

Closing the Gaps in Project Management Systems

Systems Gap Working Party Report
Association of Project Managers

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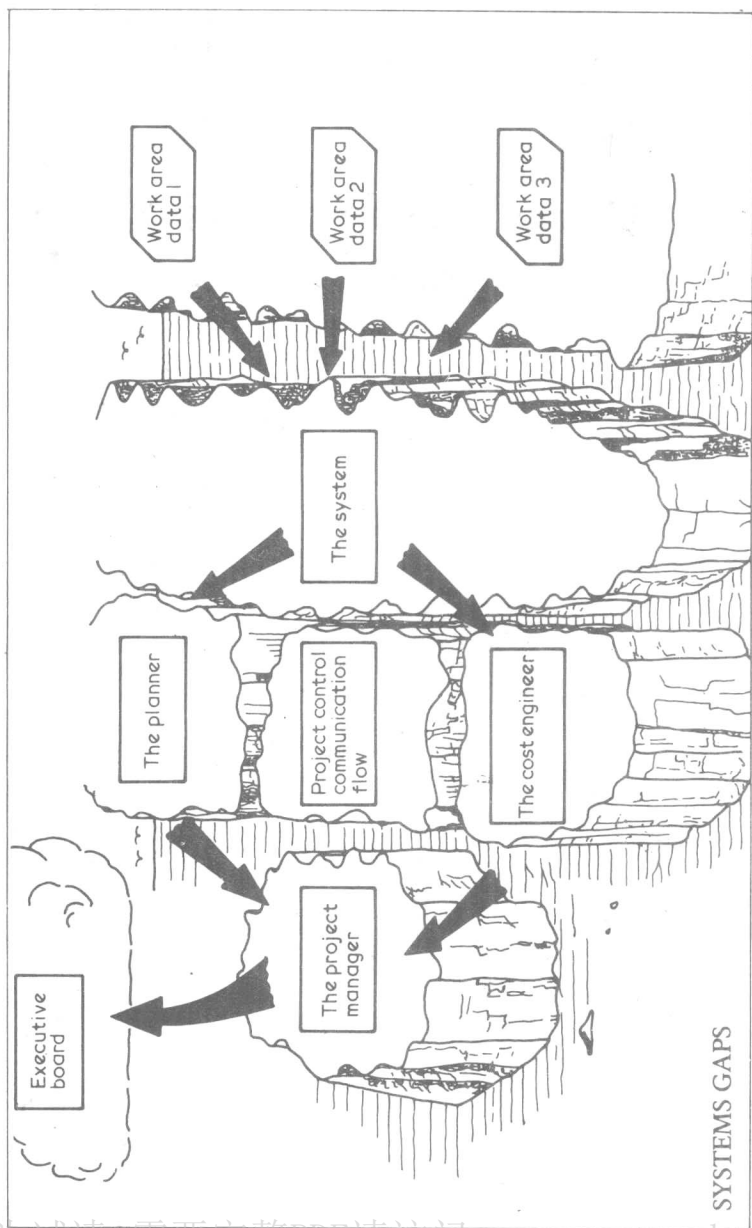
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PREFACE

Why is there a gap in project implementation between what is claimed to be possible in the control of performance relative to plans, and what project managers find to be of value in the day-to-day running of their projects?

It was this question which led the Council of the Association of Project Managers to appoint a working party to investigate the situation.

The working party was given the following terms of reference: 'To study information gaps and to determine guidelines for greater effectiveness in project management systems'. In practice, it was found necessary to consider wider aspects of project management than information systems, to determine evidence and underlying causes for systems gaps.

The working-party members, and corresponding contributors, were drawn from a wide range of disciplines and interests in project management. In addition to practising project managers, views were sought from clients, contractors, planners, cost engineers, cost controllers and others. Members of the working party were drawn from public and private sectors of industry, consultancies and universities.

The work was done in three phases. First, a general review of the topic was completed and the results were embodied in a paper called 'The Systems Gap' (Eric Gabriel), presented at the 6th Internet Congress at Garmisch Partenkirchen in September 1979.

More detailed information was then obtained by a questionnaire issued to members of the UK Association of Project Managers and by detailed investigation of each topic by individual working-party members.

The final phase, that of consolidation and drafting, was completed by an editorial group within the working party coordinated by Gerry Gilbert. It is probably inevitable that a study of this nature and magnitude, undertaken by busy practitioners of the art, takes much time to bring to fruition. A side-effect, however, is the opportunity this affords for developing ideas with colleagues in the workplace and for continuing research. References are acknowledged at the end of each chapter.

The report would not have been completed yet without the cooperation of Foster Wheeler World Services Ltd, Reading, and the encourage-

ment and practical support of the management of the Engineering Department of Mobil Services Company Ltd, London. We also gratefully acknowledge the dedication of secretaries Mary Witton, Sylvia Clement and Jean MacGillivray, who struggled from manuscript through numerous revisions to the final draft without protest.

It is hoped that the comments and recommendations made in this document will be of interest to all concerned in the development, implementation and use of project control systems, and will be particularly useful to project managers, planning engineers and cost engineers.

For a successful project, look for the gaps and close them.

ERIC GABRIEL

Chairman

Systems Gap Working Party

Association of Project Managers

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Introduction

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Projects involving major capital investments present a tremendous challenge to those responsible for managing their implementation. The social and economic impact is often such that their evolution and outcome is very much in the public eye. The results of many projects are disappointing from the point of view of commitments to cost, completion date and performance. Estimates of economic benefit often fail to be fulfilled, even though a high level of technology has been achieved. This can result in the cancellation of valuable and important projects having marginal economics.

Sometimes, before the project even starts, the basic cause of failure lies in attempting to do the wrong thing at the wrong time. On other occasions, the project has been a mismatch of economics and market needs and the existing and required technology. However, the working party decided to limit the study of the systems gap to projects with a sound economic basis and a well proven or moderately well developed technology. A United Nations report¹ has stated that government authorities frequently decide to initiate and implement a complex industrial project and later become discouraged when the implementation does not achieve the established objective. The phases in such projects have been described whimsically² as the following, in order of succession:

- Enthusiasm,
- Disillusionment,
- Panic,
- Search for the guilty,
- Punishment of the innocent,
- Praise and honours for the nonparticipants.

Energy projects, such as power generation and offshore oil exploitation, are typical of huge capital investment projects that are currently encountered, and the early achievements in these fields often fell short of expectations.

From the personal experience of working-party members and from published reports and papers, there is ample *prima facie* evidence of a

systems gap. The successful utilization of a new technique often follows its initial development after an interval of up to ten years. Project managers have a professional obligation to avoid waste of valuable resources, to enrich the working environment of their staff and all involved in project implementation, and to give value for money for their services. Hence the concern shown by the UK Association of Project Managers to address the problem, and the origin of the working party responsible for this study.

The United Nations report referred to above¹ dealt with the initiation and implementation of industrial projects specifically in developing countries and was prepared by an Expert Group which included members of the Association of Project Managers and of its international counterparts in other countries, members of the International Project Management Association (Internet).

Some of the wider political and economic factors were outside the scope of this study. The investigation was limited to matters that are, beyond any question, part of the project management task and thus capable of control by the project manager. It was necessary to consider to what extent difficulties arise because of the process of management, or because of the systems (or lack of them) in which the process is carried out.

INFORMATION TECHNOLOGY

The 1980s have been hailed as the era of information technology, and project management is very dependent upon information. One important gap that will be discussed in some depth later is that between those who know how to collect, sort and present data and those who have to obtain and pass on to others the information useful to them in the course of their work. A control organization can receive such an ever-increasing variety of feedback information that either it must be expanded to deal with the feedback, producing more and more data, or the control arrangements have to be allowed to lapse as irrelevant³.

A concept that is widely used in process plant control, and may also be relevant to project management to some degree, is that of distributed intelligence between selfregulating subunits. These subunits have access to the relevant data, or information, and can take appropriate action without the involvement of, or reference to, higher authority. The application of modern information technology should make maximum

use of this and so bridge the gaps and free the 'information bottlenecks' that feature in the project environment.

More particularly, the gaps and failures associated with 'integrated systems' devised by computer-oriented researchers and workers, will benefit from the distribution of the systems to subunits using micro-computers. What has been called 'cybernetics failure' in large projects⁴ has been caused by a multiplicity of project control approaches, creating a costly and confusing administrative burden, which has obscured the selection of appropriate project control methodology.

Proceeding further in a detailed study of systems gaps and their causes, it is advisable to define some expressions in frequent use in project management.

WHAT IS PROJECT MANAGEMENT?

A *project* is the task of creating an outcome with predetermined objectives. It involves the complex interaction of resources, services and organizations. Most capital investment programmes are engineering projects involving technological products. The objectives involve the key parameters of time, cost and performance.

A project consists of the following phases and stages:

- Definition phase
 - preliminary analysis of project need and objectives,
 - preliminary selection of alternative concepts and possible technical solutions;
 - feasibility of alternatives with assessment of relative merits
- Selection/decision phase
 - selection of preferred alternative,
 - preparation of project philosophy and general specifications,
 - investment and funding decisions
- Implementation phase
 - systems engineering,
 - establishment of plans, budgets and project specifications,
 - detail engineering,
 - preparation of drawings, specifications, schedules and bills of material;
 - contracting and procurement of all equipment, materials and

- services required for the permanent installation and temporary facilities required,
- fabrication/construction and preoperations covering testing and handover for operation
- Commissioning phase
 - prestart-up operation and test,
 - performance testing,
 - debugging,
 - adjustments,
 - transition to full operation

The division of responsibility into phases and the stages within them may vary from this arrangement with the practice of the industry involved and the contracting options available during that phase. For example, a major software project involves all the problems inherent in the engineering project, but with different corresponding disciplines and activities. 'Fabrication and construction' become 'programme structuring and coding'.

It is the intention that the comments and solutions discussed here will be of general application to projects of all types and technologies.

Management is defined as the process of working with and through individuals and groups to accomplish organizational goals. It embraces process, systems and skills and involves human relationships, leadership and motivation, in addition to the technical and coordinating functions.

The *management process* includes functions such as setting objectives, planning, organizing, motivating, coordinating and controlling, which are related as shown in Figure 1.1⁵.

A *system* is an integrated assembly of interacting dynamic elements designed to carry out cooperatively a predetermined function, and is characterized by a coherent pattern and purpose. Since systems are the subject of this study, the various types of system will be discussed in detail later. Establishing a viable system involves the various functions of the management process, and the preparation and implementation of procedures, which are rules for the operation of a system.

Management skills are attributes required to perform management functions. They may be grouped as technical—the use of knowledge, techniques and equipment to perform specific tasks and the use of human ability and judgement in working with and through people—and conceptual—the ability to understand the complexities of the overall

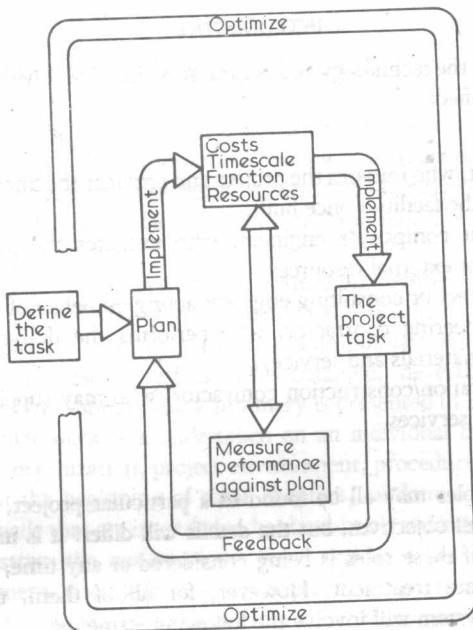


Figure 1.1. Work flow

situation and organization and to act accordingly. Although human skills are required at all levels of management, the emphasis shifts from technical to conceptual as one passes to the more senior levels of management.

Project management requires the application of management methodology, systems and skills to the accomplishment of a project. For management to be effective, complete technical, financial and schedule responsibility should be vested in the project manager, who has to provide coordination, to ensure integration of the many strands of functional management within the overall organization and operation. This lateral-vertical relationship has resulted in project management being described as requiring a matrix organization. The difficulties this creates between the project team and line management, and even within the large project team itself, will be considered later in more detail.

The term 'project manager' may be identified with different functions,

depending on the technology and organization in mind. Five distinct areas may be identified:

- the client, who initiates the project and provides the finance for it; he will use the facilities once built,
- the client company's engineer, who executes the project using internal or external resources,
- the architect or consulting engineer acting on behalf of the client,
- the engineering contractor, who performs the design (and may procure materials and services),
- the fabrication/construction contractor, who may supply materials as well as services.

The various roles may all be found in a particular project, with some common overall objectives, but the details will differ. It is important to define which of these roles is being considered at any time, since each requires separate treatment. However, for all of them, the project management system will involve the following elements:

- technical definitions and requirements—standards, specifications and work procedures,
- work scope definition and breakdown into control elements,
- task descriptions,
- organization structure, staff and definition of jobs and responsibilities,
- administrative procedures, including communications,
- information processing,
- documentation and records.

Much of this study deals with information processing, which is the most significant factor in the total management system. Some information is required by the engineers and technicians carrying out the main detailed functions of the project and has to be supplied by management. Some of it is required by other people associated with the project but outside the main stream. Management requires progress summaries and exception reports for effective decision-making. This represents the *project information system*.

STUDY METHOD AND REPORT

The working party was set up in January 1979; a list of its members is given on p97. The procedure adopted was for the working party to meet in committee and agree specific aspects, which individuals or groups then considered in detail, based on personal experience, records and literature surveys.

It was decided to prepare and issue to all members of the UK Association of Project Managers a questionnaire designed to obtain additional experience data. The response to the questionnaire was not as great as was hoped, but useful results were obtained, nevertheless. They were analysed by Ashrafi⁶ and a summary is presented in Appendix 1.

Further work was undertaken on an individual basis in the areas of project organization, project environment, procedures and data processing. At the beginning of some chapters, random critical remarks have been made that are intended to be thought provoking. They are included to illustrate the nature of the gaps, and have been considered during subsequent discussion and development of possible solutions. It was considered advisable to concentrate on problem areas that are controllable by project management, although it was recognized that numerous circumstances occur in the external environment which the project manager has to be aware of, in order to take appropriate action to counter any damaging effect on his project.

It was decided to study the overall project management system (Chapters 2 and 3) and then the information subsystem (Chapters 4 and 5). Aspects studied were the design and appropriateness of the system for effective project management and the problems encountered in application.

Guidelines for closing the various gaps have been included in each of the four succeeding chapters, and the recommendations are summarized in Chapter 6.

REFERENCES

- 1 *The initiation and implementation of industrial projects in developing countries* United Nations Industrial Development Organization, Austria (1975)
- 2 Warren, J E 'Project management' presented at Offshore South