are not available and for non-tradable goods, Social Conversion Factor (SCF) is essential to convert actual rupee value into the social cost or benefit derived

\[
SCF = \frac{X + M}{X (1 - t_x) + M (1 + t_m)}
\]

Where,

- \( X \) = exports
- \( M \) = imports
- \( t_x \) = average export tax
- \( t_m \) = average import tax

ii. **Effective Rate of Protection (ERP):**

ERP is a simple measurement that attempt to determine the true or effective magnitude of the tariff on inputs of a public project. Practically the normal rate of tariff may be 25% and if majority of output from public project is contributed with the help of imports, the domestic resources are being protected at a rate much higher than 25%. According to Bhagawati and Desai, the ERP can be defined as "the incremental value added due to the tariff divided by the value added at CIF prices. Incremental value added is the difference between value added at domestic prices and at import prices" Therefore, this can be expressed as:

\[
ERP = \frac{\text{Value added at market prices} - \text{Value added at world prices}}{\text{Value added at world prices}}
\]
This can also be presented as:

\[
\text{ERP} = \frac{\text{Value added at market prices}}{\text{Value added at World price}} - 1
\]

Therefore, ERP helps in project appraisal in similar lines with DRC provided a slight change is followed in the form of reducing Shadow Resource Cost (SER)

iii. **Domestic Resource Cost (DRC):**

The DRC (Domestic Resource Cost) version of Lal (1974) presents the criterion as

\[
\text{SER} > \frac{D}{X - M}
\]

Where,

DRC is the ratio of domestic inputs (D) measured in domestic prices to foreign exchange earnings (X - M) measured in terms of the main foreign exchange. Therefore, a generalised approach of DRC can be defined as

\[
\text{DRC} = \frac{\text{Value added at market prices}}{\text{Value added at world prices}}
\]

Where,

value added is the difference between the value of what a project produces and the value of any inputs purchased from elsewhere

The measurement of 'value added' depends on many characteristics such as technology, labour, etc.
Value added at domestic price is simply the value of payments made to domestic capital and labour.

For example, we assume that there are two goods $Q_1$ and $Q_2$ which are traded along with a good $Q_3$ which is domestically produced to export through the public project. Two domestic inputs $K$ and $L$ are used for this purpose. The world prices of these goods can be assumed $P^1$, $P^2$, $P^3$ respectively. The traded goods are charged with different tariff rates. The domestic factor prices are $r$, $w$ by applying the equation we can compute DRC as,

$$ DRC = \frac{(w \times l_3) + (r \times k_3)}{p^3 - (p^1 \times f_1)} $$

Where,

- $w$ = wage rate.
- $l_3$ = labour used in manufacture of product $Q_3 \in L/Q_3$.
- $r$ = rate of interest.
- $k_3$ = capital used for product $Q_3 \in K/Q_3$.
- $f_1$ = share of $Q_1$ and $Q_2$.

The DRC focuses on the size of domestic resources given up per unit of foreign exchange earned. It is only in these terms that the ratio makes sense.

In order to have the requisite information for appraising the projects, a manual for the preparation of feasibility studies for industrial projects in the public sector has been prepared by the Planning Commission and finalised in consultation with the Finance Ministry. A correct determination of the magnitude of the investment in the
project depends on the accuracy of demand estimates. In the Indian context of a mixed economic and the dominant position of the public enterprises in the basic and core sectors of the economy, the inter-related demand profiles for basic projects that originate within the public sector present difficulties in analysis and estimation.

The generally accepted commercial criteria to measure the success of a project is the return on investment. However, this may not be the only criterion when investment in a public sector project is examined. Investment decisions in the public sector are governed by various social and economic factors. These factors will have a bearing on the earning of a commercial rate of return on investment. In appraising any public sector project investment, special consideration has to be given to socio-economic objectives. However, in appraising an investment proposal, the dominant role of public enterprises in economic development and the overriding need for mobilising resources to ensure rapid economic growth have to be kept in view, as well as an appropriate rate of return. All these factors have to be taken into account and applied for sanctioning investment.

The government presents to the Parliament a White Paper in respect of each new public undertaking or departmental project, including expansion schemes involving an investment of Rs.100 crores or more approved by the government. Important aspects such as the size of the project, volume of investment, product mix, economics and profitability of investment, etc., are included in the White Paper for information of the Parliament.

While making investment decisions, the adoption of an appropriate rate of return is desirable in most cases. A project which may not yield the required return may
still have to be sanctioned on wider social considerations. To assist in taking such decisions project proposals should include data for carrying out social-cost-benefit analysis. Such an analysis is all the more desirable in a developing economy where the price mechanism does not reflect the social costs and benefits flowing from a project.

In ranking the project for selection, costs and benefits are resolved in their net present worth by the application of an appropriate discount rate. The question of determining a specific cut-off rate raises intricate issues like allowance for risks and uncertainties, type of industries, society's value judgement on preference between the present and the future etc. These issues are still unresolved and decisions on public sector investments have to be made, guided by a general consensus on a wide range of national considerations, and the prevailing economic, social and political situations. A generally applicable norm is neither practicable nor desirable.

Despite these improvements, public investment decision making in India, as the critics argue, suffers from the following deficiencies:

- Lack of detailed disaggregative sectoral planning
- Pre-emptive advance commitments
- Practice of submitting projects of the same sector/undertaking in a piecemeal manner
- Insufficient generation and analysis of options
- Preparation of feasibility reports without adequate studies/investigations
- Avoidable overlap in the appraisal of several agencies
- Tardy clearance procedures
• Sacrifice of economic considerations at the altar of political expediency
• Emphasis on procedures rather than substance

1.6. PROJECT MANAGEMENT Vis-a-vis FUNCTIONAL MANAGEMENT:

Project Management underlies a set of principles, methods and techniques that assist in making effective planning for the performance of tasks which are oriented towards the achievement of some objectives. Such a discipline indeed offers a highly effective managerial tool in the sense that its applicability in aspects of scheduling, controlling and re-planning of programmes and projects is primordial.

Its versatility feature is also evident since a broad spectrum of end goals may be achieved with it, such as research, development, construction, and/or installation of hardware, they may also include the development of computer software.

Project Management has a definite mission. It is not simply building systems but to build specific systems. An illustration of this statements the world of Electronic Data Processing (EDP), in which any kind of system development or programming effort is generally referred to as a project. A "task force" is set up to undertake such projects and directive guidelines are duly imparted by "management specialists."

The growth of project management has occurred much as a need to offset certain shortcoming of the traditional functional management, such as lead systems development and relatively ineffective cost and schedule performances. Among its potential benefits are the following.
i. It provides disciplines which ensure thorough project coverage and primary tasks inclusion,

ii. Commits responsibility and assures continuity of efforts despite turnover,

iii. Determines real time requirements and provides limits for scheduling,

iv. Identifies potential problem areas and takes preventive action,

v. Applies management-by-exception principle in reporting,

vi. Measures the degree of accomplishment against current scheduled plans and objectives,

vii. Facilitates re-scheduling and periodic evaluation, and

viii. Captures historical data and provides project models for future planning.

As Kielian says, however, it also presents some drawbacks. These are:

a. Project priorities and competition for talent may interrupt the stability of the organisation and interfere with its long-range interest by upsetting the normal business of the functional organisation,

b. Long-range planning may suffer as the company gets more involved in meeting schedules and fulfilling the requirements of temporary projects, and

c. Shifting people from project to project may disrupt the training of new employees and specialists. This may hinder their growth and development within their fields of specialisation.

Project Management, particularly the management of research and development projects, one of the most innovative and complex management dimensions in existence, necessitates the assemblance of a most effective project team.
A first-hand understanding of the activities required to accomplish the projects' objectives is the key criterion when selecting an organisational model. Once this concept is clear, attention should then be devoted to align the individual organisational elements, such as,

(a) the project team, and its responsibilities,
(b) the project officer, and
(c) the project manager

It is up to the top management to select the most appropriate model that fits task demands and scopes.

1.7. ORGANISATIONAL ALTERNATIVES FOR PROJECT MANAGEMENT:

These are three basic organisational alternatives that can be adopted in the field of Project Management:

i. Pure Project Organisation, where the Project participants work directly for the project manager and the latter runs the project as if it were a one-product business enterprise,

ii. Pure Functional Organisation, where a multiple-specialised manpower force is grouped together to achieve projects of different nature,

iii. Matrix organisation, composed of both project and functional human force and usually integrated to tackle large, diversified projects. This pattern of structure is distinctively project-completion oriented, and adopts itself to four different modes.
in accordance with varying degrees of authority and responsibility taken up by the project manager

a. Project manager(s) reports directly to the President or General Manager on a functional basis;

b. Project manager(s) reports to a Manager of Project Management, who in turn reports to the President or General Manager, on a functional basis.

c. Project manager(s) linked up to another functional department, but reporting to the President or General Manager, on a functional basis.

d. Project manager performing staff functions by directly advising the president or General Manager.

Among the several tasks undertaken by project managers, it can certainly be stated that the functions of Planning and Implementation of the plans are pervasive to them.

Within the project environment, plans need to be accommodated to different types of projects which require a diversity of resources as well as performance, under variables or constraints like time, costs and small error margin.

1.8. COST CONSIDERATIONS IN PROJECT MANAGEMENT:

An important phase in Project Management, besides planning and implementation, is that of costing.

The total cost of a programme is usually estimated through printing of all the activities undertaken over the scheduled period of performance. All the functional units of the project team must participate in this task, and the central target of pricing becomes
the Work Breakdown Structure. This task is one of a bottom-up type in the sense that costing information flows from the project level to the total programme level.

One major consideration is that of changing environmental conditions (such as fluctuations in raw materials and labour costs), which indeed affects cost estimation for projects under great uncertainty.

The basic components of a costing system in Project Management are materials/support costs, labour distribution costs and overheads. These components are reported on a periodical basis, as the project gets closer and closer to its completion. Regular comparison of actual incurrences vs estimates based on some experiment history is ensured, so that provisions are made to account for this cost differential at the completion stage of the project.

Once the project cost is obtained, costing activities at a programme stage are undertaken by higher-level management. This is evidently a corporate-oriented engagement.

1.9. PROJECT FAMILY TREE:

A project normally originates from a plan-national plan or corporate plan. In the normal scheme of things, the family tree for a project would be as in Fig 11. Sometimes, however, the term project may be used for what should be termed as programme or work package. This is not quite unexpected in view of their closeness in the hierarchy. A programme is not the same thing as a project, for one thing, it is not time limited like a project and also its scope and boundaries are not so well delineated. It is,
however, another thing that the approach for management of programmes may be the same as that for a project.

<table>
<thead>
<tr>
<th>Plan</th>
<th>National/Corporate plan with targets for growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme</td>
<td>Health programme, educational programme, science and technology programme</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Power plants, schools, hospitals, housing projects</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Package</td>
<td>Water supply and distribution package, power supply and distribution package</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Task</td>
<td>Award of water supply contract, construction of foundation</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Excavation, laying of cable, preparation of drawings, preparation of specifications</td>
</tr>
</tbody>
</table>

**Fig. 1.2. Project Family Tree**

Source: Choudhury, S. Project Management, P 3

Similarly, a work package is not a project though it may be so treated for the purpose of its management several work packages will constitute a project. A work package, however, has to be time limited as there is absolutely no ambiguity regarding its scope and boundaries.

**1.10. CATEGORIES OF PROJECTS:**

Much of what the project will comprise and consequently its management will depend on the category it belongs to. The location, type, technology, size, scope and speed are normally the factors which determine the effort needed in executing a project. Figure 1.3 shows the various categories into which industrial projects may be fitted. A grass root mega-high technology project is not the same thing as a modification work is a
low technology mini plant—though both will be seen as projects. Therefore, though characteristics of all projects are the same, they cannot be treated alike. An R & D project even though value-wise it may belong to the mini category, it must not receive the same attention as a low-technology mini plant. Recognition of this distinction is important for management of projects. Projects are often categorised in terms of their speed of implementation. Management of disaster projects, as in the case of the Bhopal gas tragedy, would not belong to the same category as that of putting up a plant in a normal situation—say, the same insecticide plant itself. The Asiad project is another example which was not exactly normal and illustrates the point that any another project would not be executed in the same way. Depending on the speed needed for execution of a project, there can be further categorisation as below.

Fig. 1.3. Categories of Projects
Normal projects:

For implementation of the project adequate time is allowed in this category. In a project all the phases are allowed to take the time they should normally take. This type of project will require minimum capital cost and no sacrifice in terms of quality.

Crash Projects:

In this category of projects additional capital costs are incurred to gain time. Maximum overlapping of phases is encouraged and compromises in terms of quality are also not ruled out. Savings in time are normally achieved in procurement and construction where time is bought from the vendors and contractors by paying extra money to them.

Disaster Projects:

Anything needed to gain time is allowed in these projects. Engineering is limited to make them work. Vendors who can supply yesterday are selected irrespective of the cost. Quality short of failure level is accepted. No competitive bidding is resorted to. Round-the-clock work is done at the construction site. Naturally, capital cost will go up very high, but project time will get drastically reduced.

1.11. OBJECTIVES AND SCOPE OF STUDY:

Since the introduction of planning in our country, we have been investing large sums of money in projects related to industry, minerals, power, transportation, irrigation, education etc., with a view to improve the socio-economic conditions of the people. These projects are designed with a aim of efficient management for earning adequate returns to provide for future developments with their own resources. But our experience has shown that there are several shortcomings in the ultimate success of
achieving the objectives of the proposed projects. It is observed that a number of projects have taken longer time to complete than was initially estimated, benefits from them have been realised later than expected, the capital cost have been larger than originally planned and consequently, the return on capital have been smaller than expected when the project was initially approved. It is being argued that these difficulties are mainly due to incomplete project planning and analysis. Further we find that in every plan the amount of money invested both in industrial and social projects keeps on increasing, but the development of managerial skill for implementation as well as the right kind of techniques for appraisal and control donot seem to keep pace with it.

Huge capital investment, expensive and scarce resources of materials and equipments are spent for these projects both in public and private sector. It is therefore desirable that the projects are completed within the scheduled time and the specified cost, so that the benefits from investments start flowing to the nation at an early date and rising aspirations of the people are fulfilled. Our experience shows that most of the developmental projects have taken longer than the prescribed period. To cite a few examples, The Nagarjun Sagar Project in Andhra Pradesh, Gandak and Koshi Project at Bihar etc., had time over-runs of more than 15 to 20 years.

While similar projects in developing countries are executed in shorter period, in India they take a much longer time. A fertiliser plant in India takes 84 months to set-up, in Japan it hardly takes 14 months. These may be extreme cases, but the facts remain that our projects take much longer time to complete.
Further the delay in the implementation of one project has a snowballing effect on many others. For example, if the power project like Euron is delayed, then industries and other ongoing projects, which depends on power, get adversely affected. Compounded delays curtail the tempo of economic growth in general.

Table 1.1. Delay and consequent additions to cost per year in respect of some projects:

<table>
<thead>
<tr>
<th>Name of the project</th>
<th>Delay (in months)</th>
<th>Cost of delay (Rs crores per year)</th>
<th>Final increase in cost of projects (Rs crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bokaro Steel Plant</td>
<td>72</td>
<td>51 72</td>
<td>31 32</td>
</tr>
<tr>
<td>2 Gujrat Refinery</td>
<td>12</td>
<td>27 99</td>
<td>27 99</td>
</tr>
<tr>
<td>3 Panipat Fertilisers</td>
<td>15</td>
<td>27 60</td>
<td>34 50</td>
</tr>
<tr>
<td>4 Dormalai Iron Ore</td>
<td>12</td>
<td>19 28</td>
<td>19 28</td>
</tr>
<tr>
<td>5 Bonaigaon Refinery</td>
<td>17</td>
<td>16 56</td>
<td>23 36</td>
</tr>
<tr>
<td>6 Chandrapura Power Project</td>
<td>18</td>
<td>13 03</td>
<td>19 55</td>
</tr>
<tr>
<td>7 Rajhans Cement</td>
<td>11</td>
<td>12 24</td>
<td>11 20</td>
</tr>
<tr>
<td>8 Idukhi Hydel Project</td>
<td>48</td>
<td>11 95</td>
<td>47 80</td>
</tr>
<tr>
<td>9 Atomic Power Station</td>
<td>39</td>
<td>11 60</td>
<td>37 80</td>
</tr>
<tr>
<td>10 Basic Chemical Units</td>
<td>100</td>
<td>0 72</td>
<td>6 00</td>
</tr>
</tbody>
</table>

Source: Federation of Indian Chambers of Commerce & Industries

With the delay in completion of projects, huge investment remains in the pipeline, delaying the income and employment generation. The break even point analysis in the basis of which the project is approved remains no more valid, due to the cost over runs. The pay back period is lengthened and at times the break even point goes beyond the maximum production capacity.
In this study an attempt is made to show how far the various project appraisal modules and techniques have been useful to Indian industry. We have shown that how the economic appraisal of the project can be linked to the plan target of economic growth. The discounted cash flow techniques of calculating the internal rate of return of a project provide the basic link.

We have also made attempts to find out the reasons underlying the time and cost overruns, their effect on growth of a backward area and the ways to overcome such overruns.

While this study lays more emphasis on financial and economic aspects of project appraisal but the other aspects have not been totally ignored. The importance of other appraisal modules has been realised and their relevance in project management and appraisal has been shown.

This study will also consider the hypothesis that current practices of economic appraisal of projects, at best, guarantee non-negative growth rather than the desired rate of growth envisaged for a particular time frame.

1.12. REVIEW OF EXISTING LITERATURE:

Project management in the recent past has been recognised as a management philosophy. Projects normally begin with a scratch definition of the mission, generates activities around the defined limit integrating a number of resources, machines, materials and money, that are directed towards the fulfilment of the stated mission or goal. Some scholarly works on projects consider a project as a 'magpie collection of half-baked ideas' usually applied to construction and industrial commitments.
The subject of project management is whelmed with numerous studies, articles and books. The field is flooded with various scholarly contributions. Some of the vital studies are surveyed hereunder.

Harold Kerzner\textsuperscript{22} defined project management as "planning, directing and controlling of company resources for a relatively short term project which has been established for the completion of specific goals." In this book, he views project management as a systems approach for planning and controlling. Kerzner\textsuperscript{23} in his book "In search of Excellence in Project Management" sells project management as a tool and defines what makes a company "excellent" in using it. Kerzner surveyed leading companies worldwide to collect data and stories about their strategies and methods. The book anoints 27 companies as the World best in Project Management, provides in-depth quotes from senior executives in these firms and offers detailed examples of what they did and how they did it. The most important feature is the benchmarks which can be used to improve the performances. The book deals with conceptual analysis of project management, driving forces in the field, project management systems and tools, planning for excellence, influence of economic factors, critical success factors, modern project management, integrated management process, corporate culture and value, management support, training and education for modern project management, behavioural factors, staffing for excellence and a discussion about rising stars and future directions.

Belnger\textsuperscript{24} in his book "How to plan Any Project" gives step-by-step guide for developing a detailed, initial project plan. The book is illustrated with sample charts.
and reports from various software packages. It can be used as a companion to a variety of project management textbooks and software.

Archibald, Russel D\textsuperscript{25} has presented a practical, proven system for managing all types of programs and projects, with emphasis on high-technology projects, in his book "Managing High-Technology Programs and Projects." It includes illustrations, forms, and checklists for projects start-up and close-out and it offers step-by-step coverage of setting up the project team and building project commitment, conducting in-progress evaluations and providing product direction, and ensuring the effective completion of the project.

Ibbs, William C and Kwak Young-Hoon\textsuperscript{26} in their book "The Benefits of Project Management" have described financial and organisational rewards to corporations - in today's highly competitive, resource-scarce, Internet-time based world. Project management has truly come into its own as an organisational discipline that must be in top form if the organisation is to flourish. It's essential, therefore, to establish a benchmarking process for users of project management, to assess their levels of project maturity, and to formulate ways to improve their levels of project management. The book is the first step in establishing that process. The book presents the organisational and financial benefits to organisations that result from the implementation of project management tools, processes and practices. In particular, it looks at the return on investment that organisations realise by investing in all aspects of project management. The book provides a vehicle for estimating what kind of project management return on investment improvement one can expect from taking certain actions to increase the project.
management maturity, enabling one to justify the investment of money and effort to achieve their goal.

Toney Frank and Powers Ray\textsuperscript{27} in their book "Best Practices of Project Management Groups In large Functional Organisation" have presented practical ideas to improve the practice of project management in all organisations. The information presented can also be used to take measure for the firm's position relative to others in the field. Most importantly, it identifies a broad spectrum of best practices for one to consider and then to implement it in the organisation.

In benchmarking project management, Toney and Powers provide specific key success factors and core best practices that practitioners can apply to their own workplace, the results of the benchmark analysis for the benefit of all dedicated practitioners, students, and teachers of project management professional skills, a detailed set of guidelines to enable others to replicate the benchmark process, and templates consisting of letters, agenda, ethical codes, and surveys for project management professionals to use in the conduct of their own benchmark activities.

Schuyler, John R.\textsuperscript{28} in his book "Decision Analysis in Projects" shows how risks lead to indecision-decision dilemmas. In Decision Analysis in Projects, Schuyler presents the approach and principal techniques of decision and risk analysis to help the better decision making. This book shows how to face uncertainty, manage probability and better use of valuable resources. One of the keys suggested is to have improved accuracy during evaluation. Schuyler examines expected value, which is one of the most meaningful measure of the project, the use of payoff tables. The author, with lots of
figures and tables, clarifies the effects of simulation, techniques for probability, modelling biases, other industry measures.

Pinto, Jeffery K. in his book "Power and Politics in Project Management" provides good suggestions on how to deal with political situations as well as some pointers on how to avoid getting trapped by those playing dirty politics. Because projects often exist outside the traditional functional business structure, project managers often have an unstable base of power and must cultivate other methods of influence. Here, Pinto sheds new light on power and politics, specifically in how they relate to effectively managing projects. The Project manager will learn about the skills which is required to succeed in the project environment, especially the abilities to bargain, manage conflict, and negotiate.


The book "Project and Program Risk Management: A Guide to Managing Project Risks and Opportunities" by Wideman, R. Max, (Ed.) is a useful introduction to risk in the project or program environment. The book provides a simplified understanding of the nature of project risk and opportunity and a systematic approach to risk reduction. One will get useful insights into the process of project risk management whether working on a small administrative project, a large capital works project, or anything in between. Concepts, tools, and techniques covered include risk identification, risk assessment goals and methodology, computer applications, risk response and documentation, the
management of contingency allowances, managing the risks of the project's environment, and dealing with risks in contracts.

The book "Project Leadership: From theory and Practice" by Govekar Michele, Palmer Todd, Pinto Jeffery, Thomas Peg and Trailer Jeffery is a practically written discussion of the critical roles that leaders play and the impact they have on successful project implementation. It's a pragmatic guide to project leadership, showing how leadership capabilities can effect project management practice. The book presents some of the most well-known and useful theories on leadership and offers a practical advice on applying these models to the personal leadership style. It's a hands-on guide detailing specific steps one need to follow in creating a project vision and gaining buy-in from team members, setting goals that are consistent with the vision, reaching all project stakeholders, and selling the vision.

Cleland David, Bursic Karen M, Puerzer Richard J, Valasak A Yaroslav Eds in their book "Project Management Casebook" offers 50 case studies that represent the breadth and importance of project management and its impact on the everyday management of projects. Each of the cases provides new and unique challenges that have been mastered by the practice of project management. How do project team members get the knowledge, and attitudes needed to perform effectively? One proven method is through the case-study approach. The cases enable to see how and why projects are used in a wide variety of organisational settings in contemporary life. The book has exposed to both successful and not so successful project management practices. It provides the opportunity to learn something of the real world of project management.
In "Project Management in Russia", Vladimu Voropajev offers perspectives on the country's project management application and development. He answers the questions: Why is project management needed in Russia? Where should it be applied? What tools from the rich arsenal of project management can be used right now? What tools require adaptation and what tools require new approaches and development? What fields have priority in project management development? What should be done for project management development? Voropajev begins by defining project management, including who needs it, for what purposes, and when. He goes on to give a brief historical essay on project management development in Russia and throughout the world. Accumulated experience and achievements are highlighted here. He then presents an analysis of project management and its environment in modern Russia.

Ireland, Lewis R., in his book "Quality Management for Projects and Programs" has constructed a solid presentation on how to invest in quality throughout all the Project management processes. Understanding the customer's requirements and the essential nature of planning to meet quality expectations is explored thoroughly, and there is discussion of the quality—the choice of resources, the human factors, the effects of internal and external demands, the tools, the management techniques, the methodologies, and the costs-associated with infusing quality into project management.

"The World's Greatest Project" by Darnall, Russel, is an updated and expanded version of Darnall's "Achieving TQM on Projects," describes the application of quality techniques in major projects. For the project manager who hopes to make goal-directed, client-focused and people-oriented more than just buzz words, Darnall's work
offers a blend of theory, practice, and process that's unbeatable. Project managers, clients, customers, and stakeholders all need to understand the implications and importance of quality management for projects, including goal setting and the use of team efforts to achieve these goals. Project managers who use the approach to quality outlined by Darnall will be constantly encouraged by their team as they work together, self-measuring and meeting goals they've been involved in setting. The results will be total project success.

"5-Phase Project Management" is a step-by-step book by Weiss, Joseph W. and Wysocki, Robert K., where the authors have discussed about each phase of complex project. Starting and managing new projects in organisations requires creativity and teamwork. Project planning and implementation are often blocked by confusion and conflict over goals, methodologies, and communication bottlenecks.

"Dynamic Project Management" by Kezsbom, Deborah S., Schilling, Donald S., and Edward Katherine A. examines high-tech engineering projects and shows the people who implemented them how to manage in today's high-tech project environment. Based on actual experiences in some of the authors' clients' organisations, the book addresses the difficulties in working in project organisations, the role of the project manager, how to build the project team, dealing with conflict, and how to select computer-based project management information systems.

Lewis, James P. in his book "Fundamentals of Project Management" explains how to juggle multiple tasks on a complex project from start to finish. The author's fast-track approach will enable one to set up project plans, schedule the work
effectively, establish priorities in multiple task situations, monitor progress, and achieve performance objectives.

The Human Aspects of Project Management Series by Verma, Vijay K. consists of three volumes. First volume deals with Organising Projects for success, Volume Second describes Human Resource skills for the Project Manager and Third volume explains different ways of managing the project team. People are the backbone of projects and the most important resource in a project. To survive and grow in the 21st. century, project manager must learn and use appropriate human skills to motivate and inspire all those involved in the project. This book offers practical guidelines that can be used to develop and implement the human skills appropriate to project management, and leadership.

"A Framework for Project and Program Management Integration" by Wideman, Max, provides a general explanation of project management, some insight into processes, and suggestions on how to manage projects. The book is the first step in recognising that learning about project management is learning about a process-the the process of managing change.

In the book "Earned value Project Management", Fleming and Koppelman present an old management tool in a new guise to help the manager answer the question and answer it accurately. Earned value calculations can provide the manager and the owner with an early warning signal of impending cost problems in time for the project manager to react. The authors trace the technique of earned value cost management from its formal introduction as a part of PERT/Cost through its most prominent application.
within the Cost/Schedule Control Systems Criteria (C/SCSC) The authors discuss both positive and negative aspects of earned value and argue for a more user-friendly approach that avoids mind-boggling terminology, instead simply relating planned standards to earned standards to actual costs.

1.13. METHODOLOGY:

The conceptual foundation of project appraisal modules and their practical application are the core of subject matter. The concepts and techniques in current use by the project departments, project consultants and financiers are introduced as general concepts and then explained in sufficient detail to permit application to the particular problem of projects in the public and private sector of India in general and Orissa in particular.

A significant feature of this study is the collection of information by questionnaires and random sampling method for the data collection. The study covers the important manufacturing and non-manufacturing industrial groups. These groups are as per classification provided under New Industrial Policy, 1991, the classification is depicted in Annexures.

It is an analytical study based on the sample projects collected from the project files of financial institutions and banks operating in Orissa. The sample projects belong to Public, Private, and Joint Sectors and the categories of projects comprising of industry, group, entrepreneur class, promoter side, location, purpose, and performance. It employs descriptive methodology for studying and identifying the application of project appraisal module, causes for pitfalls in project management, with special analysis of overrun projects and also to evaluate the impact of overrun on projects.
i. Sample:

The sample for this study consist of 48 projects assisted by the financial institutions and banks. While major observations have been inferred from all the sample projects, the detail analysis however is made only for 9 selected projects from the sample. We intentionally selected the 9 projects from the small scale sectors because it is this sector which is trying for industrialisation of the state of Orissa.

The study excluded those units for which proper data was not available. The number of units varied under industrial groups. From the point of view of having appropriate representations of each industrial groups (strata), the study selected every second organisation from the strata provided data was available. This process resulted in the sample of total 48 organisations having undertaken projects in the state of Orissa.

The selection of sample is not without reasons. It is partly to keep the study within manageable limits and resources. Nevertheless, the sample of 48 projects can be said to be fairly representative of the industrial units in Orissa. Above all, the sample represents cross section of the major industrial groups.

Some information in this study is produced with the permission of the concerned authorities, in other cases the confidentiality of the data is fully maintained. Certain aspects of current practices in appraisal modules are examined from the point of view of logic and suitability.

The sample project selected represent both industrially backward (Kalahandi, Koraput) developing areas of Orissa. The sample projects are used for studying the objectives of the present study.
ii. **Questionnaire and Data Sheet Design:**

Data relating to project management practice in Orissa were collected through a questionnaire. Data relating to project appraisal, monitoring, and evaluation were obtained through personal discussions held with the officials, suppliers, sub contractors, industrial consumers and others relevant to the study. We also study the manuals, procedures, systems and other relevant documents of the selected units. We also attended some of the committee meetings. Besides we had the benefit of expert comments of various other organisations on the status of selected industries.

iii. **Framework of Analysis:**

The information collected through the questionnaire and data sheet on the Project Management practices and pitfalls and impact of overrun summarised and presented in the form of tables. Means and percentages are employed to analyse the project management practices and identification of causes for overruns and its impact thereto. Correlation analysis has also been employed to identify the relationship between cost and time overruns. Analysis of variance has been put into use wherever necessary to determine the significance of relationship of overrun and various categories of projects. Further the analysis is based on tools and techniques used in project financial management and statistics. The study also relied on ratio analysis. The computer has been made use of to process the data.

**Chapter Outline:**

In the first chapter which is the introduction chapter the objectives, review literature, scope of the study, methodology adopted, sampling and statistical techniques
used all given The second chapter comprises the theoretical aspects of project management and national economy The third chapter outlines the regulatory environment for project management In chapter four the different techniques and methods of project appraisals are discussed Chapter five consists of pitfalls in project implementation The sixth chapter makes a contemporary project appraisal of different units Project Financier’s point of view has been described in chapter seven The last chapter (eighth) comprises the findings of the study with suggestions to overcome some of the problems and future research potentiality in this field of study

Limitation of the Study:

The study is based on 48 industrial projects assisted by Financial Institutions and Banks during the period of 1994-99. This study is confined to the projects of private and public sectors. In purpose-wise category of projects, this study considers ongoing, new expansion and modernisation projects. This study mainly focuses on Private sector small projects

1.14: CONCLUSION:

Project Management has assumed a great significance at the micro (organisational) level as well as macro (national) level. It is gradually becoming a management philosophy besides being a discipline.

The project appraisal techniques examine the technical feasibility, economic viability, political suitability and social acceptability of new ideas. Projects are unique and non-repetitive activities requiring special care in each case. The word project is all pervasive. Thousands of crores of rupees are being invested in one or other project,
therefore the management of these projects require a scientific approach from the beginning and till their completion

The importance of project management has attracted several scholars to examine various facets of project management in practice. We have selected 48 organisations to study the working of appraisal techniques. The data for the study has been collected both from primary and secondary sources. The study aims to find out the efficacy of the project appraisal and management techniques.
NOTES & REFERENCES:

1 Kolawoski, Polish Philosopher. Quoted by Albert, O Hirschman in his books Development Project Observed, pp 29-30


4 Dereck French and Heather Samand *Dictionary of Management* (2nd Ed)


7. Harrison, Albert O. *Development Projects* - Observed, p 1

8 Ibid


10 Goel, B.B *Project Management - A Development Perspective*, Deep and Deep Publication, New Delhi, p 102

11 Rao, P.C K, op. cit, p 73


13 Pitale, R C, op cit, p 5

14 PAD divides the projects into three categories namely industrial, infrastructural and social

15 Social Wage rate depends on employment and income generation It varies from region to region In general it ranges between 40 - 70% of the monetary wage rate
16 Basis of Project Management, AMA Seminar, New York, 1977, p 1

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