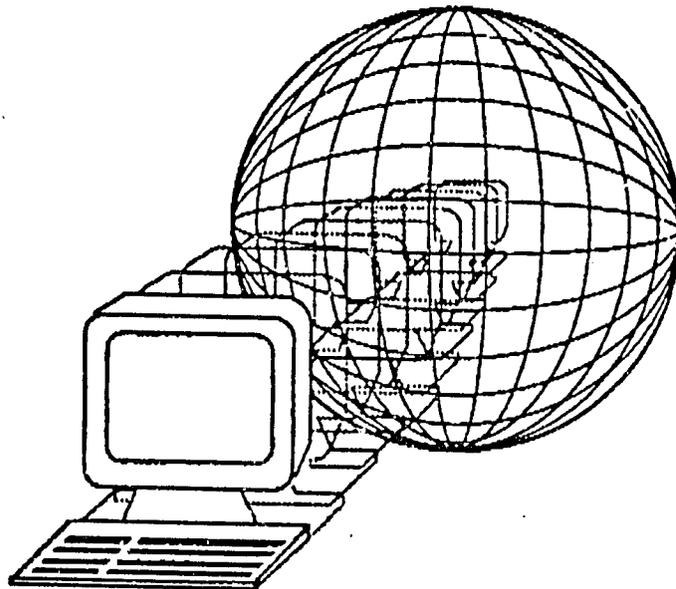


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# **A STRATEGIC INFORMATION TECHNOLOGY PLANNING FRAMEWORK:**

## **GETTING THE MOST FROM INFORMATION TECHNOLOGY**



**AGENCY FOR INTERNATIONAL DEVELOPMENT  
INFORMATION RESOURCES MANAGEMENT**

**DECEMBER 1988**

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## FOREWORD

This workbook was developed by Dr. Janice Brodman, Director of International Information Technology Projects, Education Development Center. Dr. James Short of the Center for Information Systems Research, Massachusetts Institute of Technology, played a major and invaluable role in the conceptualization and design of the Strategic IT Planning Framework.

The workbook was prepared by the Education Development Center under a subcontract (#715304) with Executive Resource Associates, Inc. The funds from the Office of Information Resources Management for this project were provided by three regional bureaus, AFR, LAC, and ANE, to support information technology transfer efforts in program and project related activities.

It is important to note that the Framework presented here is an innovative effort to modify methodologies from the private sector to make them appropriate for public sector institutions. It does not represent an official methodology of IRM. The intention is to gain experience with the Framework, as one among many strategic IT planning methods, and to determine the usefulness of this approach for host country public sector institutions.

## EXECUTIVE SUMMARY

Information technology (IT) is one of the most important resources public sector organizations have available today. Yet managers face persistent problems as they try to get the most from their information technology resources: rapidly expanding demand for IT services, rising IT budgets, combined with dissatisfaction about the contribution IT makes to achieving organizational goals.

This problem is also common in the private sector. In response, U.S. corporations and business schools have developed methodologies for building and implementing "IT strategies." These methodologies identify how IT resources can most effectively contribute to the organization, and how they are best managed. In the private sector, general management and IT executives agree that a well-designed IT strategy is crucial to getting the most from IT resources. Yet the methodologies for developing IT strategies have not been systematically made available to managers in the public sector.

This workbook seeks to address that gap. It leverages the investment made in the private sector by drawing from complex IT strategy methodologies used widely in the private sector. These methodologies have been modified to make them appropriate for public sector organizations in the U.S. and developing countries. The result is the Strategic IT Planning Framework presented here. The Framework is designed for general managers. It provides a simple yet powerful approach for determining the areas in which IT can have the greatest and most positive impact. It links organizational goals to critical information needs, and helps determine the best way to manage IT resources so they meet those needs.

Thus, an organization would use the Framework to develop an IT strategy for getting the most value from its IT resources. Afterwards, based on that strategy, the organization can develop an information systems (IS) plan of hardware and software architecture and the applications base. There are many IS planning tools available to do the latter type of planning.

The Strategic IT Planning Framework presented here is unique. It is an initial effort to adapt strategic IT planning methodologies used successfully in the private sector to make them appropriate for public sector organizations. We hope that managers will utilize the Framework and give us feedback on their experience, achievements, problems, and questions.

The workbook has five parts. Part 1 begins with background on strategic IT planning. It clarifies key concepts of strategic IT planning generally and briefly discusses major strategic planning methodologies. Part 2 defines basic concepts and requirements of the Strategic IT Planning Framework. Part 3 presents the Framework, guiding the user through each stage of the strategic IT planning process. Part 4 discusses a case exercise that shows concretely how the Framework can be used. Part 5 provides templates that will guide the Framework user through the planning process.

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## WORKBOOK OVERVIEW

This workbook presents a strategic information technology (IT) planning framework that has been specifically designed for public sector organizations in developing countries and in the U.S. It draws from several IT planning methodologies used in the private sector. These methodologies have been simplified and modified to make them appropriate and effective for use by managers in public sector organizations.

The workbook has five major parts.

Part 1 provides a background on strategic IT planning. It discusses conditions that have led organizations to conduct IT planning. It clarifies key concepts in IT strategic planning generally. It also briefly examines alternative approaches to strategic IT planning.

Part 2 explains the basic concepts and requirements of the Strategic IT Planning Framework.

Part 3 presents the Strategic IT Planning Framework, with a guide through the stage-by-stage process of conducting the framework. The Framework is designed for managers who want to ensure that IT is used efficiently and effectively in their organization.

Part 4 describes a case example that illustrates actual use of the Framework. The case offers a concrete example of each step of the framework. The case also provides figures that illustrate and clarify specifically how to use the templates.

Part 5 provides the blank templates that guide a planning team through conducting each stage of the framework. Attached to each template is a detailed explanation of its use.

**PART 1. BACKGROUND ON STRATEGIC IT PLANNING**

## PART 1

### BACKGROUND ON STRATEGIC IT PLANNING

This part of the work book provides a background in some of the major concepts and concerns of strategic IT planning. It examines three major issues:

- o Why plan?

A description of some of the forces that have led the private sector -- and increasingly the public sector -- to make planning more effective

- o Why do strategic IT planning?

An examination of some important concepts in IT planning, such as the distinction between IT strategy and IT plans

- o Types of strategic IT planning methodologies

A brief discussion of three approaches to strategic IT planning

#### Why Plan?

Public sector organizations today are under pressure. Budgets are tight. Yet the need for public services continues to grow. Organizations must get the most value out of their resources. To meet these challenges, many turn to strategic planning. They do so for several reasons: to get away from daily operational concerns and obtain a higher level view of what the organization must do to be successful; to improve communication and understanding among people in different parts of the organization; to develop more rational and effective resource allocation; to establish better budgeting and financial control.

Yet, too often, these intentions are not fulfilled. Plans are developed -- then they are put on the shelf and forgotten. Given today's challenges, it is a situation few organizations can afford.

Private sector organizations face the same problems in making planning more effective. In response, they have re-examined their planning process. The result is a realization that the process of strategic planning must change. Planning must link the strategy of the organization -- its mission and goals -- to action. It must actively involve the people who will be responsible for implementing the plans. It must bring people together so they communicate and make a commitment to the plans they are supposed

to carry out. The private sector has made a substantial investment in developing planning methodologies that make this link between goals and action.

By identifying the most effective of those planning methodologies, and modifying them for their own use, public sector organizations can leverage the investment of the private sector. Some of the most valuable of those methodologies concern information technology planning.

### Why Do Strategic Information Technology Planning?

Among the most powerful resources organizations have available is information technology (IT). Senior management often recognizes that IT should be contributing to the organization. They hear that IT will help improve efficiency and effectiveness. Yet in their own organizations they see IT expenses rising, while managers' complaints persist:

"I get plenty of information -- it just doesn't tell me what I need to do the job right."

"By the time I get the information I ask for, it's useless."

"I just can't trust these numbers for important decisions."

Yet complaints like these are only symptoms of much larger issues confronting the organization. How to use IT resources effectively? How to make expensive IT resources contribute to organization goals? How to get the most out of this very powerful resource?

These are problems facing both public and private sectors. In response, the private sector is turning to strategic IT planning. According to a 1986 survey of businesses, the heads of MIS named strategic IT planning their most important concern. General management said it was the most important IS issue (Robert Buday, InformationWEEK, March 23, 1987, page 15).

What both public and private organizations are realizing is that they must get the most out of their IT resources, and to do so strategic IT planning must link four key areas:

- o Organization strategy -- the goals and mission of the organization, and the major actions to achieve those goals
- o Organization plans -- the operational activities the organization will undertake to carry out the strategy
- o IT strategy -- the organization and major activities of the IT resource so that it supports the goals of the organization

- o IS plans -- the specific design of the information systems operations, and hardware and software infrastructure necessary to fulfill the IT strategy.

The objective of this workbook is to help organizations make that linkage. It does not provide a method to specify IS plans or design a management information system. There are plenty of methodologies already available that do that.

Instead, it offers a process to link organizational goals to critical information needs and to the organization's information system. It helps determine how IT can most powerfully contribute to achieving organizational goals. It also gets general managers and IS professionals to plan together, based on those goals.

### The Impact of Developing an IT Strategy in One Organization

The experience of a large health care agency illustrates the impact an IT strategy can have on an organization. By the 1980s, the agency had a long history of planning. In the 1960s, the planning emphasis was on budgeting and financial control. The use of information systems was primarily focused on financial transactions processing.

In the 1970s, the agency became more complex as it added a variety of new departments that provided specialized services. A formal five-year strategic planning process was begun. Each department conducted an in-depth analysis of the demand for its services, and ways to meet that demand. Yet the information systems organization remained centralized and focused on financial information. Meanwhile, managers and health care professionals had begun to demand information that would support decision-making in addition to financial information.

By the early 1980s, the agency had developed many excellent organizational strategies. They found, however, that these strategies were not backed up by effective action plans. Furthermore, the only monitoring systems were periodic financial reports. Senior management only discovered problems after a program got into serious organizational or financial difficulties.

In the mid-1980s, the organization responded to these conditions by launching a strategic information technology planning process. They began with the assumption that their organizational goals were fine. Based on those goals, they conducted a process that helped them concretely define the things they had to do to achieve those goals. They also identified measures to monitor those critical activities, and examined how well the information system could deliver that information.

Based on the results, they developed an IT strategy with several initiatives. Some involved creating or modifying applications so they provided measures of critical activities in a monthly report. Others reorganized the IS function. For example, they decided to put microcomputers in each department.

On the basis on the IT strategy, an IT plan was developed. It defined the hardware architecture, the data models, and the functional specifications of the new systems.

Within two years, the organization found that the measures they had developed served as a powerful "early warning signal." The new program monitoring reports often revealed problems early enough so that difficulties could be resolved relatively quickly and easily.

In addition, the process of developing an IT strategy helped clarify the critical issues the organization faced and improved communication among senior managers of different departments, including IS. It also helped to ensure that when IT strategy and plans were developed, they were carried out effectively.

The IT strategy process is now part of the ongoing general planning process. As conditions change, and the agency revises its organizational strategy, the IT strategy process ensures that the information system makes the changes necessary to support those organizational goals.

### Types of Strategic IT Planning Methodologies

There are many approaches to strategic IT planning. One of the most important includes models that link data to key performance indicators. The Critical Success Factor (CSF) method is one of these models. It has been modified and incorporated into the Strategic IT Planning Framework presented in this workbook. Basic features of the CSF method are discussed briefly below.

There are other IT planning approaches which are well known, but have drawbacks as strategic planning methodologies. They are not part of the Strategic IT Planning Framework; however, it is useful to understand some of their basic features. Two of the best known models -- stage models and strategic data planning methods -- are described briefly below.

### Models That Link Data to Key Performance Indicators

One powerful approach to strategic IT planning aims at finding ways to use IT to improve the quality of decision-making, and, consequently, the organization's ability to achieve its goals. These methods conduct IT planning relatively quickly and efficiently by focusing on the critical information that managers and other decision-makers need.

The Critical Success Factor (CSF) IT planning methodology, introduced in a seminal article by John Rockart in 1979, is the best known of these approaches. (Useful background articles on the CSF method are in Bullen and Rockart, The Rise of Managerial Computing, 1986). The CSF method was originally developed for general business planning. For almost a decade it has also been used for information technology planning.

The CSF method is based on the premise that there are a few key activities an organization must do well in order to be successful. Likewise, there are a few key activities a manager must do well in order to succeed. The CSF method proposes that managers should have an information system designed around those critical factors. It provides a structured process for identifying those few key activities that are critical for success, and linking them to information necessary to monitor and control those activities.

The CSF method has a number of strengths that make it a valuable part of a strategic planning framework for developing countries and donor organizations:

- o It focuses attention on the few things that must be done well for a manager or organization to succeed
- o It helps provide a clearer understanding of the means for accomplishing the organization's strategic goals
- o It links critical information needs to the means for achieving organizational goals
- o It helps identify the information services necessary to fulfill critical information needs
- o It can improve mutual understanding of general management's needs and IS technical staff's needs
- o It is easy to tailor to an organization's needs, and can be used relatively frequently as the organization responds to environmental change
- o It is easy to understand and use, in comparison with other IT planning methodologies

Studies in the private sector have shown that companies that monitor CSFs are more successful than those that do not and that monitoring CSFs explains up to 33% of superior performance in such areas as quality and innovativeness (see, for example, Per Jenster, "Firm Performance and Monitoring of Critical Success Factors in Different Strategic Contexts," Journal of Management Information Systems, Winter 1986-87, Vol. III, No. 3).

There is a potential pitfall of the CSF method. Lower level managers may have difficulty using the methodology to formulate specific management information needs. This problem can be overcome during information systems planning by using prototyping of reports and screens to help these managers identify the

specific data elements they need. At the same time, CSFs can help guide the prototyping effort by indicating where critical information needs lie. An experienced CSF analyst can also help managers to determine the specific information that addresses their needs.

### Stage Models

Another classic approach to IT planning is based on the notion that all organizations move along the same path in adopting computers. Organizations therefore face a predictable set of problems that can be solved by similar responses.

Nolan's "stages of growth" model is a good example. According to this model, organizations move along a developmental line. By understanding where you are on the line, you can see where you are going and what you must do to solve problems and move on to the next stage of growth.

According to the Nolan model, there are six stages of growth in data processing:

1. The first computer is adopted and used
2. Management encourages widespread acceptance of the new technology and development of applications that will justify purchase of the computer system
3. Computer use expands rapidly with the introduction of interactive systems for end users. Management focus is on controlling rising costs as computer use grows
4. Database management systems become more widespread, along with growing end user control over information systems
5. There is a fundamental shift in attention from managing computers to managing data
6. Computer use reaches "maturity," with computer system and related controls completely integrated into organizational planning and operations.

Stage models like Nolan's can be useful in making it clear that information systems can play various roles in an organization, and that systems with different roles need to be managed differently. These models can help managers look ahead to the ways in which they could be using information more effectively in the future.

They have had limited value, however, in their use for IT planning. They are generally based on the experience of organizations in an era when information systems were designed primarily for transaction processing of accounting functions, and one large computer filled all the organization's information needs. With widespread proliferation of microcomputers, this

model no longer holds. In developing countries, technological change has made these models largely inappropriate.

### Strategic Data Planning Methods

A third approach to IT planning focuses on data rather than on computers and applications. These models emphasize the importance of data in enhancing organizational flexibility and productivity. One of the best known of these methodologies is the Business Systems Planning (BSP) methodology developed by IBM Corp.

BSP is a comprehensive method for identifying all of the information that may be useful to an organization. It attempts to guide the planning process systematically from abstract concepts of the organizational goals to policies and procedures, and then to specific information needs.

The pitfall of the BSP method, as with most other data-oriented planning approaches, lies in its focus. It spends a great deal of time gathering details on current operational-level problems, without distinguishing between critical information and other information. It focuses on current difficulties instead of future direction and requirements. As a result, it gets swamped by the details, loses sight of strategic issues, and often paralyzes the organization.

## PART 2

### BASIC CONCEPTS OF THE STRATEGIC IT PLANNING FRAMEWORK

The Strategic IT Planning Framework, presented in Part 3, offers general managers a method for linking strategic goals to effective management of IT resources. Before turning to the Framework itself, it will be useful to clarify the basic concepts of the Framework. Some of these concepts relate to the Critical Success Factor method, which is a central part of the Framework.

This part of the workbook discusses four major areas:

- o How to use the Strategic IT Planning Framework  
A discussion of how the Framework is intended to be used and how to apply it in an organization
- o Basic requirements of the Framework  
An examination of the basic requirements for successful use of the Framework
- o Understanding CSFs  
A brief explanation of key CSF concepts

#### How to Use the Strategic IT Planning Framework

The Strategic IT Planning Framework offers a set of activities that link organizational goals, critical information needs, and ways to manage the IS function so that it meets those critical information needs. The attempt has been to keep the framework simple, but effective.

The Framework is not designed to be an abstract discussion of strategic planning. Nor is it a "cookbook" of IS planning. Instead, it is a workbook of tools that managers can use to guide their thinking about how their organization can get the most out of its IT resources. We encourage you to undertake the process, utilize the templates, and give us feedback on your experience, as well as any questions that arise.

Note that this Framework is a generic approach to IT strategic planning. To be effective, it must be tailored to fit the organization.

An example of tailoring is provided by the experience of two organizations. In one, top management believed the organization was entering a new era in which IT would become crucial to its

success. The first stage of the strategic IT planning process held interviews at every level of the organization. The emphasis of the interviews was on the strengths and weaknesses of the organization, and future views of information needs.

In the other organization, top management felt there were serious problems in the IS organization. They wanted the IT planning process to focus on solving those problems. The first stage of the planning process held interviews with the heads of departments that had expressed a rising level of complaints about IS services. The emphasis of the interviews was on the goals of the departments, critical information that managers needed to achieve those goals, and ways in which the existing IS organization and services might better meet those information needs.

### Basic Requirements of the Framework

The Strategic IT Planning Framework focuses on critical issues that link organizational goals to the way IT resources are organized and managed. As a result, it has certain requirements for success.

First, the planning process must have a strong sponsor among senior management who considers it important to understand how IT can best contribute to the organization. The sponsor will define the purpose and scope of the strategic IT planning effort, and ensure that those below him/her participate fully. It is essential that the planning team explicitly understands the sponsor's view of the purpose and scope of the strategic planning effort.

Second, the planning team that conducts the strategic IT planning effort should include both general managers and IT professionals, as well as "bridge" people who understand both the organizational needs and the IT resources capabilities (if they are available). During certain stages of the Framework, different members of the planning team may undertake different tasks. In some stages of the process, for example, the general managers and IT professionals may separate to gather different kinds of information and report their findings to the rest of the team.

The size of the planning team will depend on the purpose and scope of the planning effort. If the scope is wide, a considerable amount of information will have to be gathered and a large team will be necessary. In such cases, the teams can assign members to specific roles. In small teams each member will have to take on multiple roles.

Third, although it is not a requirement, it is important to recognize that the process is most effective if it is conducted as part of the overall organization planning process. In that way

it can link the organization's thinking about its goals and plans to consideration of its critical information needs and management of its IT resources.

In sum, there are a few critical success factors of the strategic IT planning process:

1. Keep it simple and focused on critical issues
2. Have an effective sponsor who can "sell" the process to managers in the organization
3. Use an experienced team
4. Keep it simple!

### Understanding CSFs

A central part of the Strategic IT Planning Framework is the CSF methodology. Because the CSF method will be new to many who use this workbook, key terms and concepts are defined below, as they are used throughout the workbook. It is important to understand these terms before using the Framework.

What exactly are CSFs? They are the few (3-6) key areas of activity that must be done well in order to achieve success.

It is essential to distinguish between CSFs and goals. Goals are the end result you want to achieve. Goals can also be a standard for judging your success. In contrast, CSFs are the means, they are what you do to achieve your goals. They are a way to focus on the few basic activities that underlay continued success.

#### Example: Department of Labor

GOAL: Reduce unemployment in rural areas by 5%/year

- CSFs:
- o Set aside government contracts for small rural businesses
  - o Encourage factories to locate in rural areas
  - o Improve rural businesses' access to loans

#### Example: Ministry of Finance

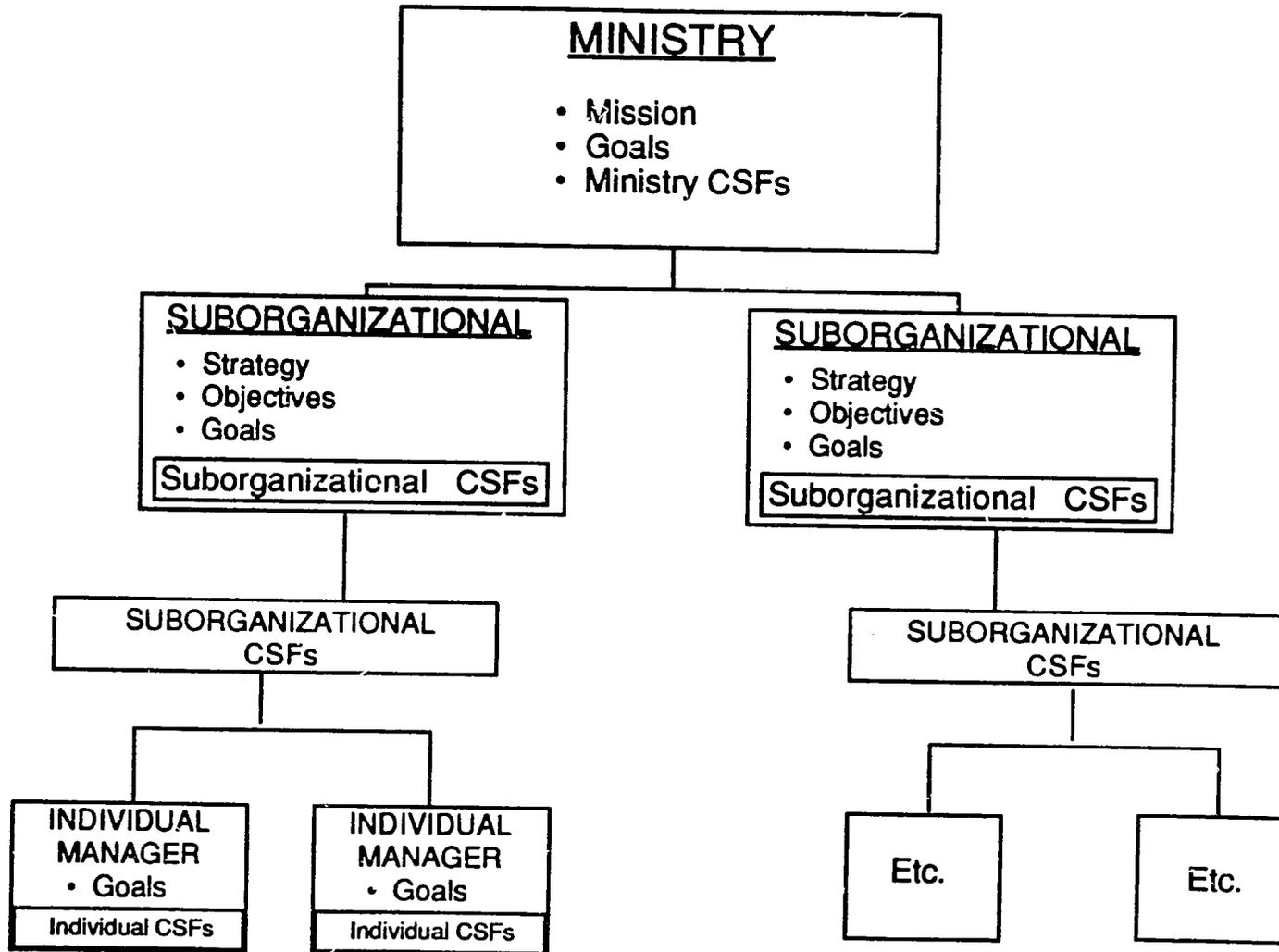
GOAL: o Reduce budget deficit

- CSFs:
- o Improve management of donor-assistance funds
  - o Reduce oil subsidies
  - o Improve tax collection process

### Hierarchy of CSFs

CSFs have a hierarchy that roughly corresponds to the organization's hierarchy (see Diagram 1). Thus, each level of the organization has: (1) a strategy or mission, (2) goals and

DIAGRAM 1. CRITICAL SUCCESS FACTORS HIERARCHY



objectives set by that strategy, (3) CSFs that are crucial to achieving those goals. The CSF process can help identify the critical success factors at any level of the organization -- organization-wide CSFs, sub-organizational CSFs, or an individual's CSFs.

### Sources of CSFs

There are six generic sources of CSFs:

- o Sector: The macro-characteristics of a particular sector. For example, a Ministry of Agriculture may have a goal to improve agricultural productivity and a sector CSF to deliver agricultural inputs precisely when the farmer needs them.
- o Organizational Strategy: The strategic goals of a particular organization. For example, in a Department of Transportation, a Division in charge of public transportation may have a goal to expand access to public transportation and a strategy CSF to increase bus service in rural areas.
- o Environment: Fluctuations outside the organization's control. For example, a Ministry of Education may have a goal to expand access to education. Reduction in the level of donor assistance may create an environment CSF to increase student/teacher ratios.
- o Temporal Factors: Short-term coping with a specific problem. For example, a Ministry of Health may have a goal to improve the quality of health care services. An outbreak of an epidemic may create a temporal CSF to expand emergency inoculation services.
- o Managerial Position: Generic, role CSFs. For example, research scientists may have a goal to achieve scientific breakthroughs, and a position CSF to stay abreast of the state-of-the-art in their fields.
- o Individual's World View: Subjective understanding of a manager's view of effective managerial practice. For example, a manager may have a goal to improve efficiency in his area, and an individual CSF to continually and carefully monitor those below him.

Not all of these types of CSFs will be important for all levels of the organization. However, it is important to understand how these sources might produce CSFs for a particular organization or for individuals within an organization.

**PART 3. CONDUCTING THE  
STRATEGIC IT PLANNING FRAMEWORK**

## PART 3

### CONDUCTING THE STRATEGIC IT PLANNING FRAMEWORK

This part of the workbook presents the Strategic IT Planning Framework, and guides the user through the six stages of the framework. For each stage, it describes:

- o The objectives of the stage
- o The major activities a planning team should conduct in that stage
- o Major outcomes the planning team should produce in that stage
- o Examples of how the activities were conducted in particular organizations
- o The templates that guide the conduct of each stage
- o The figures that concretely demonstrate how to use each template

#### The Six Stages of the Strategic IT Planning Framework

The Strategic IT Planning Framework has six major stages (see Diagram 2):

- I. Clarify the overall mission, goals, and objectives of the organization
- II. Assess the current information system infrastructure
- III. Determine the Critical Success Factors and critical information needs
- IV. Determine the gaps between information needs and the current IS infrastructure. Identify options to close those gaps
- V. Assess the trade-offs between IS support options
- VI. Select a final option. Implement the IT strategy and conduct ongoing planning

#### I. Clarify Organization Mission and Goals

The purpose of the Strategic IT Planning Framework is to link the management of IT resources to the organization's strategic goals. Thus, the first task for the planning team is to ensure that they clearly understand the mission and goals of the organization.

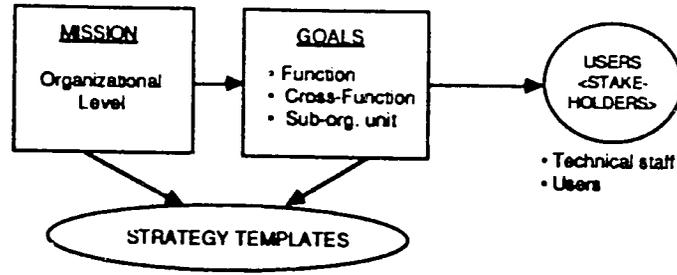
This step may involve background research to clarify major short- and long-term goals of the organization, key functions, programs, and relevant sub-organizations. The choice of functions, programs, or sub-organizations to be examined should reflect the objective of the IT strategy planning process.

In one Agency, for example, the process aimed to understand how IT could best serve the entire organization. In that case it was

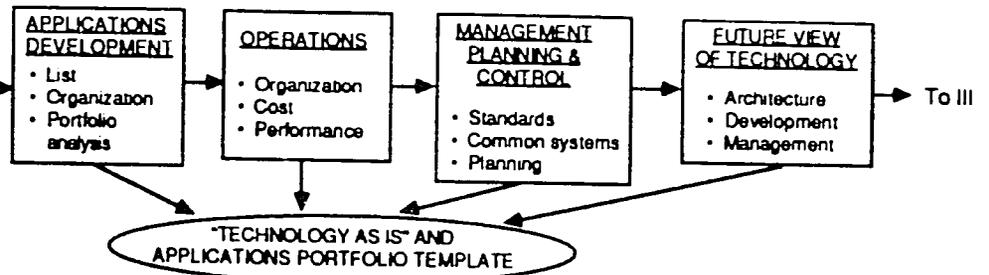
DIAGRAM 2

STRATEGIC INFORMATION TECHNOLOGY PLANNING FRAMEWORK

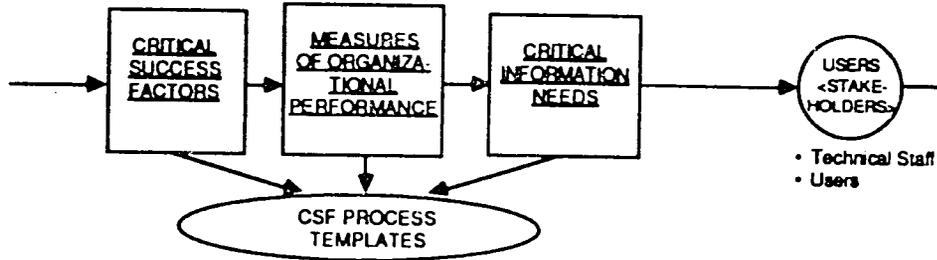
I. CLARIFY THE OVERALL MISSION, GOALS AND OBJECTIVES OF THE ORGANIZATION



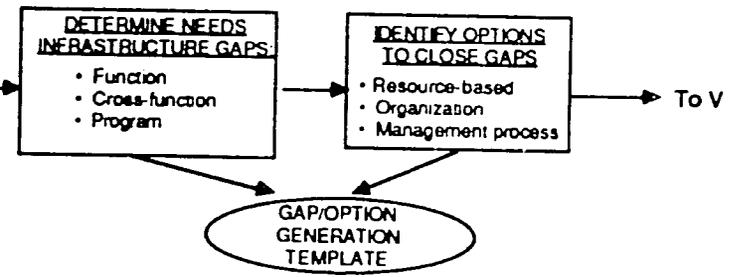
II. ASSESS CURRENT IS INFRASTRUCTURE "TECHNOLOGY AS IS"/FUTURE VIEWS



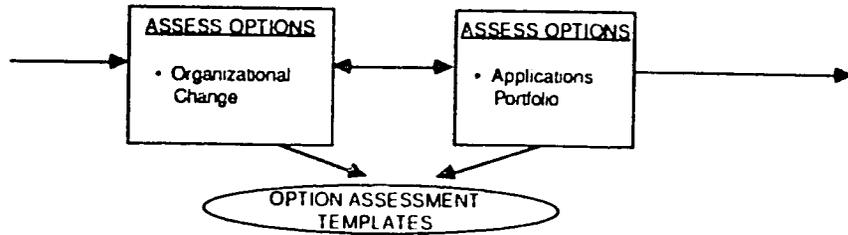
III. DETERMINE CSFs, MEASURES OF ORGANIZATIONAL PERFORMANCE & CRITICAL INFORMATION NEEDS



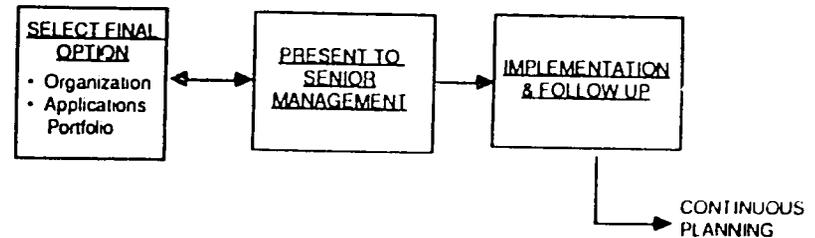
IV. DETERMINE GAPS BETWEEN INFORMATION NEEDS AND CURRENT IS INFRASTRUCTURE; IDENTIFY OPTIONS TO CLOSE GAPS



V. ASSESS TRADE-OFFS BETWEEN IS SUPPORT OPTIONS



VI. TASK FORCE EVALUATES AND PRESENTS FINAL OPTIONS



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necessary to examine all organizational functions and cross-functional programs. In contrast, the sponsor in another organization was primarily concerned about the conditions in two major divisions of the organization. Only those sub-organizations were examined.

While conducting background research, the planning team should also be alert for likely CSFs of the organization, e.g., sector, environmental or temporal CSFs.

Background research ordinarily involves reading documents that present organizational goals, and conducting informal discussions with the sponsor and others in the organization. Extensive research is not necessary. The objective of this step is only to get a good sense of the major goals of the organization and likely CSFs.

Template #1, "Strategy Template," offers a useful guide to this step (Templates are in Part 5). Figure 2 gives an example of a completed Strategy Template (Figures are in the case exercise in Part 4).

## II. Assess the Current Information System Infrastructure

Once the planning team has a clear understanding of the organization's goals, they can move to an examination of the current IS function. They will focus on two major issues. One concerns the way IT resources are organized and managed. The other concerns the features of IS applications.

In considering the first issue, the planning team will aim at determining how major IS functional responsibilities are organized. Typically, IS responsibilities are organized in one of three ways. Some organizations have "centralized" functions, with machines and IS professional staff managed as a single facility, conducting all the automated data processing for the organization.

Other organizations have "decentralized" IS operations, with all software and hardware fully operated and managed by "end user" departments. For example, an organization may have a separate IS operation in each department, independently managed by that department.

Most organizations are neither fully centralized nor fully decentralized, but a mixture of the two ("hybrid"). Some of the IS responsibilities are centralized for planning and control purposes. Others are decentralized, where it is important for individual units to control their own IT resources. An organization may, for example, have a central IS department that sets broad organization-wide standards for hardware and software

and runs transactions processing on large computers. Meanwhile, end user departments have mini or microcomputers, which they operate themselves, usually to support decision-making.

By considering each of the major IS functional responsibilities, where and how it is managed, the planning team can gain a good grasp of the organization and management of IS.

The second area to be examined are the IS applications. The intent is to determine the mix of applications and how they serve various users. The planning team will look at major applications, who uses them, the benefits they provide, their comparative cost level, and their relative importance for the organization.

A complete analysis of these aspects of IS would be a very complex task, even for an IT professional. Therefore, the framework provides templates designed to reduce the complexity, yet provide a useful understanding of the conditions existing in different parts of the organization. The team can use Templates 2 - 6 to guide this stage of the framework. Figures 3 - 7 provide samples of each of these templates, respectively.

In most organizations, this stage of the planning framework will be conducted by the IT professionals or "bridge" people on the planning team, along with, in some cases, one or more managers. These planning team members will report the results to the rest of the team. In many cases, some members of the planning team will conduct this stage while other members are conducting the CSF process in Stage III.

### III. Conduct the CSF Process

The planning team can begin the CSF process as soon as they have gained a clear understanding of the organizational goals. Thus, they can conduct the CSF process simultaneously with the assessment of current IS infrastructure.

In many organizations, the planning team will want to assign certain members with experience in the CSF process to serve as a "CSF team." The CSF team would conduct this stage of the framework and report back to the entire planning team.

The CSF process has three objectives:

- o To identify the few critical things which the organization must do well in order to achieve its goals
- o To determine the information managers need to do those critical things well
- o To gain understanding and agreement about what needs to be done across the organization

To achieve these objectives there are five basic activities (see Diagram 3):

- (1) Define the goals of the CSF process
- (2) Conduct interviews
- (3) Analyze interviews
- (4) Conduct the workshop
- (5) Link CSFs to information systems planning

#### (1) Define the goals of the CSF process

At the beginning of the CSF process the CSF team works with the sponsor to define the goals and scope of the CSF process. In some cases, for example, the sponsor may want the team to address broad issues about how the organization should organize and manage its IT resources so they contribute greater value to the organization. In other cases, the sponsor may want the team to examine more specific problems with the IS function. In any case, the goal of the CSF process should be focused on how IT can better contribute to the organization's performance.

After the goals of the CSF process have been defined, the sponsor should identify key people in the organization who will participate in CSF interviews and the workshop, and elicit their cooperation.

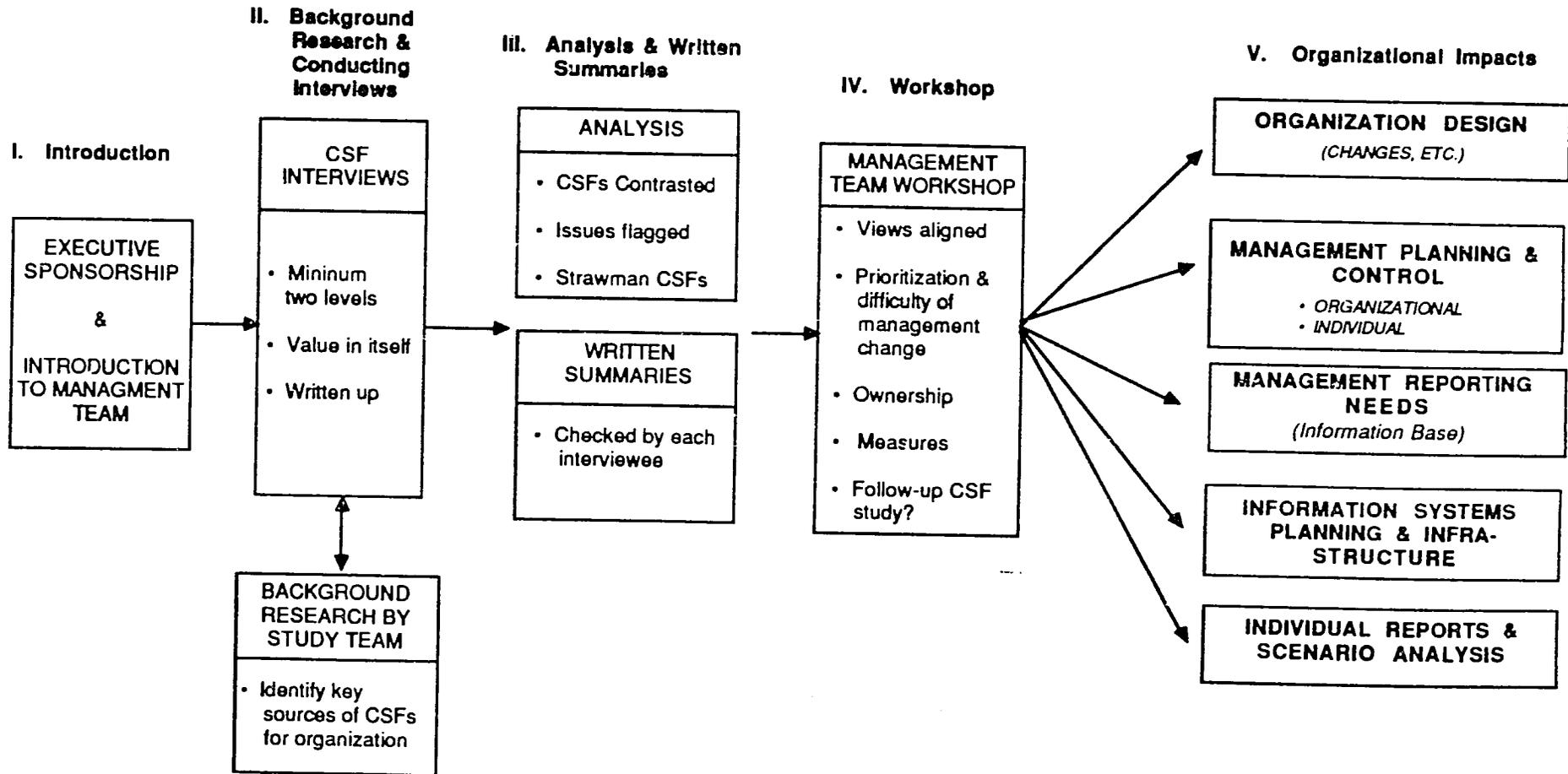
#### (2) Conduct interviews

Based on the goals of the CSF process, the CSF team will design and conduct interviews with key players in the organization. In general, the interviews will aim to uncover the major concerns these key people have as they try to achieve success in their area of responsibility. The interview will explore such issues as:

- o Key players' views of the goals of the organization
- o Where major problems in the organization lie
- o The goals key players have set for their own area of responsibility
- o The kinds of information they need to manage well
- o Their views of how well the IS function fulfills their needs
- o Future information needs

It is often difficult for people to address these issues directly. An indirect approach is usually the most effective way to elicit meaningful answers. Thus, questions about respondents'

Diagram 3: THE CSF PROCESS



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goals may begin with a general theme ("What are you trying to accomplish in this part of the organization?"), and move to specific questions ("You mentioned one of your long-term goals is to improve the quality of services. What are some short-term objectives?").

To guide the planning team in developing CSF interviews, a generic CSF interview is provided with the templates in Part 5. It includes an explanation of each section of the interview and its objectives, and some rules-of-thumb on choosing interviewees and conducting the interviews.

Of course, the generic interview should be modified to fit the goals of the particular CSF project. For example, if the major concern is with future IT needs, that section of the generic interview should be emphasized. If the major concern is in determining where current IT resources can make the greatest impact, the interview questions on "Areas of opportunity" can be emphasized.

### (3) Analyze and write summaries of interviews.

Upon completing the interviews, the CSF team must aggregate and analyze them. The CSF analysis has several objectives:

- o To determine where the major issues affecting organizational performance lie, and how IT relates to those issues
- o To determine the extent of agreement among respondents regarding organizational CSFs
- o To flag important issues that need to be addressed in the workshop
- o To develop some "strawman" CSFs, which can be used to stimulate discussion in the workshop

In one agency, for example, the CSF team found that most of the respondents agreed on the organizational goals. Respondents had very different ideas about how to achieve those goals, however. Some stressed the need to limit spending and monitor expenditures very tightly. Others felt that investing in experimental pilot projects and carefully comparing the results would be most successful. The CSF team flagged these differences for discussion in the CSF workshop.

After analyzing the respondent interviews, the CSF team will meet with the rest of the planning team to discuss the results. If other members of the planning team have been simultaneously conducting the "IS assessment" of Stage II, the team will also discuss those findings. The objective is to ensure that all members understand the CSF interview results and the current IS infrastructure.

At the conclusion of these discussions, the planning team should meet with the sponsor to discuss their findings, the implications for the objectives of the CSF process, and any changes in the focus of the CSF process.

Template #7 "Analysis of CSF Priorities Worksheet" provides an approach to analyzing the interviews. After completing the template as a "first approximation," the team can use it, with modifications suggested by the sponsor, to launch discussion in the CSF workshop.

Figure 8 shows a sample of two different respondent answers regarding the mission, objectives and CSFs of the organization. Figure 9 shows a sample of completed Template #7, developed when the CSF team aggregated and analyzed the respondent interviews.

#### (4) Conduct the workshop.

After analyzing the interviews and gaining a good understanding of the IS infrastructure, the CSF team will be ready to hold the CSF workshop. The workshop has three segments, with interlinking objectives:

- o Develop consensus among the participants about the CSFs and their priorities
- o Link the CSFs to critical information needs
- o Link the CSFs to actions that will improve performance on the CSFs

The choice of workshop participants should be made by the sponsor, with the assistance of the planning team. In general, they should be key players in the organization, who strongly influence the achievement of organizational goals.

In some cases, it may be appropriate to hold more than one workshop, with different participants. In one organization, for example, it was important to understand the value of IT in both the Central Office and the Provincial Offices. One workshop included heads of the Central Office Departments. Another workshop was held with the heads of the Provincial Offices.

To launch the workshop discussion, the CSF team can get participants to respond to the "first approximation" version of the "Analysis of CSF Priorities Worksheet" (Template #7), which the team already completed. The team will know (from the interviews) the participants' original views of the CSFs. The workshop should begin with those CSFs and move to develop a consensus about the CSFs that are common for the organization. The role of the CSF team is to facilitate discussion, stimulate

frank exchange of views, and bring about consensus on CSF priorities.

In one Agency, for example, there were very divergent views about CSFs, demonstrated clearly by the "first approximation" Analysis of CSF Priorities Worksheet. At the outset, each participant insisted that his or her view of the CSFs was correct. The CSF team guided the discussion to a deeper consideration of the experiences of the organization, its strengths and weaknesses. Gradually, workshop participants began to understand one another's perspectives. Eventually a consensus about the priority of CSFs was developed.

By the end of the first segment of the workshop, the CSF team should have revised Template #7 so that it reflects the consensus of the participants about the organizational CSFs. Figure 10 shows how the "Analysis of CSF Priorities Worksheet" in Figure 9 changed after the workshop.

In the next segment of the workshop, participants determine the critical information and performance measures they need to effectively manage performance related to each CSF. Again, the CSF team should refer to respondent interviews to ensure that participants identify the information that is particularly important in enabling them manage effectively.

The experience of one Ministry demonstrates the importance of the CSF team in this effort. Participants in the workshop had great difficulty identifying their critical information needs and performance measures. They insisted that it was impossible to quantify key performance measures, and that they needed face-to-face meetings in order to "get a sense of" the performance of areas that reported to them. Unfortunately, they could not arrange such meetings often enough to monitor those areas effectively.

The planning team had carefully considered the information needs that participants had discussed in the interviews and ways in which the information system might deliver critical information. The CSF team used this knowledge to help workshop participants clarify the specific performance measures that were critical.

For example, one participant looked for projects that were "in trouble," by talking to his program managers about project expenditures. The CSF team asked him a number of questions about how he knew a program was "in trouble." Eventually the participant realized that one of the most important indicators was when project expenditures were more than 30% over or 50% under budget targets. This measure became a critical information measure for him.

The CSF team can use Template #8, "Determine Critical Information Needs," to guide this segment of the workshop. Figure 11 shows a sample of a completed Template #8.

In the final segment of the workshop, participants identify action plans and projects that will enable them to obtain the critical information they need. Again, the CSF team can use their knowledge of the respondent interviews to stimulate discussion and ensure that participants frankly express their views.

In one organization, for example, participants were hesitant to identify action plans and key projects. The culture of that organization was to guard information, and participants were reluctant to share their ideas about the actions they would take to obtain information. The CSF team slowly convinced the participants that there were important opportunities for them to work together on activities that could serve mutual needs. Eventually, participants realized that they could share expenses and raise the payoffs of certain projects if they were willing to discuss action plans more openly.

Template #9, "Establish Action Plans," and #10, "Key Projects," can guide the planning team in facilitating this segment of the workshop. Figures 12 and 13 show samples of completed Templates 9 and 10, respectively.

#### (5) Link CSFs to information technology planning.

After the conclusion of the workshop, the planning team will link the CSFs and critical information needs to the information systems organization and services. Specifically, the team will determine:

- o Information needs that are not adequately met by existing or planned IS applications
- o IS applications that overlap and duplicate efforts while fulfilling the same information needs

In one Ministry, for example, the planning team found that the same information was being processed for different divisions using different applications, involving much duplication of effort.

Template #11 provides a guide to conducting the link between CSFs and IT infrastructure. Figure 14 shows a sample of a completed Template #11.

#### IV. Understand the Gaps Between Information Needs and IT Resources

At this point in the framework, the planning team should review the information they have gathered. On the one hand, they will

have clearly defined the organization's critical information needs, derived from its goals and CSFs. On the other hand they will have assessed the existing IS organization and services.

In this stage of the planning framework, the planning team will combine this information to determine where there are gaps between critical information needs and existing IT resources and services. After identifying those gaps, they will be able to generate options for closing the gap.

To determine gaps between critical information needs and IS services, it is important to consider three dimensions: the content of information (relevance and accuracy), how it is reported, and timeliness. For example, if managers get the information, but in a form that is difficult to use, there is a gap. If the information is timely but not sufficiently accurate, there is a gap. All gaps between needs and information delivery should be specifically noted.

The planning team in one organization, for example, found that central IS provided excellent quality data. However, because IS spent most of their resources ensuring that the data they did distribute was excellent, they were unable to provide some of the information managers needed. In contrast, in another agency, IS provided managers with all of the information they requested, but accuracy was so poor managers could not trust the numbers.

After the planning team has determined the gaps between critical information needs and current IS services, the next step is to produce options to close those gaps. The team should consider what changes in applications development, IS operations, or IS management might help to close gaps.

It is important to note that at this stage the team does not evaluate the options; they are merely seeking to develop several alternative options for closing gaps. They should endeavor to generate a number of options to close each gap, without assessing the relative value of each option. Template #12 "Gap/Option Generation" Template can guide the team in identifying gaps and options to close them. Figure 15 shows a completed sample of Template 12.

The experience of one organization demonstrates this stage of the framework. One of their critical information needs was a comparison of monthly project expenditure figures. The organization had a highly centralized IS organization, which only provided managers with aggregate data for the projects within each program.

In an effort to close this gap, the planning team generated several options. One option involved a change in IS operations: microcomputers would be placed in managers' offices and a micro-

mainframe link would be installed to let them to download the information they needed into a simple spreadsheet. Another option was to change management and applications development: new project monitoring applications would be designed by a team of general managers and IS professionals, with a general manager heading the team. IS would use those applications to prepare reports and deliver them to the managers. A third option involved a change only in application development: central IS would hire more people to develop new applications that would provide the information managers wanted.

#### V. Assess Trade-offs Among Options

At this point in the planning process, the planning team will have generated a number of options to close the gaps between information needs and IS services. Some of those options will involve changes in management process, others will propose a reconfiguration of the IS organization, still others suggest modifications or development of applications. Each option will be relatively strong or weak, depending on how well it fits the organization.

In this stage of the framework, the planning team will determine the trade-offs between the strengths and weaknesses of each option. The objective is not to calculate some "objectively best" option. It is to consider the demands and benefits of each option, in view of the organization's needs, strengths, and weaknesses.

The team will want to consider several criteria in assessing the trade-offs among options. One set of criteria will be the impact of the option on the effectiveness of the IS function. For example, how likely is it that the option will result in better delivery of accurate, timely, and relevant information?

Another set of criteria will be cost and performance drivers. The objective, however, is not to derive a quantitative cost estimate. It is to determine how well the relative level of fixed and variable costs of the option fit the particular organization. Consider the example of two organizations assessing cost drivers. In one, fixed costs were quite easy to cover, whereas variable costs were difficult to cover. They rated options with high fixed costs and low variable costs as "good" on cost criteria. In contrast, another organization with a different cost structure rated the same options as "poor" on cost criteria.

A third set of "trade-offs" criteria involves management and education. Here the planning team considers such issues as how well the option supports good quality planning and control, or the development of technical and analytic skills.

After rating all of the options, the planning team will also want to pull out the applications development options and examine them separately. For each of these options, the team will consider the relative level of investment required, the value of the application, the likely level of organizational risk (e.g., likelihood there may be negative reactions from senior management), and the technology risk (likelihood the application will not be developed successfully within a reasonable time and budget).

At this stage of the Framework the planning team will have developed a clear idea of the relative value and viability of the options. They can determine which options, in their view, are best for the organization, as well as the benefits and requirements of those options, and the reasons for selecting them over other options. These assessments can be offered to those who will make the final selection of options.

Consider, for example, the experience of one planning team. They were trying to close an information gap in which it was crucial that several departments get better access to similar data. The team found that an option to gather and process the data by central IS had high benefits and low financial costs. An alternative option, to "decentralize" processing by increasing the number of microcomputers in departments, would be more expensive.

The team also knew, however, that data collection and processing in the organization was currently highly decentralized, and the departments jealously guarded their control over data. The team decided that the option for centralized processing had unacceptably high organizational risk. The decentralized option, although more expensive, was more likely to be successful. In their report, they recommended the decentralized option. They explained why they believed that option was best for the organization. They also noted its higher cost, and the relative benefits and risks of the alternative, "centralized" option.

Templates 13 and 14 offer an effective approach to assessing option tradeoffs. Figures 16A and 16B show two samples of a completed Template 13. Figure 17 shows a sample of a completed Template 14.

## VI. Task Force Assesses and Selects Final Option

At this stage in the framework, the planning team will understand the trade-offs for a number of options to close each gap between critical information needs and IS services. They will also have developed a list of "best" options, the requirements and benefits of those options, a list of second-best options, and an explanation for the team's choices.

One major task remains: to make a final selection of options and develop a plan for implementing those options. In conducting this task, it is essential to create a sense of "ownership" in the IT strategy among those who will have to implement the final options.

There are many ways organizations carry out this task successfully. Here we suggest one approach that is widely applicable in organizations of all kinds. This approach recognizes that giving people analytical reasons to adopt a strategy, particularly if it involves change, is not enough. Those responsible for implementing the strategy must feel a sense of "ownership" in the strategy, have a stake in its success, and believe it takes into consideration their own views of what the organization needs.

To build such a sense of "ownership," this stage of the framework suggests the creation of a Task Force composed of those who will be responsible for implementing the final IT strategy. The Task Force will evaluate the planning teams' assessment of the options, agree to a final set of options, decide who will be responsible for implementing each option, and monitor the results. In most cases, Task Force members will want to confer with their senior officers during the course of these deliberations.

After the Task Force has agreed on a choice of options, they will present their recommendations to the final decision-maker. Upon senior management approval, these recommended options will comprise the organization's IT strategy.

The size of the Task Force and the participants' positions in the organization will vary, depending on the intent of the IT strategy project. In some cases, the Task Force will be the same as the CSF workshop. In other cases, there may be a Task Force for each function, or even for each gap within a function. In any Task Force, three major roles must be filled:

- o End User Representative -- Someone with strong organizational knowledge, who understands the needs of the organization and of end users
- o Technical Expert -- Someone who is an IS technical person, who understands the capabilities of the IS infrastructure
- o Senior Analyst (if available) -- Someone who understands both the organizational needs and the technical implications, who can bridge the technical and the end user perspectives.

The role of the planning team in this stage of the framework is to facilitate the option evaluation process so that the Task Force considers:

- o The major issues involved in closing each gap
- o The trade-offs between options
- o The extent to which certain areas must be actively managed if a particular option is selected
- o The cross-functional implications of adopting various options

The planning team should also assist the Task Force in assessing the options according to a number of decision criteria:

- o Relative cost levels and cost structure of alternative options
- o Service level likely to result from alternative options
- o Urgency of the issue that the option is intended to resolve
- o Implications for short-term and for long-term ability of the organization to solve problems
- o The extent of organizational change required by the option, and the organization's ability to make those changes
- o Integration of the information system infrastructure and cross-functional synergies
- o A high-level view of the impact of the options on the organization and its ability to achieve its goals

In addition, the planning team should facilitate the discussion to ensure that all members of the Task Force actively participate, and that those who must implement a particular recommendation have a commitment to its success.

In one organization, for example, the Task Force developed a number of final recommendations, based on their evaluation of the options presented by the planning team. One of the most important of these recommendations resulted when the Task Force, assisted by the planning team, examined information needs across the organization. The Task Force found that all divisions had similar problems communicating information and that an electronic mail system would significantly reduce telephone expenses for all divisions, while improving their access to critical information.

In guiding the Task Force evaluation effort, the planning team can use the findings of Template #13, "Assessment of the Trade-offs Between IS Support Options" and #14, "Option Assessment of Future Applications." Task Force members should receive copies of these templates for reference.

### Task Force Presents the Final Option to Senior Management.

After the Task Force has developed its recommendations, it should prepare a brief implementation plan outline. This plan outline defines the process of implementing the recommendations. In particular, it should address the phasing of implementation in view of the urgency of particular problems and the ability of the organization to change.

For example, in one organization, the Task Force realized that several recommendations offered high value, but also demanded high investment and high organizational and/or technology risk. They decided that the organization would not be able to implement all of the recommendations at once. After considering the IT resources available and the organization's ability to change, the Task Force decided that a combination of high value, high investment/risk recommendations and lower value, low investment/risk recommendations was most appropriate for the first phase of implementation.

The recommendations presented to the final decision-maker should include:

- o The final option choice
- o The second-best option
- o A brief justification for the choice
- o A brief implementation plan indicating the recommendations to be implemented, timing, and person responsible for implementation

The fact that the Task Force includes representatives of end users and of IS technical staff, and are the people who will be responsible for implementing the recommendations, should lend considerable weight to the final recommendations.

### Implementing the Recommendations

Implementation of organizational change is a huge management field and involves many factors. Full discussion of this field is beyond the scope of this workbook. It is important to note, however, the major factors that determine successful implementation of an IT strategy. If these factors do not support some elements of the IT strategy, it is best either to alter those elements of the strategy or wait until you can get support for them from all of these major factors.

- o Leadership. Successful implementation of an IT strategy demands strong, clear leadership support communicated throughout the organization. This is particularly crucial if the strategy involves major organizational change.

- o Culture. Having sound analytical reasons for change are usually not enough. The beliefs and values people hold must also support the change. If they do not, the change is not likely to be successful.

Where there is a conflict between a strategy element and organizational culture, it must be resolved. One approach is to reinterpret strategy so it supports the organization's culture. It is also possible to modify the strategy so it can conform to those beliefs, meanwhile starting small pilot projects that demonstrate the effectiveness of strategy elements that conflict with the organizational culture. Finally, it is possible to try to alter values and beliefs -- however, this is extremely difficult and requires strong, ongoing leadership from the top.

- o Organizational structure. The structure of the organization must support the IT strategy recommendations. If the recommendations involve changes in the organizational structure, the leadership must be willing to alter the structure, and to shift people who support the strategy into positions of power.
- o Management systems. Every organization has key management systems that strongly affect how people behave. One of the most important is the compensation system. Another is the resource allocation system. These systems must support the IT strategy recommendations, or be altered to do so. For example, the compensation system must provide incentives for people to undertake the activities involved in implementing the IT strategy.
- o People. In order for an IT strategy to be successful, people in the organization must have the commitment, understanding, and skills to implement the strategy effectively. It may be necessary to gain commitment (e.g., through incentives or messages from top leadership), build understanding (e.g., through meetings on the strategy), or develop skills (e.g., through training) so that people are willing and able to carry out the strategy.

### The Continuous Planning Process

IT strategic planning is most effective if it is not a single event, or a routine task conducted every five years. It must be an ongoing process. It is important that those responsible for the organization's general strategy regularly assess IT to ensure that it contributes to achieving organizational goals.

The strategic IT planning process discussed here is sufficiently flexible so that it can be carried out whenever it appears that IT should be contributing more effectively to the organization. The process can address either a specific problem or the general sense that "things are not quite right." It can reassess IT whenever external conditions or the organization's goals change. It can also review how newly available technologies can improve IT service in the organization. What is most important is that strategic IT planning is viewed as an ongoing effort to use information technology resources as effectively and efficiently as possible to help the organization achieve its goals.

## PART 4

### CASE EXERCISE: MINISTRY OF EDUCATION

This part of the workbook illustrates in concrete terms the conduct of the Strategic IT Planning Framework. It provides a case example, which is drawn from the experiences of several organizations.

The case shows how each stage of the Strategic IT Planning Framework was conducted in an organization. It discusses the way the planning team tailored the Framework to their particular circumstances, as well as how they resolved problems that they encountered. In addition, the Figures provide specific examples of how templates were completed during the planning process.

#### Background

The Ministry of Education (MOE) of a medium-sized developing country was under pressure to expand primary and secondary educational opportunities in rural areas. The Government had made widely publicized promises to make education available more equitably, and to expand school participation rates by 1/3 during the coming three years. The President had personally discussed with the Education Minister the importance of expanding educational opportunities in rural areas.

At the same time, the Ministry's budget was increasing by only a few percent per year. The Ministry of Finance (MOF) had ordered all ministries to reduce their expenditures, and warned that budget limits would be strictly enforced. MOF advised MOE to reduce costs per student by 25% during the next three years.

Several donor agencies agreed to assist MOE in developing programs to expand educational opportunities and improve the quality of education. At the same time, they expressed concern that funds for past initiatives had not been used effectively, and programs often fell far short of their goals. They wanted projects to be monitored more effectively. One donor suggested that the Ministry needed to improve its information system to support its efforts. The donor also recommended that the Ministry conduct an information technology (IT) strategy process that would help identify the best way to modify the information system (IS) so it would support the Ministry's goals.

#### Introducing the IT Strategy Process

The head of the Directorate General of Administrative Affairs (DGAA) was the top officer responsible for the Ministry's

information systems. He agreed to have the Ministry conduct a strategic IT planning process, with the help of a consulting group. Subsequently, he discussed the IT strategy project with the Minister and the heads of the other Directorate General Offices (see Figure 1). He emphasized the importance of the project, and asked that all officers actively participate in making the process effective.

### Conducting the IT Strategy Process

In consultation with the heads of the Directorate Generals and the Departments, an eight-person planning team was formed to conduct the IT strategy project. The team included two general managers, two IS professionals, two consultants, and two planners, one of whom was to act as head of the team. The intention was also to give the Ministry members of the team hands-on training in the methodology.

At the outset, the planning team met with the head of the DGAA to discuss his objectives for the IT strategy project. He explained, "We want to understand what is needed so that the Ministry's information system can best support our goals. As you know, one of our most important goals is expanding primary and secondary education opportunities in rural areas while keeping costs down. We want to know how the information system can help us do that successfully."

Shortly afterwards, he arranged a meeting with the other Directorate General (DG) heads. At that meeting, the senior officers and the planning team discussed the strategic IT planning process and how these senior officers would participate.

### Defining the Overall Mission and Goals of MOE

The planning team spent the first week of the planning process doing background research. They read organization mission statements, looked over the Ministry budget, read evaluation reports on Ministry projects, and discussed the operations of the Ministry with managers at various levels. They gained an understanding of the goals and scope of each functional organization, and of the major cross-functional programs in MOE (Figure 2 shows a segment of the completed Strategy Template).

The head of the planning team then assigned team members to two special teams, an "IS team" and a "CSF team."

### Assessing the Current IS Infrastructure

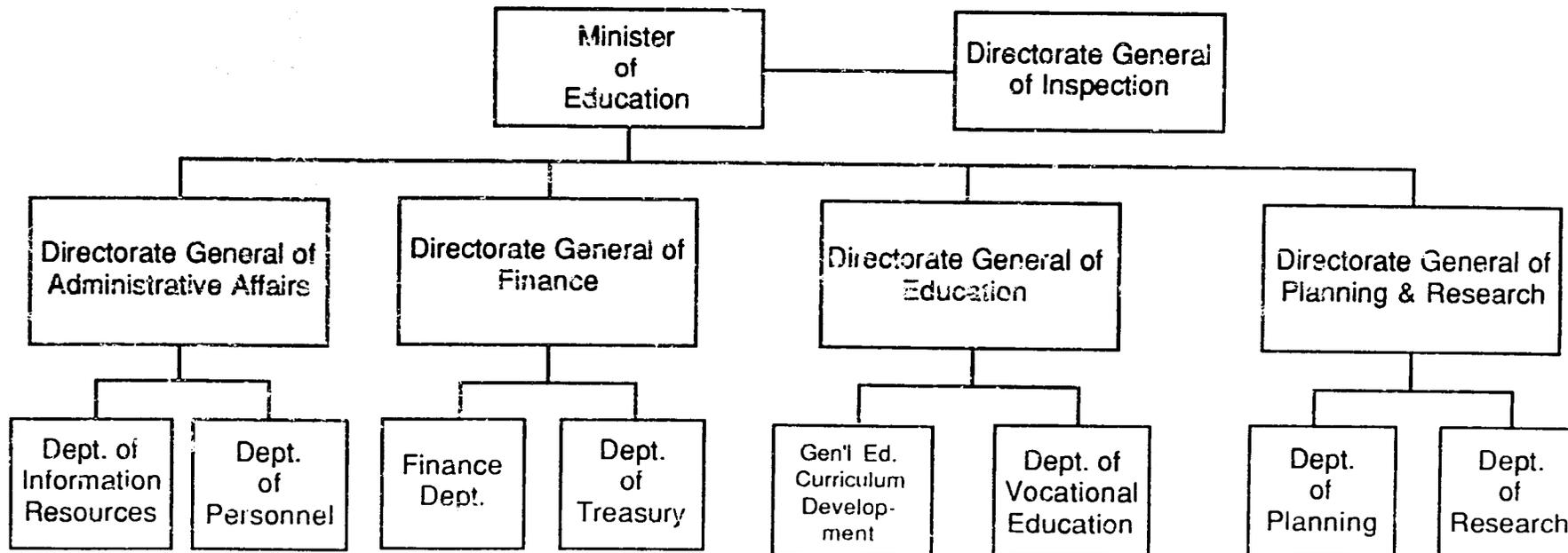
The IS team had four members. Two of the members were IT professionals from the Information Resources Department within the DGAA. The Information Resources Department (IRD) was in

Figure 1: EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

**Project Scenario:**

The Ministry of Education of a medium-sized developing country was under pressure to expand primary and secondary education opportunities in rural areas while keeping costs down. For this project, they focused on the ways key functions could use information technology to expand rural educational opportunities while holding costs down.

ORGANIZATIONAL STRUCTURE  
MINISTRY OF EDUCATION



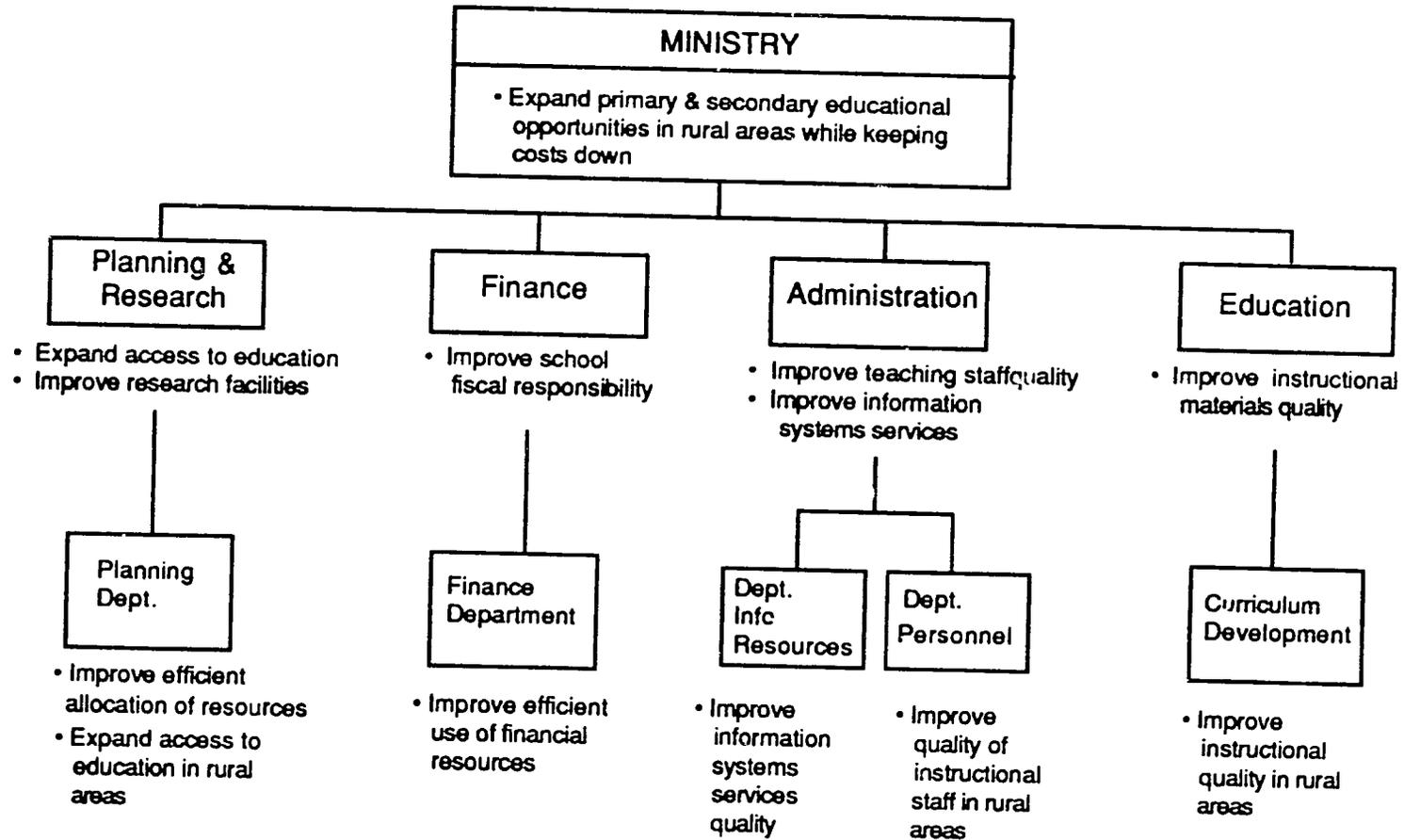
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FIGURE 2. "STRATEGY TEMPLATE"

Example Project: Ministry of Education

Goals by Function &

Sub-Organizations



2002

FIGURE 2. STRATEGY TEMPLATE, continued

**FUNCTION OVERVIEW**

<u>OFFICE</u>	<u>MAJOR PROGRAMS</u>	<u>PROGRAM BENEFICIARIES</u>	<u>SCOPE</u>	<u>ADMINISTRATION</u>	<u>FINANCIALS</u>
Finance	• Develop analytical skills among staff	• Managers in Finance Department	• 24 Managers	• Administered by Finance and Personnel	• 1.2 million over 3 years
Planning	• Expand education in villages with innovative programs	• Planning Offices in Districts	• 57 Districts	• Administered by Central Planning Office	• 5 Million from World Bank

**PROGRAM (CROSS-FUNCTIONAL) OVERVIEW**

<u>PROGRAM</u>	<u>LEAD OFFICE</u>	<u>OFFICES INVOLVED</u>	<u>PROGRAM BENEFICIARIES</u>	<u>SCOPE</u>	<u>ADMINISTRATION</u>	<u>FINANCIALS</u>
Management Skills Development	• Personnel	• Department of Finance	• Central Office Management	• 10 Managers	• Administered by Personnel and Finance	• 150,000
		• Planning Department	• Planning Officers, Central	• 8 Planning Officers	• Administered by Personnel Dept.	• 150,000
		• Department of Curriculum Development	• Analysts, Central • Administrators, Central	• 23 Analysts • 4 Administrators	• Administered by Personnel Dept.	• 300,000
		• Department of Personnel	• Administrators, Personnel Development Specialists	• 12 Administrators 4 Personnel Devel. Spec.	• Personnel Development Office	• 200,000

charge of information systems in the Ministry. The other two IS team members were the two general managers, who were from other Directorate General offices. The IS team was responsible for gathering information on the existing IS infrastructure in MOE, and reporting the information back to the rest of the team.

The IS team met with the head of the Information Resources Department and other IRD staff to discuss the information they needed. During the following three weeks, with the help of IRD staff, they gathered information on IT services throughout the Ministry. They determined which Departments received reports from the major IS applications (see Figure 3). They mapped out the distribution of major IS functional responsibilities and resources (see Figures 4 and 5). They also determined the key features, users, benefits, value, and level of investment of major IS applications (see Figures 6 and 7).

### Conducting the CSF Process

The "CSF team" consisted of the head of the planning team, the other planner, and the two consultants. The CSF team was responsible for conducting CSF interviews, facilitating the CSF workshop, and reporting back to the rest of the planning team.

The CSF team's first task was to select those to be interviewed. They met with the head of the DGAA to select the interviewees. Together, they selected 12 interviewees. Ten were "end users" of information, including the heads of the other three Directorate General offices, and the heads of the "end user" Departments: Personnel, Finance, Treasury, General Education/Curriculum Development, Vocational Education, Planning, and Research. In addition, the head of the DGAA and the head of the Department of Information Resources would be interviewed (see Figure 1).

The planning team designed a CSF questionnaire, based on the generic CSF interview, to reflect the major concern of the IT strategic planning process -- how the current information system could be made to better support the Ministry in achieving its goals. They emphasized questions that focused on areas of opportunity where respondents felt good information was most important in doing their jobs.

### Conducting the Interviews

To conduct the interviews, each planner was paired with a consultant. Each planner/consultant interview team conducted one or two interviews a day. After completing each interview, the interview team discussed the respondent's answers and ensured that the interview notes were complete and clear. At the end of the day, each interview team wrote summaries of the interviews they had conducted. They later reviewed these summaries with the interviewees.

FIGURE 3. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "IS APPLICATIONS BY FUNCTION/SUB-ORGANIZATION UNIT" TEMPLATE

APPLICATION

FUNCTION

FINANCIAL

- Quarterly Expenditure Reports
- Routine & Development Budget Allocations for Programs
- Fixed Asset Report
- ...

PERSONNEL

- Quarterly Staffing Report
- ...

STUDENT PARTICIPATION & PERFORMANCE

- Participation Reports
- Annual Test Results
- ...

	PLANNING	CURRICULUM DEVELOPMENT	PERSONNEL	FINANCE
		Plans to Receive Report	Plans to Receive Report	Receives Report
	Receives Report	Receives Report	Receives Report	Receives Report
	Receives Subset of Planned Asset Purchases			Receives Total Report
			Receives Report	Receives Report
	Receives Report			Receives Report
		Receives Report		

2/2

FIGURE 4. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "IS COST BY MINISTRY  
FUNCTION/SUBORGANIZATIONAL UNIT"

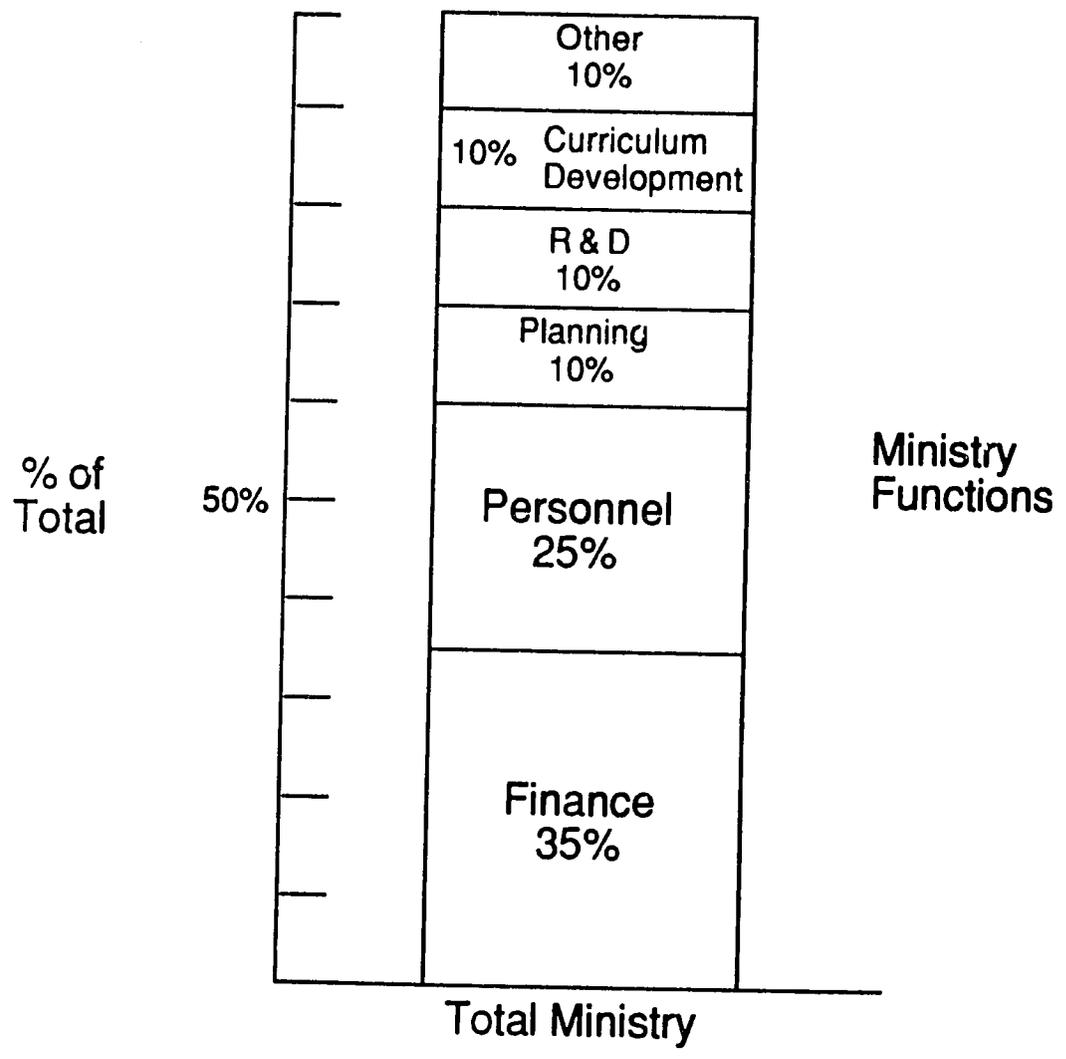


FIGURE 5. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "IS ORGANIZATION BY MINISTRY FUNCTION" TEMPLATE

IS FUNCTIONAL  
ACTIVITY

FUNCTION

	PLANNING	CURRICULUM DEVELOPMENT	PERSONNEL	FINANCE	
				Problem Expenditure Report	Other Reports
<b>1. Applications Development</b> <ul style="list-style-type: none"> <li>• Substantive Design</li> <li>• Technical Design</li> <li>• Coding</li> <li>• Support</li> </ul>	Central IS Central IS Central IS Central IS	Central IS Central IS Central IS Central IS	Central IS Central IS Central IS Central IS	Local Local N/A Local	Central & Local Central IS Central IS Central IS
<b>2. Operations</b> <ul style="list-style-type: none"> <li>• Hardware</li> <li>• Software</li> <li>• Telecom</li> </ul>	Central & Local Central IS Central IS	Central IS Central IS Central IS	Central IS Central IS Central IS	Local Local N/A	Central & Local Central & Local Central IS
<b>3. Management Planning &amp; Control</b> <ul style="list-style-type: none"> <li>• Planning</li> <li>• Architecture</li> <li>• Standards</li> <li>• Budget</li> <li>• Systems Performance</li> </ul>	Central IS Central IS Central IS Central IS Central IS	Central IS Central IS Central IS Central IS Central IS	Central IS Central IS Central IS Central IS Central IS	Local Local Local Local	Central & Local Central IS Central IS Central & Local Central & Local

3/c

FIGURE 6. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION  
 SAMPLE: "APPLICATION PROFILE PORTFOLIO ANALYSIS, PART A"

DESCRIPTION

QUARTERLY EXPENDITURE REPORTS

**FEATURES**

- Extensive line item expenditures by school

**USERS**

- Finance
- Plans for Personnel to Receive
- Plans for Curriculum Development to Receive

**BENEFITS**

- Provides Only Source of Budget Monitoring
- Provides Complete Line Item Expenditure Information Down to School Level
- Plan to Provide Subsets of Data to Personnel & Curriculum Development

**PROBLEMS**

- Not Possible to Extract Subset Unless Re-Code
- Usually Incomplete
- Usually 6 Months late or more

---

QUARTERLY STAFFING REPORTS

**FEATURES**

- Complete Staffing per Day by School
- Produces Annual Staffing Report
- Possible to Extract Data by District & State
- Produces Local Reports

**USERS**

- Finance
- Personnel

**BENEFITS**

- Provides Only Source of Information on Staffing Vacancies
- Plans to Link With Expenditure Reports For Cross-Checking

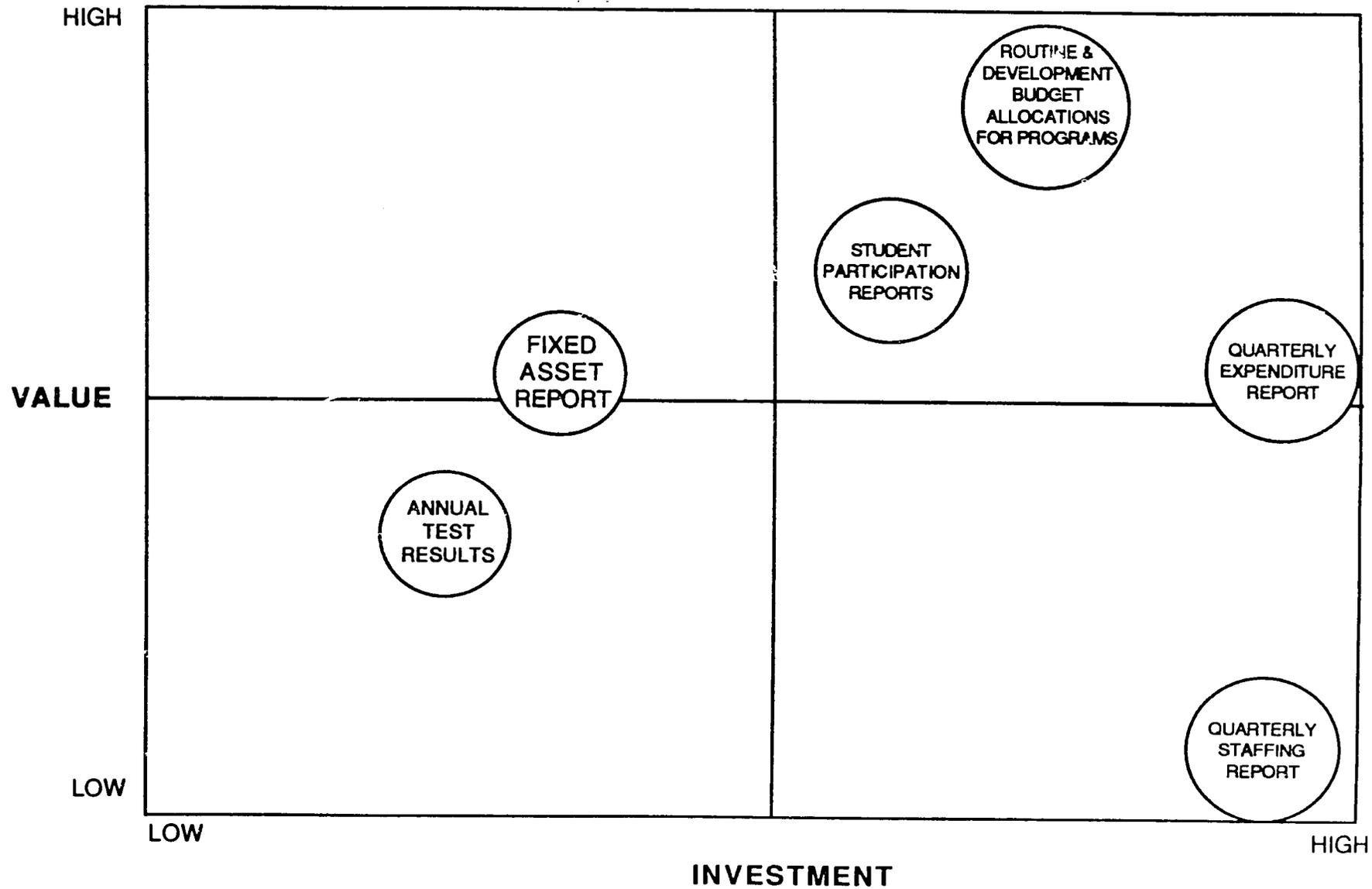
**PROBLEMS**

- Usually Incomplete
- Usually More Than 6 Months Late

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FIGURE 7. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "APPLICATION PORTFOLIO ANALYSIS, PART B"



Two of the most interesting interviews revealed underlying differences in the Ministry about how to achieve their goals. One emphasized the importance of holding down costs. The respondent returned to that theme throughout the interview, "You have to understand that the entire government is cutting back, and MOE is no exception. We absolutely must keep expenses down. Of course we must expand education in our country, but we can only do it insofar as our funds will allow."

The other respondent was primarily concerned about expanding good quality education, "Our first concern has to be giving all of our people a good education. Of course, we must be efficient in how we provide education. But we should not cut costs at the expense of expanding good education. This is our investment in our country's future!"

Figure 8 shows a list of the goals and CSFs that were reported by these two interviewees.

After the CSF team completed all of the interviews, the entire planning team met to discuss the responses. During this meeting they also discussed the findings of the IS team.

At the end of the meeting, all team members felt that they understood each respondent's views on:

- o The respondent's key job objectives
- o The Critical Success Factors for those objectives
- o The general goals of the Ministry
- o The respondent's ideas about the CSF's for the Ministry generally
- o Some of the key information the respondent considered critical to his/her job
- o The effectiveness of the IS function in meeting the respondent's information needs
- o Future information needs
- o Personal attitudes about information technology use

The planning team then aggregated and analyzed the CSF interview responses. They carefully examined the CSFs that emerged from the interviews. For each CSF, they determined its urgency, according to the interview responses, and how difficult it would be for the Ministry to improve performance related to that CSF.

Based on their analysis, they prepared an "Analysis of CSF Priorities" work sheet (see Figure 9). They met with the head of the DGAA to discuss these preliminary findings. At the end of the meeting, the head of the DGAA suggested that a meeting be held the following week between the CSF team, himself, and the other heads of the DGs. There they could determine the composition of the CSF workshop.

FIGURE 8. Example CSF Project: Ministry of Education

Sample: CSF Respondent Interview Summaries

Respondent A

Respondent B

Ministry Mission:

To provide equitable access to education that supports national development

Ministry Mission:

To provide educational opportunities more equally without lowering quality and while keeping down costs

Goals:

- o Expand primary and secondary school participation in rural areas at least 30% during the next 3 years
- o Lower costs per student 25% during the next 3 years

Goals:

- o Expand primary and secondary school participation in rural areas 30% during next 3 years
- o Improve education efficiency
- o Lower costs per student 25% during next 3 years
- o Improve instructional quality

Critical Success Factors:

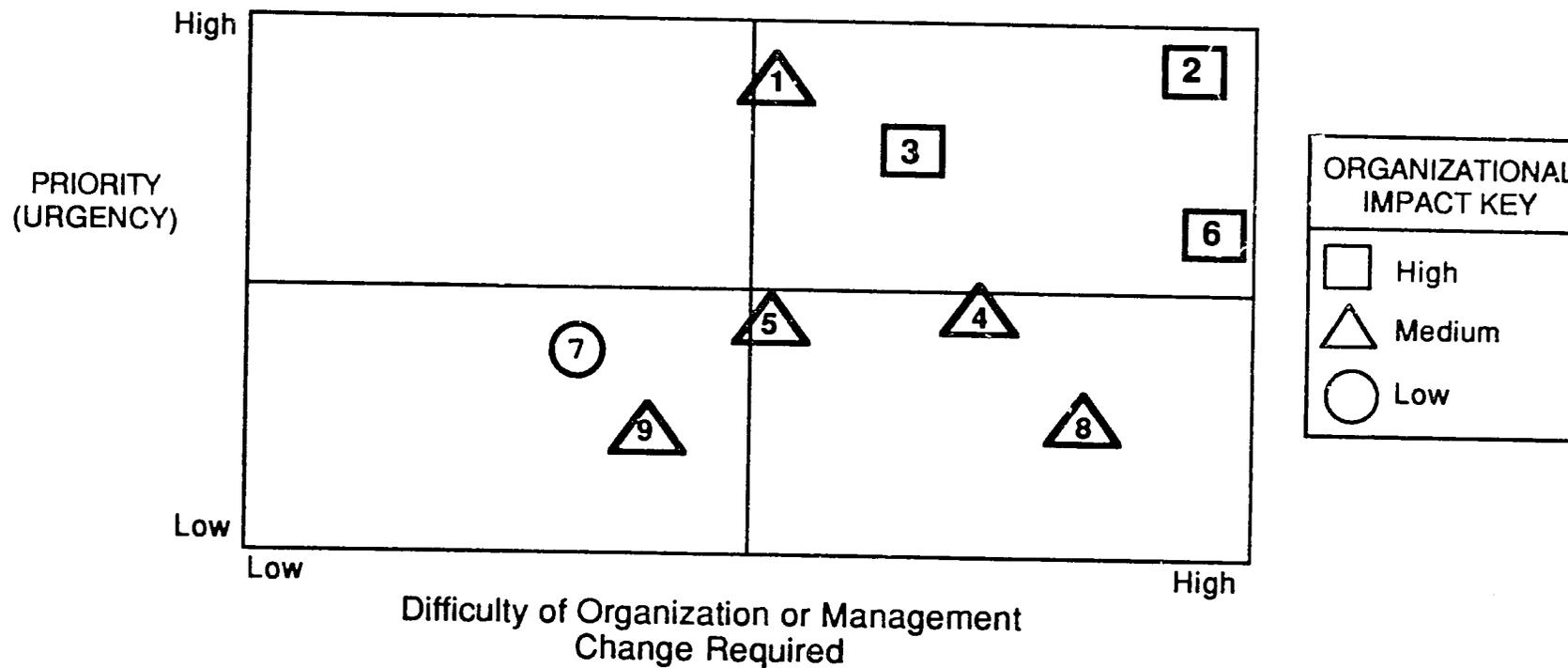
1. Expand part-time education delivered at village level
2. Improve budget monitoring of schools
3. Hold down teacher salaries
4. Raise teacher/student ratios
5. Increase employment of teachers from local area

Critical Success Factors:

1. Expand education at the village level with flexible school days
2. Improve budget monitoring of schools
3. Improve in-service teacher training
4. Use new education technologies to improve efficiency/quality/extend opportunities
5. Improve prediction of and response to employment demand
6. Improve efficiency of resource use

Figure 9. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION  
 SAMPLE: "ANALYSIS OF CSF PRIORITIES" WORKSHEET BEFORE WORKSHOP

ANALYSIS OF CSF PRIORITIES:  
 Establish Priorities by Difficulty and Organization Impact



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AGGREGATE CSFs

- |  |  |
|--|--|
| 1. Expand Flexible School-Day at Village Level | 6. Use New Education Technologies                        |
| 2. Improve Budget Monitoring of Schools        | 7. Increase Employment of Local Teachers                 |
| 3. Hold Down Teachers Salaries                 | 8. Improve Prediction of & Response to Employment Demand |
| 4. Improve In-Service Training                 | 9. Improve Efficiency of Resource Use                    |
| 5. Raise Teacher/Student Ratios                |  |

After meeting with the head of the DGAA, the planning team prepared a series of questions they wanted to be sure were addressed in the workshop. For example, they wanted to resolve differences between respondents about the Ministry CSFs for the goal of expanding education in rural areas while keeping down costs. They also wanted to clarify the respondents' own job CSFs to help achieve that ministry goal.

### Conducting the Workshop

A week later, in the meeting with the heads of the DGs, the head of the planning team expressed the belief that the DG heads and the Department heads should participate in the CSF workshop. The DG heads felt, however, that they did not have time to participate. The decision was therefore made that the Department heads who had been interviewed would participate in the workshop. The planning team would report regularly to all of the DG heads regarding the progress and findings of the IT strategy process.

On the first day of the CSF workshop, the CSF team began by explaining the workshop's objectives and major segments. They emphasized the importance of each participant frankly discussing his/her views and needs.

They launched the discussion by summarizing the goals of the Ministry and each function. They then showed the participants the "Analysis of CSF Priorities" work sheet they had developed. They explained that the work sheet reflected the CSFs the participants had identified in the interviews. They suggested that group review the Ministry goals and together define the CSFs for those goals.

One participant was puzzled, "Aren't we here to do something about the information system?" A consultant explained that the IT strategy process was intended to link the Ministry's goals to the information systems. It was therefore important that the group first become very clear about the Ministry's goals and ways to achieve those goals. It would then be possible to link those goals to the information system.

During the subsequent discussion, the group agreed on the goals of the Ministry, and on the particular importance of expanding primary and secondary education in rural areas while keeping costs down. Initially, however, the participants had little to say about the CSFs. The team stimulated participation by pointing out that some of the participants had expressed very different views about the CSFs in the interviews. For example, the head of Curriculum Development felt that expanding the use of new technologies for distance education was essential, while the head of Personnel believed it was more important to increase employment and training of local teachers.

Eventually, the group began discussing CSFs in earnest. After three hours of argument and explanation, they developed a consensus about the CSFs and their relative positions on the worksheet (see Figure 10).

The CSF team explained that the next step would be to consider information in three categories:

- o Data the participants would like to see regularly (at least each month) to assess how the Ministry was performing on the CSFs related to their area of responsibility. For example, they might want to see expenditure rates for rural education programs
- o Data that would tell them if there were major changes or serious problems in how the Ministry was performing, but that they only needed if the data did indicate such changes or problems. For example, they might want to get teacher vacancy rates for districts, but only if the vacancy rate climbed above 40%
- o Special data that would monitor the key projects

The head of the CSF team emphasized that the next part of the workshop would focus on information that was critical to the participants' work. He asked that they think about that information during the lunch break.

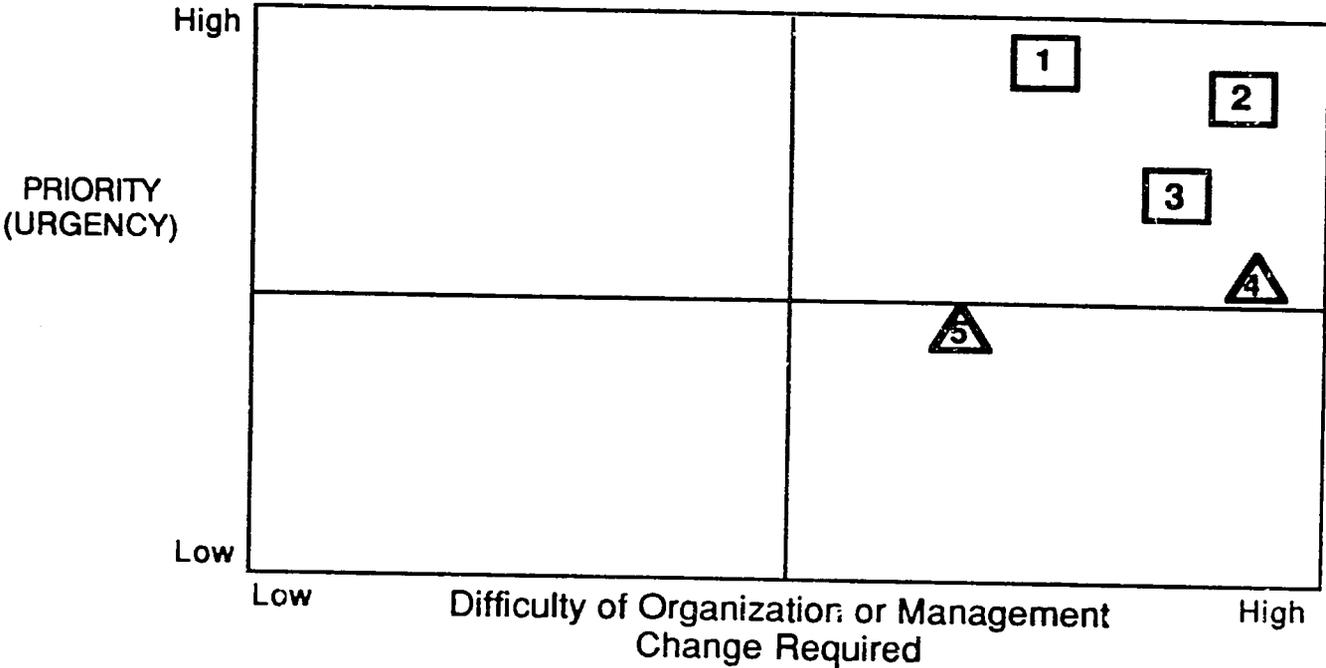
After lunch, the workshop reconvened and participants considered what information was most important to doing their jobs effectively. They addressed this agenda topic through the rest of the afternoon and into the next day. The CSF team helped the participants become very precise about the information that was critical for them. The participants also helped one another consider what measures were key. In many instances they were surprised to discover that several measures were critical to more than one participant.

By the end of the second afternoon the participants had defined what they felt were their critical information needs (see Figure 11). One of the planners commented, "Maybe if we had been able to talk like this before, a lot of problems would have been avoided."

The head of the CSF team explained that the next step would be to develop very concrete action plans that would be necessary in order for the participants to get the critical information they had identified. He asked that each participant consider possible action plans that evening.

Figure 10. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION  
 SAMPLE: "CSF PRIORITIES" WORKSHEET AFTER WORKSHOP

ANALYSIS OF CSF PRIORITIES



*24/02*

CSFs

1. Adapt Classroom Hours to Needs of Villages
2. Improve Budget Monitoring of Schools
3. Hold Down Overall Salary Costs
4. Use New Education Technologies to Improve Efficiency/Extend Opportunities
5. Improve Teacher Training

ORGANIZATIONAL IMPACT KEY	
□	High
△	Medium
○	Low

FIGURE 11. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "DETERMINE CRITICAL INFORMATION NEEDS" TEMPLATE

CSFs (by Priority by Level) Ministry-Wide	REPORTS & MEASURES BY FUNCTION			
	PLANNING	CURRICULUM DEVELOPMENT	PERSONNEL	FINANCE
1. Adapt Classroom Hours to Village Needs	Student Participation Rates by District by Month	Achievement Test Scores of Full-Time Students & Part-Time Students	Teacher Vacancy Rates in Full-Time & Part-Time Schools	
	Teacher Vacancy Rates in Full & Part-Time Schools	Changes in Classroom Hours/Day, Days/Week or Months/Year by District	Changes in Classroom Hours/Day, Days/Week or Months/Year by District	
2. Improve Budget Monitoring		Routine & Development Budget Expenditure for Curriculum Development per Quarter	Routine & Development Budget Expenditure rates for Salaries per Quarter per District	Major Item Routine and Development Budget Expenditure Rates per Quarter
		Budget Allocations for Curriculum Development Programs	Budget Allocations for Program/ Personnel Items; Monthly Report on Number of People Who Received Computer Training in Finance	Program Budget Allocations
				Donor-Assistance Funds Expenditure Rates per Quarter per State
3. Hold Down Overall Salary Costs			Trends in Salary Costs/Year by State and District	Major Item Routine & Development Budget Expenditure Rates per Quarter per District
			Total Annual Salary & Training Costs per District	Quarterly Cost Structure Analysis
4. Use New Technologies to Improve Efficiency/Extend Educational Opportunities	Costs/Student in Districts Using New Technologies & Those Using Traditional Techniques	Achievement Tests Scores of Students in "New Technology" Courses & in Traditional Courses	Teacher Evaluation of "New Technology" Courses Each Year for 5 Years	Bi-Annual Cost/Student by District
	Student Participation Rates by District by Month	Teacher Evaluation of "New Technology" Course Effectiveness Each Year for 5 Years	Teacher Vacancy Rates in "New Technology" Courses & in Traditional Courses	Major Item Routine & Development Budget Expenditure Rates by Quarter by District

34.5

The following day the workshop reconvened. The participants began discussing alternative action plans, and the probability of their success.

The head of Planning, for example, noted that the Ministry was initiating many pilot projects to develop flexible rural classroom hours and to use new technologies to expand distance education programs. She argued, "If we are going to design pilot projects like these correctly, it's not enough to guess at what people in the countryside need. We have to do a survey regularly to find out what village people need and then monitor the impact of the pilot projects."

The Head of Finance was skeptical, "Conducting surveys like that will cost too much. Who will pay for it?"

The Head of Planning responded, "If we don't get this kind of information now, we will pay a much higher price for our mistakes later."

The Head of Finance finally agreed to support surveys of a sample of villages where pilot projects were being conducted. The surveys would be conducted by the Planning Department on a trial basis for one year. At that time Finance and Planning would assess the value of the surveys.

During the rest of the afternoon participants identified action plans for which they would be responsible, and which they believed necessary in order for them to get critical information and improve the Ministry's performance on the CSFs (see Figure 12).

At the end of the day, the CSF team explained that the next step would be to identify specific projects that would implement the action plans, as well as individuals to head the projects. The team asked that the group think about possible projects that evening.

The next morning, the CSF team facilitated the discussion as workshop participants sought to identify specific projects that would carry out the action plans. Although participants had many ideas for projects, they found it difficult to decide exactly what projects to undertake. By probing for what was needed to support Ministry goals, the CSF team helped the participants define specific projects and identify people to head them.

The Head of Planning, for example, decided to limit the first round of surveys to the Western states, and put the head of the Office of Research in charge of all of the surveys. She knew that those states were receiving much attention from both the Minister and donors. She also knew that the head of the Office of Research

FIGURE 12. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "ESTABLISH ACTION PLANS" TEMPLATE

CSFs (by Priority by Level) Ministry-Wide	KEY ACTION PLANS BY FUNCTION			
	PLANNING	CURRICULUM DEVELOPMENT	PERSONNEL	FINANCE
1. Adapt Classroom Hours to Village Needs	Survey Village Needs for Flexible Hours	Develop Mathematics Radio Education Program	Develop Pilot Project for Teachers to Split Time Between Two Districts	
2. Improve Budget Monitoring			Train Finance Managers in Use of Computers	Introduce Computers to Budget Monitoring Activities
3. Hold Down Overall Salary Costs			Develop Pilot Project to Use Lower-Skilled Teachers and Provide Distance In-Service Training	Analyse Cost Structure For Different Districts
			Provide Minister With Alternative Incentives for Teachers	
4. Use New Technologies to Improve Efficiency/Extend Educational Opportunities	Evaluate Appropriateness of Alternative Technologies to Improve Efficiency	Use Planning Report on Technologies to Choose a Technology and Develop a Pilot Course in One Subject Area	Use Planning Report to Develop Teacher Training Program in Use of the Chosen Technology	Conduct Comparative Cost Study of Alternative Technologies

MSW

was very interested in village education and would be a good leader of such a project.

After considerable discussion throughout that afternoon, and during the next day, all of the participants developed a tentative list of projects (see Figure 13 for a section of the template). At the end of the day, the team suggested that the group adjourn and meet in three weeks, after the participants had a chance to review the action plans and key projects with the heads of the Directorate Generals.

The next day, the planning team met with the head of the DGAA to brief him about the results of the workshop. They explained the CSFs that participants had identified, the critical information needs the group had defined, the action plans, and tentative list of key projects.

The head of the DGAA agreed with the CSFs that had been identified. He was concerned, however, that the group members from his area were too ambitious in defining key projects. He suggested that they choose two or three projects that were most important.

The team also met individually with each of the other DG heads after those senior officers had met with the workshop participants under them. The DG heads concurred with the CSFs, and explained which action plans and key projects they favored. Like the head of the DGAA, they mentioned the importance of limiting the key projects to those that were most essential. However, they left the final choice of key projects to the workshop participants.

Three weeks later, the workshop reconvened. After a morning of discussion, the participants made final decisions about the action plans and key projects they would undertake. The CSF team concluded the session by thanking participants for their help, and the workshop was adjourned.

The next day, the CSF team reported the results of the workshop to the rest of the planning team. Two days later, the head of the planning team and one consultant met with the head of the DGAA to review the final results of the workshop. The head of the DGAA gave his approval for the action plans and projects in his area. He also requested that his office receive a monthly copy of the critical information defined in the workshop.

The team also met individually with the heads of the other General Directorate offices to review the final workshop results. At the close of each of the meetings, these senior officers approved the action plans and key projects. They also asked to receive the information that the workshop participant in their area was to receive.

**FIGURE 13. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION**  
**SAMPLE: "KEY PROJECTS" TEMPLATE**

**KEY PROJECTS BY FUNCTION**

**CSFs**

(by Priority by Level)  
 Ministry-Wide

	<b>PLANNING</b>	<b>CURRICULUM DEVELOPMENT</b>	<b>PERSONNEL</b>	<b>FINANCE</b>
1. Adapt Classroom Hours to Village Needs	Give Head of Office Research Responsibility for Surveys in all States	Give Head of Primary Education Office Responsibility to Research Existing Math Radio Courses & Select 1 for Modification Within 1 Month; Deliver a Program Plan in 3 Months; Conduct A Pilot Within 6 Months; Report Results After 1 Year	Give Head of Secondary Education Staffing Office Responsibility for All Pilot Projects Must Introduce Pilot in 2 Districts Within 6 Months; Report Results After One Year	
2. Improve Budget Monitoring			Give Head of Technical Training Responsibility to Deliver Training Program Design in 3 Months; Conduct Training Within 6 months; Report Results After Completion of Training	Give Head of School Monitoring Unit Responsibility to Submit Proposal for Computer Adoption Plan Within 3 Months; Adopt Computers Within 6 Months After Proposal Approval; Assign Staff for Training Within 6 Months of Submitting Computer Adoption Plan
3. Hold Down Overall Salary Costs			Give Head of Training Office Responsibility to Design Pilot Project & Deliver Within 6 Months; Identify Pilot Sites & Introduce Pilot in 3 Schools Within 3 Months of Project Approval; Report on Results After 1 Year  Give Head of Compensations Office Responsibility for Researching & Developing Report on Incentive Alternatives to be Delivered Within 6 Months	Give Head of Reporting Responsibility for Submitting Cost Analysis Model Within 1 Month; Delivering 1st Cost Structure Analysis Results Within 6 Months and Quarterly Thereafter

*360*

### Linking CSFs to Information Technology Planning

After these meetings, the planning team continued their analysis of the CSF interviews. They now focused on the links between the CSFs and critical information needs defined in the workshop, and the current IS services. For each information need, they examined whether there was an application that provided the information, and the extent to which it provided the information in the form the department heads needed (see Figure 14). As one of the IS professionals remarked, "A lot of this information is already in the system. But putting it in the right form will be difficult."

### Understanding the Gaps Between Information Needs and IT Resources

The planning team members then reviewed all of their work thus far. They examined the Ministry goals and the CSFs, and carefully considered the related critical information needs. They looked over the information about the Ministry's current IS services and organization.

They then turned their attention to identifying the gaps between each critical information need and the information currently being delivered by the information system. Each member of the team contributed his/her experience. Together, they were able to determine:

- o Which critical information needs could easily be addressed from existing applications
- o Areas in which data was already in the system, but there were problems in providing the information in the form managers needed
- o Areas where there were no applications to address the information need
- o Priorities for closing the information gaps they had identified

They discovered that most of the critical information was already supposed to be provided by existing applications. However, those applications were incomplete, inaccurate, not timely, and/or gave extensive information that the Department Heads had to sift through to calculate the information they really needed (see Figure 15).

After they determined the gaps, they turned their attention to generating options for closing the gaps. Some of the options concerned modifications of existing applications. Others involved changes in IS operations or management planning and control. The

FIGURE 14. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "LINKS CSFs TO IT PLANS" TEMPLATE

CSFs (by Priority by Level) Ministry-Wide		IS Applications & Infrastructure Planning by Function			
		INFORMATION NEEDS	PLANNING	CURRICULUM DEVELOPMENT	PERSONNEL
1. Adapt Classroom Hours to Village Needs	Student Participation Rates by District/Quarter	Participation Rates Only Annual on PARTICIPATION REPORTS			
	Changes in Classroom Hours/Day or Days/Week or Months/Year by District	Not Available	Available With Extensive Analysis From CURRICULUM PROGRAM REPORTS Incomplete	Available With Difficulty From QUARTERLY STAFFING REPORTS Incomplete	
	Achievement Test Scores of Full-Time & Part-Time Students		Test Scores Available But Incomplete for Full-Time Students on ANNUAL TEST RESULTS; Not Available for Part-Time Students		
	Teacher Vacancy Rates in Full-Time & Part-Time Schools	Not Available Except by Special Request From IS -- Long Waiting Period		Available From ANNUAL STAFFING REPORTS But Incomplete & Not Timely	
				Plans to Receive Subset of QUARTERLY EXPENDITURE REPORTS from Finance; Receives Program Budget Allocation Report - too much info	
2. Improve Budget Monitoring	Routine & Development Budget Allocations for Programs				
	Routine & Development Expenditure Rates per Quarter per District		Plans to Receive QUARTERLY EXPENDITURE REPORT - Too Much Info; Receives PROGRAM BUDGET ALLOCATION REPORT - Too Much Information		Available From QUARTERLY EXPENDITURE REPORTS but incomplete & not timely; receives BUDGET ALLOCATION REPORT

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team sought to develop as many ideas as possible about ways to close the gaps. Each option was fully recorded for later review (see Figure 15).

For example, the Planning and the Personnel Departments could not get teacher vacancy information they needed in a timely manner. The planning team developed some options for giving the two Departments faster access to teacher vacancy information in the format they needed.

One of those options had three aspects: operations, management planning and control, and applications development. In the operations component, microcomputers would be introduced into the Planning and Personnel Departments. In the management planning and control component, end users from those departments would be trained to manage and operate the microcomputers. This would give the Departments faster access to the data, and would enable them to put it into the format they needed. In the applications component, central IS would write a program to extract the data from existing reports and port the data to microcomputers in the Departments.

#### Assessing Trade-offs Among Options

After each critical information need was fully considered, and all of the options were recorded, the team turned to determining the trade-offs between the options. First they separated the options by function. They then examined the gaps and options within each function. They rated each option separately, according to a number of criteria. The major criteria included the option's impact on the effectiveness of the IS function, how well its cost structure fit the resources and cost structure of the Ministry, and its impact on management and education (Figures 16A and 16B show samples of the assessments of two options to close a gap).

Often, team members had very different ideas about how an option should be rated. At times the discussion grew heated.

A good example was an option to shift some IS responsibilities from central IS to the Departments. The managers and planners on the team felt that the option would improve all aspects of IS effectiveness. The IT professionals disagreed, arguing that it would greatly reduce effectiveness. The consultants facilitated the discussion, and provided a perspective gained from experience in other organizations. Only after extensive discussion did the team agree on how the option should be rated for each criterion. For some criteria, on which members strongly disagreed about rating the option "good" or "poor," they eventually decided to rate the option "adequate."

FIGURE 15. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION

SAMPLE: "GAP/OPTION GENERATION" TEMPLATE

CSFs	Information Needs	Gap Between Need & Current IS Support, Application	Option for IS Support		
			Application Development	Operations	Mgt. Planning & Control
Adapt Classroom Hours to Village Needs	Student Participation Rates by District/Quarter	<u>Planning Function:</u> Can Only Get Information Annually from Participation Reports	1. Write Program to Extract Rates/Quarter/District from Participation Reports	No Action	No Action
	Changes in Classroom Hours/Day, Days/Week, or Weeks/Year	<u>Curriculum Development:</u> Information from Curriculum Program Reports Incomplete and Hard to Extract in Useful Form  <u>Personnel:</u> Information from Quarterly Staffing Report But Incomplete & Hard to Extract in Useful Form	2. Write Program to Extract Info From Curriculum Program Reports; Distribute to Planning & Personnel	No Action	Improve Data Collection Control
			3. Write Program to Produce Report on Changes in Classroom Hours; Distribute to Planning & Personnel	No Action	Submit New Form to Schools on Changes in Classroom Hours; Improve Data Collect Control
			4. Write Program to Extract Data from Quarterly Staffing Report; Distribute to Planning & Personnel	No Action	Improve Data Collection
			5. Write Program to Extract Data from Annual Test Results; Write Program to Combine Full-Time & Part-Time Student Test Results in One Report	No Action	Improve Data Collection Control; Introduce New Survey to Schools Regarding Part-Time Students
	Achievement Test Scores of Full-Time & Part-Time Students	<u>Curriculum Development:</u> Annual Test Results Give Incomplete Information on Full-Time Students and No Information on Part-Time Students			
	Teachers Vacancy Rates in Full-Time and Part-Time Schools	<u>Planning:</u> Can Only Get Information by Special Request from IS  <u>Personnel:</u> Annual Staffing Reports Give Information But Incomplete & Not Timely	6. Write Program to Extract Teacher Vacancy Data from Staffing Report; Distribute Report to Planning and Personnel	No Action	Improve Data Collection Control
7. Write Program to Extract Teacher Vacancy Data from Staffing Report; Download to Microcomputers in Planning & Personnel			Place PCs in Planning & Personnel	Improve Data Collection; Train PC Operators in Planning & Personnel	
Improve Budget Monitoring	Routine & Develop Budget Allocations for Programs	<u>Personnel:</u> Program Budget Allocation Information too Extensive & Unfocused	8. Write Program to Extract Subset of Data; Deliver Report to Personnel	No Action	Work With Personnel to Design Report
	Routine & Development Budget Expenditure Rates per Quarter per District	<u>Curriculum Development:</u> Quarterly Expenditures Report & Program Budget Allocation Report too Extensive & Focused; <u>Finance:</u> Quarterly Expenditure Reports Incomplete & Not Timely	9. Write Program to Extract Relevant Data for Curriculum Development & Finance	No Action	Work With Curriculum Development & Finance to Design Report; Improve Data Collection Control
			10. Give Finance a Subset of Data to Use on PCs	Place PCs in Finance	Train Finance People to Use PCs; Improve Data Collection



**FIGURE 16B. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION**  
**SAMPLE: "ASSESSMENT OF OPTION TRADE-OFFS RELATED TO IS ORGANIZATION" TEMPLATE**  
 Gap: Teacher vacancy rates only through Staffing Reports; incomplete, hard to elicit, untimely

Option #7: IS Writes Program to Extract Data from Staffing Reports and Downloads to Microcomputers in Planning and Personnel

IS Support Option Range			KEY CRITERIA
Centralized	Hybrid	Decentralized	
	●		<p><b>1. Effectiveness of IS Function</b></p> <ul style="list-style-type: none"> <li>• Responsiveness (Service Bureau Utility vs. Distributed)</li> <li>• Accuracy (Utility vs. Local Control)                             <ul style="list-style-type: none"> <li>- Data Collection</li> <li>- Data Processing</li> </ul> </li> <li>• Integration</li> <li>• Relevance</li> <li>• Timeliness</li> </ul> <p><b>2. Cost &amp; Performance Drivers</b></p> <ul style="list-style-type: none"> <li>• IS Cost Structure                             <ul style="list-style-type: none"> <li>- Resource-based/Fixed                                     <ul style="list-style-type: none"> <li>• Hardware (Purchase Price/Capital Expenditure)</li> <li>• Software (Purchase Price/Capital Expenditure)</li> <li>• Personnel (Administration/Corporate Staff)</li> <li>• Overhead</li> </ul> </li> <li>- Usage-Based/Variable                                     <ul style="list-style-type: none"> <li>• Operations (Cost to Keep the System Running)   <ul style="list-style-type: none"> <li>- Hardware (Maintenance, Service, Modification)</li> <li>- Software (Maintenance, Service, Modification, Updating)</li> <li>- Line Operators</li> <li>- Overhead (Maintenance)</li> </ul> </li> </ul> </li> </ul> </li> </ul> <p><b>3. Management &amp; Education</b></p> <ul style="list-style-type: none"> <li>• Planning &amp; Control; Responsibility Distribution</li> <li>• Skills                             <ul style="list-style-type: none"> <li>- Technology Literacy</li> <li>- Analytical Skills</li> </ul> </li> </ul>
	●		
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KEY: ● good ○ adequate ○ poor

The team then took all of the applications options and considered them separately from the others. They wanted to rate these options according to the relative level of investment required, their value to the organization, the degree of senior management involvement (which they used as a proxy for organizational risk), and the degree of technology risk (the chance that the application would not be completed successfully within a reasonable budget). They felt that applications had high technology risk if IS staff had little or no experience in building that type of application or in using software or hardware necessary to develop it (see Figure 17).

After the team had determined the trade-offs among the options, they identified the "best" option to close each information gap. For many of the gaps they had already developed ideas about the most likely solutions to the problems, and this process was completed rather quickly. They wrote a brief summary of their assessment which identified the "best" option for each gap, an explanation of the likely alternatives, and the pros and cons of the top two alternatives.

#### Selecting Final Options

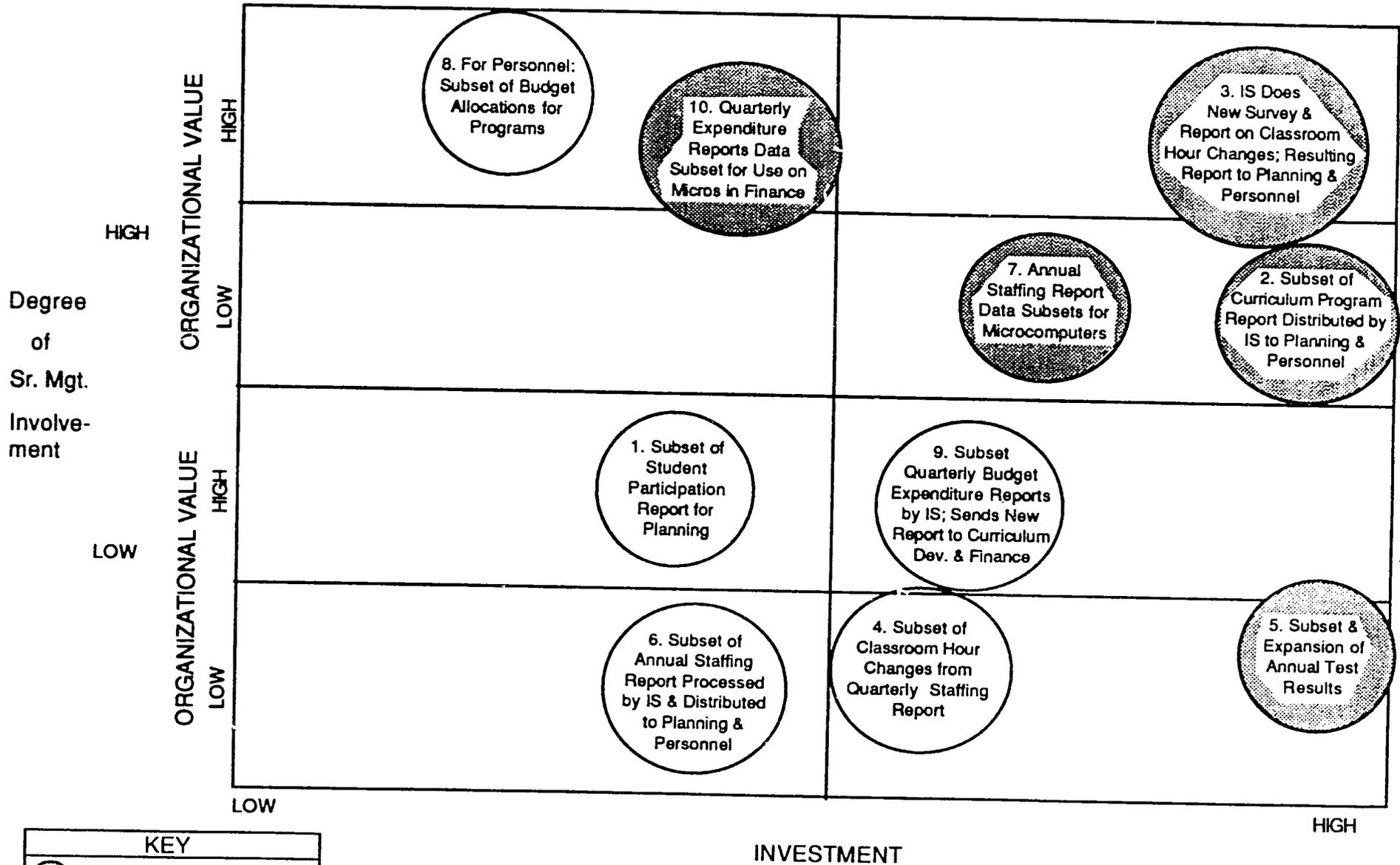
After they had assessed the options, the team reported back to the head of the DGAA. They briefly reviewed the kinds of trade-offs that would have to be made in choosing final options. The planning team explained that two critical areas of concern had emerged from the strategic planning process. One was with data management -- improving data quality, timeliness, and the efficiency of data collection and processing. The other was with the technological infrastructure -- establishing an effective and flexible applications base and processing capability.

The DGAA and the planning team then discussed the composition of the Task Force which was to select the final recommendations, be responsible for implementation of the IT strategy, and monitor the results. In view of the findings of the strategic planning process, they decided that the Task Force should have two arms. One would be a Data Management Group, responsible for improving data management processes. The other would be a Technology Steering Committee, responsible for ensuring the ministry had an effective technology infrastructure.

The head of the DGAA felt that choosing the right people for the Task Force was essential. He remarked, "You know, it is difficult to get things to change around here. The Task Force will have to be realistic about what can actually be done." He said that he would discuss structure and selection of the Task Force with the other heads of the DGs.

A week later, the DGAA met again with the planning team. He said that the DG heads had approved the recommendation to structure of

FIGURE 17. EXAMPLE CSF PROJECT: MINISTRY OF EDUCATION  
 SAMPLE: "ASSESSMENT OF APPLICATION DEVELOPMENT OPTIONS" TEMPLATE



KEY	
	High Technology Risk
	Low Technology Risk

29w

the Task Force as a Data Management Group and a Technology Steering Committee. The DG heads also decided that the members of the CSF workshop should select the members of the Task Force. In addition, the DGs asked that the Task Force report be submitted to them for informal review before the recommendations were finalized.

The following week, the Department heads who had been in the CSF workshop met with the planning team to choose a Task Force. More than a month had passed since the CSF workshop had been held and the members took time at the beginning of the meeting to chat about their activities since the workshop. Most members had not talked with one another since the workshop, and welcomed the opportunity to get together and talk unofficially about the challenges they were facing in their area of the Ministry.

The group then turned to discussion of the Task Force. The planning team explained that the Task Force would have three major responsibilities:

- o Agreeing on recommendations for an IT strategy
- o Proposing the individual who would be responsible for the implementation of each recommendation
- o Monitoring the results

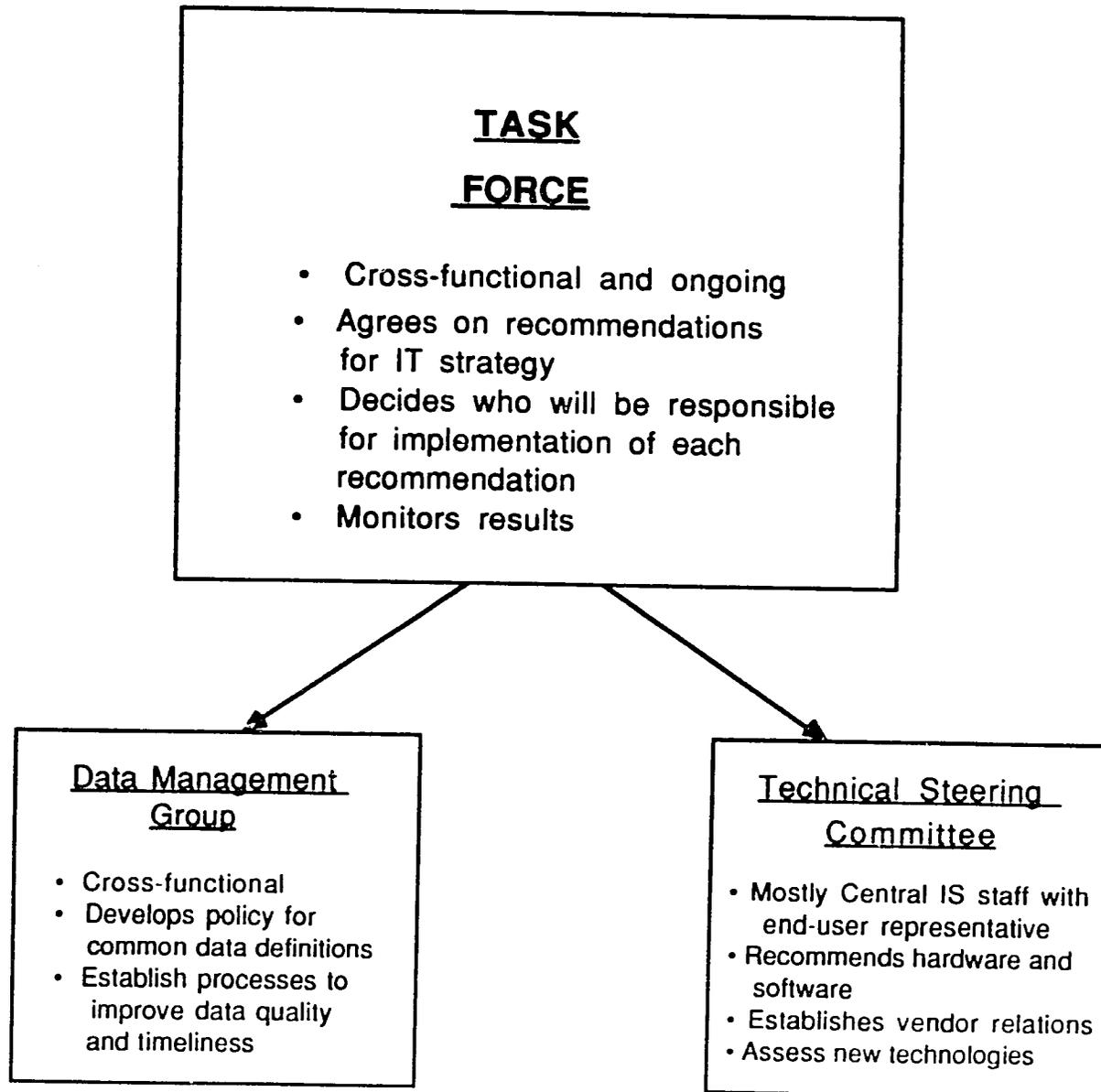
The Task Force would be cross-functional and ongoing. It would have two arms (see Figure 18). One arm would be a Data Management Group, composed of representatives of the "end user" Departments: Personnel, Finance, Treasury, General Education/Curriculum Development, Vocational Education, Planning, and Research. It would also have a representative of the Information Resources Department. The Data Management Group would be responsible for bringing about improved management of data quality and accessibility.

The second arm would be a Technical Steering Committee, composed primarily of staff from the Information Resources Department. It would also have a member from the Finance Department and from the Personnel Department. The Technical Steering Committee would be responsible for recommending and helping implement an information technology infrastructure that would meet the Ministry's critical information needs.

Together, these two arms of the Task Force would develop the final recommendations for the Ministry's IT strategy. Each arm would ensure that their part of the strategy was implemented successfully. The two groups would hold joint meetings regularly to monitor results.

During these discussions of the Task Force, the heads of the Departments agreed that they had to choose Task Force members carefully. Task Force members had to be well-respected in the

FIGURE 18. TASK FORCE ROLES AND STRUCTURE



4000

Departments, and interested in the role of IT in the Ministry. The head of the Planning Department remarked, "There are several people in my department who would want to be on the Task Force. But I think the best person is my Assistant for Education Planning. Others in the Department listen to what he has to say. He is interested in computers but is also realistic about what can be done in the ministry. And since he meets with me every week I will be able to stay on top of what the Task Force is doing."

After the heads of the Departments had selected Task Force members, the head of the planning team and one consultant arranged the first Task Force meeting. The head of the planning team opened the meeting with an explanation of the goals of the Task Force:

"As you know, we have been exploring ways the ministry's information system can help achieve the Ministry's goals. We have found that the Departments need certain information, which they cannot get now, in order to achieve those goals. We have developed some options for making the information system more effective in providing that information. As members of the Task Force, you will be responsible for selecting the final recommendations, ensuring they are implemented successfully, and monitoring the results."

After some questions and discussion of the Task Force responsibilities, the Task Force turned to examining the planning team's recommendations. In meetings during that week, they reviewed the criteria the planning team had used to evaluate options. They discussed the options recommended by the planning team, as well as the alternative options. They considered how well each recommended option would contribute to the Ministry's efforts to expand rural education while keeping costs down. They also looked at whether the options would improve the Ministry's ability to manage donor-aided projects. Finally, they considered the Ministry's ability to carry out the options. They used the "Assessment of Trade-offs" (see Figures 16A, 16B, and 17), prepared by the planning team, to help them understand the benefits and demands of each option.

The head of the planning team and one consultant facilitated the meetings, encouraging all members to present their views, and helping members understand one another's concerns. They also made sure that each final recommendation had a Task Force member who took responsibility for managing the implementation of that recommendation.

In a few cases, some Task Force members had serious questions about an option suggested by the planning team. One option, for example, involved placing microcomputers in six Ministry Departments. Although the Task Force members agreed that the

option would improve program managers' ability to monitor rural education pilot projects, a representative of the Information Resource Department (IRD) felt it would be hard to implement successfully. He argued that most managers would have difficulty learning to use the microcomputers, and the organizational risk of the option outweighed its value. As a result, the Task Force chose an option that placed microcomputers in two Divisions as a pilot project.

At the end of the first week, the Task Force members reported to the heads of their Departments on decisions the Task Force had made thus far, and questions or issues that arose. They explored with the senior officials the ability of the Ministry to implement the changes suggested by the options.

Two weeks later, when the Task Force reconvened, the members had a clear idea of which options would be approved by senior management, and which options, while valuable, should be postponed. During the following three days, the Task Force selected the final recommendations.

They prepared an IT Strategy Recommendations report to deliver to the Minister of Education and each of the DG heads. The report presented the final recommendations. For each recommendation, it noted the second-best option and briefly stated the reasons for choosing the recommended option. The report also included a brief implementation plan, which identified the responsibilities of the Data Management Group and the Technical Steering Committee in executing the recommendation, as well as the Task Force member who would be in charge of implementing the option. In addition, it gave a timetable for implementing the options.

The IT Strategy Recommendations report was informally reviewed by each of the Department heads and DG heads. In response to those reviews, a few minor changes were made in the implementation plan. The Task Force then formally presented the report in a meeting with the Minister and the heads of the DGs.

#### Executing the IT Strategy

Because the DG heads had been involved in the IT strategy process from its inception, and had reviewed the results of each stage of the process, there was strong informal support for the Task Force recommendations. As a result, the Task Force report was quickly approved by senior management.

Upon approval, the Data Management Group and the Technology Steering Committee initiated implementation of the strategy. They arranged to have joint meetings twice a month to review progress and discuss problems they encountered. Each group then met separately to undertake execution of the strategy. The head of

the planning team and the consultants agreed to work with the two groups for a year to assist them in implementing the strategy.

### The Data Management Group

When the Data Management Group met, the head of the planning team and the consultants opened the meeting by discussing the specific responsibilities of the Group.

The head of the planning team began, "As you know, the purpose of this group is to ensure that Department managers and analysts can get the information they need when they need it, and can believe the numbers. When we look at the Ministry's IT strategy, we can see that there are two major concerns related to data management.

"The first concern is to solve the problem of inefficient and redundant efforts in gathering and processing data. In many cases, more than one Department needs the same data. Right now, however, the data is not shared. Each Department tries to get its own data independently. The result is substantial duplication of effort and major problems with data collection.

"Therefore, one important goal of this Group will be to develop a policy for common data definitions which is accepted by the Departments. To do so, we will first identify which data are 'global' -- that is, the data are used throughout the Ministry -- which data are 'shared' by more than one Department, and which data are 'local' -- that is, the data are used only within a Department.

"We will work with the Departments to develop common definitions for shared and global data. The data definition will establish what unit of data we will use, and what we mean by a particular kind of data. In that way, Departments will define data in the same way, so they can access the data from the same database and get it in a format they can use.

"For example, right now two Department use teacher vacancy data. But one Department defines teacher vacancies in terms of "the number of absent teachers per day." The other Department defines teacher vacancies as "the number of hours a teacher is absent per week." We will have to work with these two Departments to establish a common definition for teacher vacancies. In the same way, we will work with all Departments that share data to define common data definitions.

"The second major concern of the IT strategy is with the quality and timeliness of data. To improve data quality and timeliness, this Group will establish ways to audit data, improve processes for collecting and processing data, and develop mechanisms to give feedback to the field regarding the quality of the data they are submitting."

During subsequent Data Management Group meetings, members developed a work plan for implementing the IT strategy. They arranged for cross-functional meetings with members of Departments that used the same data. At these meetings, they helped the Department staff to establish common data definitions and to improve management of data collection and processing.

In one case, for example, several offices in two Departments needed to share data on classroom hours. The offices defined the data differently, however, and calculated it from different sources. The Data Management Group worked with these offices to establish a common data format and to improve data quality.

As a result, the offices established a common definition of classroom hours as "classroom weeks per month." Together, they developed a single data collection sheet for schools, replacing four different reporting instruments. They also pooled their resources to establish an in-service training program in data collection for school administrators. They cooperated to improve management control of data collection, and strengthened the monitoring of data quality. The Head of one office remarked, "If the Data Management Group had not gotten us to talk together about our needs and problems, we never would have realized that we could work together to solve them."

The Data Management Group also worked with Departments to simplify and clarify several data collection instruments. This effort reduced the amount of time that schools and ministry field personnel had to spend on completing reports. It also made it easier and faster to enter the data into the information system. As a result, more complete data were gathered from the field, and the quality of the data improved.

Other activities of the Data Management Group included meetings with other organizations within and outside the government to discuss their approaches to handling data and methods for improving data quality. Based on these discussions, they introduced new methods for collecting and monitoring the quality of field data in the Ministry.

#### The Technology Steering Committee

The head of the planning team and the consultants also worked with the Technology Steering Committee to clarify the Committee's responsibilities and to implement the IT strategy. They outlined the specific role of the Committee: to recommend hardware and software modifications and acquisitions, to define investment criteria, to establish vendor relations, and to assess the value new technologies would have for the Ministry.

At the close of the first meeting, the head of the Technology Steering Committee summarized the discussion, "The IT strategy has developed an applications portfolio and changes in operations that will give the Departments better access to the information they need. Our job is to make that applications portfolio and operations plan a reality. To do so, we have to determine exactly what is needed in terms of new applications development, enhancement to existing applications, and better processing capability."

During subsequent meetings, the Committee carefully reviewed the applications portfolio and operations options in the IT strategy. They worked with each Department to determine the best way to implement the IT strategy for that Department.

For example, the IT strategy directed the Information Resource Department to place microcomputers in the Finance Department, provide Finance with specific data for budget monitoring, and train Finance staff in the use of microcomputers. To determine how best to implement this part of the strategy, the Steering Committee examined the existing applications in central IS and the skill base in the Information Resource Department and the Finance Department.

Based on their assessment, the Committee felt that central IS could modify existing applications to provide the information needed by Finance. They also felt, however, that the Information Resource Department (IRD) staff needed training in microcomputer use before they could train staff from other Departments.

The Committee recommended that this part of the strategy be implemented in three phases. In the first phase, three staff from IRD would attend a microcomputer training program outside the Ministry. In phase two, after IRD staff had completed their microcomputer training, the Finance Department would receive ten microcomputers. IRD would develop an application to port budget monitoring data from the mainframe to the microcomputers, and would train Finance staff in using microcomputers to process the data. In the third phase, the Finance Department would get an additional 20 microcomputers, and the trained Finance Department staff would train other Finance staff.

These actions would improve Finance's access to timely information and support their analysis of critical data for decision-making. In addition, the productivity of Finance Department program analysts would be enhanced by having IT capability.

Another part of the IT strategy involved providing a monthly monitoring report, including financial and other data, to all Divisions for the projects in their area. The Steering Committee found that the Ministry's central mainframe computer, as

currently configured, could not handle the transaction volumes required to provide this information. The Committee conducted a thorough examination of alternatives for solving the problem. Based on their findings, they recommended that the Information Resources Department expand the storage and processing capacity of the mainframe, and rewrite several COBOL applications to provide increased flexibility in financial data calculations. They also recommended that IRD acquire a new database management system, and agreed to help IRD weigh the merits of purchasing the system or building it using COBOL.

In another instance, the Steering Committee found that no existing application could provide the information that the IT strategy said should go to all Department heads. To implement this part of the strategy, the Committee recommended that a small -- about three-person week -- prototype system be developed on a single microcomputer to give one Department head access to the information via a decision support tool. If this prototype were successful, IRD would expand the prototype to a more general application for the heads of all of the Departments.

In addition, the Steering Committee monitored technology change in areas important to the Ministry. For example, they periodically canvassed the vendor community to assess technological progress in key areas. As part of this effort, they held three informal meetings during the year and invited three major vendors to present new products.

### Results

The strategic IT planning process had many important impacts. The Ministry gained a far better understanding of the role information technology could play in helping accomplish Ministry goals. The strategic planning process helped general managers and analysts think about the key issues for Ministry success, and about using information technology to address these issues. It helped information systems professionals and general managers better understand one another's problems and concerns. It also raised general managers' awareness of the challenges involved in creating responsive and effective information systems, and of the role they could play in this effort. As a result, the Ministry established a much closer alignment between its goals and its management of information technology.

The IT strategy itself provided several major benefits. It identified areas where cost savings were possible by improving data management, and where ministry operations and decisions could be improved through better and more timely access to information.

The IT strategy also provided a formal process for looking at future technologies and their potential for changing current IS

infrastructure. It thereby enabled the Ministry to use new technologies to expand services in response to rising needs.

A year after implementation of the IT strategy had begun, the Head of the Planning Department commented, "Before, we had good ideas about how to expand rural education, but it was hard putting them into practice. We couldn't tell if projects had problems until it was too late to solve them. And we couldn't prove our successes. Now we get information we need to support our work and to demonstrate the impact of rural education programs to upper levels of the government and outside donors."

The Head of the Finance Department remarked, "In the past, we would just get information from IRD and complain if we didn't get what we needed. Now we are partners with IRD in determining what we need, and developing ways to make sure we get it. One result of this change is that we can get project expenditure information earlier and therefore have time to develop more rational budgets."

At the end of that year, in a public announcement on the progress of the Ministry, the Education Minister formally praised the IT strategy, "This information technology plan has made unique contributions to the Ministry. For the first time, officers can get up-to-date information on the programs they have to manage. As a result, our rural education programs are reaching more people more effectively. We were proud to receive the President's commendation for the progress we have made. We have also gained strong donor support for new rural education programs. In addition, the Ministry of Finance has praised our new budget monitoring process, which is a direct outcome of the information technology plan. Most importantly, officers from many areas of the Ministry have worked together to develop and execute this plan. We believe that this will lead the way to better communications between all of the Departments in the future."

Shortly afterwards, the Ministry of Finance and donor agencies decided to support similar IT strategy efforts in other ministries. They asked MOE to make presentations to the other Ministries, describing the strategic IT planning process they had conducted, the lessons they had learned, and the benefits they had obtained.

**PART 5. TEMPLATES AND  
GENERIC CSF QUESTIONNAIRE**

**PART 5**  
**TEMPLATES AND**  
**GENERIC CSF QUESTIONNAIRE**

This part of the workbook has two sections:

5.1 A generic CSF interview

5.2 Blank Templates for the Strategic IT Planning Framework

The generic CSF interview discusses important techniques in designing and conducting CSF interviews. It also provides a generic CSF interview, which a planning team can tailor to its needs and objectives and use to conduct the CSF interviews.

The templates guide a planning team through each stage of the strategic IT planning framework. Attached to each template are instructions in the use of the template.

## 5.1 USING THE GENERIC CSF INTERVIEW

### Techniques in Designing and Conducting Interviews

Introducing the CSF process. The CSF process must have a strong internal sponsor who is respected as unbiased. The sponsor should explain the CSF interview process to interviewees and elicit their cooperation before the interviews begin. It is best if the sponsor sends a letter to all of those to be interviewed. The letter should announce and briefly explain the CSF process and its purpose, list the interviewees, and provide administrative details.

If you hear the following comments during an interview, it indicates that the sponsor has not been sufficiently effective in selling the process or telling you about current problems:

"We've been asked this type of thing before, and nothing ever happens" (you need to get more information about what similar activities have been conducted during the past two or three years and why they were unsuccessful)

"Why are you asking me about what I'm supposed to be doing. I thought the problem here was what the Information Support people are supposed to be doing" (sponsor has not "sold" the process; should have warned you about conflicts in this area)

"I think the whole way this is being done is wrong. Let me tell you how I think we should be doing planning... (sponsor probably should have warned you; find out if the person has suggested his ideas to top management)

Choosing people to be interviewed. The choice of interviewees will depend on the purpose and scope of the planning process.

There are some rules of thumb about choosing participants:

- o Start small. Conducting CSF interviews is complex. Particularly when you are beginning to use the process, try to keep the number of interviews limited to fewer than 10. The minimum number of interviewees is six.
- o Conduct interviews at least in two levels of the organization. It is usually better to interview a few people from several levels rather than many people from a few levels. At a minimum, however, interview people at two levels of the organization.
- o Choose interviewees who strongly affect the organization's ability to achieve its goals. The

purpose of the CSF process is to develop strategy. Because strategy is typically developed at a fairly high level, you will usually want to conduct interviews at that level.

The interview team. An experienced team is crucial to the success of the interview process. If possible, the interviews should be conducted by a two-person team, with one person leading the interviewing, the other writing the responses and checking to be sure that previously anticipated CSFs are covered, and that inconsistencies in the interview are probed and resolved.

It is best to alternate the roles of lead interviewer and writer. Immediately after the interview, the interview team should discuss the interview and clarify notes as fully as possible.

Rules of thumb in conducting interviews:

- o Keep the discussion moving
- o Try to draw out the respondent, not direct him/her
- o When you get important, interesting, and excited answers, follow up to fully understand the respondent's views
- o If the respondent is hostile or embarrassed about some issue, leave it quickly
- o Realize that interviews will be demanding. The questions are unusual and designed to stretch people and determine the critical activities in the organization that need to be done better. Often there are problems in the organization that the CSF process will uncover. Therefore, interviewing is rarely an easy process. This is why experience is crucial.

Designing the CSF interview instrument. The generic CSF interview, below, provides effective questions for exploring important issue areas, discusses the objective of these questions, and suggests areas to probe related to each question.

You should use this generic interview as a guideline, and tailor it for your own organization, and the objectives of the CSF process. The questions you ask should reflect the major interests of the IT strategy planning process. For example, if the interest is in planning for the future, most of the interview time and attention should be given to questions in that area. If the major concern is in determining where current IT resources can make the greatest impact, the emphasis can be on questions related to "Areas of Opportunity."

There are some rules-of-thumb regarding the design of a CSF interview:

- o People often have difficulty identifying their "goals." Therefore, in asking questions about goals, begin with general questions, then focus.

EXAMPLE: Begin with general questions such as "What are you trying to do here at X organization?" Then, after the respondent talks about what he is trying to accomplish, identify the goals s/he had mentioned and probe further. "You have identified X as a short-term goal. What other longer-term goals do you have?"

- o In asking questions about goals, be sure to refer to a time period.

EXAMPLE: "Your goals for the coming year" or "Your long-term goals and immediate objectives"

- o Design the interview to last no more than two hours

Confidentiality. The decision about confidentiality will depend on the organization, the sponsor, and the reasons for conducting the CSF process. In most cases, responses are confidential and only summary data without attribution are reported back to the sponsor. In some cases, however, sponsors may actually read the questionnaire responses, and interviewees are given enough information about others' answers to see how well their own views match.

### THE GENERIC CSF INTERVIEW

The generic CSF interview has three sections:

- o Organization Environment Section
- o Information Technology in the Organization Section
- o Action Items

#### Organization Needs

1. Respondent's functional responsibilities

Q: Please describe your responsibilities here as [respondent's position].

2. Respondent's mission in the organization

Q: What are the most important things you are trying to accomplish here?

[The objective of this question is to:

- o Clarify the respondent's goals. Probe for short-term and long-term goals, e.g., "You've identified X as a short-term goal. What longer term goals do you have this year?"
- o Understand the fit between the respondent's view of his job goals and his/her boss's view of the respondent's job goals
- o The respondent's views of the general organization's goals

If necessary, probe so you clearly understand these three areas. Probes might include the following:

- o "...so your mission is [describe your understanding of the respondent's goals.]"
- o "If I were to ask your boss what your mission is, would s/he agree?"
- o "How does your mission connect to the general goals of [the organization]?" The importance of the respondent's views of the general goals of the organization will depend on the respondent, e.g., lower level respondents probably do not directly connect their job goals to the broader organizational goals.

3. External factors -- FOR TOP MANAGEMENT ONLY

Q: What organizations and conditions outside [the organization] strongly affect the ability of [the organization] to accomplish these goals?

4. Respondent's organizational objectives

Q: If we were talking with you two years from now, what would you point to as the key things you have accomplished since [current year]?

5. Respondent's Critical Success Factors

Q: How do you intend to accomplish these objectives?

[This question will identify the respondent's CSFs]

Q: What obstacles might make it hard for you to accomplish these objectives?

[This question helps identify common obstacles people face in trying to achieve their goals, and whether the obstacles relate to lack of information]

6. Areas of opportunity for IT to add value

**Q:** What three questions would you ask if you were away from the office for an extended period? Why?

Another variation of this question: "What are the first three things you would look at if you were away from the office for an extended period?"

[The objective of this question is to determine the critical information the respondent needs. If s/he does not have that information readily available -- for example, if the respondent must get the information from someone else -- flag it for discussion in the workshop.]

[Probe to be sure you understand what information the respondent looks for, how s/he gets it now.]

**Q:** You had expected to attend a one-day conference. You just found out it is cancelled. What will you do with the "free" day?

[The objective of this question is to determine what is not being done now, that the respondent thinks should be done]

**Q:** The head of [the organization] has just approved the extra person you requested. What will you do with him/her?

[The objective of this question is to determine the kinds of activities that are not being done which the respondent thinks should be done]

**Q:** You have just been promoted. What do you think was the major factor?

[The objective of this question is to determine what the respondent believes his/her superiors think is most important about his/her job. If the answer is different from what the senior person thinks is important about this job, flag it for discussion in the workshop.]

## Information Technology in the Organization

### 1. General state of information technology in the function or sub-organization

Q: What kinds of information systems support do you get now in your [function/sub-organization]?

Q: Is this adequate? Are you getting the information you need when you need it?

[Probe for:

- o Sufficiency of information
- o Quality (accuracy) of the data
- o Timeliness

Q: You've identified a problem with [sufficiency/quality/timeliness]. What do you do when [problem occurs]?

[Ask this question only if there was a problem mentioned in the previous question. For example, "You've identified a problem with getting project expenditure reports on time. What do you do when the expenditure information is late?"]

Q: What could you do if you had that information when you need it?

[The objective of this question is to determine how important the information really is. If the respondent can immediately say what s/he could do if s/he had the information, it indicates s/he has a real need for it. If the respondent has difficulty saying what s/he would do, it indicates s/he may be merely making a routine complaint, but the information is not critical]

Q: If I were asking you these questions a year ago (two years ago), would your answers be different?

[The objective of this question is to see whether the respondent considers changes due to IS support or due to change in the organization. Probe both of these.]

Q: What will happen to your information systems needs in the future?

2. Respondent's personal use of technology

Q: What kinds of information technology do you personally use now?

[Probe for the use of personal computer, electronic mail, etc.]

Q: Have you attended any executive [or management] workshops (internal or external), university classes, or other forms of technology-related education? How have you used that knowledge?

[The objective is to understand the way the respondent uses information technology. Will s/he use information directly from a personal computer, only from written reports, etc.]

Action Items

This section of the interview identifies the respondent's view of the "next steps" needed to resolve the issues the CSF process is addressing.

1. Respondent's major concerns and views on next steps

Q: As you know, [the sponsor or other senior manager] is beginning to look at the question of whether [the organization's] current information technology resources will be adequate to meet the organization's future goals. Could you give us your thoughts on this effort?

Q: How involved are you in this effort? How involved would you want to be?

Q: What is the most important thing [the sponsor or other senior manager] could decide to do next to make this effort successful?

2. Wrap up question

Q: Is there anything you were expecting us to ask that we did not yet ask?

[Always include this question at the end of the interview. It tells you what is most critical to the respondent. Be sure to leave enough time at the end of the interview -- at least 10 minutes -- for this question.]

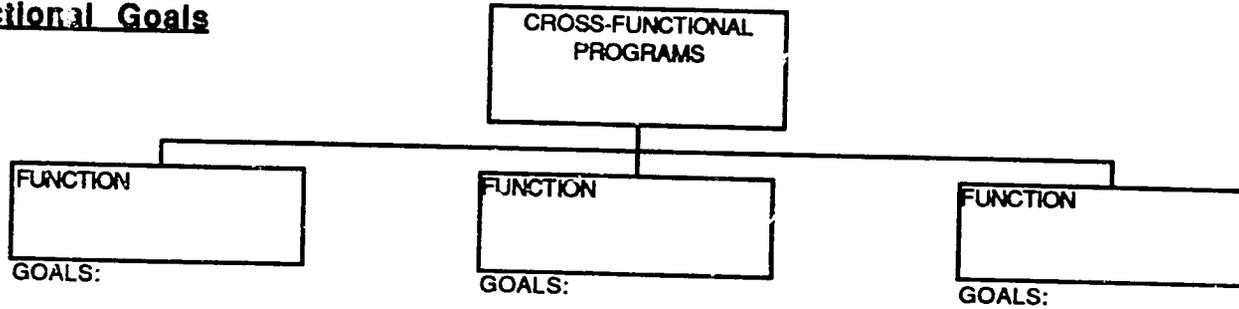
**5.2 Blank Templates for the  
Strategic IT Planning Framework**

# Template 1. STRATEGY TEMPLATE

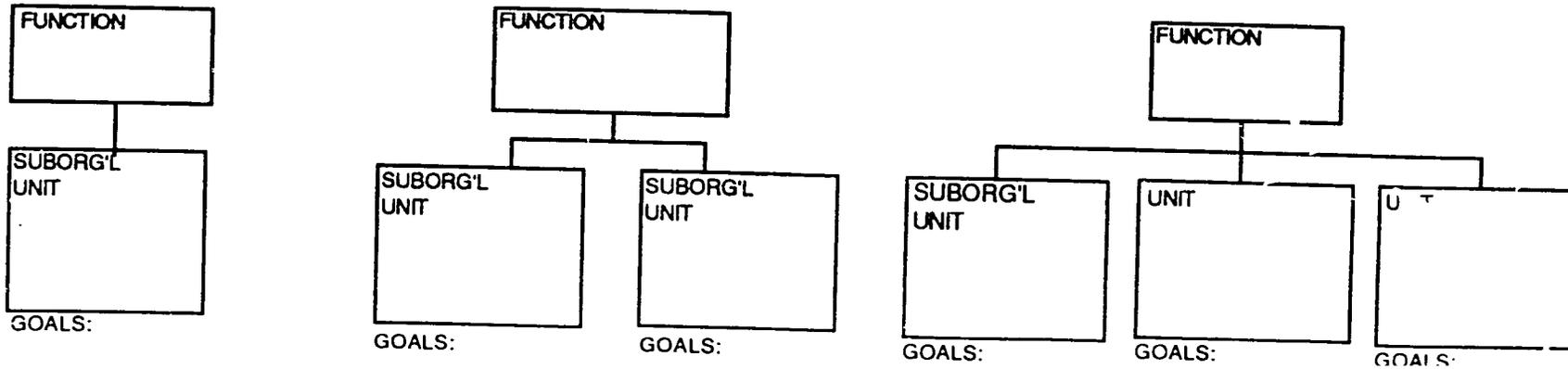
## Goals by Function



## Cross-Functional Goals



## Sub-Organization Goals



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Template 1. STRATEGY TEMPLATE, continued

**FUNCTION OVERVIEW**

<u>OFFICE</u>	<u>MAJOR PROGRAMS</u>	<u>PROGRAM BENEFICIARIES</u>	<u>SCOPE</u>	<u>ADMINISTRATION</u>	<u>FINANCIALS</u>
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**PROGRAM (CROSS-FUNCTIONAL) OVERVIEW**

<u>LEAD OFFICE</u>	<u>OFFICES INVOLVED</u>	<u>PROGRAM BENEFICIARIES</u>	<u>SCOPE</u>	<u>ADMINISTRATION</u>	<u>FINANCIALS</u>
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### Using Template #1: Strategy Template

Use Template #1, Strategy Template, to guide you in clarifying the goals of the organization and the major functions, and relevant sub-organizations and programs. The choice of functions, programs, or sub-organizations to be examined should reflect the objective of the IT strategy planning process. Extensive research is not necessary. The objective of this step is only to get a good sense of the major goals of the organization and relevant units and programs, and to reveal some likely CSFs.

Figure 2 provides a sample of a completed "Strategy" Template.

- SSA

TEMPLATE 2. IS APPLICATIONS BY FUNCTION/SUB-ORGANIZATION UNIT

APPLICATIONS

FUNCTIONS

FUNCTION	FUNCTION	FUNCTION	FUNCTION

54'

Using Template #2:  
IS Applications By Function/Sub-organization Unit

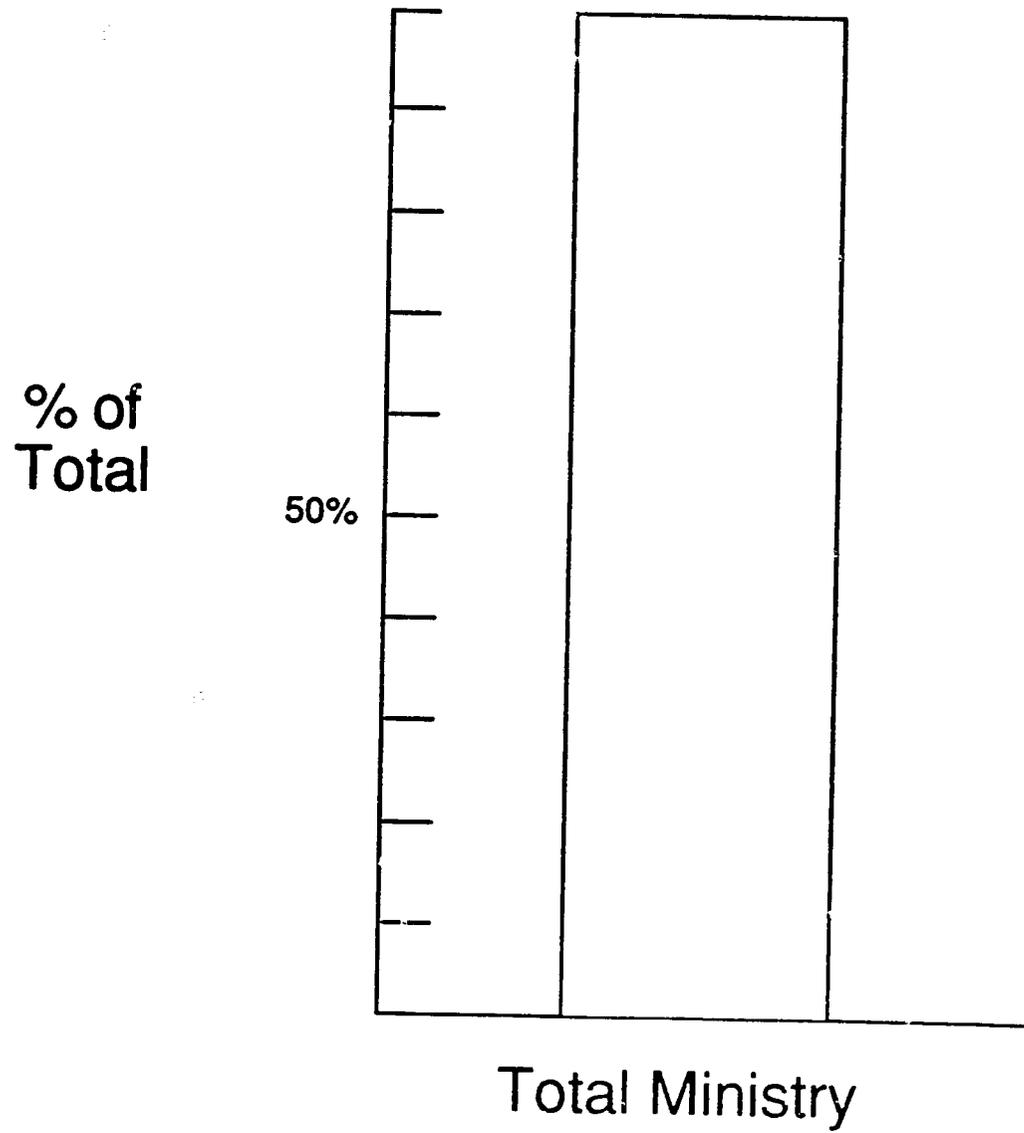
Template #2 helps guide the identification of the major IS applications used by each organizational function or suborganizational unit.

To complete Template #2:

- o List the applications down the first column. Only list applications that hold information that could fulfill a critical information need
- o List the functions or sub-organizational units across the top of the template
- o In the appropriate box, write whether the function receives, plans to receive, or would like to receive the application

Figure 3 shows a sample of a completed "IS Applications By Function/Suborganizational Unit" Template.

TEMPLATE 3. IS COST BY MINISTRY FUNCTION/SUB-ORGANIZATION UNIT



Using Template #3:  
IS Cost by Ministry Function/Sub-organizational Unit

Use Template #3 to help you represent the distribution of IT costs across the organization. You do not have to conduct a detailed cost study. Instead, develop an "informed estimate" of the distribution of costs among the functions or suborganizational units (depending on the focus of the IT strategy planning process).

Figure 4 shows a sample of a completed "IS Cost by Ministry Function/Suborganizational Unit" Template.

# TEMPLATE 4. IS ORGANIZATION BY MINISTRY FUNCTION

## IS FUNCTIONAL ACTIVITY

## FUNCTIONS

1. Applications Development
  - Substantive Design
  - Technical Design
  - Coding
  - Support
  
2. Operations
  - Hardware
  - Software
  - Telecom
  
3. Management Planning & Control
  - Planning
  - Architecture
  - Standards
  
  - Budget
  - Systems Performance

FUNCTION	FUNCTION	FUNCTION	FUNCTION	
			Major Application	Major Application

19

#### Using Template #4: IS Organization by Ministry Function

Use Template #4 to get a good sense of the extent of centralization or decentralization of major IS functional activities across the organization.

To complete Template #4:

- o List the functions or sub-organizational units along the top of the template
- o If major applications are developed or managed differently, list those applications under the function in which they are used
- o For each IS functional activity listed in the template, indicate whether that activity is conducted by the central IS group or by the end user organization that actually uses the application (i.e., is conducted "locally").

Figure 5 shows a sample of a completed "IS Organization by Ministry Function" Template.



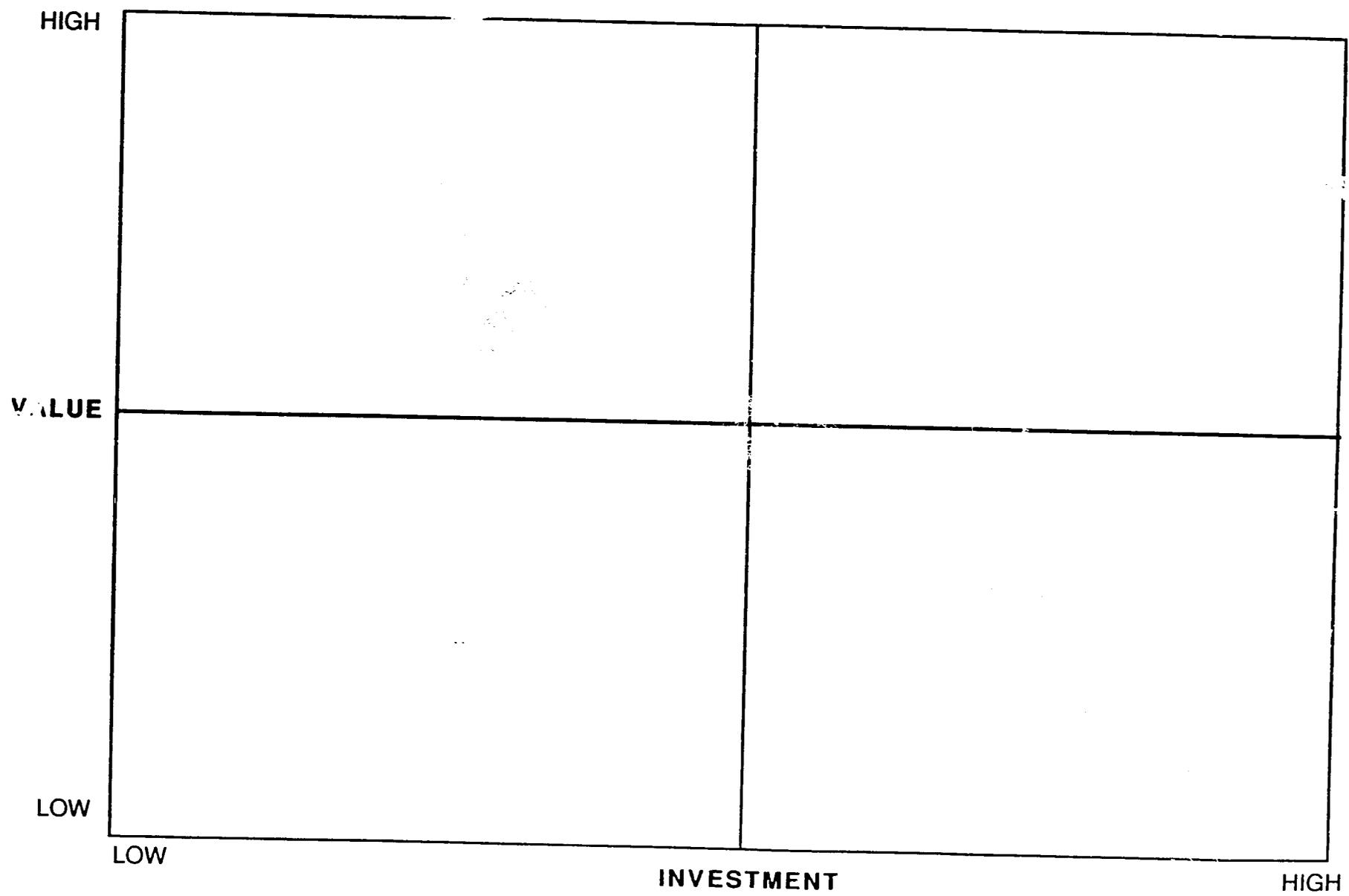
Using Template #5:  
Application Profile Portfolio Analysis, Part A

Use Template #5 to help get a good understanding of the features, users, benefits, and organizational impact of the IS applications. Complete Template #5 for each major application, existing and planned. To complete the template:

- o Write the name of the application across the top
- o Specify the key features, the users, and major benefits of the application
- o Briefly describe the problems with the application

Figure 6 shows a sample of a completed "Application Profile Portfolio Analysis, Part A" Template.

TEMPLATE 6. APPLICATION PORTFOLIO ANALYSIS, PART B



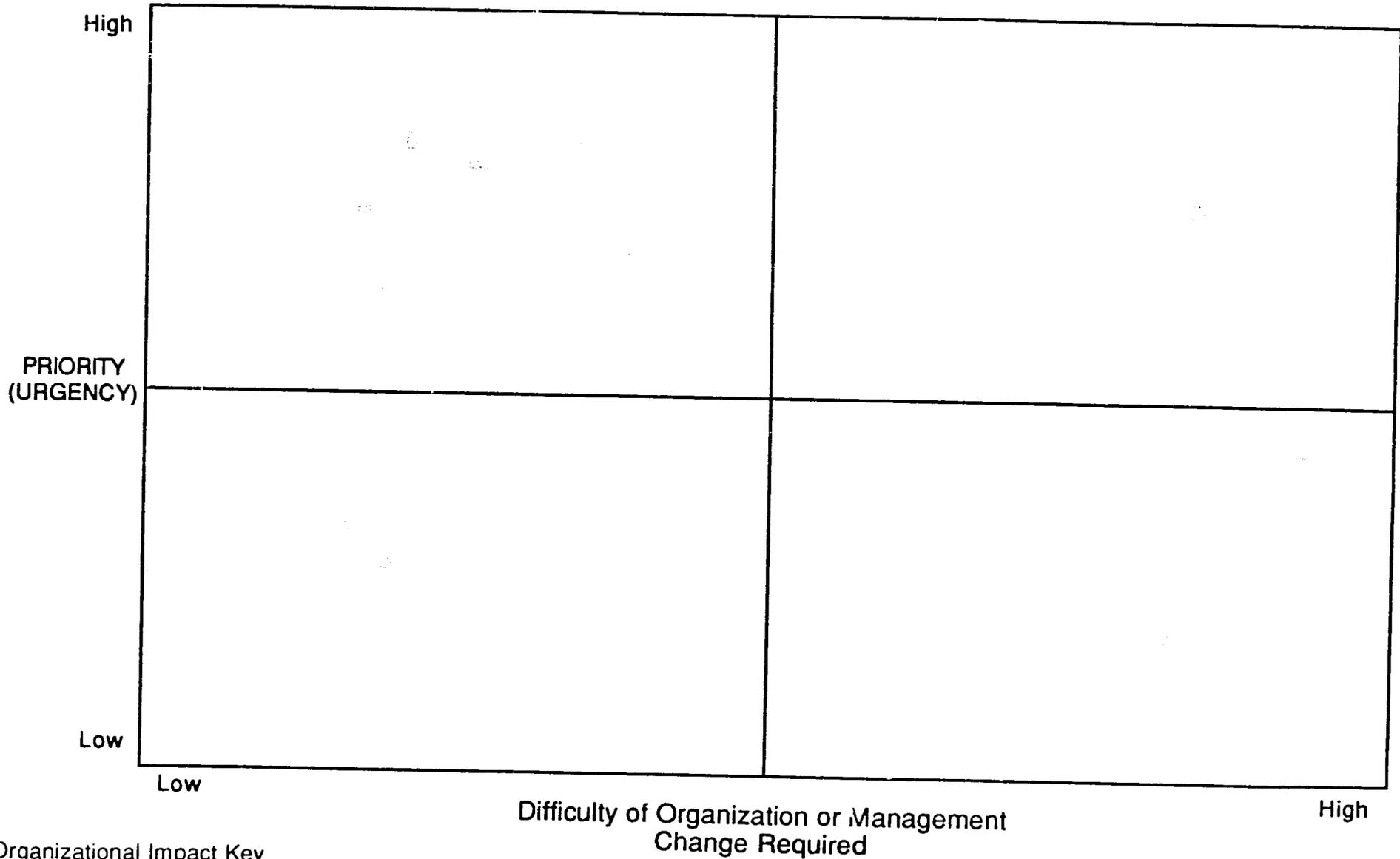
10

Using Template #6:  
Application Portfolio Analysis, Part B

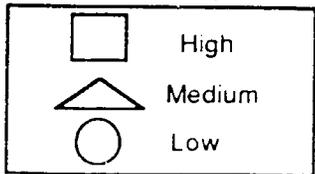
Template #6 helps to assess the value vs. investment relationship for the major applications. Position each application on the template to reflect its relative value to the organization and its relative level of investment. Note that the intent is to show a relative estimate of the value and investment rather than precise figures.

Figure 7 shows a sample of a completed "Application Profile Portfolio Analysis, Part B" Template.

# Template 7. ANALYSIS OF CSF PRIORITIES WORKSHEET



Organizational Impact Key



10/1

Using Template #7:  
Analysis of CSF Priorities Worksheet

Template #7 will help you gain a good sense of the relative urgency (priority) of each CSF and the difficulty the organization is likely to have in fulfilling it. Position each CSF on the worksheet to reflect its urgency and the difficulty the organization will have conducting it.

You will use Template #7 in two ways. First, develop a "first approximation" of Template #7, based on your analysis of the interviews. Use this first approximation to begin the workshop discussion of CSF priorities.

During the workshop, use Template #7 to help facilitate the discussion and develop consensus among the workshop participants. At the end of the workshop you should have a completed Template #7 that reflects the consensus of the participants.

Figure 9 provides a sample "CSF Priorities Worksheet" developed after a CSF team analyzed the interviews. Figure 10 shows a sample of the completed "CSF Priorities Worksheet" after the CSF workshop.

Template 8. DETERMINE CRITICAL INFORMATION NEEDS  
REPORTS AND MEASURES BY FUNCTION

CSEs

(by Priority by Level)

FUNCTIONS

	FUNCTION	FUNCTION	FUNCTION	FUNCTION

11

### Using Template #8: Determine Critical Information Needs

Use Template #8 to guide the workshop participants in determining what data will enable them to assess performance related to each CSF. For example, if a CSF is to increase teacher/student ratios without lowering education quality, ask such questions as "How can managers measure changes in ratios and education quality? What would managers want to know if ratios increased? Quality dropped? What population would they want to monitor, e.g., an individual school, a school district, a province? "

For each CSF, the workshop participants should identify:

- o Information they need in order to monitor performance on that CSF
- o Data they want to get if there are important changes related to that CSF

To complete Template #8, list CSFs by priority and level, down the first column. List the functions (or sub-organizational units), across the top. As participants identify critical information needs, write those information needs in the appropriate box.

Figure 11 shows a sample of a completed "Determine Critical Information Needs" Template.

Template 9. ESTABLISH ACTION PLANS

KEY ACTION PLANS BY FUNCTION

CSFs  
(by Priority by Level)

FUNCTIONS

	FUNCTION	FUNCTION	FUNCTION	FUNCTION

13

Using Template #9: Establish Action Plans

Use Template #9 to guide the workshop discussion of action plans that will enable workshop participants to obtain the critical information they need. List the CSFs, by priority and level, down the first column. List the functions (or sub-organizational units), across the top. As participants make a commitment to an action plan, write it into the appropriate box.

Figure 12 shows a sample of a completed "Establish Action Plans" Template.

# Template 10. ESTABLISH KEY PROJECTS

## KEY PROJECTS BY FUNCTION

CSEs

(by Priority by Level)

FUNCTIONS

	FUNCTION	FUNCTION	FUNCTION	FUNCTION

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### Using Template #10: Establish Key Projects

Use Template #10 during the workshop to guide the identification of key projects that will carry out the action plans. It is important to ensure that participants define projects very concretely and identify specific individuals to be responsible for those projects.

To complete Template #10, list the CSFs, by priority and level, down the first column. List the functions (or sub-organizational units), across the top. As participants make a commitment to a key project, write it into the appropriate box.

Figure 13 shows a sample of a completed "Key Projects" Template.

# Template 11. LINK CSFs TO INFORMATION TECHNOLOGY PLANNING

CSEs

## IS Applications & Infrastructure Planning by Function

	INFORMATION NEEDS	FUNCTION	FUNCTION	FUNCTION	FUNCTION
	Information Needs				
	Information Needs				
	Information Needs				

W,

Using Template #11:  
Link CSFs to Information Technology Planning

Use Template #11 to help you link the CSFs and critical information needs to specific information systems applications and infrastructure plans. Specifically, you should determine:

- o Information needs that are not adequately addressed by existing IS applications or plans
- o IS applications that overlap and fulfill the same information needs

To complete Template #11:

- o List the CSFs as they are listed in Template #8.
- o List the information needs for each CSF down the second column.
- o Across the top of the template, list the functions or sub-organizational units.
- o In the appropriate boxes, write the major IS applications, existing and planned, that address the information need. Also write the extent to which the application fulfills the need.

Figure 14 shows a sample of a completed "Link CSFs to Information Technology Planning" Template.

TEMPLATE 12. GAP/OPTION GENERATION

OPTION FOR IS SUPPORT

CSEs

Information Needs	Gap Between Need & Current Support, Application	Application Development	Operations	Mgt. Planning & Control

19'

Using Template #12:  
Gap/Option Generation

Template #12 will guide the effort to identify gaps between information needs and IS services, and to develop options to close those gaps. There are seven steps to completing Template #12:

1. List the CSFs and the critical information needs in the first two columns, as they are listed in Template #11.
2. Identify gaps between information needs and existing IS support, and write them in column 3:
  - o To determine gaps, refer to Templates #2, #5, #10, and #11. Use Template #10 to determine whether there are key projects that are necessary to address the information needs. Use Templates #2, #5, and #11 to determine whether applications development is needed to address the information needs.
3. Consider options related to applications development that would close the gaps. In the fourth column, write applications development options that will improve the way applications fulfill information needs.

To determine those options, look at the features of the organization's applications (Template #5) and the applications portfolio analysis (Template #6). Consider the following questions:

- o Should existing or planned applications already be fulfilling the information needs? If so, why are they failing to do so? Does this suggest options for applications development that can close the gaps?
  - o In order to fulfill critical information needs, do current applications need to be changed or are new applications necessary? What viable options are there for making these changes or developing new applications?
  - o What is the relationship between investment in applications and their value (Template #6)? Are investment and value usually proportionate? Are there applications with high investment but only moderate or low value? If so, what options are there for developing applications that provide greater value for the investment?
4. Consider changes that may be needed in IS operations in order to close gaps. In the fifth column, enter options that will improve the way IS operations meets information needs.

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To determine those options, look at the distribution of responsibility for IS operations (Template #4). Consider the following questions:

- o Is the responsibility for hardware, software, and telecommunications centralized, decentralized, or a hybrid? Do IS problems appear to relate to whether IS operations are managed centrally or locally? Would changes in the distribution of IS responsibilities resolve these problems?
  - o Do problems occur where different IS operations are handled in different locations, e.g, hardware is decentralized while software selection and maintenance are centralized? Does this suggest options for changing IS operations, e.g., decentralizing software selection or maintenance?
5. Consider changes that may be needed in management planning and control. In the sixth column, enter options that will improve the way management planning and control fulfill information needs.

To determine those options, look at the distribution of IS responsibilities related to management planning and control (Template #4). Consider the following questions:

- o Is the responsibility for various management activities centralized, decentralized, or hybrid? Do diverse locations of responsibility create problems in fulfilling information needs?

For example, if IS planning is centralized while control over systems performance is decentralized, do problems arise when centrally developed plans conflict with local level efforts to improve systems performance?

6. Examine the distribution of IT expenses (Template #3). Consider the following questions:
- o Are areas with important gaps receiving a relatively small proportion of IT resources? If so, should options for applications development or IS operations include provisions for additional resources?
  - o Are areas with important gaps receiving relatively high levels of resources? If so, does that suggest options to improve management and control of the IS function?

Figure 15 shows a sample of a completed "Gap/Option Generation" Template.

TEMPLATE 13. ASSESSMENT OF OPTION TRADE-OFFS RELATED TO IS ORGANIZATION

GAP:

NAME OF OPTION:

IS Support Option Range			KEY CRITERIA
Centralized	Hybrid	Decentralized	
			<b>1. Effectiveness of IS Function</b>
			• Responsiveness (Service Bureau Utility vs. Distributed)
			• Accuracy (Utility vs. Local Control)
			- Data Collection
			- Data Processing
			• Integration
			• Relevance
			• Timeliness
			<b>2. Cost &amp; Performance Drivers</b>
			• IS Cost Structure
			- Resource-based/Fixed
			• Hardware (Purchase Price/Capital Expenditure)
			• Software (Purchase Price/Capital Expenditure)
			• Personnel (Administration/Corporate Staff)
			• Overhead
			- Usage-Based/Variable
			• Operations (Cost to Keep the System Running)
			- Hardware (Maintenance, Service, Modification)
			- Software (Maintenance, Service, Modification, Updating)
			- Line Operators
			- Overhead (Maintenance)
			<b>3. Management &amp; Education</b>
			• Planning & Control; Responsibility Distribution
			• Skills
			- Technology Literacy
			- Analytical Skills

GOOD     ADEQUATE     POOR

AP

Using Template #13:  
Assessment of Option Trade-offs Related to IS Organization

Use Template #13 to guide the assessment of trade-offs among options to close the gaps between information needs and the IT infrastructure. The objective is not to calculate the "best" option, but to identify the strengths and weaknesses of alternative courses of action.

To assess options related to centralization/decentralization of IS functional responsibilities:

1. Use a separate Template #13 for each option you are assessing.
2. At the top of the page, write the gap you are trying to close. Below it, write the name of the option you are assessing.

Note that you may have several options (and therefore several Template 13's) for each gap.

3. Examine the Key Criteria list in Template #13. Add any criteria from your organization's CSFs that are not reflected in the Key Criteria. List the three major criteria (effectiveness, cost and performance, and management and education) in order of their importance to your organization.
4. Using the Key Criteria in Template #13, rate each option listed in Template #12. To rate the options:
  - o If the option involves a centralized IS organization, rate it in the "centralized" column. If it involves a hybrid organization (i.e., some IS responsibilities are centralized, some decentralized), rate it in the "hybrid" column. If it involves a decentralized organization, rate it in the "decentralized" column.
  - o Consider each criterion and decide whether the option is good, adequate, or poor in fulfilling that criterion. Fill in the box with the appropriate circle -- dark, cross-hatched, or blank (see the key on the template). In step 3 below are "Rules of Thumb on Assessing Options," which discuss some guidelines for assessing options.

For example, one organization had two options for closing a gap. One option called for central IS to

develop new applications and deliver reports to end user divisions. The CSF team rated this option in the "centralized" column. They felt this option would be adequate in terms of the first criterion, responsiveness. They entered a cross-hatched circle in the "centralized/responsiveness" box.

After completing the assessment of the first option, they moved to the second option. It called for microcomputers to be placed in the divisions. They rated this option in the "decentralized" column. They felt the decentralized approach would be good in terms of the first criterion, responsiveness. They entered a black circle in the "decentralized/responsiveness" box.

- o Note that two options that are both "centralized," "decentralized," or "hybrid" will be rated in the same column but may be rated differently, depending on their particular characteristics.

For example, a Ministry had two options for improving a reporting system. Both options involved placing microcomputers in divisions. One, however, left all applications development and management planning and control responsibilities with the central IS organization. The other option placed applications development in the divisions, but left management planning and control with the central IS organization. These two options were both rated in the "hybrid" column, but received different ratings for several criteria.

3. The following "Rules of Thumb" offer guidelines for assessing whether centralization, hybrid, or decentralization is generally a good, adequate, or poor approach. They are only guidelines. Conditions and perspectives of different organizations vary greatly. To rate the options for your own organization, it is essential to assess the option in view of the organization's unique conditions.

- o Effectiveness of IS function

- Responsiveness

This criterion rates how quickly and easily an end user can get a special information request fulfilled, e.g., a particular set of information or modification of a standard report.

In general, a centralized IS tends to perform like a service bureau utility, providing a standard service and set of information to everyone. It is

often relatively difficult to get special reports or sets of information from centralized IS organizations. Thus, centralized systems are often adequate or poor in responsiveness.

A decentralized, or "distributed," system generally has computers (usually microcomputers) where end users can operate them. It is usually relatively easy for people to get a special information request fulfilled because they can do it themselves. Thus, decentralized systems are often good in responsiveness.

In general, a hybrid system is also quite responsive, particularly if the system includes microcomputers which end users can operate themselves.

- Accuracy

This criterion rates the accuracy of the information that end users receive. There are two aspects: data collection and data processing. The relative accuracy of data from a centralized, hybrid, or decentralized system can vary greatly, depending on the skills and management at the central or local level.

In general, consider three aspects. The first is skill level. Who has the skills necessary to ensure that data are collected accurately, and/or that data processing produces accurate results -- central IS or end users (possibly both)? The second aspect is commitment. Who is more committed to ensuring data accuracy -- central IS or end users? The third is management control. Who is better able to control the data collection process, and/or ensure that data processing is done correctly -- central IS or end users?

- Integration

This criterion rates how well the IS organization integrates information needs in different parts of the organization so that it efficiently fulfills those needs. One clue to poor integration is having incompatible computers or applications in different parts of the organization that make it necessary to re-enter or reprocess data.

In general, it may be more difficult to achieve integration with a decentralized system than with a centralized one. It is essential, however, to consider the particular system. Some centralized

systems have serious integration problems because applications have been developed over time without documentation and there is a great deal of redundancy. Some decentralized systems are highly integrated because there are useful standards for hardware and software, and good communication between units.

Hybrid organizations are increasingly popular because central IS sets some broad standards to ensure integration, and within those standards the end user units plan systems that fit their particular needs.

- Relevance

This criterion rates how well the information that end users receive actually fits their needs. In general, decentralized systems are more likely to provide relevant information than centralized systems because the end user can define and manipulate the data to fit his/her needs.

Again, however, it is important to assess the particular system. In some cases, a centralized system may be better able to produce relevant information, for example where information needs are complex and end users do not have adequate skills to define and manipulate the data themselves.

- Timeliness

This criterion rates how well the system gets information to end users when they need it. Historically, centralized systems have had problems delivering information in a timely manner. Decentralized systems are often better at delivering timely information because end users can process the data themselves.

- o Cost and Performance Drivers

- IS cost structure

This criterion rates the option according to how well its cost structure fits the organization. The rating depends on the overall cost structure and the particular financial needs and conditions of the organization.

In considering these criteria, some issues to examine include the option's cost trends over time, the possibility of charging back some kinds

of costs to end users, and the experience of other departments in the government.

For example, in one ministry, the centralized system had high fixed costs but low variable costs. However, fixed costs could easily be charged back and shared among several departments, whereas it was hard to charge back variable costs. The CSF team rated the centralized option "adequate" on the fixed cost criteria and "adequate" on the variable cost criteria.

In another ministry, it was difficult to cover fixed costs and easier to cover variable costs. They also had a centralized option with high fixed costs and low variable costs. Unlike the first ministry, however, they rated the centralized option "poor" on fixed cost criteria and "good" on variable cost criteria.

o Management and Education

- Planning and control/Responsibility

This criterion rates how well the IS organization manages the IS resource and sets and enforces standards that fit the overall organization. Again, of course, the rating of an option depends on the distribution of skills within the organization, as well as the relationships and perspectives of IS and end users.

In general, however, centralized IS organizations are good at setting and enforcing standards. Yet they have often been criticized for managing the IS resource and designing standards in ways that do not fit the needs of end users.

Many organizations now consider decentralized planning and control to be preferable because the resulting plans fit the needs of the particular end users, and end users more rigorously enforce standards they helped to set.

Hybrid organizations often are strong on this criterion because central IS manages straightforward "transaction processing" systems and end users manage decision support systems. In addition, as noted above, central IS defines broad standards to ensure integration, and end users plan for their needs within those standards.

- Skills

This criterion rates the extent to which the system supports skills development, including technical skills and skills in data analysis. The rating depends on the values of the organization and the existing skill base and training systems. The strength of a centralized system is often that it supports deeper technical skills. The strength of a decentralized system is often that it supports more widespread (though shallower) technical and analytic skills.

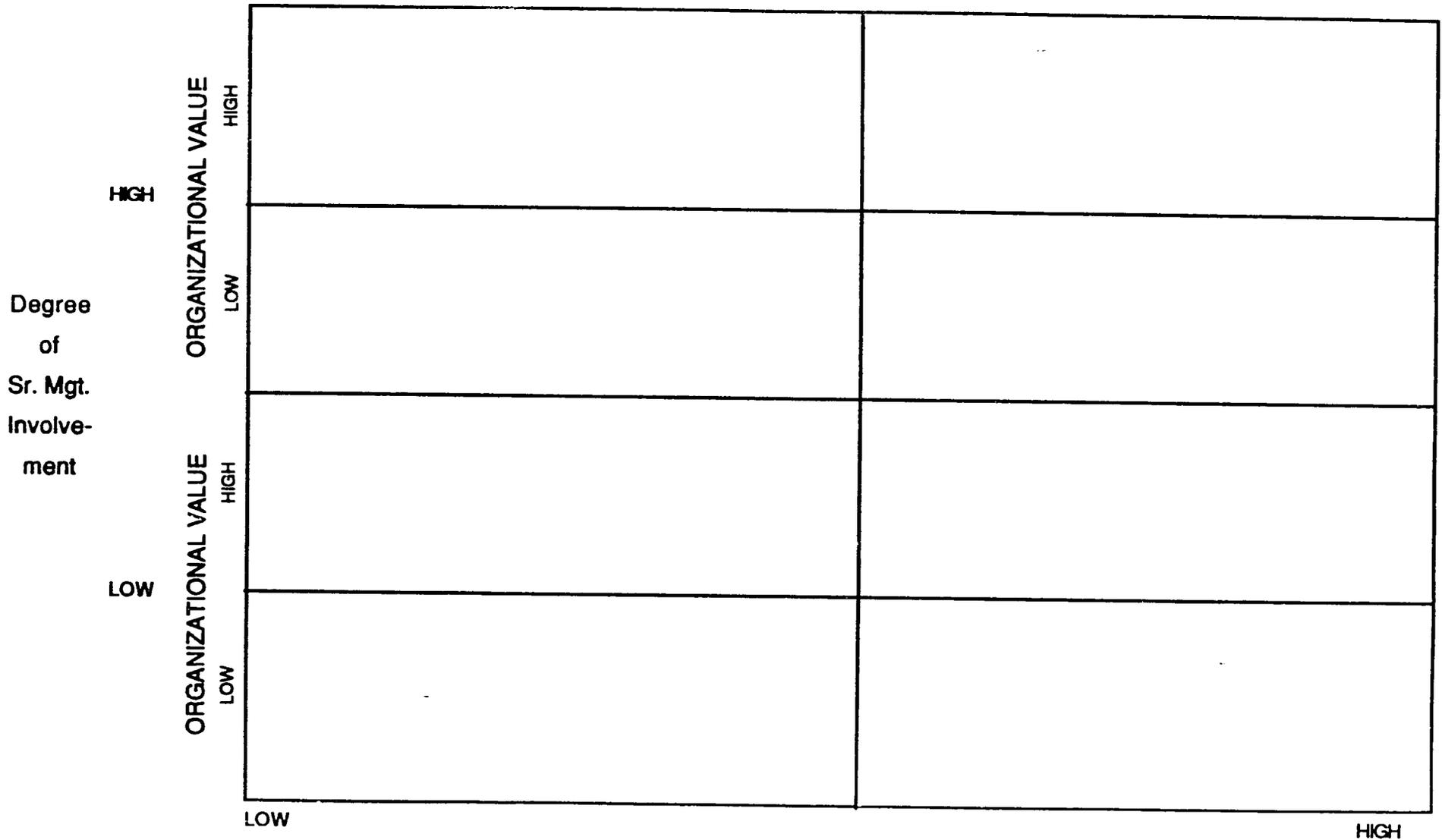
4. After completing a Template #13 for each option, separate the templates according to the functions or suborganizational units to which they apply.
5. Consider the gaps within each function or suborganizational unit. Examine each gap separately. Assess the options to close the gap. What does the rating (the pattern of circles) indicate about the strengths of each option? The weaknesses? What are the trade-offs between options to close each gap?
6. Compare the existing distribution of responsibilities (refer to Template #4) and the results of the options assessment. Where the option has the same IS organization as currently exists, the risk of implementing that option will be lowered. Where the option is very different from the existing IS organization, it will be more difficult to implement.

For example, in one Ministry, option assessment showed that a centralized option was the best way to gather and process certain data sets. Template #4, however, showed that data collection and processing was highly decentralized in the ministry, and that divisions guarded their control over data zealously. It became clear that implementing that option would hold high risk.

7. Now go back and examine all of the options. Consider whether there are synergies between options so that by pursuing them together it is possible to use resources more efficiently or effectively.

Figures 16A and 16B show two sample "Assessment of Option Trade-offs Related to IS Organization" Templates.

TEMPLATE 14. ASSESSMENT OF APPLICATION DEVELOPMENT OPTIONS



KEY	
	High Technology Risk
	Low Technology Risk

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Using Template #14:  
Assessment of Application Development Options

Use Template #14 to assess the options to develop or change applications.

1. Enter into Template #14 any new applications suggested in Template #12. Rate these applications according to the criteria in Template #14: relative investment, organizational value, degree of senior management involvement.

For this template, degree of senior management is a proxy for organizational risk. High senior management involvement is associated with higher organizational risk than lower senior management involvement. However, high senior management involvement also provides higher visibility if the effort is successful.

In addition, mark each option according to the key for technology risk. To determine technology risk, consider the size of the development project (larger projects are riskier than smaller projects), and the familiarity of the IS staff with that technology (unfamiliar projects are riskier than those with which the staff have experience).

2. Enter into Template #14 the options listed in Template #12 to expand or change existing applications. Rate these applications development efforts according to the criteria in the template.
3. Consider whether there are any synergies between options, so that by doing them together it is possible to use IS resources more efficiently and effectively.

In one ministry, for example, they realized that instead of building two new applications for two divisions, it was more efficient to build one application so it fit the needs of both divisions.

Figure 17 shows a sample of a completed "Option Assessment of Future Applications Development" Template.