CHAPTER ONE
Chapter One

A FRAMEWORK OF THE STUDY

This chapter is an introduction to the study. It develops a theoretical background and builds a general framework within which the study is undertaken. It falls in nine sections which are taken below.

1.1 Preliminary Considerations

In this section, an attempt is made to define project, management, project management, formulation, evaluation, implementation, implementation delays and cost over-runs. These are the key-words used throughout the study.

1.1.1 Project, Management and Project Management

Hirschman viewed a project in a development context. He defines a development project as "a special kind of investment. The term connotes to purposefulness, some minimum size, a specific location, the introduction of something quantitatively new, and the expectation that a sequence of further development moves will be set in motion."\(^1\) To him, development

projects are privileged particles of the development process. While Hirschman stresses development and linkages, Taylor and Walting defined a project as a group of interrelated activities with defined start and finish points and need for an agency to direct it.\textsuperscript{2} Little and Mirrlees (henceforth called \textit{L} & \textit{M}) put a more practical definition stating that "a project is any scheme, or part of scheme, for investing resources which can reasonably be analysed and evaluated as an independent unit."\textsuperscript{3} They further recognised that if the parts are so closely related that the objective could not be fulfilled by only one, then all these parts should be taken as a whole or one project. They emphasised the need for evaluation. A recent definition emphasising objectives of time, cost and performance is one offered by Stickney and Johnston who defined a project as "a complex, identifiable task which is interdisciplinary (interfunctional) in nature and has specific objectives established for the parameters of time, cost and performance."\textsuperscript{4} More recently, Arbani used the systems concept in defining a project. To him, a project is "a total system consisting of input, process, output and feedback."\textsuperscript{5}

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From the above five definitions, it may be seen that a project is a system consisting of input factors of labour, capital, land and management which are interrelated in a process to achieve outputs stated in specific objectives of time, cost and performance. Such project which can reasonably be evaluated, has linkages (forward and/or backward) with other activities or projects in the economy which will accelerate the development pace.

Management, according to Mary Parker Follet, is "the art of getting things done through people." But recent books on management define it as a process involving management functions. Trewatha and Newport, for example, define management as the "process of planning, organising, actuating and controlling an organisation's operations in order to achieve a coordination of human and material resources essential in the effective and efficient attainment of objectives." Donnelly, Gibson and Ivancevich (1984) also described management as "the process undertaken by one or more individuals to coordinate the activities of others to achieve results not achievable by one individual acting alone." Such a definition of management as a process of

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6 Mary Parker Follet, Quoted in: Stoner, James A.F. and Wankel, Charles, Management, Printice Hall of India, New Delhi, 1986, p. 3.

7 Trewatha, Robert L. and Newport, M. Gene, Management Functions and Behaviours, Business Publications Inc., Dallas, 1979, p.4.

managerial functions is also offered by Stoner and Wankel (1986)\(^9\) and Terry and Franklin (1987).\(^{10}\) By the same token, we may define management as a process of planning, organising, actuating and controlling in order to coordinate human and non-human resources of an organisation to achieve stated objectives.

Two approaches to the study of project management in the literature of management can be distinguished. One confines project management to the management of project activities after pre-implementation studies are prepared. The other approach includes in addition to the first one studies which precede implementation. For the purpose of this study, the second approach is followed. This approach is clearly stated by Copur.\(^{11}\) According to Copur, project management falls in two broad categories: First is the allocation of investment funds to the most profitable and productive projects which results in what is called feasibility studies. The second category is organising the project and establishing administrative apparatus for successful performance of project tasks.

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From the foregoing discussion of the definitions of the terms project and management, project management may be defined as the management of the venture from the inception of project idea to its completion. It involves the application of scientific tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities to achieve desired results according to stated objectives. All these achievements are to be reached within constraints of time, cost, quantity and quality.

To put it more clearly, one may say that project management is concerned with the following stages:

(a) Conception of idea
(b) Pre-feasibility study
(c) Feasibility study
(d) Detailed project report
(e) Implementation, monitoring and control
(f) Trial tests and start-up of production

1.1.2 Project Planning (Formulation and Evaluation)

Project planning consists of project formulation and evaluation.

(a) Project Formulation

Project formulation is the stage from the conception of the project idea till the final analysis of the necessary elements in order to decide the viability of the project. It is done in three stages: Preliminary study, prefeasibility
study and feasibility study.\textsuperscript{12} This exercise is, in essence, a sort of organising the investment proposal into a manner which will help analysing and evaluating the project in the next stage. That is to say, usually a project is formulated in the way it will be appraised.\textsuperscript{13} The function of the formulation stage is to study alternative ways of accomplishing the objectives of project idea and to present the supporting data in a feasibility study for evaluation or appraisal.\textsuperscript{14} Such a feasibility study usually covers technical, commercial, financial and social aspects.

(b) \textbf{Project Evaluation}

Project evaluation in the literature of project management, as stated by Puttaswamaiah\textsuperscript{15} and Cleland,\textsuperscript{16} among others, is of three types: pre-project evaluation, ongoing evaluation and post-project evaluation. Project evaluation in this study refers to the first type and is used interchangeably with project appraisal.

Project evaluation is concerned with two issues: First is making sure that information presented in the feasibility

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study are accurate and second is analysing different aspects presented in the study to help in taking a decision whether the project is recommended for selection, modification or rejection. The analysis in project appraisal covers: 17

1. Technical analysis - to answer the question whether technical specifications are realistic and optimal.

2. Commercial analysis - to answer the question whether product specification and marketing plan and organisation structure are soundly conceived.

3. Financial analysis - to appraise the estimation of financial costs and benefits and the financial viability of the project.

4. Social profitability analysis - to examine the worthiness of the project from the point of view of society as a whole.

Financial appraisal of a project, as opposed to social appraisal, analyses the project from private profitability point of view. It measures profitability of the resources put into the project using market prices. All factors are quantified to obtain a definite criterion as to accept, reject or modify the project.

Social appraisal, on the other hand, is concerned with examining the social dimension of the project. The focus here is on social costs and benefits. Market or actual prices, as L & M, among many development economists in the 1960s and 1970s have argued do not, in most cases, reflect social costs 17

and benefits in developing countries. There are many factors which distort actual prices, e.g., inflation, currency overvaluation, imperfect capital markets, protection, external effects etc.

Therefore, in social appraisal, market prices are corrected. Furthermore, linkages, air and water pollution, employment generation, setting industrial units in backward areas etc. and non-quantifiable social factors which the project may enhance or reduce are examined. A popular technique of social appraisal of projects is social cost-benefit analysis (SCBA) which "purports to be a way of deciding what society prefers." 

1.1.3 Project Implementation

Project implementation is the allocation of tasks to individuals and groups within the project organisation and the execution of these tasks according to stated objectives of time, cost and quality. Project implementation relies on project formulation and evaluation. Implementation of an industrial project involves setting up of manufacturing facilities and consists of:

(1) Project and engineering designs
(2) Negotiations and contracting
(3) Construction
(4) Training
(5) Plant commissioning

Those activities are carried out within managerial aspects of authority, responsibility and relationships, installing and operating control systems and coordinating all efforts towards achieving schedules and specifications.

1.1.4 Implementation Delays and Cost Overruns

Implementation delay is a delay which occurs in implementing a project. It is used to mean completion delay and starts from the completion date agreed upon between client and contractor. It is also called time overrun and has been studied in this thesis in terms of the delay in number of months from projected date of completion.

By the same token, additional cost to the contract cost of the project due to time overrun is referred to as cost overrun. It is sometimes referred to as cost of delay.* Sometimes, however, it may not be a function of time overrun.

1.2 The Role of Project Management in Economic Development

Economic development is"a move towards even more efficient and differentiated methods of supplying people with the

* Measurements of implementation delays and cost overruns to reflect the problem under study come later in this chapter.
requirements for survival and improvement." In the pace of economic development, governments of developing countries have embarked on massive programmes and plans. The challenge these countries faced, and are facing, is the problem of efficient allocation of their scarce resources. Planning at national level is accepted in most developing countries, and the public sector projects have become the main concern of the planners. Individual projects in these countries "must be, and inevitably is", as argued by Fitzgerald, "seen in the context of the public investment programme as a whole and, perhaps more importantly, of the role of this latter in economic development."  

A public investment programme or national planning becomes crucial when management of the country activities becomes more complex and task-oriented. The aim of such planning is to accelerate development at all levels and in diverse fields. The objective of planning is to guide project formulation. That is to say, formulation, the cornerstone of the project, emphasises the overall objectives of the national plan. This is a prerequisite, as stated by the World Bank23 and UNIDO,24 among many other books, for a

project to pass the test of feasibility. Equally important is that, project evaluation should be carried out within the framework of plan objectives, and only the alternative that best fulfils the objectives should be selected.\(^{25}\)

That is to say, it is accepted among development economists that the fruits of projects could not be ascertained without the framework of a good plan. Benefits of a project are more if it is analysed within a framework of an overall development plan because national objectives can directly be reflected at project level. These plans are first prepared on the basis of aggregate estimates and later on adjusted according to the project proposal. Therefore, as L & M recognised, plans require projects and projects require plans.\(^{26}\) This circular reasoning means that project management is a cyclic process; it starts with an idea and goes through preparation of studies, evaluation and implementation. Completed projects are inputs for the preparation of new plans.

Projects, once formulated, are scrutinised to determine whether and to what extent they can contribute to the objectives. Monetary values are used, and the project cash flows are usually summarised into a single measure of profitability for acceptance, rejection or modification. In this regard, the use of market prices and the application of


discounting techniques are widely adopted by economists and financial experts. But as it is, all inputs and outputs may not be quantifiable. In such cases, as recommended by UNIDO, the relationship between development objectives and various components of the project should be worked out on their best possible estimates. These facts presupposes that the personnel of organisations which evaluate the projects be well trained in project appraisal techniques and methods.

A word of caution deserves mentioning is that governments use other measures and fiscal policies to reallocate resources in their economies. Mere use of project planning does not mean that all development objectives are taken care of. Furthermore, a project well-formulated in a feasibility study, as argued by Brichta and Sharp, does not in itself guarantee success because the environment in which the project is to be implemented may bring about many problems.

1.2.1 Implementation Delays and Economic Development

One of the problems during project implementation is delays which have been a common factor and involve extra costs. Most important, delays in project implementation involve extra costs

in terms of benefits postponed. Benefits that a completed project could generate have to be lost because of delay, and opportunities have to be foregone because resources are blocked in the uncompleted projects.

In addition, if the delayed projects were to generate forward and/or backward linkages, then the linked projects/activities will also suffer a chain reaction. In ultimate analysis, development objectives of the country will take more time and money to achieve.

One of the causes of project implementation delays quoted in the literature of project management is inadequate formulation of projects. But delays may equally result from mismanagement of implementation. Good project planning, however, leads to implementing projects with minimum delays and cost overruns; thus helping in accelerating the achievement of plan objectives. The stages of project management -- formulation, appraisal and implementation -- are therefore, as stated by UNIDO Manual, closely interrelated, and the ultimate success of an investment decision depends equally on each of them. This presupposes building sound organisations and systems for evaluating and implementing the projects.

1.3 Literature Review

There is vast literature on project management in general, and on industrial project management in particular, in India and Sudan. Emphasis in this section will be made on the most relevant material. Other references, however, may be referred to in subsequent chapters whenever felt necessary.

Porwal (1976)\textsuperscript{34} studied the practices and procedures of capital expenditure decision-making in large manufacturing companies in the private sector in India. It is an empirical study of the organisational, quantitative, behavioural and control aspects of capital budgeting in large manufacturing public limited companies. Porwal's study did not tackle formulations and implementation stages of the studied projects to have a wholistic vision of the problems.

Raj (1972)\textsuperscript{35} wrote a book on public enterprise investment decisions in India. This is an outcome of his Ph.D. thesis entitled: The Dynamics of Capital Budgeting Decisions of Public Enterprises in India. The study aimed to examine the dynamics of the capital budgeting decision process in public enterprises and to offer constructive suggestions in terms of organisation, criteria of selection, required rate of return and decisions with regard to solving conflicting requirements.

\textsuperscript{34} Porwal, L.S., \textit{Capital Budgeting in India}, Sultan Chand & Sons, New Delhi, 1976.

economic, political and social. Raj critically examined the guidelines set by the Planning Commission of India in May 1966 for investment decision-making. His analysis concentrated on criteria for selection of projects, location decision, organisation of capital budgetary decisions, training needs, control over public industrial investments and reporting of performance of public enterprises. Decision-making process and management with regard to implementation and follow-up procedures were not included within the scope of Raj's study.

The Bureau of Public Enterprises (BPE) of India (1980) prepared an in-depth study of cost and time overruns of Barauni Fertiliser Project. The study described the project from its inception to its completion and analysed the problems encountered. According to the study, Barauni project was planned to be implemented from March 1968 to July 1971 but was delayed till October 1976. Total cost overrun of the project was Rs. 571.8 million. Project management was not sound throughout the whole stages of the project. A case study was extracted from this in-depth study and presented in chapter five to highlight problems of fertiliser projects.

The Federation of Indian Chamber of Commerce and Industry (1981) prepared a paper on the loss being caused to industry


in particular, and the economy in general, by implementation delays mostly because of excessive controls and bureaucratic bottlenecks. Whether a private or a public sector project, said the paper, formalities of licensing, finance etc. might take six to seven months. Therefore, in 12 projects, delays in months ranged from 11 months to 100 months, and cost of delay ranged from Rs. 26.4 million to Rs. 3,103.2 million. This paper, however, was not an in-depth academic exercise to analyse the system and problems of project management.

In the First National Economic Conference of Sudan (1982), papers presented threw light on the working of the economy and problems encountered. The section on major industries in Sudan described, among other things, the development of sugar and textile industries. Different problems of these industries in both the public and private sectors were brought to the surface. These were raw material shortage, infrastructure, marketing and finance. But problems discussed were mostly confined to the operation stage -- not to the implementation and pre-implementation stages.

In my M.Sc. thesis (1983), I studied the extent and causes of delays in public industrial projects implementation in Sudan. The study attempted to measure the extent of delays in public industrial projects, to assess cost of delays and to


examine the implementation system. The study pointed out different causes of delays, e.g., unsound organisation, inefficient coordination, poor communication and long payment procedure. The study, however, concentrated on the implementation stage and did not link it with project planning to trace the problems back to the formulation and evaluation stages.

Kharbanda and Stallworthy (1983) described project implementation of some Indian public sector fertiliser projects. They provided data on time and cost overruns in the case of 15 fertiliser projects. They showed how cost overruns were the rule---not the exception---in project implementation. The writers attributed the causes to departmental execution and reserved chapter eight of their book for describing problems encountered in Trombay Fertiliser Plant Complex. Problems which led to delays were mainly related to delays in decision-making to make use of the gas associated with oil discovered at Bombay High in 1974 which caused an opportunity loss of Rs. 120 million. This is a problem of coordination from early stages to make use of such resource. This study concentrated on fertiliser project implementation as far as cost of delay and decision-making are concerned. Other aspects of implementation,

e.g., organisation, planning, control and payment were not touched. In addition, the pre-implementation stage was not dealt with.

The BPE and the Standing Conference of Public Enterprises (SCOPE) (1983)\textsuperscript{41} organised a national workshop on project management in India. This workshop integrated the different stages of project life cycle in the public sector in India. It covered total systems approach to project management, pre-implementation stage and project implementation. Industries tackled were steel, power, process plants (fertilisers, chemicals and petroleum), engineering, paper, cement, coal and mining. Fertiliser projects problems were mainly inadequacies in feasibility studies, procedural delays of Government clearances, non-availability of scarce materials, incapability of indigenous suppliers of equipment and power failures. More emphasis was put on implementation, and the different stages were not integrated into a wholistic vision.

My paper on the extent and costs of delays in public industrial projects in Sudan (1984)\textsuperscript{42}, was an exercise in project management. This was more or less an extract of my M.Sc. thesis, mentioned above in this section, in which I attempted to describe a methodology of measuring project time overruns and costs of delays of Sudan public sector projects.

\textsuperscript{41} SCOPE, Proceedings of National Workshop on Project Management in Public Enterprises, New Delhi, 1983.

Rao and Mehta (1984) studied time and cost overruns in 289 Industrial Development Bank of India (IDBI) assisted private sector projects in the period 1964-65 to 1979-80. About 76 per cent of the sample had cost overruns. Delay in project completion has been studied in terms of delay in number of months from projected date of completion. 85 per cent of the studied companies had time overruns. Causes of the overruns, ranked according to their importance, were high construction cost, price rise of indigenous machinery, omission of some essential machinery from the project scheme, underestimation of project cost and working capital, change in the value of rupee, increase in import/custom duty and change in project scope. But the IDBI study did not draw conclusions and recommendations on the implementation stage and licensing procedures.

Hafiz (1984), an ex-consultant of the Six Weaving Projects of Sudan wrote a paper on the obstacles to industrial development projects implementation in Sudan in the 1970s. Those were problems of public sector industrial projects which related to contracts, coordination, organisation, shortage of finance, bureaucratic delays and infrastructure. Although it brought many implementation problems and offered good suggestions, Hafiz's paper did not attempt

to link implementation with project planning and, hence, left a gap to be filled.

In his Ph.D. thesis on development administration, Mahmoud (1984) reserved some parts in which he discussed some problems of administration in public sector industrial projects implementation in Sudan. According to Mahmoud, political decisions prevailed in projects location and contract administration and bargaining led to loopholes, technical problems and penalties paid by Sudan Government to foreign contractors. Mahmoud's study was not an in-depth one of project management. Rather, it was an exercise in development administration. However, it raised some issues of project implementation when he discussed the effect of politics in project management.

Abu Affan (1984) evaluated the impact of industrial policy measures on achieving stated goals of the industrial development strategy and their impact on the performance of the existing industrial sector of Sudan. She interviewed a sample of 42 private sector companies through a comprehensive questionnaire. The Industrial Acts of the Sudan Government since 1956 were critically examined. Conclusions were drawn on policy issues which included measures to reform the

public manufacturing sector, reformulation of the old incentive policies, reformation of the licensing apparatus and revision of project selection criteria. Affan's study concentrated on private sector industry but did not give enough consideration to public sector industry which gained more importance in the 1970s.

Rathi and Tripathy (1986)\(^\text{47}\) wrote a paper which presented the views of cross-section of managers involved in projects. Those were 23 participants of a residential programme on project management organised by the Indian Institute of Management (IIM), Ahmedabad. All projects implemented, according to the study, had cost and/or time overruns, ranging from 2.8 per cent to 68.8 per cent and 11.5 per cent to 80 per cent respectively. This was true for both public and private sectors. Among the stated causes of cost and time overruns were lack of infrastructural facilities, inadequate investigation at pre-feasibility stage, change in scope of work, inflation, labour/financial problems of contractors and long clearance procedures. The paper was only a survey -- not an in-depth study -- which pointed some problems for further investigation.

The Ministry of Programme Implementation and the IIM,\(^\text{48}\)


Calcutta (1986), organised a national workshop on project implementation in India which tackled problems of project implementation in coal, power, petroleum, petro-chemicals, fertiliser, steel, aluminium and engineering industries. Both public and private sectors were covered and main issues discussed were contract management, project scheduling, monitoring and organisation. Conclusions were drawn on project formulation and evaluation. However, this was not an academic exercise; rather, it represented point of views of practical experience in project implementation.

In its cover story, the Business World (1987) surveyed the worst managed projects in major sectors of the Government of India. The survey covered power, petroleum, coal, steel, mining, fertiliser, paper, atomic energy, railways and shipping industries. According to the survey, a total number of 264 Union Government projects which interalia included the railways, power, petroleum, steel, coal, fertiliser and power had cost overrun of Rs. 2,15,130 million. Growth rate in production decreased from 6.8 per cent (1984-85) to 6.3 per cent (1985-86) mainly because of delays in project implementation. The survey presented different point of views of managers and Government officials. It attempted to reflect the unsound practices of project management in public sector industry. The private sector was not included in the survey.

A recent study on project management in India is that of Korgaonker (1987) who reviewed and analysed the Indian experience as to why there are heavy cost overruns in project implementation. His study was based on a survey of current practices in project management, particularly in the public sector. Professor Korgaonker cited instances where effective management practices have led to completion of Kudremukh Iron Ore Project and Adilabad Cement Project according to plans. He drew implications of his analysis for the pre-investment investigation, project appraisal, organisation and implementation stages. Private sector was not tackled.

From the literature above, it is clear that the works reviewed either concentrated on one or a few stages of the project life cycle ignoring other stages, or concentrated on one sector leaving the other. A study is needed to concentrate on few industries of the public sector and to throw light on the practices of private sector industry in project planning. More important, no comparative study has ever been made between the experiences of Sudan and India in project management. Therefore, such a comparison, if made, will go further milestones in tracing the causes of unsound project management in both the countries and in offering constructive suggestions in policy issues.

1.4 **Scope of the Study**

In the beginning of this section, it is worth emphasising that this study is, by and large, carried out to examine and analyse the process of project management in manufacturing* industry in Sudan. The main focus of the study is on Government textile, sugar and leather industries which are represented by the 18 projects of Appendix 1. However, access to the Indian experience adds a new dimension to the study, as it enables a comparison of the Indian experience with the experimentation launched in Sudan.

The study is carried over four dimensions:

(a) **Type of industry**: The research work is confined to manufacturing industry of Sudan and Indian manufacturing industry in general, and fertiliser industry in particular. In this respect, two cases, Melut Sugar Project and Barauni Fertiliser Project from Sudan and India respectively are studied.

(b) **Type of ownership**: The study concentrates on the government sector. However, light is thrown on the process of private sector industrial projects evaluation.

(c) **Time horizon**: The study covers the period 1970-85. But as some projects of Sudan are still under-implementation, the study stretches beyond 1985 to

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* Manufacturing projects and industrial projects are used interchangeably throughout the thesis.
pinpoint and analyse problems encountered in their implementation.

(d) Country-wise experience: The study is a comparative one between the experiences of Sudan and India in project management.

The justification for the four points is tackled in the following section.

1.5 Justification of the Study and its Relevance to Sudan

1.5.1 Justification of the Study

As stated in the previous section, the study is carried over four dimensions: type of industry, type of ownership, time horizon and country-wise experience.

As far as the type of industry is concerned, the work is confined to manufacturing industry. This is because more effort of the Sudan Government was put on manufacturing industry in the 1970s. The Five Year Plan of Economic and Social Development 1970-71 - 1974-75 envisaged an annual growth rate for manufactured output at an average rate of 9.4 per cent.\(^1\) Besides, the relative contribution of the manufacturing sector to the country's gross domestic product was envisaged to increase from 8 per cent in 1970 to 9.6

per cent by 1974-75.\textsuperscript{52}

But project management in Sudan is not up to the expectations. Various difficulties are encountered. Most obvious are implementation delays, cost overruns and low capacity utilisation. Appendices 1 and 2 show implementation schedules and costs of Sudan public sector manufacturing projects. Completion delay as percentage of planned completion period, which we calculated in Appendix 3, exceeded 50 per cent in most of the projects, and five projects -- as shown in Appendix 1 -- planned to be completed ten years back are still under implementation. Total cost overrun in seven projects (Appendix 2) amounted to Ls 6,120\textsuperscript{*} thousand.

Production performance, on the other hand, is bad as evident from Appendix 4. Total production of the Six Weaving Sheds reached its peak in 1985-86 when it registered 7,440 thousand yards. But this was only 11 percent of the installed capacity of the projects (66,000 thousand yards).

India has also witnessed similar problems. The paper of the Federation of Indian Chamber of Commerce and Industry reviewed in section 1.3 showed this. Average delay of the twelve projects studied was 38 months and total cost overrun amounted to Rs. 4,983.9 million.\textsuperscript{53} In addition, 76 per cent

\textsuperscript{52} Ibid., p.24.

\textsuperscript{53} These figures are calculated by the present writer from: Cover Story, Op. cit., pp. 8-14.

\textsuperscript{*} Ls stands for Sudanese pound: Ls 1 = Rs. 3.111
of 289 private sector projects assisted by the Industrial Development Bank of India during the period 1964-65 - 1979-80 overran their cost and 85 per cent encountered time overruns averaging 10 months.\textsuperscript{54}

A recent article on Indian most delayed projects revealed that completion delay in the worst managed projects in coal, railways and fertiliser industries were of the order of 204, 144 and 119 months respectively. Their cost overrun was Rs. 12,452.5 million.\textsuperscript{55} Such problems were also reflected in Korgaonker survey which showed a total cost overrun of Rs. 5,442 million in seven public sector fertiliser projects.\textsuperscript{56}

The fertiliser industry in India encountered serious implementation delays and cost overruns. These are shown in Appendices 5, 6 and 7. As evident from my calculations, delay as percentage of planned completion period in most of the projects (Appendix 7) exceeded 50 per cent, and total cost overruns of the projects amounted to Rs. 9,288 million (Appendix 6).

These facts about implementation delays and cost overruns in Sudan and India point to weaknesses somewhere in the process of project management which call for in-depth investigation.

The study, however, concentrates on the government sector

because in the Five Year Plan 1970-71 - 1974-75 of Sudan, the contribution of the public sector in industry was 60 per cent. By the end of the plan period the share of public sector investment in manufacturing sector averaged 21 per cent per annum of total expenditure. This is a substantial increase if compared to 8.8 per cent per annum of the period 1965-66 - 1969-70 for Sudan. Therefore, the study concentrates on the public sector. This is not to say that the private sector is ignored. As it is still the leading sector in manufacturing industry, and is witnessing a high concentration in the capital city of Khartoum, some sections in the thesis are reserved to study the process of industrial project evaluation by the licensing organisation and term-lending institutions.

The study covers the period 1970-85 because this is the period when more money flew into Government investment projects in Sudan and prolonged gestation periods and cost overruns occurred. Five projects (as shown in Appendix 1) are still under implementation. Therefore, the time dimension of the study stretches in the 1980s to pinpoint and analyse the problems encountered in their implementation.

The study is a comparative one between the experiences of Sudan and India. Both the countries were under British

rule and obtained their independence more than three decades ago. Also both countries started national planning since their independence, and projects have been taken up in a big way to speed up the process of development. While India is an industrialising country, Sudan is still lagging. India is more developed with sound plans and qualified personnel. Therefore, it is for the interest of Sudan to see how India has faced and solved problems of project management.

But the structures of the economies of Sudan and India are not the same. The Sudan Government owns the bulk of sugar and textile projects, the focus of our study. These are mainly owned by the private and cooperative sectors in India. This study concentrates on fertiliser industry of the public sector of India, which witnessed serious problems of delays and cost overruns as mentioned in the previous pages, for the following reasons.

(1) Sugar, textile and fertiliser projects belong to the same family of industries, namely, agro-industry sector, which gives them similar features. All of them are linked with agriculture.

(2) Sudan, a predominantly agricultural country importing fertilisers at present, is more likely to opt for fertiliser investments soon. The irrigated and rain-fed agricultural schemes of Sudan which were exhausted over the years, need fertilisers to enrich the soil. Therefore, the lessons to be
gained from project management in fertiliser industry in India would help foresee problems in future projects when Sudan starts fertiliser investment.

(3) Last, but by no means the least reason, the matter of comparison concerns public sector industry in developing countries. And as the principles underlying project management in public sector industry are more or less the same, comparing fertiliser (in public sector industry) with sugar and textiles, also in government sector, is valid.

While the present work is a study of the process of project management in manufacturing industry, two projects are selected and analysed to give more insight into the working of the system. Melut Sugar Project from Sudan is selected because it is the project with the longest gestation period. It is located in the Southern Region, the most under-developed region in Sudan. On the other hand, a case study of Barauni Fertiliser Project in India is used to highlight problems of project management. Barauni project, one of the most delayed projects in fertiliser industry in India, is located in Begusarai, an under-developed region of North Bihar. It encountered problems similar to those of Sudan projects.
1.5.2 Relevance of the Study to Sudanese Economic Problems

Sudan is the largest country in Africa covering an area of about 2.5 million square kilometers. Its population, according to 1983 census, is about 21 millions with an annual growth rate of 2.8 per cent. On the eve of its independence (1956), the per capita income in Sudan was estimated to be equivalent to $ 100 per annum which made the country one of the least developed countries in the world.\(^5\)

The fact that Sudan was, and still is, predominantly agricultural with one main cash crop (cotton), the country's economy was subjected to fluctuations in both volume and value of its export crops. Because of these economic problems, the first national government started a massive programme to cure the economy, industrialisation was to take the form of import-substitution starting by producing consumer goods. That was to encourage the establishment of industrial projects, which would help alleviate problems of unemployment, stagnant per capita income, low standards of living and poverty. It would also ensure economic independence. These were taken care of by embodying the policy in the Approved Enterprises (Concessions) Act, 1956. The policy was not a success.

substitution industrialisation was one of the main policies to achieve development objectives. For the first time, the public sector invested in industry by establishing nine factories -- primarily agro-industrial projects located in rural areas. But the problem of those investments was that they were not based on proper feasibility studies. Therefore, problems of location, shortages of raw material and other input supply worked against the success of these ventures.

In 1966-67, the contribution of the manufacturing sector to the country's gross domestic product was 2.8 per cent compared to the 6.8 per cent envisaged by the Ten Year Plan to be achieved by 1970-71. The problems of poverty, unemployment and low standards of living were not solved. The country was mainly depending on cotton as a source of foreign exchange and no industrialisation was achieved to substitute for imports.

The May Government (1969-85) drafted the Five Year Plan (1970-71 - 1974-75) and The Six Year Plan (1976-77 - 1982-83). A high priority to the manufacturing sector was accorded to achieve economic development. Manufacturing output was to grow by 57.4 per cent by the end of the Plan period, i.e., it was to grow at an annual average growth rate of 9.4 per cent. And as stated in the previous section, the relative

contribution of the manufacturing sector to the country's gross domestic product was envisaged to increase from 8 per cent in 1970 to 9.6 per cent by 1974-75. 61

About 60 per cent of the total manufacturing investment in the Five Year Plan was the share of the public sector. Many agro-based projects were planned. Those were mainly textile, sugar and leather projects. But they added new problems to Sudan economy as all of them were characterised by long gestation periods. Therefore, instead of substituting for imports, employing more people, promoting agriculture and raising the standard of living, they blocked foreign capital borrowed at high interest rates and delayed the economic development process of the country.

Therefore, a bulk of Sudanese exports in the 1980s was still mainly of agricultural primary goods, e.g., cotton, sesame and gum arabic (Appendix 8). It is rather risky to depend on agriculture which in turn depends mainly on rain. The early 1980s draught which hit Sudan had its far reaching effect on agriculture, and hence, on foreign exchange reserve of the country. The foreign market of agricultural production, on the other hand, is not stable. Therefore, there is a pressing need to manufacture some of the agricultural products in Sudan so as to add more value, generate more employment, encourage agriculture, provide against risk of

depending on one or a few products and dilute economic dependency.

A last problem which makes this study relevant to Sudan economic problems is the sharp fall of the Sudanese pound against the United States dollar in the last ten years. While the official rate of a Sudanese pound was $2.5 in June 1978, now (1988) it fell sharply to $0.222. This overburdens the foreign exchange reserves of the country which is witnessing long gestation periods of its projects.

Therefore, it is rather difficult for industrialisation in Sudan to achieve its desired objectives because all 1970s projects under this study are characterised by long gestation periods in an era of worldwide inflation and a continuous devaluation of the Sudanese pound. The Sudan government has built institutional framework for project evaluation and implementation control. But still the problems have not been solved and the projects of the 1970s overran into the 1980s. Therefore, a study of project management of Sudan manufacturing industry in general, and public sector manufacturing projects in particular, I believe, will go a long way in pinpointing pitfalls and discovering remedies.

1.6 The Problem Stated

As stated in section 1.5, in the Five Year Plan 1970-71 - 1974-75, the Sudan Government accorded more importance to
manufacturing industry as compared to previous periods, and put more effort on the public sector as compared to the private sector industry. To implement plan targets, the original plan envisaged an investment of Ls 60 million in the manufacturing sector, i.e., about 18 per cent of the total investment of Ls 385 million during the plan period. Of this sum, Ls 36.4 million were to be invested by the public sector and the remaining Ls 24 million were to come from private investment.

In order that such big investment outlay of the public sector was implemented efficiently, the Sudan Government has set up organisations for project appraisal and implementation. However, from Appendix 1, Implementation Schedule of Sudan Public Sector Manufacturing Projects, it is clear that all projects have witnessed long gestation periods. Five projects planned to be completed ten years back (i.e., 1977-78) are still under implementation. This, while Appendix 2 shows costs and cost overruns in seven of the projects which only burden the country and retard its economic development.

Indian public sector fertiliser industry which occupies the upper-most place in the development priority of the country and underwent three decades of planned development is

no exception in this regard. Appendix 5 shows implementation schedule while Appendix 6 shows cost overruns in thirteen fertiliser projects of the public sector. None of the projects was completed on schedule, and their cost overruns ranged between Rs. 55 million to Rs. 216 million. The country had to rely on imports to fill the demand-supply gap during the delayed periods and it had to incur additional costs to cover the overruns.

Completion delays are measured by slippages from planned completion periods. Also, statistical tools (range, mean, standard deviation and coefficient of variation) are used as measurements of the delay problem. In Appendices 3 and 7, delays are measured by the slippages from planned completion period for Sudan and India respectively. Deducting planned completion date from actual completion date gives completion delay. Completion delay in Sudan manufacturing projects ranged between 9 months for Ed Duiem Weaving Project, and 33 months for Hager Assalaya Sugar Project. On the other hand, completion delay in Indian fertiliser projects ranged between 13 months, for Trombay IV Project, and 96 months for Sindri Rehabilitation Project. That is to say, the ranges of completion delay were 24 (33-9) and 83 (96-13) months for Sudan and India respectively. These ranges, no doubt, show big gaps. More powerful statistical tools are used to measure the delays. From Appendix 9 the mean completion delay, standard deviation and coefficient of
variation for Sudan projects are found to be 17 months, 7 months, and 41 per cent respectively. These are 47 months, 25 months and 53 per cent respectively for Indian fertiliser projects. The large coefficients of variation for both Sudan and India refer to the serious problem of delays among the projects of these countries.

A further approach to the measurement of delay is by taking average completion delay as percentage of planned completion period. This gives more insight into the problem of delay as compared to planned completion periods. Average completion delay for Sudan and India are found to be 69 per cent and 109 per cent respectively. Again, these percentages are alarming.

Such delay problems, according to Avots,64 Taylor and Walting65 and Krishnaswami,66 among others, are indications of project management failure.

1.7 Objective of the Study

The study aims at the following:

(1) Examining the process of project management in public


sector manufacturing industry in Sudan and India. Emphasis will be put on public sector agro-industry in Sudan and fertiliser industry of the Government of India.

(2) Throwing light on private sector industrial project evaluation in Sudan and India.

(3) Comparing the experiences of Sudan and India in project management (1 and 2 above) to highlight the pitfalls which have resulted in delays, cost overruns and wrong locations of industrial units.

(4) Offering policy recommendations which may help minimise project management problems in Sudan and India

1.8 Research Methodology

1.8.1 Hypotheses

In developing countries, I believe, there is no scientific planning of projects. Scarce resources are not assembled according to priorities and, hence, projects suffer in their implementation stage. These facts lead to implementation delays which may also be caused by unsound and long procedures, act of foreign contractors, delays in imports and lack of wholistic vision of the projects.

Cost overrun of the projects, on the other hand, may be caused by inflation or wrong assessment of the projects. A rise in the general price level of inputs and building materials to be used in implementation may push up project cost
and this is, to a far extent, out of control of management. However, extension of implementation date of a project may result in the postponement of some activities to an inflationary period and, hence, unnecessarily push up project cost.

Wrong assessment of a project with respect to its capacity, location etc. may necessitate revisions later on which lead to problems during implementation and push up project cost. This factor is also controllable.

Good project control in developing countries has not been exercised. Neither sound systems are built nor good functioning of the systems has been exercised. I think that India has gone further milestones in project planning than has Sudan. Furthermore, project implementation systems and practices are more sound in India than in Sudan.

The following propositions are put forward for investigation:

1. Project planning in Sudan and India does not follow any scientific, stable and valid objectives. Clear-cut guidelines are not given. This led to the long gestation periods and big cost overruns which have been encountered in the implementation of public sector manufacturing projects of Sudan and Indian Government fertiliser projects during the period 1970-85.

2. The evaluation procedure of private sector industrial projects in Sudan and India is not sound and has resulted in
concentration of industry in Sudan and unbalanced regional development in India.

3. There is lack of sound project control in Sudan and India which led to unnecessary delays and cost overruns.

4. Implementation delays and cost overruns of the projects in Sudan and India are caused by factors such as wrong assessment and unsound implementation of the projects vis-a-vis capacity, location, supply/demand, finance, organisation, supervision, monitoring, coordination and control. These factors are controllable.

5. India is better than Sudan as far as industrial project management is concerned. Therefore, the experience of India -- an industrialising country -- in project management benefits Sudan which is still non-industrialising.

1.8.2 Research Design

This research work is of both descriptive and prescriptive nature. It is divided into seven chapters. Chapter two examines the experience of Sudan in project management in manufacturing industry. While the chapter is mainly about the public sector, two sections on industrial project evaluation by the Secretariat General for Investment and term-lending institutions shed light on private sector industrial project evaluation. A case study of Melut Sugar Project (Sudan) is presented in chapter three. Chapter four describes the
process of project management in public sector manufacturing industry in India and examines industrial project evaluation in the private sector as practised by licensing and term-lending organisations. Process and problems of project management in Barauni Fertiliser Project are described in chapter five. Chapter six analyses the process of project management described in the previous chapters. A comparison of the experiences of Sudan and India is offered to highlight the pitfalls. The main findings of the study and recommendations of the present writer on policy issues are offered in chapter seven followed by appendices and bibliography.

1.8.3 Sources of Data

In examining the processes of project management in Sudan and India, the study relies on empirical analysis. Two case studies from both the countries were used to highlight problems encountered through the different stages of project management. For this purpose, both primary and secondary data were collected and analysed. Discussions on the early days of the study with faculty members of the Department of Business Administration, Aligarh Muslim University, and the Indian Institute of Management (IIM), Ahmedabad, helped the present writer to develop his own ideas and to describe the process of project management in India. Primary data was collected in two stages: First it was collected through
unstructured interviews conducted with Government officials in Sudan (1985) and India (1986). In these pilot surveys, free discussions were held with officials in Projects Bureau (PB), the Secretariat General for Investment (SGI) and the Planning Department (PD) in Sudan as well as with officials in the Project Appraisal Division (PAD), the Ministry of Industrial Development and the Plan Finance Division in India.

In the light of data collected from the pilot surveys and secondary sources, informal interviews were conducted with officials of the PAD, the Ministry of Programme Implementation, the Bureau of Public Enterprises (BPE), the Department of Fertilisers and the Fertiliser Corporation of India in early 1987. Thereafter, in mid-1987, similar interviews were conducted with officials of the Projects Preparation Unit (PPU), The Committee of Melut Sugar Project Equipments, the PB, the SGI and term-lending institutions in Sudan.

Secondary material, however, formed an important complementary part of the data. The methodology used in this was scanning available literature on the experience of India in project management. Such material was collected from documentation centres of Ministry of Programme Implementation, the Planning Commission of India, the IIM, Ahmedabad, the Fertiliser Association of India, the BPE and the Ministry of Industrial Development. This is in addition to material from research
divisions of the Industrial Development Bank of India and the Industrial Finance Corporation of India. Unpublished material and Government reports from the PD, the PB, the SGI, the PPU, the Industrial Bank of Sudan and the Sudan Development Corporation, formed great deal of the secondary data.

My observations from visits made in the early 1980s to some public sector manufacturing projects in Sudan were utilised in the analysis. This was supplemented by further observations made during the interviews and course of study.

1.9 Limitations of the Study

I have been given a study leave for three years by the Government of Sudan to carry out the research work. This posed a strict time limit to plan for the work, collect relevant material, analyse the data and undergo other formalities of a Ph.D. study. This limitation was exacerbated by the small amount of funds made available for travels and data collection in Sudan and India.

Perhaps, biggest handicap is that in Sudan no statistics is kept in an organised form for the use of research. Therefore, the actual costs of all the projects could not be traced. While time schedule for the eighteen projects (Appendix 1) was prepared, actual project cost could be traced for only seven of them.
The time, money and availability of data limitations made the present writer to extract Barauni Fertiliser Project case study (Chapter 5) from an in-depth study prepared by the BPE. However, engineers in the Department of Fertilisers and the Hindustan Fertiliser Corporation clarified many issues about the project. These limitations, no doubt, have had their effect on the study but the results obtained are indicative of the magnitude of the problem, and the analysis and conclusions are still valid.