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A MANAGEMENT ACCOUNTING & REPORTING SYSTEM



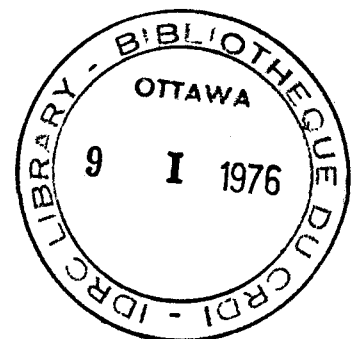
FOR
INTERNATIONAL
DEVELOPMENT
RESEARCH CENTRE

P. S. ROSS & PARTNERS
MANAGEMENT CONSULTANTS

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February, 1973

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February 27, 1973

Dr. W. David Hopper
President
International Development Research Centre
2197 Riverside Drive
Ottawa, Canada

Dear Dr. Hopper:

We are pleased to submit our report entitled "A Management Accounting and Reporting System for International Development Research Centre". This report, which is the result of two months of investigation and analysis is intended to provide a basis for management planning of the reporting process necessary to support program management activities, as the Centre moves towards a level of equilibrium which has not yet been achieved.

Throughout this study, we have appreciated the candor and cooperation with which you and your Directors have discussed plans, options and styles of operation. Our recommendations have taken these into account as fully as possible, recognizing the uncertainties which must surround the planning process in a growing organization. The close working relationship which we established with your Comptroller, Mr. R. Audet, and with the Project Coordinator, Mr. J. Laidlaw, also have been invaluable, as the detailed statements of requirements began to be developed.

... /2

Dr. W. David Hopper

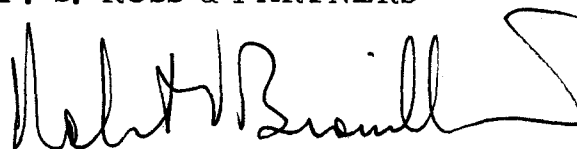
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February 27, 1973

We trust that our efforts commend themselves to you. We have enjoyed this opportunity to work with you and your management and hope that we may be of service again in the future.

Sincerely,

P. S. ROSS & PARTNERS

A handwritten signature in black ink, appearing to read "Robert V. Brouillard". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Robert V. Brouillard
Principal

RVB:bm

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I. INTRODUCTION

In December, 1972, P. S. Ross & Partners began a study to examine the existing accounting and reporting system of International Development Research Centre, in terms of the long-term needs for management information and the possible requirements for computer power to meet these needs. Our investigation was to include an examination of other possible requirements for computing power as well, so that a rational overall policy in this area could be developed for future needs.

As a result of our investigation, we believe that we have developed a good appreciation of International Development Research Centre and its long-term requirements. Our work has included interviews with senior management, an examination of the existing accounting and reporting system, an examination of the program management process and an investigation of other computer requirements.

We have examined the Centre's current plans for future growth and have assessed the range of options which the future may present. Our findings and recommendations which are presented in this report reflect our conviction that International Development Research Centre requires a management reporting system designed to support the more complex requirements of program management in the 1970's but capable of introduction gradually, as both size and sophistication increase.

II. OBJECTIVES

The objectives of this report are:

- * To specify the information requirements for the management of the programs of International Development Research Centre.
- * To describe the structure of a recommended management accounting and reporting system.
- * To present a plan for the detailed design and implementation of this recommended system.

III. THE EVOLVING INFORMATION REQUIREMENTS

International Development Research Centre is a young organization unique in the field of international aid. Its principal objective clearly centres upon research to benefit people living in rural communities in low-income countries. The Centre places great importance on encouraging research workers in the developing countries to undertake the prime responsibility for identifying and organizing the research activity. In this regard, the Centre's philosophy is less one of direct knowledge transfer from the more developed to the less developed countries than one of knowledge development, gained through the grantee's self-management, with substantive reviews of the project by the Centre as the work proceeds.

The Centre has divided its program into four divisions:

- * Agriculture, Food and Nutrition Sciences,
- * Population and Health Sciences,
- * Social Sciences and Human Resources, and
- * Information Sciences.

There is close cooperation between the Centre and other international development institutions, particularly the Canadian International Development Agency. The activities of the Centre and C.I.D.A. do not directly overlap, but every attempt is made to ensure a maximum of coordination between these two Canadian agencies. In fact, the Centre administers two large agricultural projects for C.I.D.A. In addition, the Information Sciences division is working closely with United Nations agencies and others in the building of global networks for information exchange in the development field.

In the longer term, the growth of the Centre will be closely tied to the continued expansion of the Government of Canada's overall policy for aid to developing countries. Indeed, with the exception of relatively minor amounts of investment and other income, the Centre currently receives all its income as a grant from the Government of Canada. IDRC has shown a pattern of rapid growth in grant income over its short history from \$1.4 million in 1971 to \$8 million in 1973. The 1974 grant is expected to be approximately \$14 million. The Centre's management anticipates

substantial growth to continue for the next few years. If this does happen, the Centre could easily rival the external aid branches of the Ford Foundation and the Rockefeller Foundation in levels of their present expenditure.

The organization structure of the Centre has evolved to support two principal functional areas: the program function itself, which is responsible for the identification and management of projects and the administrative function which acts in support of the program areas. The executives in the program areas are professionals in an appropriate discipline. In addition to their role of identifying and managing projects, their professional expertise has made it possible for them to make major contributions to international progress in the field of research in the sciences and technologies of development. The professional qualifications of the particular program executive has a profound effect on the managerial style of the program.

In an environment which must be strongly program-oriented, capable administrative executives provide an important balance in the control of program activities. In both accounting and program control, professional knowledge is applied to the management functions which administer the affairs of the Centre.

Although the program content of the divisions is diversified, the basic steps in the life cycle of a project are generally similar. Projects evolve from an initial concept to a formal request from the prospective grantee, through a review by the Projects Committee to approval by the President, Executive Committee or Board of Governors as required. Finally, the grantee is notified of the award and his approval of the grant conditions is received. This process is linked closely with the accounting and reporting system. When projects are approved by the President, Executive Committee or Board of Governors, funds are considered to be appropriated to that project. When the grantee communicates his acceptance of the grant conditions to the Centre, funds are considered to be committed to the project. Disbursement of the funds follows the receipt of the grantee's acceptance, but in many instances the grant will be disbursed in installments over a period of years. The method of funding differs among projects. Some funds may be disbursed entirely to the grantee; some funds may be disbursed entirely by the Centre; and there may be a combination of the two within a single project. Although the Centre budgets yearly on an appropriation basis, the mode of operation clearly presumes that future years' revenues will be used to pay for the commitments made in earlier years, since the average life of a project is currently approximately three years. In addition to the normal grant, the Centre also engages in

program activity support projects. These consist of two main types, consultancies, and meeting workshops and conferences.

The management style of the Program Directors varies with the programs they administer. Program Directors have considerable discretion in allocating their budget to activities and world areas. The emphasis in the early stages of the life of the Centre has largely been on the identification of worthwhile projects. As the Centre's program matures, the early projects will begin to draw to a close. As this happens, the Centre will begin to look at evaluation of the results of the projects in terms of social and economic impact measurement, research performance evaluation and benefit/cost. The management practices used to accomplish this will vary, depending upon the type of projects and the method of funding. For example, although all projects are budgeted, financial monitoring of projects on which funds are fully administered by the grantee can only occur after at least a portion of the funds have been spent.

In the early years of the Centre, funds were abundantly available for projects. In future years, the Centre's management expects that the rate of growth of available funds will tend to level off, so that the grant income received from the Federal Government will become a relatively stable percentage of Canada's total aid budget. Concurrently, however, as the Centre emerges as a leader in the field of foreign development through research, the demands on the Centre for funds will increase and the program areas will be forced to select projects in an increasingly rigorous manner. Under these circumstances, detailed information on both results and costs will be required so that intelligent decisions can be made in the evaluation and selection of new projects.

Administrative functions are of two distinct types. On the one hand, a local administration function is associated with each program area. Program administration costs are considered to be all costs within a program area which are not spent directly in respect of projects. On the other, the general administration services support all program areas. Administration costs of all types are likely to grow in the future, although not at the same rate now that the basic services are established. Nevertheless, close attention will be necessary to control these costs in this area, so that administrative functions may be broken down into functional areas to permit some measure of performance evaluation to take place.

Two Vice-Presidents are responsible for relations with other donor agencies and for liaison with foreign governments and agencies in

the countries where grants are being made or contemplated. Furthermore, the Centre has set up regional offices in several centres and anticipates some future growth in these centres. Although the information demands of the two Vice-Presidents and the regional offices has not been great so far, the demand for information by region concerning expenditures, the projects funded or under consideration, cost performance and results obtained will increase as the Centre grows.

In an environment where projects are initiated from four different program areas and from all corners of the globe, the monitoring of project progress from initial concept to final acceptance by the grantee is essential. The Project Coordinator is responsible for ensuring that all requirements are met as the project passes through the various stages, up to the point where the project becomes a commitment. The Comptroller ensures that key progress information is presented as requested before funds are disbursed. However, as the Centre expands, some central coordination of the progress of the projects beyond the commitment stage is likely to be necessary as well. This monitoring would involve the collection of data against a series of phases or events in the project cycle. These phases or events may be defined in terms of reports due, project visits required or a variety of unique measures related to the particular project, as defined by the Program Director. The nature of the monitoring process should vary not only for reasons of content and organization but for valid reasons of style of management since each Project Director requires slightly different types and levels of reporting. As the Centre grows, the style of management may continue to evolve and management requirements for information also may change. These conditions prescribe flexibility as the key factor in designing systems to meet the monitoring requirements.

The current reporting system at the Centre has two main components, monthly financial statements and the Governors' newsletter. In addition to the balance sheet and statement of income and expense, the current financial statements present information at the activity level regarding appropriation budgets and actual appropriations, commitments, and expenditures. This level of financial information was certainly adequate for the Centre in its infancy. The number of projects under administration was not great and the managing of projects in large part could be accomplished with relative ease. However, greater needs have already been identified by management and, as the Centre grows and cash available for new projects becomes increasingly scarce, it will become necessary to develop more formal yardsticks for measuring prospective projects, and for assessing performance on projects either in progress or completed. The accounting department will be expected to provide further analysis of the data. If this information is not forthcoming, the program areas will attempt

to develop the information they require, with consequent results in terms of duplicate or conflicting records. In designing a reporting system which looks to the future years, the Centre must foresee this change in management information requirements and plan to be ready to meet these new needs.

The treasury function which is responsible for the management of the Centre funds will become increasingly important in the future. As the Centre expands, more sophisticated cash planning and budgeting will be required. The timely and prudent investment of funds will become increasingly critical as the gap between the supply and the demand for funds narrows. Since the inception of the Centre, the demand for funds has fallen short of the supply because of the time slippage in project progress. These experiences are now part of the Centre's planning process, however, and, combined with its growing recognition as a development agency, the Centre may find itself requiring more cash than is available, for immediate disbursements. Sound cash planning practices will serve to assist in this process of allocating scarce funds.

In preparing a concept of an accounting and reporting system which will meet these future needs, one must understand the constraints under which the Centre's budget operates. Unlike organizations which begin their budgetary process by listing expenditures, the governing factor in the IDRC budgetary process is the level of funding to be received. Once this is known, the Centre is able to define its cash availability for new projects. Because the outflow of funds on projects takes place over a series of years, the Centre will always appropriate more dollars to projects than it has cash available in the current year. It can be clearly seen, therefore, that a balance must be achieved among appropriations, commitments and cash flow. As the Centre grows, the careful integration of all three factors with the proposed cash budget for future years will be a key management activity.

In summary, management's demands for timely information can be forecast to expand rapidly. The demands for the Centre's limited funds are increasing and management must have some means of assessing the social and economic benefit of projects, whether before award, during execution or on completion. Information will be required to measure the projects as they progress through the stages from conception to completion. More detailed analysis of costs will be required and information on the costs of administering individual projects will be of value to management. All these objectives must be accomplished in an unpredictable environment of professional and managerial change and growth. It is to this set of requirements that we have directed our design

efforts. The next section of this report explores the concept of a recommended reporting system which will enable the management of IDRC to meet this challenge.

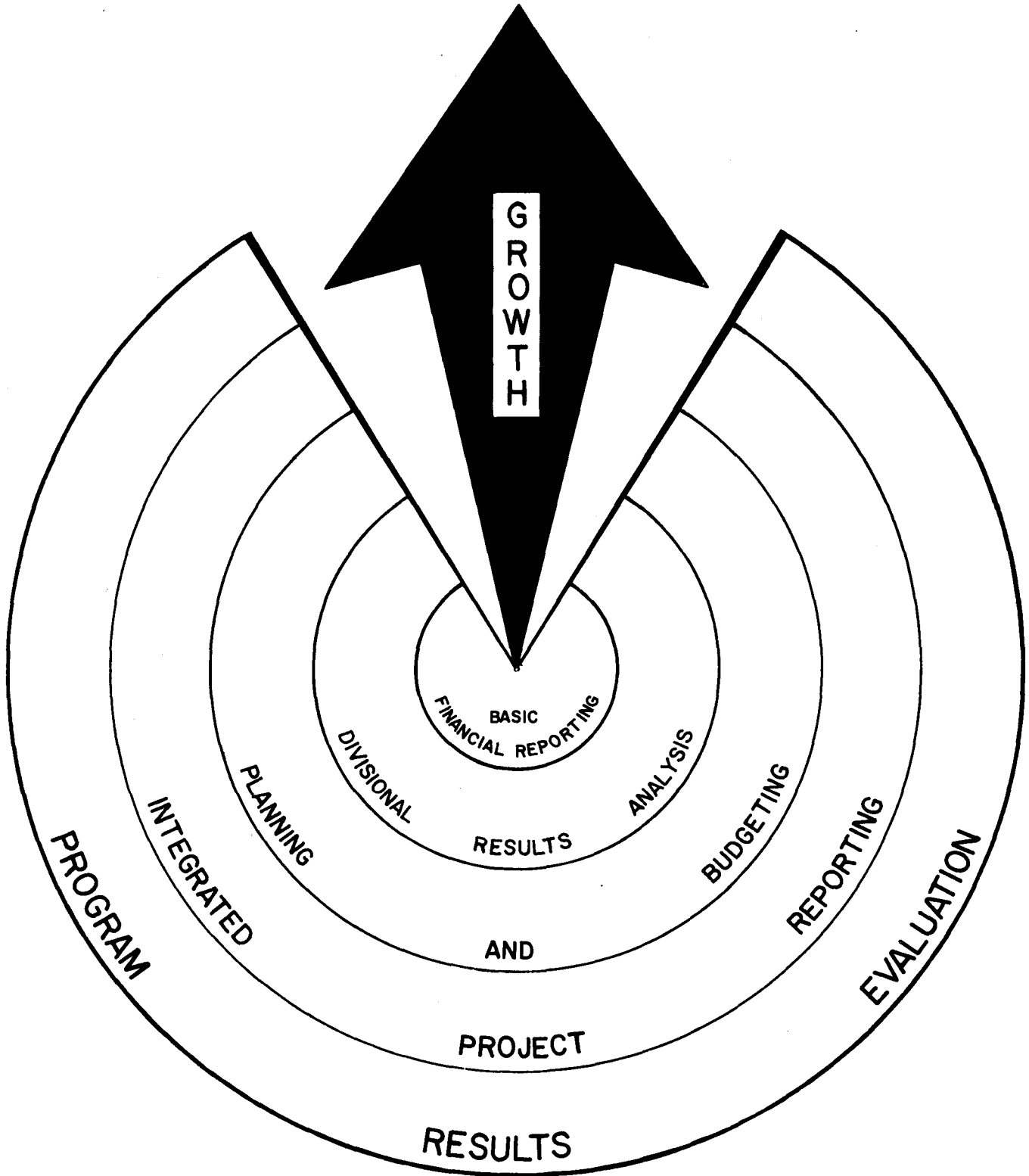
IV. THE CONCEPT OF THE RECOMMENDED SYSTEM

In the light of the requirements identified previously, the overall objectives of the recommended management accounting and reporting system must be to provide the Centre with the means to manage successfully a variety of programs and to formulate policy based on the best information available. In designing a system to meet these basic objectives, a variety of design criteria were established against which the design would be evaluated. These criteria are:

- * Adaptability to the evolution of IDRC from infancy to maturity as an aid organization, in terms of changes in approach to the provision of aid and the change in information requirements for qualitative and quantitative evaluation of program plans and results.
- * Capability to support increasing sophistication as the demands for information by management increase both in selectivity and in rigour.
- * Ability to provide information for effective control and evaluation of projects and programs undertaken.
- * Ability to generate a reporting system which is consistent at all levels of management.
- * Ability to produce information for effective financial planning and budgeting.
- * Compatibility with a variety of management styles and management service functions.

In the development of an effective management information system, it is essential to recognize that many requirements must be satisfied. These requirements, in the case of IDRC, range from the mandatory recording of basic financial data and the evaluation of Financial Statements to the evaluation of the effectiveness of current programs and projects. Exhibit 1 shows a hierarchy of reporting through with the management process of IDRC should evolve, in terms of the information demands which

THE IMPACT OF GROWTH ON REPORTING REQUIREMENTS



management will make. At the centre, the basic financial records support the production of financial statements. This information activity cannot be considered highly sophisticated but it is essential from an executive and management viewpoint. Associated with this first level is the information necessary to provide for the fiduciary control of the Centre assets. In the second circle the reporting of expenses by object is added, as well as the ability to separate costs into divisional elements. The third circle represents the capability of management to extract information for planning and budgeting and to measure performance against these plans, both for projects and for administrative activities. This level also introduces the concept of commitments, in terms of the funding of programs, projects and administration overhead. The next circle provides for the integration of financial and non-financial management in a unified structure which will enable individual control functions to be carried out while supporting the interrelated function of cash flow forecasting of expenses based on commitments. Basic program performance data would begin to be available at this level as well, so that the early elements of a program evaluation system can be established. The attainment of the outside circle will involve a recognition that the apparently independent reporting system of the lower levels are in reality closely related and interdependent. The qualitative evaluation of results can be linked with a variety of measurable data and, by examining the relationships between projects and analyzing all the information available, management can perform the difficult program evaluation and performance measurement functions by which every management must assess its own performance.

The usefulness and reliability of a reporting system are related directly to the quality of the data that it has available. In attempting to build an effective system, therefore, the first step is to specify the information required and ensure that it is collected and stored. In a properly integrated system, the information is collected only once and used to compile a variety of different reports to satisfy many users. The fundamental requirement is that all users receive reports which are developed from the same basic information. If this is not accomplished, management's faith in both the information itself and in those who produce it will be shaken.

Recognizing that management must plan for the future, it is apparent that this system must contain the capability of evolving through the various levels of sophistication previously discussed, without necessarily incorporating all the features at this time. The means of achieving this is to establish now the items or the nature of the items to be collected and held. In this regard, three groups of items must

be considered:

- * Data required for current established reports.
- * Data required for proposed reports that will be implemented during the next one to three years.
- * Data required for reports and analyses which have not been completely formulated but which can be anticipated in general terms.

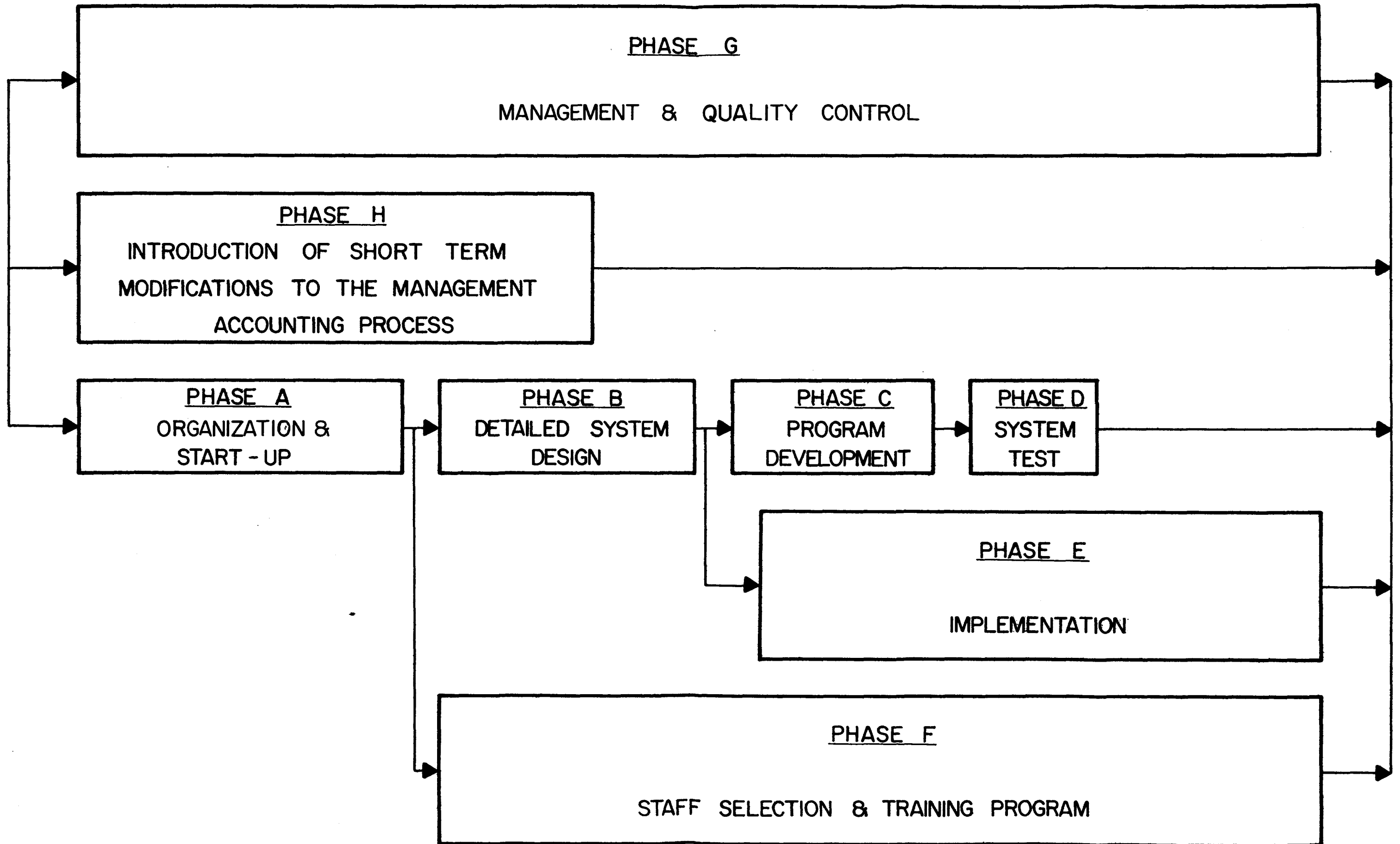
These requirements can be viewed in terms of the structure of a management accounting and reporting system, not all of which is required immediately. Exhibit 2 demonstrates the process by which the reports can be represented in terms of their purpose and construction.

The reports to the left in Exhibit 2 contain data which reflects the Centre's financial and program plans. The information for these reports is generated from current projects information, from information concerning anticipated projects and from anticipated future revenues. The information contained in this series of reports will be used by senior management to formulate the longer term growth plans for the next few years. Information contained in these reports is also required by the Treasurer to make investment decisions and manage the general level of funds held by the Centre.

The results reports displayed in the centre of Exhibit 2 present a variety of information which is useful to several levels of management internally and which is necessary for reporting externally. In this set of reports, project information is available from the project level itself through the divisional summary level to the overall summaries for the Centre. Information also is presented for administrative areas. The information is presented in a manner which enables management to assess the level of expenditure and monitor performance against budgeted expenditures and committed amounts. Summary financial statements also are provided for management purposes and for reporting to other interested parties.

The evaluation reports displayed to the right in Exhibit 2 present the greatest difficulty. These reports are intended to combine information on expenditures, relating them to a specified set of objectives to arrive at indicators for measuring performance. It is at this level that the Centre must undertake the developmental work necessary to identify the most relevant factors to be measured in order to arrive at a satisfactory basis for measuring the success of its projects.

AN OVERVIEW OF THE IMPLEMENTATION PLAN



The vertical hierarchy of Exhibit 2 presents the organizational implications of the proposed reports. The first stage, which is not shown in the diagram, is the collection of raw transaction data which is subsequently grouped in a logical manner to provide individual project reports. A further upward grouping provides reports for each Activity and Division and, ultimately for executive management. It is axiomatic that the completion of projects and the evaluation of program accomplishment is of primary importance to the Board of Governors and the senior management of the Centre. This will be accomplished only if effective project monitoring is maintained. In this regard, a fundamental requirement in the operation of the reporting system is the integration of the program project information of both a financial and a status nature. Project monitoring must be performed at the program level by those members of IDRC staff who are familiar with the nature and objectives of a project. The degree to which effective project monitoring can be carried out varies with the grantee and with the program area and can be assessed appropriately only at the program level. Future management policy and decision making requires that the information available from this process be collected and presented for analysis and subsequent reporting. Accordingly, we envisage that the Project Coordinator will play an even greater role in the future by assisting in the collection and dissemination of data. This proposed style of operation for IDRC is consistent with the maintenance of a central display showing the status and plans for all Centre projects. In terms of the development of the information base, IDRC personnel will require familiarization with the processes by which important data for monitoring the completion of planned events in the life of a project and for financial planning are to be made available.

The approach recommended in the design of this management accounting and reporting system involves the establishment of an information base containing all the information required to produce the variety of reports. The important characteristic of this information base is that one source of information will be used and rearranged as required in different sequences and/or summaries. In a manual system this can be done when the volume of data and the number of reports are both low. The data volumes and the variety of reports required by IDRC cannot be produced using manual techniques. Therefore, in this information base concept, we anticipate that IDRC will choose a local computer utility on which to implement its system.

The use of computer data bases capable of extensive and varied analysis requires that the related coding structures be designed carefully. The appendices to this report identify the elements of data that must be

present in the data base and also the coding structures required to produce the anticipated reports. During the detailed system design phase, the appropriate codes will be specifically assigned and approved. The codes presented in the appendix are intended to provide an indication of the likely codes that will be required. Similarly, the elements of information that are required to meet the reporting requirements must, after management approval of the scope of the reports, be designed in detail.

In summary, the essence of this recommended system design is the overriding need to provide IDRC with a process by which over the coming years it can increase the sophistication of its management process in terms of the evaluation of programs and the detail analysis of activity within projects, and at the same time cope with the increased volumes of information which a larger program will generate.

The system design concept presented here will permit IDRC to follow an orderly pattern of growth in terms of its ability to manage its programs and to measure qualitatively and quantitatively its own contribution to the world's developing nations. As the organization grows in size and in experience, the facilities inherent in the reporting structure will be utilized more extensively. The inclusion of cash forecasting and budgeting requirements will also enable senior management to cope with possible changes in the mode of funding. A later section of this report presents a plan for the orderly implementation of the system. This will permit the various program areas to advance at their individual speeds, implementing only those portions which they require at this time, while building the basic structures which the future will need. In this way, both the design itself and the process of implementation have been tailored to the unique characteristics of IDRC.

V. THE REQUIREMENT FOR COMPUTING POWER

IDRC has a variety of needs for computing power. These include the management accounting and reporting system, the internal and external services that would result from the proposed ISIS system, and a variety of other requirements for statistical analysis stemming from both internal and external demands. The successful development of computer based systems for operation over a long term will require acceptance of the philosophy that all system components be capable of being modified to reflect the growth and change in the Centre. This flexibility must be present in the system design, in computer program design and in the selection of the appropriate source of computer power for the operation of the system.

The computer power for the operation of the management accounting and reporting system can be satisfied by a medium scale business computer. In examining the alternatives for operating the proposed management accounting and reporting system, the following alternatives were considered:

- a) Manual,
- b) Bookkeeping machine,
- c) In-house computer,
- d) Service bureau batch computer
- e) Remote Job Entry card reader and printer connected to a local service bureau batch machine,
- f) On-line, real-time computer.

The manual and bookkeeping machine options were considered unacceptable due to their inability to handle the volume of work likely to occur by 1974. At the other extreme, an on-line, real-time computer was rejected on the basis of its substantially higher costs for design and operation over the remaining approaches without an equivalent increase in performance. The remaining approaches all are considered appropriate, the major element of differentiation being cost. The in-house computer most appropriate for the management accounting and reporting system

is of medium scale. However, the proposed system would not on its own require the dedication of a machine of this size. Neither would the system require, at least in its initial stages, a remote job entry terminal. Since both of these latter options are more costly than the use of a computer service bureau and since the selection of the service bureau option does not preclude the subsequent selection of other options, we have concluded that the use of a service bureau batch computer for the operation of the system is indicated.

The computer requirements for ISIS, as outlined in the report prepared by Digital Methods Ltd., can be satisfied by the selection of the Alphatext computer utility for batch processing and for on-line data entry. Digital Methods Ltd. also recommended that consideration be given to the reprogramming of ISIS such that it could operate on an in-house computer system with the following likely characteristics:

- * IBM 360/30 or equivalent,
- * 128K core,
- * 4 tapes,
- * 3 disk drives,
- * 1 line printer,
- * 1 card reader.

Although a detailed critique of the DML report is beyond our terms of reference, our general reading of the findings did not uncover any evidence or lead us to any observation which would contradict their general conclusions.

In the course of our discussions with the management of IDRC concerning their requirements for computer power, the area of statistical analysis was mentioned on several occasions. The demands for this capability arise either from IDRC personnel directly or from requests from grantees related to their projects. After careful consideration, we have concluded that these computer power requirements can best be obtained either from the IDRC Hewlett-Packard computers or from a service bureau when the particular application is larger.

The ability to forecast with any degree of accuracy the amount of computer power required by these various needs is limited. In the case of the management accounting and reporting system, the time

frame over which the full capability of the system is implemented is the limiting factor. In the case of the ISIS system, the amount of external usage made of the system governs the requirements. It would, therefore, be desirable for IDRC to adopt a policy of having only the appropriate computing power required at any point in time, with the provision that additional capacity be readily available to meet any increased needs. As the pattern of usage develops, IDRC will be able to make cost/benefit decisions which may lead to the eventual installation of more computing power in-house.

The major regular usage of computer power in the immediate future will result from the management accounting and reporting system and the ISIS system. The current computer configuration required to operate the ISIS system is well defined, and a likely in-house configuration has been predicated. It would be desirable, therefore, to design the management accounting and reporting system to be compatible with the ISIS computer system requirements, since the basic feature of both computer system requirements are compatible.

Based on our review of IDRC computing requirements, we recommend that:

- * The management accounting and reporting system initially be tested and implemented on a service bureau computer in a batch environment.
- * The management accounting and reporting system be designed and programmed to operate on a computer configuration which would be compatible with that suggested for the ISIS system, in the event that ISIS were implemented on an in-house basis.
- * In the event that the implementation of the ISIS system results in a remote job entry terminal being installed at IDRC, this facility also should be used to access the computer system on which the management accounting and reporting system has been implemented.
- * The statistical analysis requirements be reviewed on an item by item basis and the most appropriate source of power be made available from:

- a) An in-house Hewlett-Packard machine or equivalent, or
- b) Service bureaus available and convenient to the user.

VI. A RECOMMENDED APPROACH TO IMPLEMENTATION

The implementation plan recommended in this report has two primary objectives:

- * To implement short term changes to the existing manual accounting system.
- * To implement the recommended computer-based management accounting and reporting system.

The first of these is intended to achieve immediate gains through the introduction of improvements to the existing manual system. Some of these changes have been held by IDRC management pending the completion of this study. Others will reflect parts of the recommended system design which can be implemented immediately. All changes made will be consistent with the parallel development of the computer-based system.

In approaching the second objective, we recommend that the detailed system design and implementation of the computer-based system at IDRC be accomplished through a task force. Such a group requires the involvement of both management and program personnel as well as systems design, computer programming and accounting skills. IDRC should add one or two additional personnel to its staff to maintain and operate the system once it has been designed. Other sources of supply should be utilized to obtain the skills necessary only for the life of the system development activity. This group should consist of a manager responsible for the successful development of the system, specialist technical personnel with skills in computer system design and programming and IDRC accounting and program staff. If IDRC staff are included at an early stage, user personnel can become fully conversant with the system prior to it becoming fully operational.

The detailed system design and implementation plan presented in Appendix B identifies the tasks necessary for the successful implementation of the system. The related schedule presumes the formation of a balanced team with the appropriate professional and technical skills and identifies the time frame within which the system can be developed. It reflects those tasks which of necessity must overlap and those which

can take place simultaneously. It will be noted that the schedule has been carefully related to the IDRC financial year. In this respect, the schedule provides for the operation of the computer system in parallel with the manual system from January 1, 1974 to April 1, 1974. As of April 1, 1974, the manual system could be discontinued

The plan and schedule are intended not only to identify the tasks required for the successful implementation of the system, but also to serve as a vehicle for monitoring the progress of the work. Embedded in the plan are two fundamental themes, the need for regular formal reporting of progress against the plan and the need to create permanent documentation of the systems being developed. Provisions have been made at key points in the plan for reviews of the schedule so that management may revise the schedule if required in the light of changing conditions. This approach makes available an early warning of delays which may impact on the management planning process.

The major phases in the plan and their interrelationships are depicted in Exhibit 3.

Organization and Start-Up

The work performed during this phase will establish the design team. The organization of the team will be formalized and the internal and external reporting links will be agreed. At the same time, standard practices for documentation, programming and system testing will be specified.

Detailed System Design

This phase will result in the production of detailed program specifications and the selection of a contract programming firm to perform the programming. User staff will be asked to approve the reports and coding structures developed during the phase and the processes for production of the reports will be designed.

Program Development

The programs will be written, tested individually and accepted for system testing during this phase. The work will be performed under the supervision of the system designer.

System Test

This phase will be concerned with testing the operation of all the programs in the system in concert. It will be performed by the systems analyst assisted by the contract programmer who has been involved with the program development.

Implementation

This phase will commence at the completion of the system design phase. It will be concerned with the collection and preparation of conversion data, the conversion process itself and the subsequent parallel operation prior to acceptance of the system by the user.

Staff Selection and Training

This program will commence early in the system design phase. Its interest is to ensure that IDRC has the appropriate staff for the ongoing operation of the system. In addition, it will examine any particular training requirements that may exist within the affected operations of IDRC. Areas to be considered include forms design and control, filing and project control.

Management and Quality Control

This is an essential element in the systems design and implementation. By identifying these functions as a separate phase, we are stressing the importance we attach to them.

Introduction of Short Term Modifications to the Management Accounting Process

This phase has been included in the work program in order to allow the Accounting Department to make modifications to its current system. These modifications are intended to allow the implementation of selected reporting requirements of the proposed system on a manual basis while at the same time ensuring that any modifications made will be compatible with the computer-based system.

In summary, the key elements in the plan are:

- * team organization,
- * user participation,
- * system planning and control,
- * progress reporting,
- * rigorous documentation practices.

implementation plan is built upon a large number of steps carefully designed to ensure that the basic accounting reporting system structures developed now will lay the for continued development as the Centre evolves.