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ARAB REPUBLIC OF EGYPT
TECHNICAL COOPERATION PROGRAM
TO
PLANNING AND RESEARCH DEPARTMENT,
SUEZ CANAL AUTHORITY

REPORT ON THE STUDY OF
ORGANIZATION AND FUNCTION
OF "ECONOMIC UNIT"

MARCH 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In accordance with the agreement between the Governments of Japan and the Arab Republic of Egypt, the Japan International Cooperation Agency (JICA) conducted studies on the organization and functions of the "Economic Unit" which was established in the Planning and Research Department, the Suez Canal Authority.

JICA organized a Steering Committee chaired by Professor Yoshimi Nagao of Kyoto University and a survey team comprising experts from the Mitsubishi Research Institute and the Japan Maritime Research Institute, and dispatched it to the Suez Canal Authority in Ismailia. In addition, JICA trained in Japan six staff members of the Suez Canal Authority for a period of three months in order to improve their technical capabilities.

This report based on the field survey conducted in Egypt deals with necessary organization and functions of the Economic Unit in achieving the objectives of the Unit.

I hope this report will prove to be useful for the development and expansion of the Suez Canal, the promotion of economic development of Egypt and for the promotion of friendly relations between Egypt and Japan.

I would like to express my heartfelt appreciation to the officials concerned of the Government of Egypt and Suez Canal Authority for their valuable assistance and hospitality they have extended to the Japanese Survey Team.

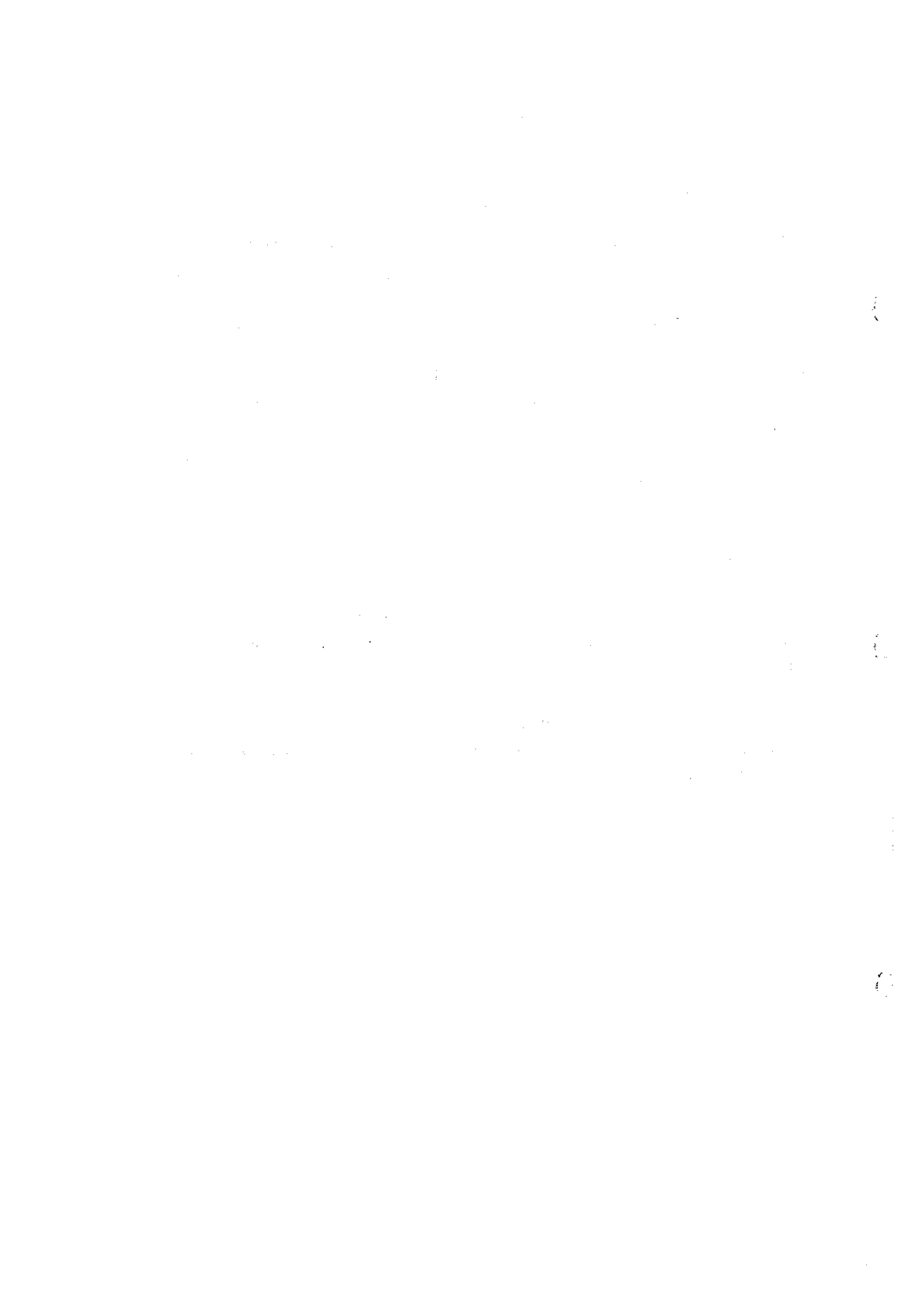
March 1979



Shinsaku Hogen

President

Japan International Cooperation Agency



CONCLUSIONS

It is our great honor and privilege to submit herewith the final report on the Study of the Organization and Functions of the "Economic Unit" of the Planning and Research Department, Suez Canal Authority (SCA), Arab Republic of Egypt. This report is presented here in partial fulfillment of the technical cooperation program which was stipulated in the Scope of Work agreed upon between the SCA and JICA in June of 1978. In order to fulfill the program requirements a series of actions have been taken by the Japanese Survey Team (JST); 1) a field study at the SCA in Ismailia in July~August 1978; 2) the technical training program which was carried out in Japan for the SCA participants in October~December 1978 and 3) submission of an Interim Report on the Study of the Organization and Function of the "Economic Unit" in November 1978. This final report was written on the basis of the findings and information made available to us through these activities and the results of discussions held with SCA officials. It is sincerely hoped that this final report will meet the requirements and merit the SCA's consideration. The following paragraphs will summarize the main conclusions of the present report.

The Long Term Goals of the Economic Unit

It is our belief that in the future the Economic Unit should become directly involved in SCA top management planning and decision making activities and processes, acting as a staff organization for "research and planning." This role can be performed most effectively if the Unit remains within the organizational framework of the present Planning and Research Department (PRD).

The establishment and development of the Economic Unit should directly serve the purpose of strengthening the organizational capabilities of the PRD.

The organizational capabilities of the PRD which should be reinforced are its "planning functions." The planning functions or processes of the SCA management can be divided into the following categories of activities:

- (1) Collection, storage and maintenance of data and information relating to planning problems
- (2) Processing of data, analysis and evaluation of the information and selection of policy alternatives
- (3) Formulation of strategic and management plans and implementation and control procedures

In the future the reinforced Planning Research Department should consist of four Sections; 1) Planning Section, 2) Economic Research Section, 3) Systems Analysis Section and 4) Information Section. The Planning and Information Sections are, in part, already existing in the PRD and the remaining two sections are those which are planned to be established as the "Economic Unit."

In order to realize the long term goal of the Economic Unit, organizational reshuffling or re-form may become necessary in the future to redefine what kind of roles should be played by individual sections and departments with respect to the SCA management's planning functions. Re-examination and re-evaluation must be performed for this purpose on the following problems:

- (1) Functions and tasks that are now carried out by the Planning and Statistical Sections as their routine jobs.
- (2) Problems of how intradepartmental planning functions or activities (e.g., work, budget and project planning) should be coordinated with the planning functions of the PRD and Economic Unit.

The establishment of the Economic Unit should be considered to be the first step in achieving the long term objectives described in the previous paragraphs. The attainment of these goals is thought not only desirable but also feasible, judging from the information available to us about the SCA's internal workings and the general capabilities of the Economic Unit's staff members. Nevertheless, it cannot be denied that these objectives will be attained only through gradual and step by step development of the organizational capabilities of the Economic Unit.

The Short Term Objectives of the Economic Unit

As a first step the Economic Unit should be divided into two "groups," but not as sections; the Economic Research Group and the Systems Analysis Group. Their major functions are to provide information analysis and research services to the SCA management. Their purpose is to assist the SCA management in making rational and optimal planning and decisions on matters concerning the SCA's Canal operations. During the initial few years, an incubation period, the Economic Unit should devote its full resources, efforts and time to the development of its capabilities as a "research organization," but should not participate in any phase of the planning process of the SCA management. The research functions and tasks of these two Groups are to be briefly explained as follows:

Economic Research Group

Its main tasks are collection, analysis and evaluation of data and information relating to the SCA's external problems, particularly the economic, financial and technological aspects of these problems. Through these activities the Economic Research Group tries to keep the SCA management abreast of current trends and developments in the SCA's environment affecting the Canal operations. Specific tasks of information analysis and research work of this group are spelled out below:

- (1) Data and information collection, storage, analysis and evaluation of trends of the Canal traffic, e.g., trends in world economy and trade, seaborne trade, commodity flow of major items (oil, oil products, bulk cargos, etc.), shipping costs and route costs, fleet mix, ship building and Canal related technologies, external trends affecting determination of tariff, cost trends, etc.
- (2) Economic and technological forecasts on the problems mentioned above; this forecasting analysis should be carried out with the technical support of, or jointly with, the staff

members of the Systems Analysis Group.

- (3) Data and information collection, storage, analysis and evaluation of financial and cost trends or problems effecting the SCA's operations and management; e.g., financial policies and statutes of major countries and shipping companies and operators analysis of the SCA's internal cost structure such as operating and maintenance costs of the Canal which are not routinely dealt with by the Financial Department, etc.
- (4) Forecasting analysis of costs and financial trends or problems mentioned above; e.g., assessment of ship operators' response to the SCA's tariff policy, financial status analysis of ship operators, construction contractors and so on, trends projection of shipping costs and route costs, etc.

Systems Analysis Group

The Systems Analysis Group is charged with the responsibility to engage in quantitative analysis and forecasts of the SCA's external and internal problems which require sophisticated and specialized mathematical and statistical knowledge and skills. Its main task is to analyze and evaluate these problems in depth and to formulate alternative solutions for the SCA management. The specific research tasks or work are:

- (1) Systems analysis and forecast of the Canal transit volume and cost structure of shipping and route costs, etc.
- (2) Quantitative analysis and forecast of effects of tariff determination and the SCA's revenues.
- (3) Analysis and evaluation of feasibility studies which are made by outside consultants
- (4) Evaluation of various kinds of projects including the Canal expansion project
- (5) Technical support services which will be provided to other sections and departments in the fields of systems analysis techniques, computer programmes and software development, etc.
- (6) Establishment of information and data management system for the Economic Unit

It is our judgement that the Economic Unit's work will be adequately carried out by staff of 14 researchers and/or analysts headed by the manager of the Unit and supported by several secretaries, clerical and/or research assistants. The staff composition can be stated as follows:

Manager of the Economic Unit	1
Economic Research Group	6
Systems Analysis Group	8
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Total (excluding the secretaries and assistants)	15

This staff organization should be interpreted in terms of the following criteria and standpoints:

- (1) The total size of the staff required for the Economic Unit should be determined by taking account of the nature, type and volume of the specific tasks to be undertaken by each group.
- (2) The staff size cannot be strictly measured in terms of a ratio of expected workload over the staff members' productivity, partly because a variety of research tasks cannot be assessed by a standard unit of measurement and also, because the workload may expand as the staff's capabilities will increase.
- (3) The six staff members of the Economic Unit who were already trained in Japan should be considered as the core group of the Unit. In view of their capabilities and fields of interest, it is our judgment that two of them should be assigned to the tasks of the Economic Research Group and the remaining four members to the Systems Analysis Group.

It cannot yet be determined when the Economic Unit will become ready to be fully integrated into the organizational framework of the Planning and Research Department. This judgment should be made by taking into consideration the following:

- (1) Types of personnel recruited for the Economic Unit and the research capabilities they will attain through technical training.
- (2) The SCA management's decision as to how organizational reform or reshuffling should be made so as to increase the organizational efficiency of the planning and decision making processes of the SCA.

The first and most important short term objective is that the Economic Unit should become fully operational as a research organization within the shortest possible time. For this purpose, the organization building of the Economic Unit must proceed hand in hand with the training program of its staff members. In this respect, careful attention should be drawn to the following:

- (1) The Economic Unit should start producing its own research output as soon as it becomes ready to initiate its activities.
- (2) As the staff members' capabilities improve, so the amount of output should expand and its quality should be upgraded step by step.
- (3) The Economic Unit's jobs should be created and become "routinized" through constant assignments or reassignments of specific research and information analysis, programs or projects.
- (4) During the initial few years – the incubation period of the Economic Unit – JICA will provide the SCA with as much assistance as possible through the technical cooperation program. This assistance will be, for example, 1) technical training of key staff members, 2) on-the-job training for the job initialization at the SCA, 3) data and methodology manuals and other supporting materials for the research work. Despite this

provided assistance, the SCA's self-efforts and organizational support should not be neglected for the development of the Economic Unit.

- (5) During the process of development, senior staff members of the Economic Unit must play important roles; i.e., active roles of planning, coordination, monitoring and control actions, leadership, administrative supervision, etc. In this respect, management education of the senior staff members of the Economic Unit may contribute a great deal to the organization building of the Economic Unit and to the effectuation of its work.
- (6) For the first step of the operation of the Economic Unit, a large scale computer system may not be used as an information data base. However, for the analysis of transit, traffic forecast, financial analysis and other types of systems analysis problems, computerized system of analysis of adequate level will be planned to be used. The type of information system required for the Economic Unit should be carefully evaluated from the standpoint of its economy, efficiency, capabilities of the staff members, amount of data processing work, etc. A hasty introduction of a full scale computer system should be avoided.
- (7) As the Economic Unit's research capabilities become gradually established, consideration should be made as to how its activities will be coordinated with those of the Statistical Section of the PRD.

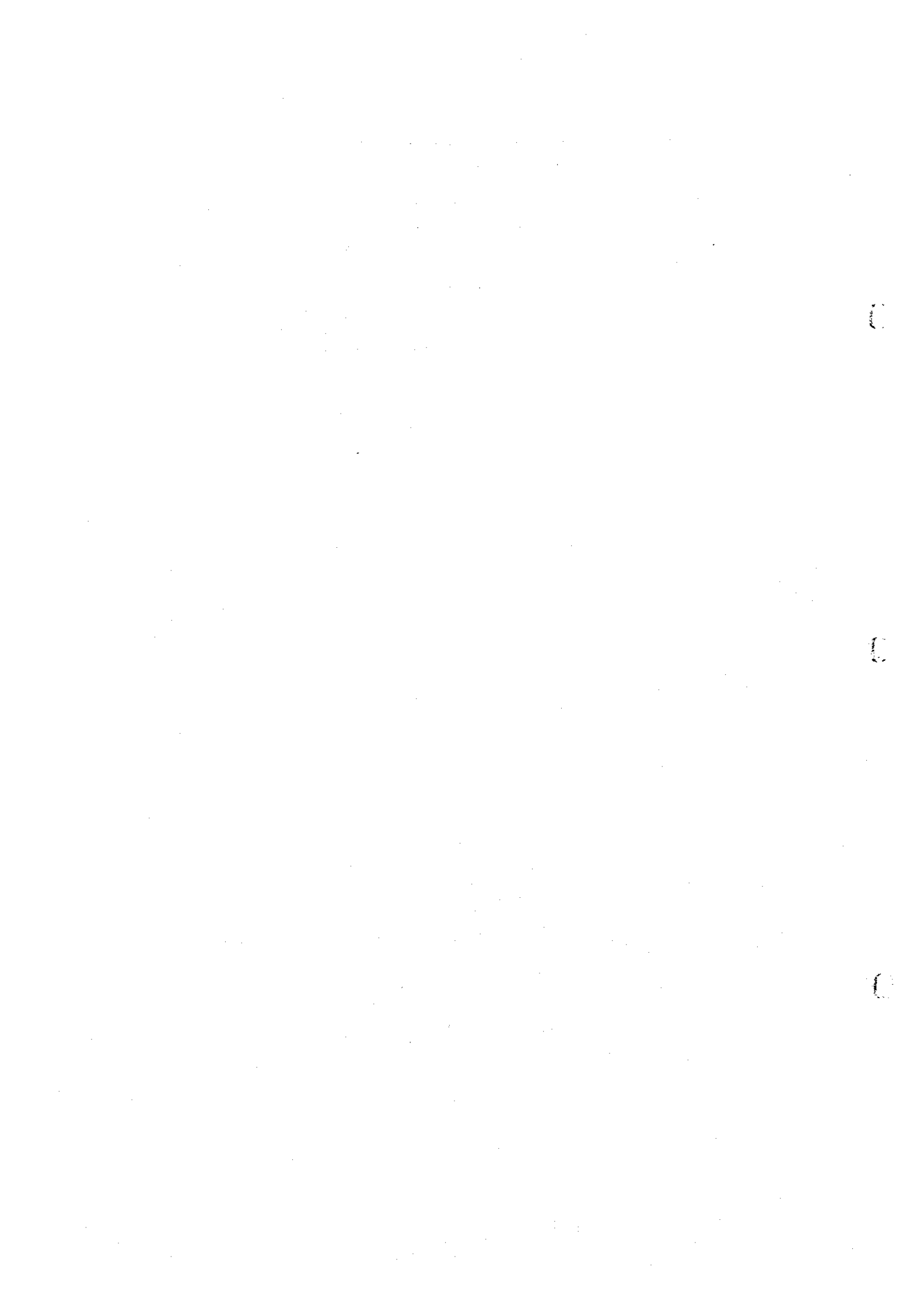
It is advised that the following output should be produced by each group of the Economic Unit in light of their respective roles and functions:

Economic Research Group

- (1) Summary reports on various trends and developments in the SCA's environment
- (2) Data and information summarized as extracts and abstracts on important topics or problems
- (3) Short analysis and evaluation reports on selected problems, written upon request
- (4) Data and information handbooks to be used as reference materials in the SCA, etc.

Systems Analysis Group

- (1) Short and long-term forecast reports of transit and other problems
- (2) Analysis and evaluation reports on feasibility studies
- (3) Project evaluation reports on some portion of a project
- (4) Computer programs and software packages, etc.



RECOMMENDATIONS

It is our great honour and privilege to be able to participate in the SCA's endeavour to create an Economic Unit. In the following pages we wish to present to the SCA's management, with a deep sense of respect, a set of recommendations with regard to the present technical cooperation program.

Roles of the Economic Unit

The Economic Unit will be able to play a very important role acting as staff specialist and coordinator on the problems and/or study results on projects whose technical aspects will be examined by the various Departments involved, e.g., Financial, Engineering, and other related Departments. To do this, the Economic Unit must be defined as a staff organization to perform planning functions of the SCA and must also become capable of performing the technical role as the staff specialist on management planning. It is judged that it will take at least several years for the Economic Unit to be able to start fulfilling this type of management supporting role within the SCA.

However, it can be estimated that even during the transition period of the Unit's maturing process, it will be able to contribute to on-going feasibility studies by participating in some selected portions of the feasibility study on the projects, and also will be able to undertake feasibility studies on small projects related to the SCA's internal activities. It is expected that within a couple of years the Unit will be able to attain a certain degree of technical proficiency in economic research, systems analysis and management science.

It is desired that by the end of the present technical cooperation program the Economic Unit will at least be able to reach a stage where they are capable of assessing and judging the technical contents and merits of a feasibility study on the project conducted by outside consultants. It is also expected that they will be able to attain technical proficiency in performing various types of computer simulation studies and technology forecasting on a trial basis.

It is believed that the SCA is well experienced with feasibility studies of engineering and transit operation problems and has acquired a sufficient degree of technical knowledge and skills. Therefore, it is felt that the Economic Unit will be able to receive valuable advice and suggestions from experts in other Departments on matters relating to engineering problems. Our opinion is that as far as the Economic Unit's forecasting analysis is concerned, it will be able to contribute in two main fields in the future; the first field is economic forecasting analysis of world environmental problems, sea-borne trade and transport market trends, and Suez Canal transit volume etc; and the second is technological forecasting analysis of various trends of shipping and transport technology (e.g., pipeline, landbridge, Panama Canal, Cape route, etc.) which will seriously affect the SCA's policy decisions on tariff structures, development of the Canal capacity, etc.

It is our sincere desire that through the joint and concerted efforts of both the SCA and the JICA, the Economic Unit will be able, as the result of the present cooperation program, to attain the capabilities; first, to understand, analyze and evaluate the feasibility studies of important projects, and second, to execute by themselves at least some portions of feasibility

studies at an appropriate level.

The SCA's Organizational Support and Back-Up

It must be said that the self-motivation of the Economic Unit's staff members is not enough, but their work must also be supported and assisted by the SCA's cooperative efforts and understanding, in order that the Economic Unit may become a workable and viable research unit. The following are some important conditions and requirements which are deemed crucial for establishment of the Economic Unit.

(1) Qualifications of the Staff Members

In order to meet the qualification requirements advised to the SCA by JST, utmost efforts should be exerted to select and recruit the most qualified personnel from within and without the SCA's organization.

In view of the fact that the Economic Unit must undertake some portions of the feasibility study of the projects, higher priority should be placed upon the education of techno-economists. For this purpose it is strongly recommended that persons with an engineering background and several years' experience in the Suez Canal operations should be recruited to the staff positions of the Economic Unit.

(2) Introduction of Hardware and Office Equipment

In light of the need to process statistical and quantitative data as quickly as possible, it is considered highly desirable that the Economic Unit will be equipped with an in-house computer. When the Economic Unit's jobs become fully operational the need for such a computer would become immediate and urgent. It is suggested that the SCA take the need of a computer into careful consideration.

As the Economic Unit's work progresses, the amount of data and research output will inevitably increase. It is strongly urged that the Unit become sufficiently supplied with office equipment such as a filing system, photostating machine, etc.

(3) Inter-Departmental Cooperation

It is strongly advised that the data collection and information processing system which was already developed in the SCA (e.g., data collection of the Transit Department, monthly and annual reports published by the Statistical Section, etc.) should be productively coordinated with each other and integrated into a total system of information management in the future. The Economic Unit's input and output of data and information should be viewed within this context of the total flow of information for the SCA's decision-making and planning functions.

However, even during the transition period of the Unit, it is strongly urged that inter-departmental rules and procedures should be established to facilitate information flow within the SCA. The Economic Unit should have easy and ready access to the data sources, publications and other necessary information of other departments, and a system should be built in such a way that the Economic Unit's research output will be effectively distributed to other departments. On this score inter-departmental cooperation and favorable working relationships must be considered to be one of the important conditions under which the Economic Unit will be able to become a viable organization within the SCA.

(4) Support for Research Output

It is planned that the Economic Unit will produce research output as one of the major objectives of the cooperation program and that once its jobs become operational, the Unit will start producing output on a continuing basis. To support this activity it is requested that budgetary allocations be made by the SCA for procurement of necessary research materials, publications, statistical data and other necessary materials.

In addition, in order that the Economic Unit's research activity and its output be fully recognized and appreciated within the SCA, organizational efforts must be made to promote the understanding and cooperation of other departments which will receive research output from the Economic Unit. It is also important that a feedback system be built within departmental interactions whereby the interests, needs and requirements of other departments will be effectively fed back to the type of research output produced by the Economic Unit. It must be recognized that the fact that the Economic Unit is being recognized as a legitimate organization in the performance of important jobs and tasks will greatly arouse motivation, aspirations and the incentive of the staff members to do a better job.

Information and Cultural Exchange, Promotion of Good Will Between the Two Countries

It is our strong belief that technical cooperation should not be limited to the exchange of information, technical knowledge and skill, but must also be based upon friendly human relations that will be established between the two countries. In this sense, a frequent exchange of people between the two countries should be encouraged and viewed as having great importance, for this will promote a sincere and deep mutual understanding of the cultural heritages, ways of thinking and lifestyles of the two countries.

It is our firm belief that the Japanese Survey Team's visit to Ismailia and the visit of the SCA's management and trainees to Japan have made a tangible contribution to this good will objective. It is our sincere wish that mutual and friendly relationships will be continuously developed in the future through the kind consideration and efforts of the management of SCA. Finally, we would like to express a deep sense of our gratitude to the SCA's management and staff members for their kind hospitality and never-ending consideration given to the Japanese people participating in the present technical cooperation program.

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SUMMARY

The Final Report on the Study of the Organization and Function of the "Economic Unit" has been prepared with the intention of explaining and confirming the basic concept, framework and procedures for establishing and developing the Economic Unit. It is believed that the findings from the JST's survey conducted at the SCA in July~ August, 1978 have been fully examined and incorporated into this report. The evaluation of the 1978 training program in Japan as well as evaluations of the trainees' performance have also been considered.

This report consists of two parts. Part I sets forth a fundamental framework within which the Economic Unit should be established and developed. Part II explains and discusses the procedures of the Technical Cooperation Program for implementing the development of the Unit based on this framework.

PART I ORGANIZATION AND FUNCTION

In setting up a capable and efficient organizational unit to assist the top management in its strategic decision-making, there are three interrelated functional areas to be concerned with (Table I.1) :

- (1) Information analysis function
- (2) Strategy formulation function
- (3) Management planning function

Taking into consideration the present organizational situation and the limited availability of qualified staff, it is strongly advisable that the first phase efforts of the SCA in developing the capability of the Economic Unit be focused on the implementation and nature of the "information analysis" function (until March 1981).

The consulting and planning functions, corresponding respectively to (2) and (3) above, should be considered to be long-term objectives of the Unit which will be achieved by integrating the resources now belonging to other sections.

This approach can be called a "stepwise approach" in contrast to a "normative approach" in which all of the desired functions are implemented at one time. This approach has more advantages in organizational features, such as size, structure, internal and external coordination, development of staff capabilities through training programs, and so forth (Table I.1).

The basic framework of developing the Economic Unit has been constructed based on the "stepwise approach" (Figure I.2), in which the tentative (the first phase) objective of the Unit has been separated from its long-term objectives. It is kept in mind, however, that the tentative objective is not isolated but closely coordinated as a step towards the long-term objectives.

In order to achieve the tentative objective of the Unit basic strategies have been adopted:

- (1) To place the highest priority on attainability rather than the normative concept
- (2) To place emphasis on the production of useful output for the management rather than theoretical sophistication

Eight vital components for implementing the basic strategies have been selected:

- (1) Training program oriented toward practices
- (2) Textbooks and manuals designed for useful output
- (3) Production of output through O.J.T. programs
- (4) Reflection of the needs of other departments in the research output
- (5) Training of middle management for supervising, orientating and training its staff
- (6) Recruitment of qualified new staff
- (7) Coordination with other sections
- (8) Promotion of work efficiency

Information analysis function of the Economic Unit is broken down into the subject components, and the manner in which this function is connected to the strategic decision making subjects for top management is displayed (Figure I.3).

The information analysis function of the Economic Unit is divided into two sub-functions in order to achieve functional effectiveness in terms of two basic strategies based on the following criteria:

- (1) Capabilities required by each of the sub-functions and the capabilities of the assigned staff are reasonably well balanced.
- (2) Functional distinctions among the sub-functions are clear, and the resulting organizational structure is simple.
- (3) Working procedures among the sub-functions are reasonably straight-forward and facilitate the evolution of the Economic Unit's function.

One of the sub-functions deals with the problems and issues which require systematic utilization of quantitative data through application and development of systems analysis techniques; another sub-function is concerned with the problems and issues which can be analyzed individually through economic logic, qualitative reasoning and objective judgment.

The Economic Unit is divided into two groups corresponding to these two sub-functions; the group corresponding to the former sub-function is named the Systems Analysis Group, and the group corresponding to the latter sub-function is named the Economic Research Group. A step-wise evolution of the Economic Unit's functions, distributed to the two Groups, is displayed (Figure I.4) together with the function and structure of its long-term normative objectives (Figure I.5).

In compliance with the division of functions, subject components of the functional area have been grouped into eight units of work, each of which is called a task (or task area); five are assigned to the Economic Research Group, and three to the Systems Analysis Group as follows:

Economic Research Group

- o Maritime Economics
- o Energy
- o Commodities and Goods
- o Techno-economics
- o Financial and Operational Study

Systems Analysis Group

- o Maritime Transport and Canal Traffic
- o Financial and Cost Analysis
- o Project Evaluation

Each task has its own subject components, each of which is called a task subject, and produces output covering those task subjects (Table I.2). Although some of the task subjects overlap between the two Groups, there is a clear distinction; the Systems Analysis Group deals with its task subjects as the components of a system and applies systems analysis techniques; the Economic Research Group treats each of its task subjects as an individual subject and stresses the qualitative characteristics and peculiarities of an individual problem in a task subject.

Task areas, task subjects, and types of output of the two Groups determine the flow of information and work in and between the two Groups (Figure I.6). The production of specific output by the two Groups in the early phase of the Economic Unit has been planned, and in order to increase its productivity, supporting materials provided by the consultant are suggested (Table I.3). Job descriptions for each task are laid out accordingly.

In view of the size of the SCA organization, case studies of Japanese corporations conducted as referential information for the SCA (Appendices II & III) and other general information, the size of the Unit during its early phase of development has been set at not more than twenty staff members. By estimating the approximate amount of work for each task area on one hand, and by restricting the amount of work for each task area based on the priority with regard to the specific requirement of the SCA and the capability level of the staff on the other hand, the number of staff for each task has been determined (Table I.4), totalling 14 staff members by the end of March 1981, excluding clerical and secretarial supports.

In line with planned expansion of work output, increases in the number of staff members by recruitment are scheduled (Table I.5). Taking into account that the SCA has some difficulties in recruiting qualified staff members from internal and external sources, bread-and-butter qualifications of staff for those task areas are provided.

PART II ROLE OF THE PRESENT TECHNICAL COOPERATION IN DEVELOPING THE ECONOMIC UNIT

The objectives of the present technical cooperation program are to assist the SCA in establishing the Economic Unit within the SCA organizational framework as a viable and long-lasting research organization. The Economic Unit will engage in a variety of research tasks which are judged to be valuable to rational decision making and planning on matters concerning the SCA's external and internal problems. These problems are, for example, Canal transit analysis and forecast, tariff study, project evaluation, analysis of the Canal operations, financial analysis of the SCA's operations and so on.

In order to assist the SCA in building the Economic Unit, the technical training program will be extended to the SCA for the three year period of cooperation. However, the objectives will be accomplished only through joint and concerted actions and efforts of the participating organizations and their staff members, viz., the SCA management, staff members of the Economic Unit, Japan International Cooperation Agency (JICA), training organizations and their staff members in Japan and others.

To what extent the objectives will be accomplished, and what kind of specific program should be designed for the Economic Unit will in part therefore, depend upon the conditions existing in the SCA and efforts exerted by it; i.e., availability of qualified personnel, their progress made during the training program, specific needs and requirements of the SCA, the SCA's organizational support, etc.

The technical training program proposed in this report is divided into two parts; one is a technical training program which will be conducted in Japan for the Economic Unit's staff members; and the other is an on-the-job training program that will be conducted for them by the Japanese consultants and technical experts at the SCA in Ismailia.

As a whole, the technical training program is planned to continue for three years. However, the objectives, contents, methods, durations and other related matters of the specific training programs in Japan and at the SCA will be determined by taking into consideration the educational level, technical capabilities and other qualifications of the SCA participants, progress and achievements demonstrated by them, the SCA's needs and requirements, the considerations that must be made by JICA and other pertinent factors.

It must be agreed that the specific contents of each year's training programs will be discussed between the SCA and JICA. The results of such agreement will be spelled out in the Scope of Work which will be concluded between the Suez Canal Authority and Japan International Cooperation Agency on behalf of the Japanese Government. The training program of that year will be carried out in accordance with the provisions made in the Scope of Work.

A general framework of the three year training program will be briefly explained in this paper. However, for the reasons mentioned in the preceding paragraphs, the specific training program contents that are explained in this report may become subject to change. The general framework of the training program should therefore be understood as a set of recommendations to indicate what is to be done, why it is to be done, how long it must be done, and other principal problems

of training which should be considered by both the SCA and JICA.

The technical training programs proposed in this paper can be characterized by the objectives set forth, the training policy, methods adopted and other features. They are to be briefly explained in the following paragraphs.

The training program will be designed in such a way that at the end of the three year period the staff members of the Economic Unit will be capable of performing the following research and planning related functions; 1) analyzing and evaluating feasibility studies made by outside consultant on a variety of projects; 2) carrying out by themselves a portion of the feasibility studies as required by the SCA management; 3) conducting by themselves, necessary research work on matters concerning management decision making and planning; such as on Canal transit volume analysis and forecast, tariff study, financial analysis of the SCA operations, development of management science techniques, and other problems; 4) supplying periodically necessary and timely information to the SCA management in order to keep them abreast of current trends, events and developments which will directly affect the SCA's management.

In order to achieve these objectives, a step by step approach will be used in the present technical cooperation program. The training will start from the basic training curriculum which will be taught to all of the participants in the first year and will gradually shift to more specialized and advanced fields of training at later stages.

The objective of the first year of training is to make the participants familiarized with basic problems, terminologies and concepts, methods and other related problems which are indispensable for correct understanding of the SCA's problems. In the first year the following training curricula were already given in Japan:

- (1) Introductory course of maritime transportation problems in which all of the world sea-borne trade and maritime transportation problems relevant to the SCA were discussed.
- (2) Statistical data analysis course in which elementary mathematics, statistics and computer programming were explained.
- (3) A training course in which basic theories, concepts and methods of international economy and seaborne trade, transit analysis and managerial economics were discussed.
- (4) A course in which basic methods of transit forecast and project evaluation were explained in their relation to the SCA's concrete problems.
- (5) A course in which business research methods and procedures were explained.

At the second stage, it is proposed that the curriculum contents will become specialized into three fields; viz., Economic Research, Systems Analysis, and Management problems of the Economic Unit. In the third stage, the curriculum will not only become specialized, but also advanced in the respective fields of training and it will become geared more towards attainment of specific research requirements of the Economic Unit. During the second and third stages the following training curricula are planned to be given to the staff members of the Economic Research Group and Systems Analysis Group by taking into account their respective roles with

the Economic Unit:

For the Economic Research Group

(1) Theories and Disciplines

- International economics and trade
- Maritime transportation economics
- Managerial economics
- Managerial accounting
- Business statistics and mathematics or introductory econometrics

(2) Specific Training Problem Areas

- World economy and seaborne trade
- World energy and oil trade
- Maritime transportation problems
- Shipping costs
- Descriptive analysis of Canal transit
- Study of tariff and Canal revenue, etc.

For the Systems Analysis Group

(1) Theories and Disciplines

- Mathematics and statistics
- Systems analysis, management science and operations research
- Computer programming and simulation techniques
- Forecasting methods
- Cost/benefit analysis and other project evaluation methods

(2) Specific Training Problem Areas

- World fleet of tankers
- Model analysis of tanker shipping costs
- Canal capacity analysis
- Transit analysis and forecast
- Quantitative analysis of tariffs and Canal revenues
- Methods of project evaluation, etc.

For Management Education

Lecture sessions and on-the-job training are planned to be given to senior members of the Economic Unit on the following:

- Business research methods
- Management theory and practice of research organizations
- Introductory management science

These training curricula will be designed to serve the purpose that the staff members of each Group will become capable of performing the respective research roles of the Economic Unit, whose duties and responsibilities will be explained in Part I of this report.

The present technical cooperation program is also characterized by the fact that the "product-oriented" training method will be used in order to achieve the following purposes; 1) production of research output and training will become effectively combined, 2) routine research jobs will be gradually created during the training period, 3) learning process will be expedited through "doing actual research work" unassisted, and 4) the staff members will be able to develop a sense of purpose, goal and achievement orientation.

Pragmatic, interdisciplinary and problem-solving approaches are to be adopted in view of the concrete and immediate needs to solve the SCA management problems. Lecture and problem exercise sessions will be effectively combined so that theoretical knowledge of the required subjects will be directly translated into the research and application problems of the SCA.

The training program curricula will be made flexible and adjustable to meet the qualifications of the staff members of the Economic Unit and specific needs or requirements of the SCA.

The training program in Japan will be directly linked with on-the-job training at the SCA, allowing for a sufficient length of "breathing period," during which time the staff members will be able to perform double tasks; viz., reviewing and supplementary study of what they have already learned in the previous program and preparations necessary for the succeeding training program.

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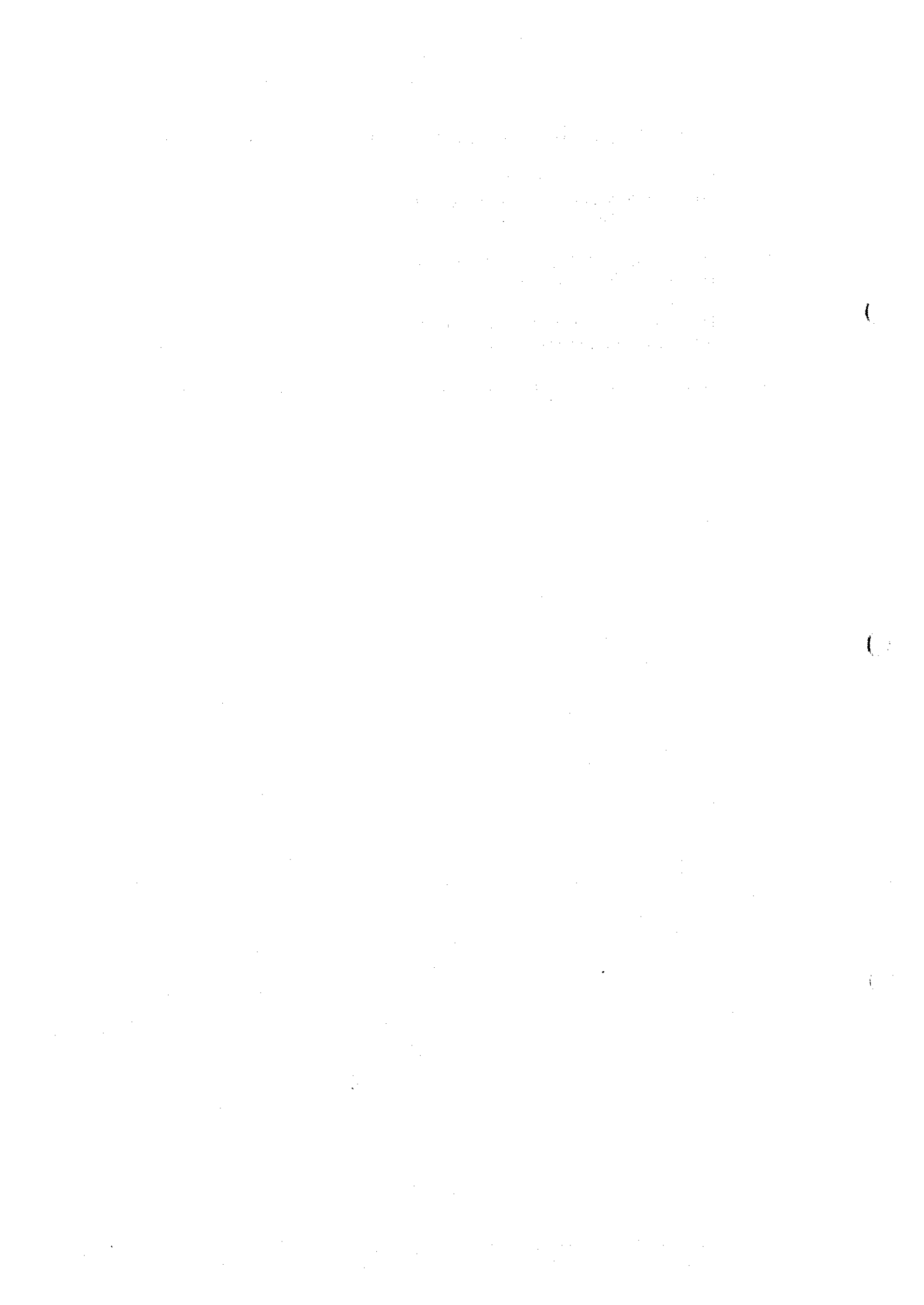


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PART I

ORGANIZATION AND FUNCTION

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CHAPTER 1 INTRODUCTION

The accelerated rate of changes taking place in economic environments all over the world during the past decade has been creating rapid shifts in the patterns of demand and consumption of products and services. The difficulties in understanding the interrelationships among many variables in the market-place and inside the organization, and in reacting to the changes quickly enough, are generally recognized as one of the greatest threats to corporate planning and performance. In light of such circumstances, there has been a growing recognition by corporate management that sustained corporate renewal and growth can be achieved only through the effective utilization of an integrated research and planning function; which promotes a continuing adjustment of corporate resources and capabilities in relation to evolving needs of the marketplace.

The SCA's intention in establishing the Economic Unit is to assist its management in planning future management policy and future development of the Canal, through the strengthening of its capabilities in economic, financial and traffic analysis, evaluation and planning.

Following the extensive field work of the Japanese Survey Team during July~ August 1978, concerning the SCA's situation related to the establishment of the Economic Unit, Part I of this report specifically deals with how the Economic Unit should be organized in its functions, tasks, configuration, staffing, working mechanism and management, so that the objective of establishing the Economic Unit will be effectively accomplished under the imposed constraints of available time and resources. The level of the present performance and potential capability of the staff members was appraised through the 1978 training program in Japan, and the results have been reviewed and incorporated throughout this report.

Although the basic framework has not been changed from the Interim Report, some revisions have been made after discussion with SCA personnel on the Interim Report in November 1978. Besides terminology and expressions, parts of Chapter 2 were rewritten; in Chapter 3, the tasks of each Group have been broken down more specifically, and explanations about work procedures between the Groups and among the tasks are added. Accordingly, a job description corresponding to each task area has been given. Staffing of each Group, as discussed in Chapter 4, has been determined through the information and experiences acquired during the 1978 Training Program in Japan. This is, however, still considered to be subject to some adjustments in the course of future training and practices.

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CHAPTER 2 ORGANIZATION

2.1 Objectives

It has been confirmed through the survey by the Japanese Survey Team that the objective in setting up an Economic Unit is to develop functional capabilities within the SCA to assist the SCA's top management in making sound decisions on matters directly connected to the sustained growth of the SCA. These decisions are to be made in such a way that the revenue of the SCA will be optimized from the viewpoint of short-term operation and long-term strategic objectives. The SCA wishes to establish the simplest and most efficient organizational unit which is capable of assisting top management in planning economic policy and future development of the Canal through economic, financial and traffic planning, analysis and evaluation.

The functions that the SCA management expects the Economic Unit to achieve are generally referred to as corporate planning functions and can be broken down into the three following sub-functions:

- (1) Developing information about the corporation and its environments, leading to strategy formulation and strategic decision making (Information analysis sub-function).
- (2) Evaluating alternative courses of action against stated objectives and preparing integrated overall plans by incorporating the plans of individual departments (Management planning sub-function).
- (3) Assisting and participating in corporate and departmental management in formulating strategies and making strategic decisions (Strategy formulation sub-function).

The mutual relationship among those three sub-functions can be shown schematically in terms of the primary flow of information as in Figure 1.1: Schematic Relationship Among Corporate Planning Sub-functions.

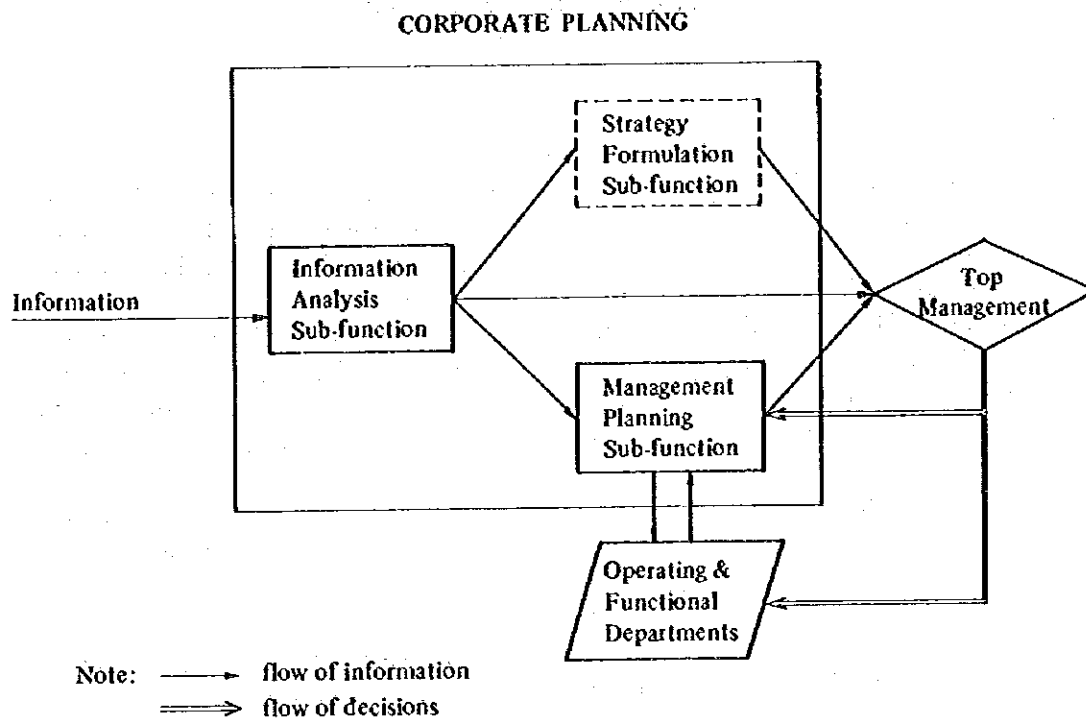


Fig. I.1 Schematic Relationship among Corporate Planning Sub-functions

Strategy formulation and management planning are carried out on the basis of assumptions concerning the internal and external conditions of the organization in the future. These assumptions are made based on the output of the "information analysis" sub-function. The activity of information analysis covers analysis, forecasting, evaluation and interpretation of internal activities and environmental conditions in the future by making use of qualitative and quantitative analytical tools. Therefore, "information analysis" can be considered to be the foundation of "management planning" and "strategy formulation".

The primary purpose of the "management planning" sub-function is to develop and annually update a frame of reference for making current decisions which are consistent with long-term management objectives and strategies. Annual plans specify a step in the evolution of the organization toward the long-term objectives which are particularized in long-term plans.

"Strategy formulation" is a very sophisticated role to be played. In corporate planning functions it is not the function of strategy formulation itself, but it can be referred to as the function of "proposing to and participating in top management during formulation of organizational objectives and strategies, and serving as an advisor/consultant to the chairman and other members of the board on planning issues." This functional area requires both technical expertise and years of professional experience.

At the SCA, "strategy formulation" belongs almost entirely to the chairman and the board of directors, except for occasional inquiries on strategy-related matters from the chairman to departmental managers. The "management planning" function at the corporate level is located as a matter of procedure in the Planning Section of the Planning and Research Department, but

actual plans, which are operational in nature and short- to medium-term in the coverage of time, are prepared by the Planning Sub-committees and consolidated by the Planning Committee. No involvement of the Planning Section is indicated in departmental and project planning activities. At the corporate level little "information analysis" has been systematically conducted to be utilized for strategy formulation and management planning.

Taking into account the present situation in the SCA stated above, together with the limited availability of qualified staff for the Economic Unit, it is, for practical reasons, recommendable that the course of developing the capabilities of the Economic Unit is to be divided into two phases. In the first phase the functional goal of the Economic Unit should be set at an adequate level that is feasible to attain in a short to medium period of time; in the second phase overall capability integrating those three sub-functions can be developed as the long-term objective of the Economic Unit, successive to the first phase. In accordance with this approach, it is strongly recommended that during the first three years the efforts of the SCA in developing the capabilities of the Economic Unit should be focused on implementation and nurture of the information analysis function. As for the objectives for a longer period of time, measures are to be taken to reinforce the management planning function; the strategy formulation function will be developed eventually through the process of accumulating knowledge and experiences in the other two sub-functional areas.

2.2 Framework for Developing the Economic Unit

In line with the recommendation made in the previous section, the tentative three year objective for developing the capability of the Economic Unit has been set to gradually strengthen its information analysis function in the first phase in order to develop a full-fledged corporate planning function. This approach can be called a "stepwise approach" as opposed to a "normative approach" in which all of the desired functions are implanted at one time.

Although advantages and disadvantages of the two approaches depend upon the needs and situation of the organization, generalized characteristics are shown in Table I.1: Characteristics of "Stepwise Approach" and "Normative Approach". In short, the "stepwise approach" is more advantageous when resources are limited, and when a simple and efficient organization with a limited scope of functions is required. Furthermore, the following two points are most important for the SCA in the development of the Economic Unit's capabilities; first, unless the goal of the Unit is practically attainable, it loses its stand no matter how supreme its concept is; secondly, unlike the academic world, business practices require reality and usefulness in their results rather than theory on paper. For these reasons the SCA's approach is to aim at enabling the Economic Unit to produce meaningful products for the management through the balanced acquisition of knowledge and experience by the staff in their assigned tasks.

The basic framework of developing the Economic Unit, shown as Figure I.2: Basic Framework for Developing the Economic Unit, has been constructed on the basis of the "stepwise approach" and feasible attainability of practical usefulness.

Table 1.1 Characteristics of "Stepwise Approach" and "Normative Approach"

Criteria	Stepwise Approach	Normative Approach
Scope of function	Limited to information analysis	Comprehensive coverage
Required number of staff	Can start with small number of staff and increase according to circumstances	Needs more staff to assign broader range of tasks
Required capability of staff	Basic tasks require basic knowledge and less experience	Sophisticated tasks require higher level of knowledge and more experience
Organizational feature	Simple at the start	Complex from the start
Internal coordination	Less difficult	More difficult
External relations	Limited contacts with other sections require less adjustments	Broader contacts with other sections require more adjustments and coordination
Training program	Concentrated	Diversified
Attainability	Good because efforts can be concentrated	More risky because efforts are diversified

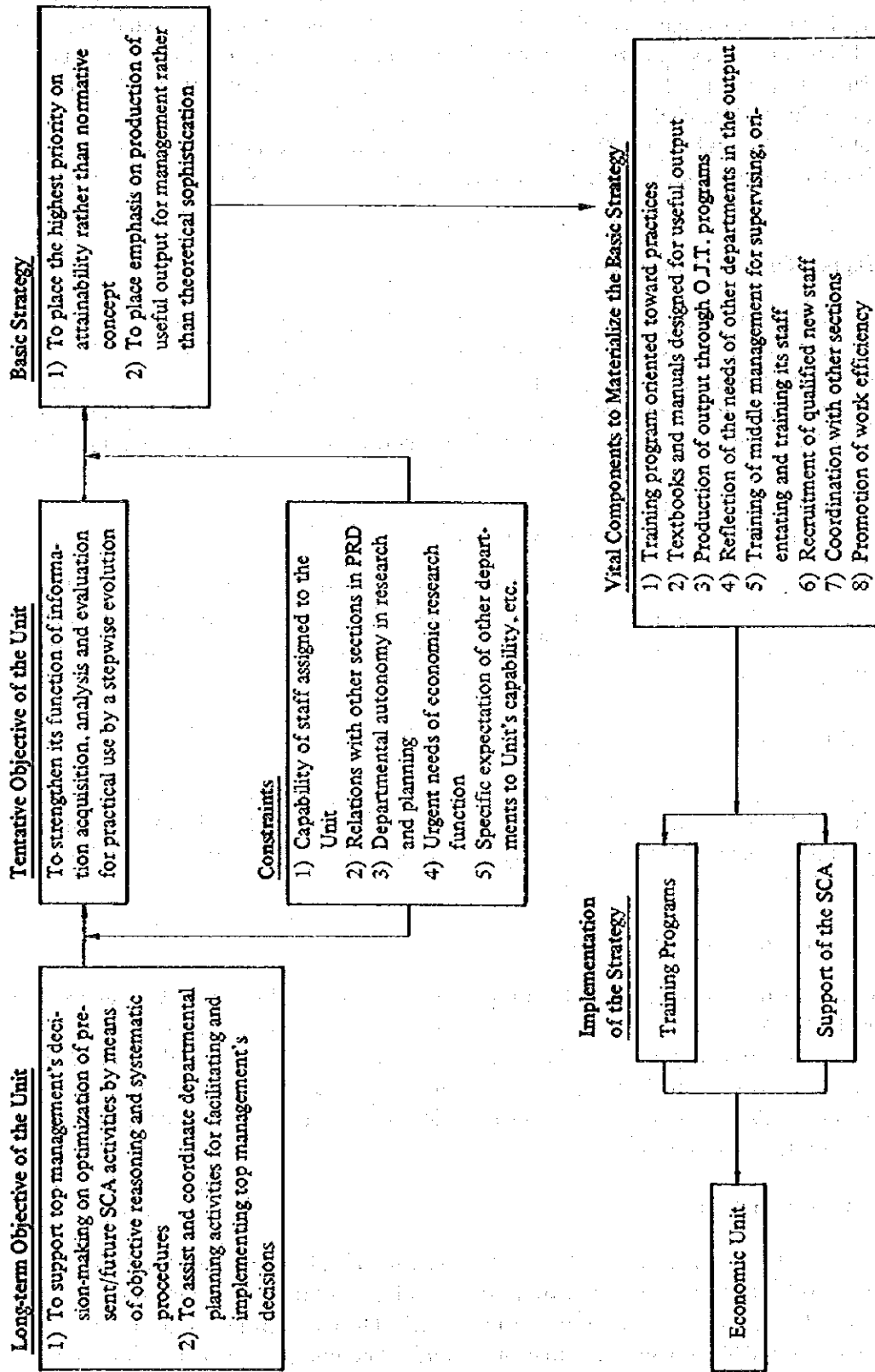


Fig. 1.2 Basic Framework for Developing the Economic Unit

In this figure, due to the various kinds of constraints imposed upon the Economic Unit, such as limited capabilities and experience of the available staff, relations with other sections and departments and so forth, the tentative objective of the Unit has been clearly separated from the long-term objectives. The examination of those constraints also suggests the adoption of two basic strategies as the means of effectively achieving the tentative objective; that is, 1) to place the highest priority on attainability rather than normative concept; and 2) to place emphasis on the production of useful output for management rather than theoretical sophistication. In order to materialize these strategies, they have been divided into eight vital components (or tactics).

Training Program Oriented toward Practices

Training programs can be grouped into two types; one is designed for acquisition and accumulation of basic and/or theoretical knowledge; the other is for the application and/or further extension of the knowledge to find explanations, solutions, alternatives, assumptions, etc. in connection with events, problems and issues in practice. Since the output of the Economic Unit must be practically useful for the management, the training program must have a strong orientation toward practices.

Textbooks and Manuals Designed for Useful Output

With limited knowledge and experience, it is difficult for the staff of the Economic Unit to produce practically useful output in the early stage. For the purpose of compensating the shortage of staff capability, guiding and instructive materials specifically prepared for use by the staff would by all means be useful.

Production of Output through O.J.T. Programs

As a part of practically oriented training programs and also as reinforcement of supporting materials, the staff members will undertake actual production of output in the local training program. Dispatched consultants or experts will give advice and assistance to the staff during this output production.

Reflection of Other Departments' Needs in the Output

Support from other Departments in the SCA is indispensable for the Economic Unit as a viable organizational unit. As the sources of internal data and statistics, the importance of other Departments' cooperation will increase along with the evolution of the Economic Unit's function. For these reasons the foundation of mutual cooperation should be nurtured from the beginning of the Unit's operation by responding to and reflecting the needs of other Departments in the production of output.

Training of Managerial Staff

During the infancy period of the research and planning function, there will tend to be many problems and issues which are not clearly defined or resolved within the organization. Staff members will seek orientation and guidance in their work. The scope of research and planning work is by nature more indefinable than that of operating line functions, which necessitates stronger leadership within the working hierarchy of the organization. The role to be played by

the middle management (equivalent to the Deputy Director and the Section Chief in the SCA organization) through specific training programs would be to give the staff members distinct recognition of their missions and to cultivate understanding and insight as a basis of judgment for issues and problems they are dealing with. More specific responsibilities of the middle management will be discussed in section 3.3.

Recruitment of New Staff for the Economic Unit

Currently available personnel for the Economic Unit are limited in number and in their capabilities. It is expected that the present staff members will develop their potential capability to become the key staff members of the Economic Unit through the training program. The Economic Unit, however, needs more staff members to perform required functions. To what extent it will be able to serve the requirements of the SCA depends largely on the quality of newly recruited staff of the Economic Unit. For this reason, the recruitment of new staff should be considered to be one of the most critical determinants for the successful attainment of the functional objective. The SCA management must place the first priority on this point and diversify its recruiting effort within and the outside of the SCA.

Relationship with Other Sections in PRD

Although the tentative function of the Economic Unit will not be extended beyond information analysis, as stated before, it still needs to establish not only friendly relationships, but also close cooperation with other sections of PRD. In the immediate future, it will rely on the supply of statistical data on the Canal transit from the Statistical Section; it will have to make an appropriate arrangement with the library, which belongs to the Planning Section, in acquisition and maintenance of published information. Furthermore, foreseeing the possible future link of activities in management planning between the planning section and the Economic Unit, the relation of these two units should be maintained as close as possible.

Promotion of Work Efficiency

In economic research activities timely production of informative output and prompt fulfillment of occasional assignments are vital parts of the work, as mentioned before. To meet the efficiency requirement, research staff must increase their productivity through acquisition of more knowledge, skills and experience. At the same time they need adequate support from clerical staff and office equipment to increase their productivity. It is highly recommendable that the SCA provide the research staff with an adequate level of supporting staff and equipment within the extent that the budget will permit.

These components of the basic strategy will be implemented in the training program, which is designed in such a way that the effects of individual strategic components will be maximized to achieve the tentative objective of the Economic Unit. It is to be recognized, however, that the last three components can be utilized only with the committed and affirmative support of the SCA. And, finally, as the joint outcome of training programs and the SCA's commitment, the capability of the Economic Unit will have been determined.

2.3 Functional Areas and Division of Functions

It has been recommended in the previous sections that the tentative function of the Economic Unit should be focused on information analysis. This involves the comprehensive acquisition and mobilization of relevant data and information about the organization and its social, economic and technical environments, past, present and future. The information developed as such provides valuable bases on which probable impacts of environmental changes on the organization can be assessed, and needed responses and actions can be determined and incorporated into management plans.

Figure I.3: Unit's Functional Area and Its Components Connected to Strategic Decision-Making illustrates how the information analysis function of the Economic Unit is connected to the strategic decision of top management. Each of the strategic decision subjects are enclosed by double rectangles in the center of the illustration. These are (1) tariff structure of the SCA, (2) transit capacity of the Canal, (3) operating strategy (short-term strategy) and (4) expansion strategy (long-term strategy). These four subjects are enclosed by a large dotted rectangle, which implies possible functional participation of the Economic Unit as one of its long-term functional objectives. Also in a dotted small rectangle is "management planning", which is another possible functional area of the Economic Units within its long-term objectives. However, neither of the functional areas in the dotted rectangles is included in the tentative objective of the Economic Unit's function. The individual components of the Economic Unit's function are enclosed by solid rectangles. All of those components are closely related to the strategic decision subjects, directly or indirectly. They are also interrelated to one another, directly or indirectly. As recognized from the illustration, these components of the Economic Unit's function make up a system to support the strategic decision-making of top management. The system is to be operated in such a way that information obtained from internal and/or external sources is processed and converted to more beneficial or directly useful information for the decision-making of the top management.

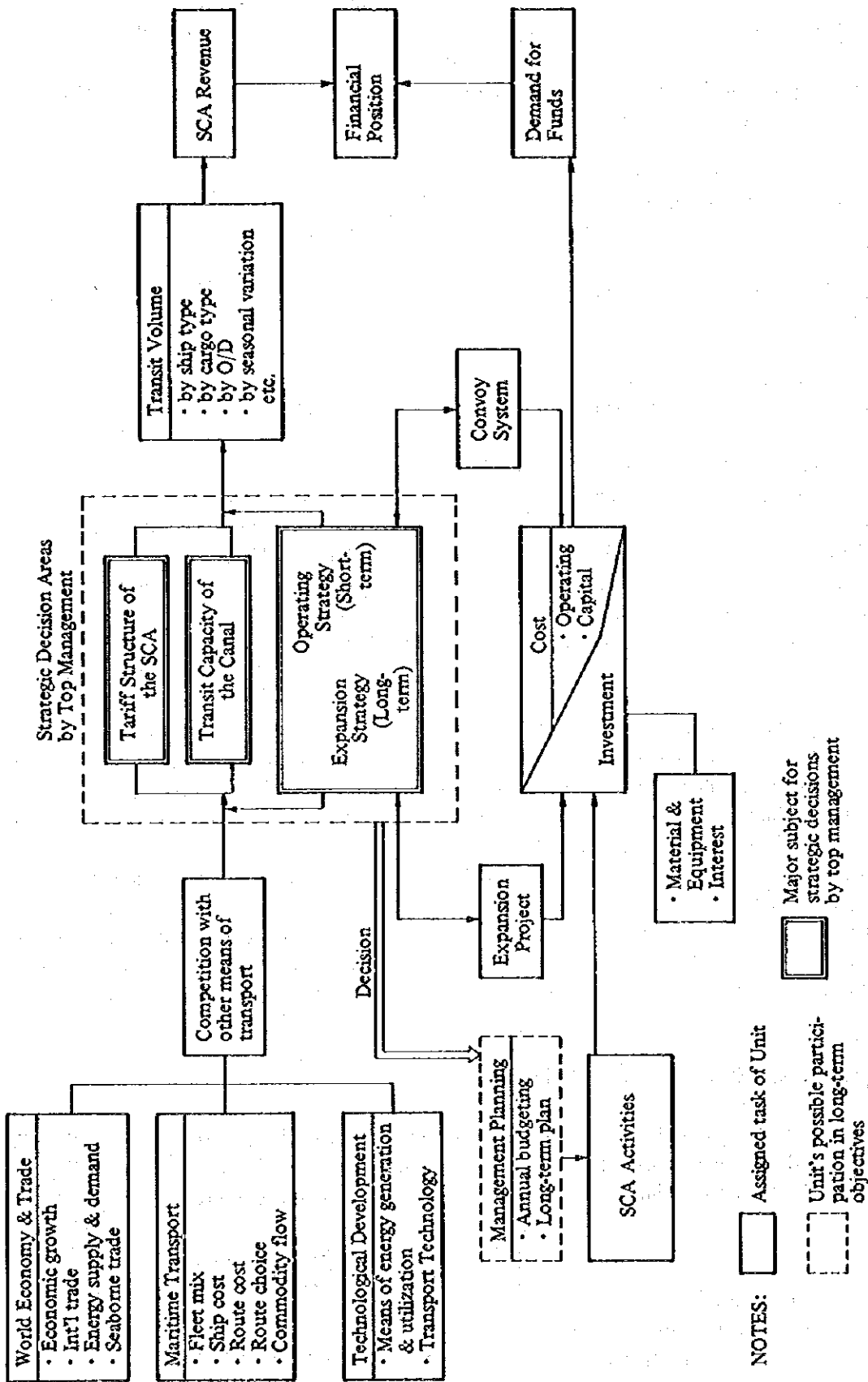


Fig. I.3 Unit's Functional Area and Its Components Connected to Strategic Decision-Making

As seen from Figure I.3, the functional area of the Economic Unit is so broad that a certain method of functional division is desirable in order to achieve the Unit's functional effectiveness. As for the division, the following considerations have been specifically made with respect to the basic strategy stated in Figure I.2, capabilities of available staff members, organizational performance, working procedures, and a future functional evolution.

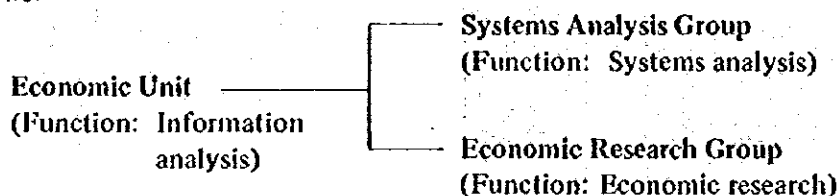
- (1) Expected functional efficiencies are balanced among the resulting sub-functions in such a way that capabilities required by each of the sub-functional areas will be equilibrated to that of the staff to be allocated to the corresponding sub-function.
- (2) Functional distinctions among those sub-functions are clear, and the organizational structure resulting from the division is simple.
- (3) Working procedures among those sub-functions are reasonably straight-forward, and future evolution of the Economic Unit's function will not be hampered, but facilitated.

The first criterion is concerned about the problem that no matter how a division of the function is desirable, the difficulty in adequate staffing to meet it causes unbalanced productivities among those sub-functions, if capabilities, experience and backgrounds of available staff members are limited. The second criterion is important to make functional specialization and coordination among those sub-functions easier, resulting in achievement of higher productivity of the Economic Unit. The third criterion pertains to the integration of those sub-functions at the present and to the integration with other sections in the Planning and Research Department in the future.

It has been concluded that the division of the Economic Unit's function into two sub-functions will be most suitable for it to cover the functional areas in light of those three criteria explained in the previous paragraphs. One sub-function deals systematically with such problem areas as transit volume, the Canal capacity including convoy system, tariff studies, cost analysis, project evaluation, etc., which requires the application and development of systems analysis techniques and methodology; another sub-function deals with such problem areas as world trade, maritime transport, trade flow and patterns of commodities and goods, technological progress related to the SCA operation, financial position of the SCA, etc., which can be treated as individual and/or independent problems with economic analysis and/or qualitative reasoning. The former is named a "systems analysis" sub-function, and the latter an "economic research" sub-function.

2.4 Organizational Structure and Its Evolution

In the previous section on the tentative function of the Economic Unit, "information analysis", has been divided into two sub-functions, i.e., "economic research" and "systems analysis". Accordingly, the Economic Unit is divided into two Groups corresponding to those sub-functions, as follows:



Based on the reasons for and process of dividing the information analysis function discussed in the previous section, the function of the two Groups has been defined as follows:

Economic Research Group

This Group has two prime functions; one is surveillance of external environments, and the other is monitoring of internal activities of the SCA. Its function can be itemized as follows:

(1) To collect a scope of information on the external environments which are relevant to the defined task areas (see Table I.2). The types of information it deals with are events, movements, developments, changes, etc. in the fields of transport and related industries, economics, politics, social affairs and technology. Major sources of information are periodical publications of related trades, industries and professional specializations.

(2) To analyze and evaluate the obtained information in order to estimate the eventual impact of the reported events and issues on the operation of the Suez Canal. Its primary tool for analyzing and evaluating information is qualitative reasoning and logic.

(3) By selecting appropriate subjects from collected and analyzed information, to prepare reports to the management of the SCA at a determined regular interval.

(4) For facilitating the understanding of the overall financial position of the SCA, SCA operations and departmental activities by the management of the SCA, to gather internal information and to prepare reports at a determined interval. The information treated is mainly financial and transit-related. The degree of analysis is not indepth. Financial and transit-related data compiled are also utilized by the Systems Analysis Group. The progress of individual projects is also monitored and reported.

(5) To monitor primarily the development of maritime and energy-related technology and to make economic evaluation of the effect on SCA operation.

(6) To conduct specific studies, occasionally assigned by the management, mainly concerning the problems or issues in the same category as described in (1) above.

Systems Analysis Group

The characteristic of this Group is the use of systems analysis techniques in dealing with problems and issues. Thus, it mainly utilizes numerical data and mathematical logic, in contrast with Economic Research Group. Its prime functions can be itemized as follows:

(1) To review and evaluate the adequacy of the level and structure of current tariffs and to make recommendations for adjustments or alterations. This function involves a number of auxiliary tasks; basically this group must understand the present demand and supply situation for Suez Canal transit. Then, it must make a projection of future demand and supply; this requires varieties of work for data gathering, maintenance and utilization.

(2) To analyze and evaluate the feasibility of specific projects. This function also has a vast infrastructure underneath it, and requires varieties of data to be systematically gathered,

managed and processed. The types of projects can be divided into medium-term and long-term. Projects are also classified by the size of investment required. Models may be constructed to deal with the evaluation of projects with common characteristics.

(3) To interpret the results of numerical analysis and evaluation in terms of the SCA's contexts and to prepare reports for the management of the SCA.

The functions described above are tentative objectives for the two Groups to achieve within three years from the start, through the development of their capabilities and experiences. The process of the evolution of those two functions is shown in Figure 1.4: Stepwise Evolution of Organization. In the first step both groups start with rather simple and straightforward tasks and assignments. For example, an assigned work of the Economic Research Group in the first year could be the selection of significant and important information for the SCA among numerous articles published in journals of the maritime transport industry or world trade journals. Important parts are extracted from selected articles, or abstracted summaries are prepared in report form, then internally circulated for review by the management. As for the monitoring of internal activities, it may start with reorganization of financial and/or transit data from past years, and prepare time-series tables and graphs. In the case of the Systems Analysis Group, the first task might be short-term forecasts of transit volume of a certain type of ship through use of an extrapolation method.

By going through this sort of unsophisticated work, these Groups accumulate information, knowledge, skills and experience. In the second step the Economic Analysis Group may deal with economic evaluation of a new technology or technological development; such as a study on the impact of increased numbers of fission reactors in service in western Europe on the consumption of petroleum in the area. The systems Analysis Group may participate in a project evaluation study or evaluate the efficiency of different convoy systems under a certain condition.

It should be recalled that the tentative assignment and evolution of these functions in the Economic Unit is not an isolated effort within a certain period, but it has a definite goal to attain as a long-term objective of the Unit. That is the normative function of research and planning which is discussed in Section 1. The organizational structure displayed in Figure 1.5: Long-Term Objective of the Research and Planning Function of the SCA is a typical example of the normative research and planning function, which can be associated with the results of the evolution of the Economic Unit's tentative function. The largest distinction between the Economic Unit and the Planning Department in Figure 1.5 is the fact that the latter is equipped with a management planning function. The management planning function brings in quite a difference. It necessitates regular contacts with line and staff departments in preparation and coordination of various management plans. Without this function in the tentative organizational structure, the Economic Unit does not have regular contacts with other departments for the time being. Since the information developed or transformed by the Economic Unit is the basis of selecting the most relevant set of assumptions for management planning (which is currently undertaken by the Planning Section of the Department), the Economic Unit and the Planning Section should be functionally connected in the long-term objective. Another distinction is that the function of information acquisition and management become an independent section separated from the information analysis function of the Economic Unit, because the amount and diversity of information accumulated and handled becomes very large. Therefore, in this organizational structure, both the Economic Research Section and the Systems Analysis Section are concent-

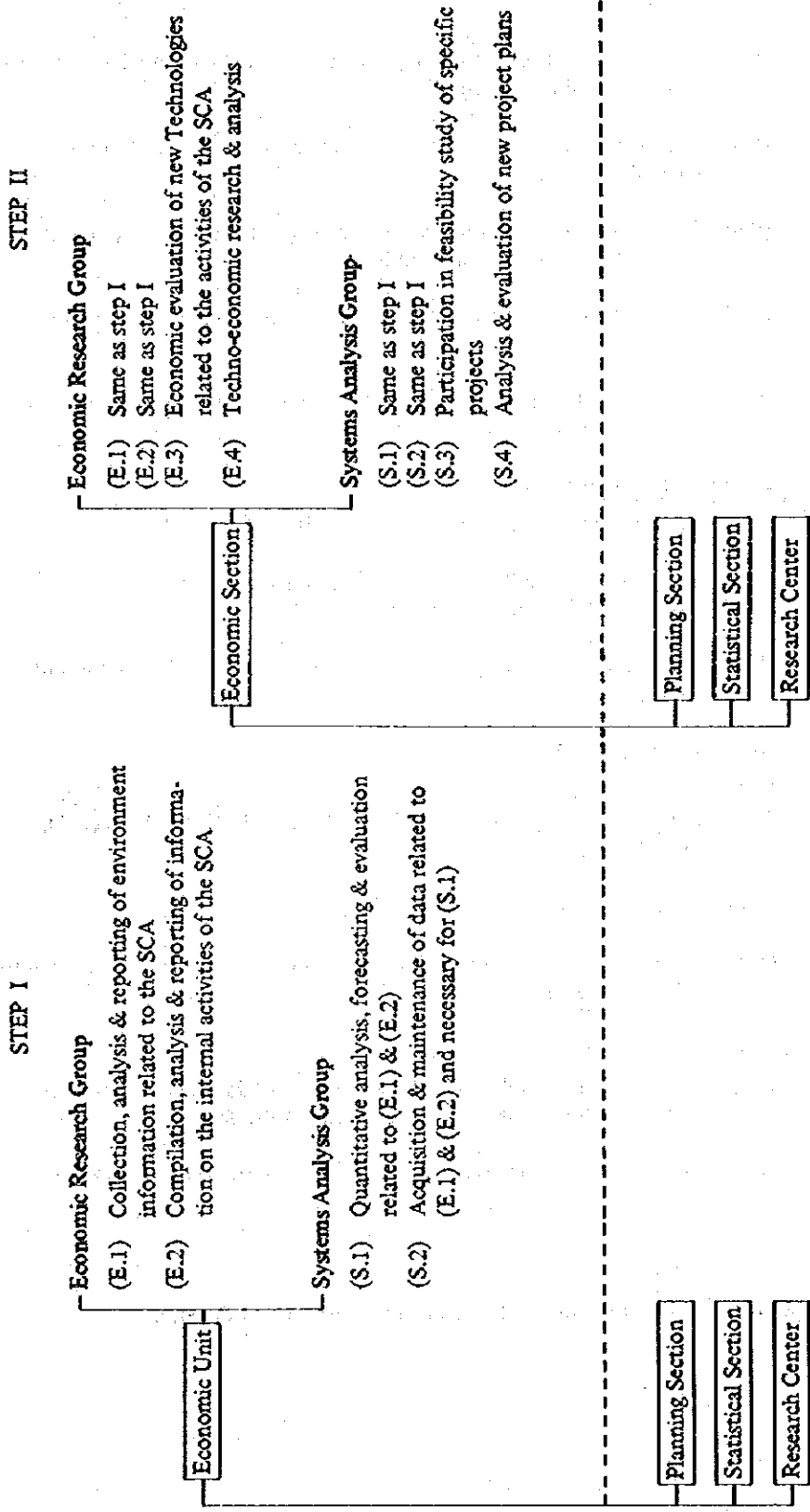


Fig. I.4 Stepwise Evolution of Organization

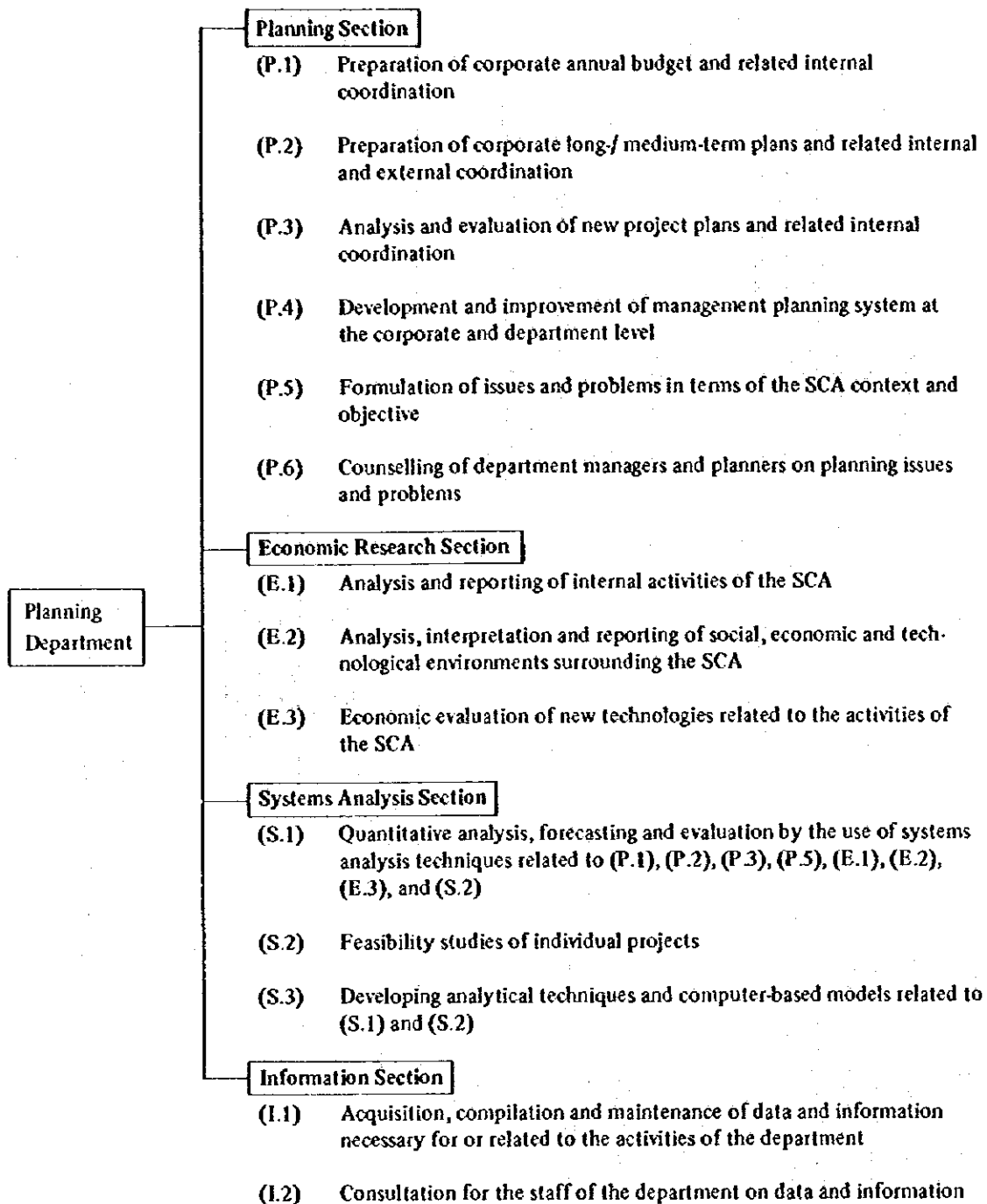


Fig. I.5 Long-term Objective of the Research and Planning Function of the SCA

rated more on processing, analysis and development of information, leaving the function of information acquisition and management to the Information Section.

Thus, in order to consolidate the tentative functions of the Economic Unit in the normative function of the Planning Department, two kinds of effort should be made by the SCA. One is the development of functional capability of the tentative Economic Unit, and the other is the reinforcement of the functional capability of the present Planning Section in the Department.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for ensuring the integrity and transparency of the financial system. This section also outlines the various methods used to collect and analyze data, highlighting the role of technology in streamlining these processes.

In the second part, the focus shifts to the challenges faced by organizations in implementing effective risk management strategies. The text explores how external factors, such as market volatility and regulatory changes, can impact an organization's ability to manage its risks. It provides a detailed analysis of the different types of risks and offers practical advice on how to identify, assess, and mitigate them.

The third part of the document addresses the issue of data security and privacy. It discusses the growing concerns over data breaches and the potential consequences for individuals and organizations. The text provides a comprehensive overview of the various security measures that can be implemented to protect sensitive information, including encryption, access controls, and regular security audits.

Finally, the fourth part of the document discusses the future of the financial industry. It explores the impact of emerging technologies, such as artificial intelligence and blockchain, on the way financial services are delivered. The text also discusses the importance of staying up-to-date with the latest industry trends and regulations to ensure long-term success and compliance.

CHAPTER 3 TASKS, WORKING PROCEDURES AND OUTPUT

3.1 Tasks

In Figure I.3 the Economic Unit's functional area has been broken down into a number of components. When those components are grouped into units of work under certain criteria, the unit of work is called a "task". A task is a basic unit of work assigned to an organizational unit like the Systems Analysis Group and the Economic Research Group in the Economic Unit. The criteria used for the grouping vary according to the function or functional objectives of the organizational unit. In the case of the systems Analysis Group and the Economic Research Group, the former's function is to deal with these components as the elements of a system and through quantitative interrelations of one to another; in contrast, the functional approach of the Economic Research Group is not systems-oriented, but oriented toward treating those components as individual problems. Thus, the most decisive criterion for making up the tasks of those two Groups is the approach and methodology used to deal with these components.

The components of the functional area shown in Figure I.3 are, thus, grouped into eight tasks (or task areas), five being assigned to the Economic Research Group, and three belonging to the Systems Analysis Group, as follows:

Economic Research Group

- o Maritime Economics
- o Energy
- o Commodities and Goods
- o Techno-economics
- o Financial and Operational Study

Systems Analysis Group

- o Maritime Transport and Canal Traffic
- o Financial and Cost Analysis
- o Project Evaluation

Each of these task areas has its own task subjects to deal with, and some of the major task subjects falling in each task area are shown together with the planned work/output in the two Groups in Table I.2: Task Area and Major Subjects of the Two Groups.

It is clearly recognized from Table I.2 that the grouping of these components in the functional area shown in Figure I.3 has been carried out in accordance with the criteria. Some of the task areas are overlapping between the two groups, because the functional division is not based upon the subject or discipline, but based upon the approach or methodology used to deal with the problems and issues in the functional area by the two groups. This characteristic is clearly demonstrated by the difference between the two task areas in Table I.2; one is "Maritime Economics" under the Economic Research Group, and the other is "Maritime Transport and Canal Traffic" under the Systems Analysis Group. Each of these task areas deals with trade flow, trade patterns, ship costs, route costs, fleet mix, etc.. However, the approach of the Systems Analysis Group is to treat those task subjects as the components of a system eventually affecting the Canal traffic and the revenue of the SCA. Therefore, it applies systems analysis techniques to

these components. In contrast, the approach of Economic Research Group is to treat these task subjects as individual or fragmentary subjects, and the mutual interrelations among these subjects are investigated not through the process of complex quantitative analysis, but through the qualitative reasoning and economic logic with limited numerical tools.

Table I.2 Task Area and Subject of the Two Groups.

	TASK AREA	TASK SUBJECT	WORK/OUTPUT
ECONOMIC RESEARCH GROUP	Maritime Economics	<ul style="list-style-type: none"> ○ World economy & trade ○ Seaborne trade ○ Maritime transport 	<ul style="list-style-type: none"> ○ Extract ○ Abstract ○ Studies of independent problems/events ○ Specific assignments from the management ○ Preparation of data handbooks
	Energy	<ul style="list-style-type: none"> ○ Trade flow & pattern ○ Origin/Destination ○ Ship cost/Route cost 	
	Commodities and Goods	<ul style="list-style-type: none"> ○ Trade flow and pattern ○ Origin/Destination ○ Ship cost/Route cost 	
	Techno-economics	<ul style="list-style-type: none"> ○ Technological forecasting ○ Transport technology ○ Technological feasibility 	
	Financial and Operational Study	<ul style="list-style-type: none"> ○ Revenue/Expenditure/Cost ○ Budgetary/Accounting review ○ Operation/Project review 	
SYSTEMS ANALYSIS GROUP	Maritime Transport and Canal Traffic	<ul style="list-style-type: none"> ○ Trade flow ○ Shipping cost ○ Route cost ○ Fleet mix ○ Canal traffic/capacity ○ Tariff review 	<ul style="list-style-type: none"> ○ Short-term forecast ○ Long-term forecast ○ Support of E.R.G. ○ Analysis/evaluation of feasibility studies ○ Participation in feasibility studies ○ Software development ○ Development of information systems ○ Preparation of data handbooks
	Financial and Cost Analysis	<ul style="list-style-type: none"> ○ Investment analysis ○ Cost analysis ○ Tariff review 	
	Project Evaluation	<ul style="list-style-type: none"> ○ Feasibility studies of operational projects/investments ○ Evaluation of feasibility studies of expansion projects ○ Participation in feasibility studies of expansion projects 	

3.2 Working Procedures and Output

In the early phase of the Economic Unit's activities, there are basically three kinds of work flow in and between the two Groups. The work of the two Groups can be considered as the proces-

sing of existing information and data and as developing new information and data in the form of the Economic Unit's output for use by the management. The first and second kinds of work flow involve little or no interaction between the two Groups; they work independently on those task areas from the acquisition and processing of information and data to the development of new information and data. In the third kind of work flow, the Systems Analysis Group assists the Economic Research Group; when the Economic Research Group finds out that the more systems-oriented approaches are desirable or required in a specific area, it asks the Systems Analysis Group to process and analyze the relevant data and to provide it with the results for qualitative interpretations. In such working mechanism the Economic Research Group sets forth objectives, assumptions, hypotheses, constraints, alternatives, etc., and the Systems Analysis Group applies analytical techniques such as statistical analysis and forecasting. These three kinds of work flow and information in the early stage of the Economic Unit are shown under the "tentative" objectives in Figure I.6: Flow of Information and Work in the Economic Unit under Tentative and Long-Term Objectives.

When the two Groups work independently as shown in Figure I.6, the first step in the work is acquisition and compilation of data and information for both Groups. Due to its functional characteristics, the Systems Analysis Group places the major emphasis on numerical data, and the Economic Research Group on explanatory and observational information. Major sources of data and information are: 1) International organizations and agencies such as the United Nations, OECD, IMF, OPEC, UNCTAD, etc., 2) branches of national governments, 3) economic and trade publications, 4) private companies of the concerned business sectors such as shipping, transport, natural resources, shipbuilding, banking, etc., and 5) specialized consultants and research firms. Some are publicly available on a regular or irregular basis; some are proprietorially available or in limited circulation.

The Systems Analysis Group works on the task area of the maritime transport and Canal traffic, for example, as follows. The final objective of this task is the evaluation of tariff structures for the optimization of SCA revenue with respect to the current and future traffic of the Canal and the current and future allocations of traffic to the alternative routes. Therefore, for each of the concerned commodities and goods, data and statistics related to trade flows, fleet mix, shipping costs, etc. are collected, and the traffic allocation to the alternative routes and the traffic of the Canal are to be analyzed and forecasted against the current and/or alternative levels and structures of the tariff. The staff on the task deal mostly with numerical data, forecasting methods and mathematical models.

In the Economic Research Group, on the other hand, the staff on the tasks of maritime economics, energy, and commodities and goods also deal with the same subjects and components such as trade flow, ship type, fleet mix, shipping costs, etc. However, they are concerned with analyzing individual phenomena or events from the viewpoint of their backgrounds, causes, effects, interrelations, interactions, expectations, anticipations and so forth. From the collected information, they identify events and changes which are of importance to the SCA, follow their developments and trends, and project their outcomes and impacts. They do not rely heavily on systematic processing of numerical data but integrate and synthesize information from various sources, interpret the results of quantitative manipulations of numerical data, and construct scenarios.

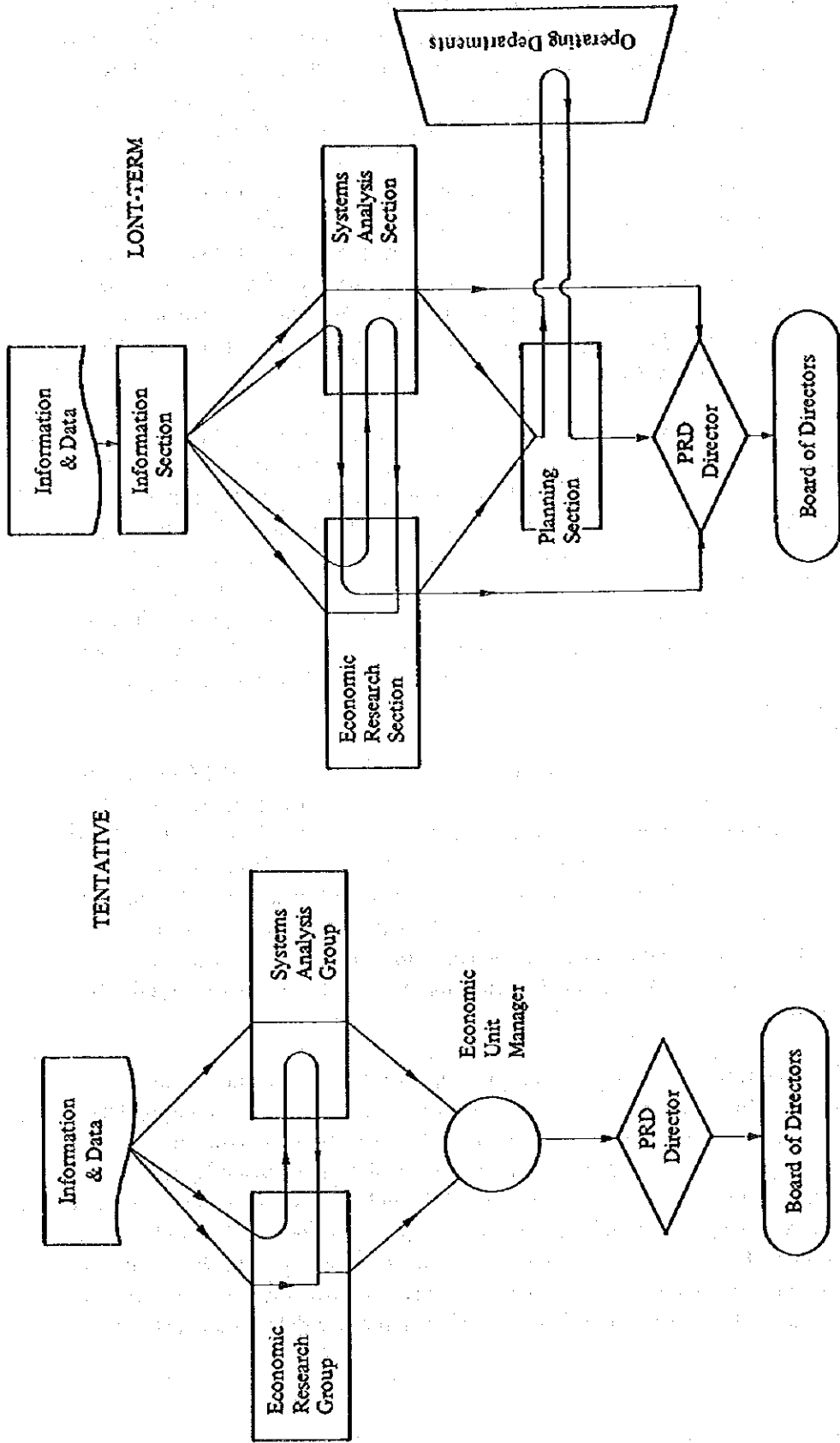


Fig. I.6 Flow of Information and Work Under Tentative and Long-term Objectives

Even during the process of working on an individual subject matter in the Economic Analysis Group, some problems require systematic analysis of numerical data in support of the group's reasoning or judgment. In such cases the Systems Analysis Group provides its assistance in collecting data, applying adequate techniques to process them, and producing the results. The results are fed back to the Economic Research Group to be consolidated into its work. This is the technical consulting function of the System Analysis Group, which will be desirably expanded in the future to service to other departments, as this group becomes more capable.

As stated in Section 2.1, in the early phase both of the Groups will limit their interactions with other sections of the PRD as much as possible. This is because there are many internal problems which require formal adjustments on organizational structure and task areas among the sections and Groups. The achievement of the long-term final objectives of the integrated research and planning function explained in Section 2.4 heavily depends upon the successful outcome of this adjustment. In Figure I.6 flow of work and information under long-term objectives, which can be associated with the integrated corporate planning function, are demonstrated. Four sections are closely coordinated to perform the function of corporate research and planning under the management of the PRD director. In the meantime, the two Groups independently acquire necessary information and data of the SCA internal activities such as transit statistics and financial data.

As has been emphasized in Section 2.1, functional capabilities are not measured by detailed and lengthy descriptions of tasks assigned to the Economic Unit on paper, but are appraised by the usefulness of output produced by the staff assigned to the tasks. The difference of those two contrasting approaches should be clearly recognized in the SCA's effort to develop the capabilities of the Economic Unit. Therefore, in the framework for developing the Economic Unit, the tasks of the two Groups are closely tied to their output.

Output is generally prepared in report form for review by the management, but the staff also produces manuals and handbooks for its own use. There are two kinds of reports; one is produced regularly in certain formats which are internally circulated for review, and another is prepared in response to specific assignments which occasionally come from the management.

Table I.3: Planned Production of Output by the Two Groups and Supporting Materials, shows types of output produced by the two Groups in the early phase. Sources of information for the Economic Research Group are primarily various kinds of publications. The staff regularly reviews journals and periodicals which are judged informative and useful with respect to the activities of the SCA. Out of many articles in those publications the staff sorts out some articles that are evaluated as significantly important to the SCA and prepares extracts or abstracted summaries of those articles. When the capabilities of the staff are increased, comparisons and integration of different articles dealing with the same subject matter and/or simple analysis by using available data are made and brief comments or notes are provided by the staff. This kinds of work are, in principle, common to all of the task areas of the Economic Research Group shown in Table I.2.

As for the Systems Analysis Group, its output in the early phase is mainly forecasts of transit volumes and transit revenue by various classifications, because the projections of those variables are the basis of stariff study and project evaluation which are the ultimate objectives of the Group. A limited scope of project evaluation study is undertaken by referring to the previous

Table I.3 Planned Production of Output by the Two Groups and Supporting Materials

GROUP	- March, 1979	April, 1979 ~ March, 1980	April, 1980 ~ March, 1981
Economic Research		<ol style="list-style-type: none"> 1. Selected extracts of important environmental information related to the Canal activities from various sources 2. Abstracts of important information on world trade, seaborne trade, maritime transport, the Canal traffic, etc. and brief analysis reports 	<ol style="list-style-type: none"> 1. } Gradual up-grading 2. } of the quality of output 3. Forecasting of technological development in maritime transport
	Systems Analysis	<ol style="list-style-type: none"> 1. Reports on short-term forecast of Canal transit volume (Elementary) 2. Reports on short-term forecast of transit revenue (Elementary) 3. Introductory review of the feasibility studies previously conducted for SCA 	<ol style="list-style-type: none"> 1. } Up-grading reports 2. } to higher quality 3. } 4. Reports on long-term forecasting of transit volume of tankers and non-tankers
Supporting Materials	<ol style="list-style-type: none"> 1. Textbooks for training in Japan 2. Report on the study of organization and function 3. Data handbook (I) 4. Manual for short-term forecasting (I) 5. Introductory long-term forecasting methods for tanker transit 	<ol style="list-style-type: none"> 1. Data handbook (II) 2. Manual for short-term forecasting (II) 3. Intermediate long-term forecasting methods for tanker transit 4. Introductory forecasting methods for non-tanker transit 	<ol style="list-style-type: none"> 1. Data handbook (III) 2. Manual for short-term forecasting (III) 3. Intermediate long-term forecasting of non-tanker transit 4. Project evaluation

studies, and the results are incorporated into the report. In order for the Group to produce this output, it needs to have supporting data which must be acquired and prepared by the staff of the Group.

However, data collection and preparation is very time-consuming and laborious work before the staff becomes familiarized. It is also a very crucial part of forecasting work which critically affects the forecast results. Therefore, the staff needs the assistance of well-experienced advisors in collection, preparation and utilization of data used for forecasting work. Such assistance as the staff may need is listed on the bottom of Table I-3. Those supporting materials facilitate the staff's understanding of the tasks to be worked on and increase the productivity of the staff.

3.3 Job Descriptions

As frequently stated in the previous sections and chapters, the tasks and responsibilities set forth in this section are to be understood as the first step towards developing a comprehensive and integrated function of research and planning in the SCA. It must also be understood that the following descriptions are not definite and are subject to adjustments and changes in light of the evaluation of the performances of the Unit and its staff members.

Since the corporate research and planning function is relatively new in many organizations, it does not have fixed orbits in the sphere of management practices and shows marked similarity in formal statements of the function among organizations. But, just as often, there seem to be considerable variations in actual practices according to the perception of the function by the incumbent top management as well as the manager of the research and planning function. The implication should be kept in mind that, regardless of the formality, the characteristics of the corporate research and planning function in practice could be affected to a certain extent by the person who is the greatest beneficiary of the service.

Manager, Economic Unit

- (1) Maintains regular reporting and communication with the director of the Department about the activities, output and related matters of the Unit.
- (2) Plans annual budget and needed personnel for performing regular reporting services; also plans to fortify and expand the Unit's activities and seeks necessary budget and manpower allotments; takes responsibility in the execution of allotted budget.
- (3) Appraises the quality and usefulness of regular reporting services of the Unit, and plans and introduces new measures for the improvement of the services; at the same time propagates the significance and usefulness of the Unit's output among the departmental managers to secure their support.
- (4) Inspects reports, both regular and occasional ones, prepared by his subordinates to ensure that those reports are adequately prepared to meet the requirement or the interest of the recipients.

(5) Whenever necessary coordinates the relationships between the Unit and other sections in PRD or other departments so as to ensure their cooperation for the work of the Unit.

(6) Supervises chiefs of the two Groups in scheduling and balancing the workload of each group and each staff member and in coordinating the interface of the work between the two groups, so as to provide on-time regular services of the Unit and to effectively respond to the occasional requests of top management within the given manpower and budget limitations.

(7) Develops the capability of the Unit by systematic on- and off-the-job training of the staff and by broadening the experience of staff through work assignments.

(8) Cultivates and maintains appropriate contacts with outside information sources to obtain specialized information and expert consultation, whenever necessary.

Chief, Systems Analysis Group

(1) Reports regularly the activities and output of his Group to the Unit's manager.

(2) Executes budget allotted to his Group in carrying out the allotted tasks.

(3) Directs, supervises and participates in the production of output dealing with or related to the task subjects in the task areas assigned to Systems Analysis Group (see Table 1.2); and also directs, supervises and participates in the acquisition and management of data needed for performing those tasks.

(4) Cooperates with the chief of the Economic Research Group to promote the activities of the Groups for attaining better quality of output and higher productivity of the Unit as a whole.

(5) Circulates the output of his Group within the SCA with appropriate interpretations so that the recipients can better understand and appreciate their implications and significance and can make full use of them.

(6) Keeps informed of technical development in systems analysis and management science fields and takes initiative in adopting new methodological approaches and techniques for dealing with problems and issues.

(7) Pays attention to the availability and sources of data pertinent to the management of the SCA and the development of the Suez Canal so that the data base of the Unit is always being updated and improved.

Chief, Economic Research Group

(1) Reports regularly the activities and output of his Group to the Unit's manager.

(2) Executes budget allotted to his Group in carrying out the allotted tasks.

(3) Directs, supervises and participates in regular production of output dealing with or related to the task subjects in the task areas assigned to Economic Research Group (see Table 1.2); and

also directs, supervises and participates in the acquisition and management of information needed for performing these tasks.

(4) Cooperates with the chief of the Systems Analysis Group to promote the activities of the two Groups for attaining better quality of output and higher productivity of the Unit as a whole.

(5) Circulates the output of his Group within the SCA with appropriate interpretations so that the recipients can better understand and appreciate their implications and significance and make full use of them.

(6) Keeps informed of social, economic and technological trends and developments in the world so as to initiate pertinent research and information services to the management by identifying and estimating the impact of such phenomena on the SCA.

Transport Analyst, Systems Analysis Group

(1) Assigned to the task area of "maritime transport and Canal traffic" under the supervision of the Group Chief, undertakes forecasts, analysis and evaluation regarding maritime transport and the Canal traffic by utilizing statistical and other analytical techniques and tools.

(2) Major subjects to be covered by this task are trade flow, route costs, shipping costs, fleet mix, etc. for each of the concerned commodities and goods; also covered are the Canal transit operation including Canal traffic, Canal capacity and tariff study. The task requires not only the study of individual subject matters, but also the study of the interrelation and interaction among these subjects through the use of systems analysis approaches.

(3) Another specific task area is concerned about the studies on the implications and/or impacts of other means of transport such as pipelines on the Suez Canal operation at present and in the future.

(4) In close coordination with other staff, constructs and manages data base that is needed for performing the above-mentioned task; this includes identification of the sources of data, acquisition, compilation and maintenance of data, and construction of schemes to systemize the data handling.

(5) Regularly produces output in the fields of assigned task area to be incorporated in the reports which are circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the assigned task area.

Financial Analyst, Systems Analysis Group

(1) Assigned to the task area of "financial and cost analysis" under the supervision of the Group Chief, undertakes financial and cost analyses of the Canal operation and investment projects.

(2) Major subjects to be covered are investment analysis, cost analysis and tariff review; the final objective of the task is to establish an analytical system which enables estimates of total

revenue from various operations and investments against various costs associated with those operations and investments; with such a system evaluation of the tariff structure is carried out against various alternatives.

(3) Undertakes cost study covering step by step operational costs, maintenance costs, development costs and administration costs, and finally establishes and maintains a cost data base as a part of the total financial analysis system which can be utilized as a consistent cost information source for project evaluations.

Project Analyst, Systems Analysis Group

(1) Assigned to the task area of "project evaluation" under the supervision of the Group Chief, participates in and carries out various types of project evaluations and feasibility studies.

(2) In close coordination with other staff, develops and manages an information system that is needed for the evaluation of various types of projects.

(3) Supports the staff in the development and application of systems concepts and methodology for analyzing, evaluating and forecasting problem matters in the task areas covered by the Systems Analysis Group.

(4) Regularly produces output in the fields of assigned tasks to be incorporated in the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

Maritime Economist, Economic Research Group

(1) Assigned to the task area of "maritime economics" under the supervision of the Group Chief, reviews and studies various kinds of publications to analyze, evaluate and interpret the state-of-the-art, developments and changes primarily in world economy, international trades, maritime transports, and factors and events affecting those fields of activities.

(2) In close coordination with other staff, constructs and manages an information system that is needed for performing the above-mentioned tasks; this includes identification of the sources of information, acquisition, compilation and maintenance of it, and construction of schemes to systemize the information handling.

(3) Regularly produces output in the fields of assigned tasks to be incorporated into the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

Trade Analyst – Energy, Economic Research Group

(1) Assigned to the task area of "energy" under the supervision of Group Chief, reviews and studies various kinds of publications to analyze, evaluate and interpret the state-of-the-art, developments and changes in the international trade and transportation of petroleum and related industries.

(2) In close coordination with other staff, constructs and manages an information system that is needed for performing the above-mentioned tasks; this includes identification of the sources of information, acquisition, compilation and maintenance of it, and construction of schemes to systemize the information handling.

(3) Regularly produces output in the fields of assigned tasks to be incorporated into the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

Trade Analyst -- General, Economic Research Group

(1) Assigned to the task area of "Commodities and Goods" under the supervision of the Group Chief, reviews and studies various publications to analyze, evaluate and interpret the state-of-the-art, developments and changes in the international trade and transportation of major commodities and goods such as grains, metal ores, coal, fertilizers, wood, steel products, etc.

(2) In close coordination with other staff, constructs and manages an information system that is needed for performing the above-mentioned tasks; this includes identification of the sources of information, acquisition, compilation and maintenance of it, and construction of schemes to systemize the information handling.

(3) Regularly produces output in the fields of assigned tasks to be incorporated in the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

Techno-economist, Economic Research Group

(1) Under the supervision of the Group Chief, monitors the state-of-the-art and development of technology closely related to the activities of the SCA and analyses, evaluates, forecasts, and interprets the effects on the operation of the Canal; the fields of technology include transportation, shipbuilding, energy, etc.

(2) In close coordination with other staff, constructs and manages an information system that is needed for performing the above-mentioned tasks; this includes identification of the sources of information, acquisition, compilation and maintenance of it, and construction of schemes to systemize the information handling.

(3) Regularly produces output in the fields of assigned tasks to be incorporated in the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

Operations Analyst, Economic Research Group

(1) Assigned to the task area of "financial and operational study" under the supervision of the Group Chief, compiles, reviews and studies the operational and financial matters and records of

the SCA, covering revenues, expenditures, budgets, Canal traffic, cargo movements, etc. The final objective of the task assigned is a technical bridge and coordination between the Economic Unit and other sections in PRD and other departments.

(2) In close coordination with other staff, constructs and manages an information system that is needed for performing the above-mentioned tasks; this includes identification of the sources of information, acquisition, compilation and maintenance of it, and construction of schemes to systemize the information handling.

(3) Regularly produces output in the field of assigned tasks to be incorporated in the reports which are to be circulated for review by the management of the SCA; also, prepares reports, upon the requests of the management, on the subject matters in or related to the fields of assigned tasks.

CHAPTER 4 STAFFING FOR THE ECONOMIC UNIT

4.1 Size of the Economic Unit

Generally speaking, the size of an organizational unit is closely related to the scope of its function, variety of tasks to be performed by it and the productivity of its staff. In the case of the Economic Unit, its functional area is broad, the tasks necessary to cover the functional area are diversified, and the productivity of the staff is safely assumed to be relatively low at the early phase of its activity, since most of the staff currently assigned to the Unit have little experience in research work. This may lead to the conclusion that the Economic Unit should have a large number of staff members.

There are critical problems, however, in relying on the general approach stated in the above paragraph in determining the size of the Economic Unit. First, unlike the types of work assigned to factory workers, the amount of work for each of the different task areas in the Economic Unit cannot be measured with the same yardstick because of the difference in the nature of the work. Secondly, as the productivity of the staff assigned to a task area increases, the scope and/or depth of the work tends to increase; thus, the total amount of work for the Economic Unit, a Group or a task is not fixed, but changes according to the productivity of the staff. Thus, the total amount of work for the Economic Unit or for the two Groups not only cannot be determined, but it also changes.

Furthermore, some of the information has been acquired as to the level of knowledge and capability of the individual staff members in the Economic Unit through the training program in Japan in 1978. The 1978 training programs, however, were designed mainly to provide trainees with the basic knowledge required for carrying out these tasks in the Economic Unit, and the information is by no means sufficient to evaluate the individuals capability to apply the basic knowledge to actual problems and to produce useful output for the management.

It is quite customary that the size of the research and planning unit at the headquarters in a large corporation in Japan or other western country is kept moderate. It seldom goes beyond 20 staff members, as recognized in the cases of Appendices I and II. The major reasons are, to mention a few, first, quality of work is the most important criterion in contrast to the quantity, and competence of the staff is respected against the size of the Unit; secondly, when the size becomes large coordination among staff members of subunits (such as sections) poses major problems; thirdly, therefore, when the size becomes large, parts of the functions are divided or distributed to the operational departments to specialize in specific fields or types of operational activities.

For the reasons stated in the previous paragraph, it has been concluded that in the early phase of the Economic Unit the scope of its whole task area is limited in such a way that the total number of staff members should not go beyond twenty. In accordance with the importance and priority to achieve the tentative objectives of the Unit with regard to the needs of the SCA, the scope and amount of work corresponding to each task area is estimated respectively, and the required number of staff for each task area and the desirable background of each staff have been determined as shown in Table I.4: Number of Key Staff in Task Areas and Desirable Background. In determining the number of staff allocations, the level of knowledge and capability of the staff to be recruited in the future is assumed to be equivalent to or higher than that of six

staff members already assigned to the Unit.

Table I.4 Number of Key Staff in Task Areas and Desirable Background

	TASK AREA	NO. OF KEY STAFF	BACKGROUND		
			Econ.	Comm.	Eng. Sci.
ECONOMIC RESEARCH	Maritime Economics	1	x		xx
	Maritime Economics	1	xx		x
	Energy	1	x		xx
	Commodities & Goods	1	xx		x
	Techno-economics	1			x
	Financial & Operational Study	1		x	
SYSTEMS ANALYSIS	Maritime Transport & Canal Traffic	1	x		xx
	Maritime Transport & Canal Traffic	1	x		xx
	Maritime Transport & Canal Traffic	1	x		xx
	Maritime Transport & Canal Traffic	1	xx		x
	Financial & Cost Analysis	1	xx		x
	Financial & Cost Analysis	1	x		xx
	Project Evaluation	1	x		xx
	Project Evaluation	1	x		xx

Note: xx indicates higher priority than x.

Considering the capacity of the training program and also the availability of qualified staff from internal and external sources, the schedule for increasing the number of staff until March 1981 is tentatively laid out in Table I.5: Evolution in Number of Staff. These numbers listed should be flexibly revised in the future according to the performance of existing staff, quality of newly recruited staff, and needs of the SCA management and other departments.

Table I.5 Evolution in Number of Staff

	March, 1979	April, 1979		April, 1980	
		March, 1980	March, 1980	March, 1981	March, 1981
<u>Economic Research</u>					
Chief	—	1		1	
Staff	2	3		5	
Total	2	4		6	
<u>System Analysis</u>					
Chief	—	1		1	
Staff	4	5		7	
Total	4	6		8	
Number and specialization of new staff to be recruited		Economist	2	Economist	2
		Engineer	2	Engineer	2

4.2 Staff Qualifications

Manager, Economic Unit

- (1) Has a degree in engineering, preferably in civil engineering or mechanical engineering, and good working knowledge of English.
- (2) Over 45 years old; possesses working experience of over ten years in the industry and/or government offices in engineering, research and/or planning and also some experience in a supervisory or managerial position; working experience in the SCA is highly desirable.
- (3) Has strong motivation for research and planning function, not only through engineering and scientific disciplines, but through an interest in socio-economic analysis of subject matters.
- (4) Is capable of taking initiative and leadership and of motivating his subordinates in dealing with challenges and problems; must be a good coordinator to handle work assignments and human relations within his Unit as well as to maintain good working relations with other departments and sections.
- (5) Must also have capacity of being a good educator, counsellor and consultant for his subordinates, colleagues in other departments and senior management people, respectively.

Chief, System Analysis Group

- (1) Has a degree in engineering, mathematics, statistics or computer-related fields, and has at least intermediate technical knowledge and skills to work on quantitative information primarily for economic forecasting and systems analysis; also has good working knowledge of English.
- (2) About 40 years old; possesses working experience in the industry, government offices and/or academic institutions over 10 years, preferably in engineering, research and/or planning; working experience in the technical departments of the SCA over 10 years is highly desirable.
- (3) Must be interested in and motivated for working on systems- and economics-oriented research in dealing with data, analytical techniques, mathematical models and systems science.
- (4) Must have flexible attitude and capacity in dealing with problems and people, and in applying his knowledge and experiences to problem solving.
- (5) Be good at handling human relations, and interested in working with people and developing capabilities of himself as well as his subordinates by working on his duties.

Chief, Economic Research Group

- (1) Has a degree in economics with basic knowledge of economic analysis and forecasting; degree in engineering, commerce, accounting or business administration with strong interest in and orientation to economics is acceptable; also has good working knowledge of English.
- (2) About 40 years old; possesses working experience in the industry, government offices and/

or academic institutions over five years preferably in the fields of economics, market research and/or planning.

(3) Must be interested in organizing, coordinating and consolidating research work composed of different phases and tasks.

(4) Must have flexible attitude and capacity in dealing with problems, issues and people, and in applying his knowledge and experiences to problem solving.

(5) Be good at handling human relations, and interested in working with people and developing capabilities of himself as well as his subordinates by working on his duties.

Transport Analyst, Systems Analysis Group

(1) Has a degree in economics, statistics, mathematics or engineering, and has basic technical knowledge and skills to work primarily on maritime transportation problems, such as trade flow shipping cost, route cost, etc.; also has adequate working knowledge of English.

(2) Not over 35 years old; possesses working experience in the industry, government offices and/or academic institutions over five years in economic research, market research and/or planning.

(3) Must be interested in and motivated for working on research in the fields of maritime transport, shipping industry and world trade in dealing with data, and analytical and forecasting techniques.

Financial Analyst, Systems Analysis Group

(1) Has a degree in economics, engineering, mathematics, or statistics, and has basic technical knowledge and skills to work on statistical, accounting and financial data primarily related to the operation and management of the Canal; also has adequate working knowledge of English.

(2) Not over 35 years of age; highly desirable to have working experience in the SCA in the field of the engineering, transit, procurement, accounting and/or financing over five years; working experience in other departments of the SCA over five years are also acceptable.

(3) Must be interested in and motivated for working on the research related to the financial management of the Canal and investment analysis and evaluation by dealing with accounting and financial data.

Project Analyst, Systems Analysis Group

(1) Has a degree in civil engineering, but a degree in other fields of engineering, mathematics, statistics or computer-related fields may be accepted, and desirably has intermediate technical knowledge and skills to work on economic, financial, accounting and engineering data; also has adequate working knowledge of English.

(2) Not over 40 years old; highly desirable to have working experience in the technical department(s) of the SCA at least over five years and some experiences in project planning, implementation and evaluation.

(3) Must be interested in and motivated for the application of systems analysis and management science techniques primarily to project evaluation or investment analysis.

Maritime Economist, Economic Research Group

Trade Analyst – General, Economic Research Group

(1) Has a degree preferably in Economics, but a degree in engineering, commerce, accounting or business administration with strong interest in and orientation to economics is acceptable; also has adequate working knowledge of English.

(2) Not over 35 years of age; possesses some working experience in the industry, government offices or academic institutions preferably in the fields of economic and/or market research or planning. Familiarity with shipping and/or trading business is highly desirable.

(3) Must be interested in and motivated for research work dealing with economic, industrial and political aspects of international trade and shipping business.

Trade Analyst – Energy, Economic Research Group

(1) Has a degree preferably in engineering or science, but a degree in economics is acceptable; also has adequate working knowledge of English.

(2) Not over 35 years old; highly desirable to have working experience in petroleum or petroleum-related industry; familiarity with the structure of supply and consumption of oil in the world is also highly desirable.

(3) Must be interested in and motivated for research work dealing with economic, industrial and political aspects of supply, consumption, competition with other sources of energy, trading and shipping in petroleum and petroleum-related industry.

Techno-economist, Economic Research Group

(1) Has a degree in engineering with strong interest in economic and financial analysis; has basic technical knowledge primarily on transportation equipment and shipbuilding technology and industry; also has adequate working knowledge of English.

(2) Not over 35 years old; has working experience in the industry, government offices and/or academic institutions over five years, preferably in engineering, research and/or planning fields.

(3) Must be interested in and motivated for working on technology and its development in the fields primarily related to the transportation of goods and materials, and technical and economic implications of the technology and its development to the operation of the Suez Canal.

Operations Analyst, Economic Research Group

(1) Has a degree in engineering, economics or commerce, and has basic knowledge to understand accounting and budgeting documents primarily related to the operation of the SCA; also has adequate working knowledge of English.

(2) Not over 35 years of age; highly desirable to have working experience in the SCA in the field of transit operations, accounting or budgeting over five years are acceptable.

(3) Must be interested in and motivated for working on the research related to the traffic of the Canal and operation of the SCA in dealing with data related to the Canal transit, transit revenue, accounting and budget.

PART II

**ROLE OF THE PRESENT TECHNICAL COOPERATION PROGRAM
IN DEVELOPING THE ECONOMIC UNIT**

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CHAPTER 1 INTRODUCTION

In the preceding Part I a set of recommendations was presented to the Suez Canal Authority concerning organizational problems of the Economic Unit. Explanations were made on the technical details of the following problems;

- (1) Objectives and framework of developing the Economic Unit
- (2) Functional areas and division
- (3) Organizational structure of the Economic Unit and its developmental stages
- (4) Research tasks of the Economic Unit and its work procedures
- (5) Production of research output
- (6) Job descriptions of major research job positions
- (7) Size of the Economic Unit, staffing and qualifications of the staff members.

It is understood that the technical cooperation program spelled out in Scope of Work (concluded in June 1978 between the SCA and JICA) was designed to serve the purpose of assisting the SCA to establish and develop an Economic Unit within the SCA organizational framework. As a means to achieve this goal, the first year technical training program was already carried out in Japan during the period of October ~ December 1978 for the participants who were selected by the SCA.

However, it must be noted that the objective of establishing and developing the Economic Unit will only be achieved through continuous efforts of its staff members and organizational support of the SCA. The technical cooperation program which will be extended to the SCA by JICA, is limited to the role of assisting the SCA to achieve the objectives by means of the technical training programs, which will be carried out in Japan, as well as at the SCA, for the remaining years.

In Part II detailed explanations will be provided as to what kinds of training programs are planned to be given to the Economic Unit's staff members by JICA. It is strongly urged that the SCA formulate a personnel training program of its own in line with the framework of the training program proposed in this paper.

Therefore, it should be kept in mind that what will be explained in this Part ought to be interpreted as a general plan of the training program which should be implemented by both parties concerned; i.e., the SCA and JICA. It is not intended that all of the training program suggested in this Part will be carried out under the technical cooperation program proposed to the SCA by JICA. It is advised that the SCA carry out a training program of its own for the staff members of the Economic Unit. In this respect the general outline of the training program explained in this Part can be used as a guideline or reference by the SCA.

As was defined in the Scope of Work of June, 1978, the technical cooperation program is planned to continue for three years. An overall training program will be explained in this Part on matters concerning the following:

- (1) A general framework of the technical cooperation program that is planned to be extended to the SCA by the Japan International Cooperation Agency (JICA) on behalf of the Japanese

Government.

- (2) A general outline of the training programs that should be carried out both by the SCA and in the technical cooperation program proposed herewith in this paper.**
- (3) A tentative three year training schedule**
- (4) An outline of the first year training program which was already executed in Japan**
- (5) Recommended on-the-job training that should be undertaken at the SCA**
- (6) Problems that should be considered when the training programs will be designed for the following years.**

What kinds of specific training programs will be carried out at each stage will be defined in the Scope of Work that will be agreed upon each year between the SCA and JICA.

CHAPTER 2 A GENERAL FRAMEWORK OF THE TECHNICAL COOPERATION PROGRAM

The general framework of the technical cooperation program was already explained in the Scope of the Work of the Technical Cooperation Program for the Planning and Research Department, which was agreed upon in June, 1978, between Dr. A. Ammar, Director of the Planning and Research Department, SCA, and Mr. Shoji Ishizuki, Head of the Japanese Contact Mission, Japan International Cooperation Agency (JICA). The technical details of how each component activity of the cooperation program spelled out in the Scope of Work, will be implemented were also explained in the Inception Report on the Technical Cooperation Program which was submitted to the SCA by the Japanese Survey Team (JST) in July 1978. There is no need to elaborate further here and reiterate what was already agreed upon between the two parties concerned. However, it must be reemphasized that;

- (1) The objectives of the technical cooperation will only be, as frequently stressed, accomplished through joint and concerted actions and efforts of the SCA and the JICA.
- (2) Despite the fact that the cooperation program will last for three years, during which time the objectives set forth in the Scope of Work were planned to be achieved, the specific programs for each year must be renewed annually and confirmed by the JICA because of the budgetary decisions required for the Japanese Government for each fiscal year.
- (3) To what extent the objectives will be accomplished and what kind of specific programs must be designed in detail will, in a large part, depend upon what kind of persons are recruited by the SCA and how much these recruits progress each year.
- (4) For these reasons the specific contents of the general framework of the technical cooperation program will be subject to change and never considered to be fixed. They should be deemed flexible so as to be able to accommodate any changing requirements and conditions.

With these remarks and reservations in mind, the following pages provide brief explanations as to what are the specific objectives of the cooperation program, what kind of programs are considered desirable to achieve them, and how they are planned to be carried out.

2.1 Objectives of the Technical Cooperation Program

The objectives of the present technical cooperation program can be defined as follows:

- (1) To firmly establish the Economic Unit within the organizational framework of the Planning and Research Department of SCA, so that the required functions and tasks, explained in the previous Part, will duly be performed:
- (2) To expand and enhance the research and analysis capability of the staff members who were recruited and will be assigned to positions in the Economic Unit.

For the first objective, management education, on-the-job training at the SCA and consultation

services will be offered to the SCA by the Japanese professionals. However, it must be understood that the objective of establishing the Economic Unit within the SCA as a viable, stable and long-lasting Unit will only be achieved through continuous efforts, whole-hearted support and mobilization of the organizational resources of the SCA as well as of the JICA, and that roles of outside consultants are naturally circumscribed to provide professional support, advice and assistance to the SCA. In this regard the joint actions and efforts of the parties concerned are viewed as a prerequisite for making the Economic Unit a viable organization within the SCA.

For the second objective, technical training programs will be offered in Japan for three years to the trainees who are to be selected by the SCA. On-the-job training will also be conducted at the SCA for the same period. The training curricula are to be designed to meet the purpose that the technical knowledge and skills necessary to perform the Economic Unit's tasks and functions will become sufficiently acquired by the trainees during the cooperation period. It is desired that at the end of the training period the trainees will be able to become self-supportive and capable of playing positive roles within the SCA. However, special attention must be drawn to the following points;

(1) In the technical cooperation program primary efforts will be directed towards achievement of the second objective, i.e., acquisition, development and enhancement of the research capability of the Economic Unit's staff members, for it is believed that the organizational ability of the Economic Unit is largely determined by how much its staff members will become capable of performing its functions.

(2) In this respect, the research output planned to be produced by staff members of the Economic Unit will have considerable importance in the present cooperation program, because it is believed that; 1) they will acquire necessary knowledge and skills quickly by actually engaging in the research activities; 2) the learning process will be greatly expedited by "simulated practice" of the research output production; and 3) routine research jobs will be gradually established within the Economic Unit.

It must be recognized that how well the objectives of the training can be accomplished will be determined by various interacting factors which will affect a learning process of a trainee, such as his personality, motivation, level of his previous training and experience, his general aptitude and ability, the type of the training methods used, duration of the training, and so on. Some of these elements can be controlled by a training institute and others cannot. The schematic relations of the objectives of the present technical cooperation program and methods to achieve them are shown in Figure II.1: Objectives of the Technical Cooperation Program and Methods to Achieve Them and II.2: Ability Elements and Training Programs. Since these Figures are considered self-explanatory, no further explanations will be made here.

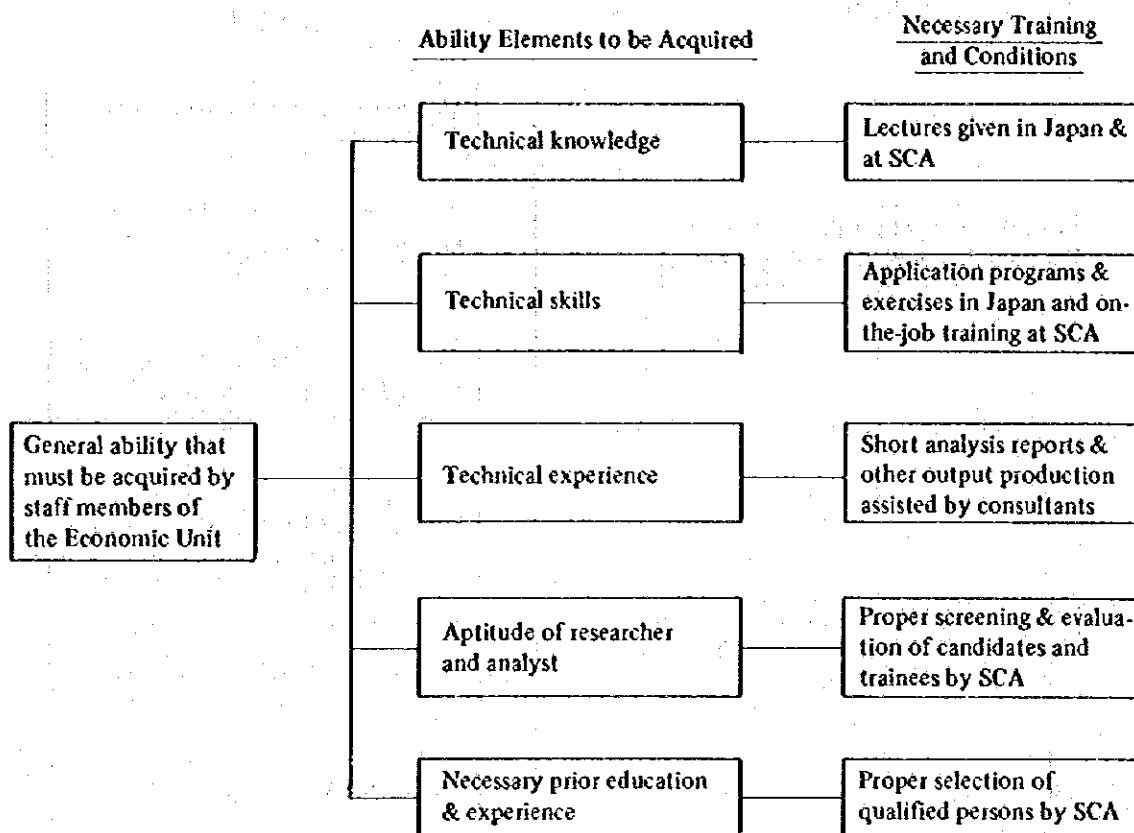


Fig. II.2 Ability Elements and Training Programs

2.2 Availability of Human and Organizational Resources

It must be taken for granted that for its success any training program will depend upon what kind of favorable conditions exist for the program. In this respect, it will be understood by the SCA that the extent to which objectives set forth in the previous section will be accomplished depends in large part upon who will be selected by the SCA for the staff positions, and also upon how much organizational support will be given to this program by the SCA. In this regard careful consideration should be given to the following:

(1) As suggested in Section 4.2 of Part I, it is highly desirable that those people who will be recruited to the Economic Unit have the following qualifications; a) university graduates specialized in any of the following fields, viz., economics, managerial accounting, engineering, statistics, computer science and other science fields, b) relatively young enough to quickly absorb new technical knowledge and skills, c) worked for several years at the SCA so that they are already familiar with its operational problems, d) sufficient degree of English proficiency in understanding technical subject matters.

(2) Although the Japan International Cooperation Agency (JICA) will make a recommendation to the SCA as to the qualifications of personnel desirable for the Economic Unit, the final judgment and selection will be made by the SCA.

(3) Depending upon who will be selected for the Economic Unit, the types and length of the training program to be required will inevitably change. Therefore, the training program suggested in this paper should be regarded as a general framework within which detailed program contents will be decided at each stage by taking into consideration the qualifications of those who will be selected and how the training program has progressed.

(4) No technical cooperation program will become successful unless it is fully supported by the parties concerned. It must be kept in mind that the present program is no exception and requires joint and concerted actions of both organizations.

2.3 Policies of the Training Program

The proposed technical training program will be characterized by the policies, methods and strategies to be used to implement the training objectives set forth, under the conditions where it is hard to find well qualified personnel within and outside of the SCA. The training must be conducted both in Ismailia and in Japan. The policies adopted in the present program should be clearly spelled out as follows:

(1) The stepwise approach is adopted and the training starts from the basic training curricula which will be taught to all of the participants in the first year and gradually shifts to more specialized and advanced fields of training at later stages.

(2) The "product-oriented" training method is used in order to achieve the purposes that; a) production of the research output and training will become effectively combined, b) routine research jobs will be created during the training period, c) the learning process will be expedited through "doing actual research work" by themselves, and d) the participants will be able to develop a sense of purpose, goal and achievement orientation.

(3) Pragmatic, interdisciplinary and problem-solving approaches are to be adopted in view of the concrete and immediate needs of solving SCA management problems.

(4) Lecture and problem exercise sessions will be effectively combined so that theoretical knowledge of the required subjects will be directly translated into the research and application problems of the SCA.

(5) Activity or action oriented method is used in such a way that practical skills will be quickly acquired by the participants so that they become capable of carrying out the entire process of a research project.

(6) The so-called "micro-approach" is used with the view to training the staff members who directly contribute to the "organization building" of the Economic Unit, and the training program will be carried out in relative isolation from the intraorganizational problems of the SCA.

(7) The training curriculum will be made flexible and adjustable to meet the qualifications and specific needs or requirements of the participants.

(8) The training program in Japan will be directly linked with on-the-job training at the SCA,

with a sufficient length of interim breathing period during which time the participants will be able to perform double tasks; viz., reviewing and supplementary study of what they have already learnt and preparations necessary for the succeeding training program.

(9) A series of group sessions will be held to establish group spirit or sense of team work among the participants.

2.4 Training Principles and Methods

Viewed from the vantage point of experiences and lessons accumulated over the years at various training institutes in Japan as well as in foreign countries, the following principles and methods of training will be selectively used in the present training program in Japan:

(1) In all training programs emphasis will be placed on practical techniques and problem-solving approaches, and formal classroom lecture sessions will be greatly reduced.

(2) Participant-centered training methods will be used such as workshops, group and team-centered discussion groups, case studies, individual exercises and assignments, etc.

(3) Self-training programs of sufficient length will be provided to the participants in the period between the end of the training in Japan and on-the-job training at the SCA.

(4) Necessary preparations will be made to "train trainers" so that training staff will develop; a) an open personality that responds to the needs of the SCA and the participants, b) an ability to utilize a variety of teaching methods as circumstances require, and c) an ability to establish personal rapport so that training will be considered as a shared responsibility and concern of the parties involved.

(5) The participants must become motivated to learn new skills and knowledge. The learning process and results should be checked and feedback to the succeeding stage. The materials to be learned should be developed by stages with feedback corrections at each stage. Learning by doing will be stressed.

(6) A variety of training courses such as orientation, induction training (portal or vestibule training), refresher training and re-training courses will be effectively combined, depending upon who will be selected for the Economic Unit.

2.5 Research Output Planned to be Produced

As explained in Section 3.2 of Part I, the present technical cooperation program is characterized by stress placed upon "production of research output" to be produced by staff members of the Economic Unit during the training period. This approach serves the following purposes:

(1) Actual research work will be created and gradually routinized as "jobs" so that the staff members will be able to have concrete job requirements to be fulfilled. By expanding the amount of output to be produced and upgrading the output quality the Economic Unit as "a system of

research activities" can be firmly established within the SCA. This is a strategic policy chosen by the JST (the Japanese Survey Team) for O/B and O/D purposes (Organization Building and Organization Development.)

(2) Training can establish in the trainees' minds an attitude of "achievement-orientation", "sense of role and goal", "job-awareness", "sense of motivation", etc.

(3) The results of the Japanese technical cooperation efforts can be objectively evaluated through tangible performance measurement of research output.

(4) A central target or focus will be generated in the cooperation programs and every activity can be geared towards attainment of the objective to produce research output which is judged to be relevant to information requirements of the SCA.

(5) By means of "learning by doing" the trainees' learning process can be greatly expedited.

It is planned that necessary prior preparations will be made during the period of January ~ March 1979 and that the Economic Unit can initiate its output producing efforts during the period of April ~ June 1979.

The types of research output planned for production are listed in Table II.1: Research Output Planned to be Produced by the Unit. A few remarks should be made concerning this Table.

(1) These are tentative plans for the products that are judged to be topics or themes of considerable importance for the SCA. How many of them will actually be produced will in a large measure depend upon the SCA's support and capabilities acquired by the trainees.

(2) Subjects or topics of research output will be allocated either to individual staff members or to the groups, Economic Research and Systems Analysis, depending upon the types of research activities required.

(3) In selecting the topics and subject matters of products for each year, the best effort will be exerted to weigh priorities in the SCA's information requirements.

(4) However, major subject matters will be selected from those which are directly related to actual problems of the SCA, external and internal, and upon which forecasting and analysis methods could productively be applied.

(5) The output volume will be enlarged and its quality will be improved as the training program progresses.

Table II.1 Research Output Planned to be Produced by the Economic Unit and Supporting Materials

	~ March, 1979	April, 1979 ~ March, 1980	April, 1980 ~ March, 1981
Output	Economic Research	<ol style="list-style-type: none"> 1. Selected extracts of important environmental information related to the Canal activities from various sources 2. Abstracts of information on world trade, seaborne trade and the Canal transit, and brief analysis reports 	<ol style="list-style-type: none"> 1. Gradual up-grading of the quality of output 3. Forecasting of technological development in maritime transportation
	System Analysis	<ol style="list-style-type: none"> 1. Reports on short-term forecasting of the Canal transit volume (Elementary) 2. Reports on short-term forecasting of transit revenue (Elementary) 3. Introductory review of the feasibility studies previously submitted to SCA 	<ol style="list-style-type: none"> 1. Up-grading reports to higher quality 2. 3. 4. Reports on long-term forecasting of transit volume of tankers and non-tankers
Supporting Materials	<ol style="list-style-type: none"> 1. Textbooks for training in Japan 2. Report on the study of organization and function 3. Data handbook (I) 4. Manual for short-term forecasting (I) 5. Introductory long-term forecasting methods for tanker transit 	<ol style="list-style-type: none"> 1. Data handbook (II) 2. Manual for short-term forecasting (II) 3. Intermediate long-term forecasting methods for tanker transit 4. Introductory forecasting methods for non-tanker transit 	<ol style="list-style-type: none"> 1. Data handbook (III) 2. Manual for short-term forecasting (III) 3. Intermediate long-term forecasting of non-tanker transit 4. Project evaluation