OBJECTIVE

To manage information necessary to make decisions in support of the entity's mission, goals, and objectives.

BACKGROUND

The key to business success is information: accurate information, delivered at the right time, to the people who need it and can quickly make the best use of it (James Martin Associates Training Brochure, January 1991). Useful, accurate, and timely information must be available and organized in a manner that supports the entity's mission, goals, and objectives.

The effective use of information is pivotal to the timely, efficient delivery of state government services to the public. Executive management should ensure that there are systems in place to produce quality and timely information, which is the key to effective decision making (Executive Information Systems: A Guide for Senior Management and MIS Professionals, Preface, p.7). Information systems capture, process, and report information about events, activities, and conditions necessary for informed decision making and reporting.

Levels of management will have different information needs for the types of decisions they make. Top level executives and board members need information about overall financial performance, information for strategic decision-making, and information on factors that will affect future performance of the entity. Middle managers need information on the current performance of their organizational units. Operations management is concerned more with information about day-to-day operations of specific departments.

For additional information related to Managing Information, review the modules on Policy Environment, Mission, Policies and Procedures, and Organizational Structure.

DEFINITIONS

Information resources include the information, equipment, personnel, and finances involved in information system processing.

An **information system** (IS) serves to collect, record, process, store, retrieve, and display information. It includes both computer-based and non-computer systems. Its major purpose is to facilitate an organization in meeting its mission, goals, and objectives in an effective and efficient manner.

A **program** is a function that has goals and objectives and is responsible for carrying out a service or producing a product (Department of Information Resources, How to Conduct a Feasibility Study, June 1992).

The **Quality Assurance Team** (QAT) is composed of representatives from the Department of Information Resources, the Legislative Budget Office, and the State Auditor's Office. The team is responsible for approving major information resources projects (Guidelines for Quality Assurance Review, January 1994).

OVERVIEW OF THE PROCESS   **The basic phases of information management are:**
- **Analyzing the entity's requirements for information**
- **Analyzing how the entity uses information technology**
- **Developing the entity's information management plan**

PROCEDURES

Suggested procedures, organized according to the elements of a finding, are listed below.

Review criteria:

General criteria applicable to information management are as follows:

    General criteria
- Information provided should be accurate, easy to use and delivered timely to people who need it and can make the best use of it.
- Benefits derived from the information should be worth the cost of capturing it.

Specific criteria	**Analyzing the entity's requirements for information**

- The entity's mission and goals should be defined. See the Mission Module for additional information.
- Processes should be in place to respond to changes in the entity's environment. See the Policy Environment Module for additional information.
- Key programs should be identified and assessed as to how they relate to the entity's mission, goals and objectives.
- Processes should exist to identify the major stakeholders of each program, determine their roles and evaluate their objectives.
- Legislation that lists requirements for or otherwise affects entity programs should be monitored.
- Processes should be in place to determine the information needs of executive management and individual programs.

At the executive management level the needs assessment should:
- Determine what information is needed by executive management currently and over the next five years.
- Document how these information requirements support the entity's efforts to achieve its mission.
- Identify the importance of each type of information.

At the program level the needs assessment should:
- Determine what information the entity needs to function and operate on a daily basis.
- Determine how programs relate to each other, within and outside the entity.
- Evaluate the major problems programs encounter and assess how information can help solve the problems.
- Categorize the major decisions program management must make and determine how additional information could help.
- Determine the key areas in which the program must perform satisfactorily to accomplish its objectives and consider what information is needed to manage those key areas.
- Assess how projected changes to programs affect the information that programs require.
- Evaluate how information can improve the effectiveness of client services.
- Determine what kinds of information could enhance the program's efficiency.
- Assess whether outcomes support the goals as stated in the strategic plan. See module on Strategic Planning for additional information.

- Assess whether the program depends on an outside source for information and if this information is accurate and useful.
- Determine whether current arrangements for obtaining information will meet future needs and consider possible alternatives.

- The entity should have a process for comparing the value of various types of information to the cost of obtaining it. The primary factor to consider within this process is whether the costs of obtaining information are reasonable and appropriate considering:
  - connectivity needs (compatibility of different information systems)
  - duplication of information (similar information collected multiple times)
  - validity of the information (information which is accurate and useful)
  - timeliness of the information (ready access)
  - accessibility (difficulty of access)
  - ownership (confidentiality/security and proprietary considerations)
- The entity should evaluate the usefulness of reports to both executive and program management. Reports should be:
  - timely
  - at the appropriate level of detail
  - exception based

  - easy to use and understand
  - reliable and complete

Analyzing how the entity uses information technology

- The entity should have an inventory of hardware, software, facilities, telecommunications equipment, and personnel skilled at using and maintaining information technology.
- The entity should have a Biennial Operating Plan for information resources and a Strategic Plan for Information Resource Management. (Copies are required to be filed with the Department of Information Resources.)
- The entity should be assessing the strengths and weaknesses associated with how it uses information technology. The entity should:
  - compare the current information management plan to the entity's overall strategic plan
  - define the organizational structure and role of the group in charge of implementing the information management plan
  - develop cost/benefit analyses for all information technology projects
- The entity should be identifying problems and opportunities associated with how it uses technology.

- The entity should also be considering opportunities for improving existing information technology, and/or looking for opportunities for cooperative ventures with other agencies.
- Processes should be in place for tracking costs associated with the current system of information technology. Operations, support costs, and overhead should all be tracked.
- Assessments should be conducted of how well the entity uses technology to support their strategic direction. Issues to consider are:
  - how the entity's technologies directly support the strategic direction
  - how the entity's technologies support other functions, such as accounting, inventory, personnel, etc.
  - the level of automation for support services compared to the level associated with providing direct client services
  - how computer applications meet program needs
  - the amount of computer related maintenance and overhead required for current information technology
  - whether information technology is "state-of-the-art", current, or out-of-date, and related cost/benefits associated with the technology
  - current capabilities of information systems and technology
  - what users say about the entity's information technology
  - how potential improvements are prioritized

Developing the entity's information management plan

- The entity must develop an information management plan. (Information Resources Management Act [TEX. REV. CIV. STAT. ANN. art. 4413(32j) (Vernon Supp. 1992)], V.T.C.S.) The entity should have a clear understanding of their own requirements for information and their technical capabilities for information management. This requires creating a long-range plan for the strategic management of information resources.
- The entity's information management strategy should change as needs for information change, the ways the entity uses information technology changes, or new challenges and opportunities arise. Agencies should review what has been learned during previous planning steps and revise the entity's strategy as necessary. The entity needs to consider:
  - whether the current strategy enables the entity to meet its information requirements
  - whether changes in programs or technology require the entity to modify its information management strategy
  - if the entity is capable of successfully implementing the current or proposed information technology strategies
- Possible projects involving information technology should be defined by reviewing and assessing identified problems and opportunities. The entity

should be as precise as possible in quantifying benefits and resources for specific projects, including:
- indicating the primary objective of the project and describing the problem or opportunity it addresses
- examining both quantitative and qualitative benefits to the entity and its clients
- describing the resources the project will require in terms of equipment dollars and personnel years
- listing major milestones, including the due date for a feasibility study, the start date of the project, the estimated end date of the project, and any other important checkpoints in between
- naming the activities that must be completed before the project can begin, their start and end dates, and the people responsible for them
- Priorities should be set to determine which projects to pursue first and how to allocate resources to them. Projects should be considered from the current and previous planning cycles.
- All ongoing projects should be reevaluated in light of the current information management strategy. Priorities should be set among projects by defining criteria for evaluation. Weights should be assigned to indicate how important each project is relative to the others.

- Consideration should be given to the most economical means for addressing an information need. For example, it may be possible to customize or use software or hardware already developed and in use at a similar entity. Planners should be aware of initiatives being undertaken in other states, and at the federal and local levels.
- The information management plan summarizing the planning process should be documented.
- Processes should exist for reviewing the implementation of prior year plans.
- Improving the planning process should be an ongoing goal. An evaluation of how well the planning process benefitted the entity should be conducted.

Assess Condition:

Determine the actual process used

Conduct interviews, observe operations, and identify and collect available documentation in order to gain an understanding of the entity's actual process and controls for managing information. Possible procedures include, but are not limited to:

- Determine where the information management process resides in the entity, who participates in the process, and how the participants are selected.
- Obtain and review any manuals, policies and forms that could document any phase of the information management process, including its relationship to entity goals, objectives, strategies and plans.
- Determine if and how management consciously selects and employs the assumptions, criteria, methods, processes and techniques used in the information management process. Obtain and review available documentation on the assessment of risks, costs, and benefits.

- Review legislation for significant statutory requirements regarding data collection and distribution. Identify the process of data collection and distribution to meet statutory requirements.
- Obtain the history of SAO audit work at the entity from the EDP client file in SAO central files. Also obtain previous audit working papers and reports.
- Obtain copies of the Information Resource Management plans (Agency Strategic Plan for Information Resource Management and the Agency Biennial Operations Plan) submitted to the Department of Information Resources (DIR) with DIR's comments from the EDP client file in the SAO central files.
- Determine whether the entity is currently under Quality Assurance Team (QAT) review.
- Obtain documentation collected by the Quality Assurance Team for the entity.
- Interview personnel from the State Auditor's Office that have previously audited the entity.
- Review the entity's Mission Statement and Policies and Procedures on Information Management.
- Review the entity's inventory of information technology (includes hardware, software, facilities, personnel skills, etc).
- Determine changes in-progress or planned changes to the information systems within the near future.
- Review past audit findings regarding information systems at the entity. Consider outside audits as well as consultants' recommendations for follow-up.
- Identify the key business functions and goals of the entity.
- Identify information needed to support the key functions and goals.
- Document the flow of information within the entity.
- Determine the:
  - information flow
  - identification of key internal and external users and their information needs
  - best sources for obtaining data
- Determine how the entity obtains input from Internal Audit regarding recommendations for information systems.
- Determine the extent to which information is generated from end-user computing.
- Determine what information is needed by management to perform their job and make decisions. This step should be done at the executive management level and then done at the operating management level for the major programs. This can include the relevant controls from the management control cycle, as well as function specific information needs.
- Determine if there are any processes in place at the entity for addressing future changes in information needs.
- At the executive and program management level, determine:
  - The critical success factors that need to go right to achieve success for the entity. For example, implementing major projects by certain deadlines, staying within budget, and meeting client needs.

- The key performance detecting and monitoring mechanisms for the entity; that is, information that shows actual performance in relation to goals and objectives. See the module on Performance Monitoring and Evaluation for more information.
- The other information that is provided. Compile a list of reports received, their frequency, and from whom received. Take note of on-line computer inquiry capabilities. Be aware that executive management may rely on the reported or queried information from other levels of management.

- Based on the highest priorities/goals that were identified previously, identify and review the significant information systems, databases, and reports to determine what information is available and what is being used. Typical categories of information include planning, organizing, monitoring, controlling, budgeting, communicating, and reporting.

MANAGEMENT FUNCTION	TYPICAL TYPES OF INFORMATION
Planning	Strategic plans, operating plans, and cost studies
Organizing (Training/Hiring)	Time reports, requested training reports, attendance reports, and course listings
Monitoring/Evaluating	Status reports, quarterly performance measure reports, progress reports, and evaluations
Controlling	Policy manuals, procedure manuals, and memos
Budgeting	Budgets, LARs, and cost estimates
Communicating	Meeting minutes and agendas (The board, divisions, teams, and councils are common groups which disseminate information.)
Reporting	Required federal reports, other reports or notices

- Determine the methods of communication and information sharing within the entity (vertically and horizontally), with other agencies, and with non-state entities.

- Determine the entity's planning process for upgrading or improving information technology.
    - Determine the organizational structure of the planning process.
    - Review any relevant documentation related to the process (meeting minutes, memos, etc.).
    - Determine the extent of program and executive management participation in the planning process.
- In addition to gaining an understanding of the actual process, also try to find out:
    - how the participants view the actual process
    - what parts of the process the participants see as successful or unsuccessful and why
    - what the participants think is important about the process and why

This information may help identify causes and barriers.

Determine the strengths and weaknesses of the information management process

Using the tailored criteria, the understanding of the entity's process gained above, and the procedures in this section, analyze the information management process to determine if it:

1)   is designed to accomplish the management objective(s)
2)   has controls that provide reasonable assurance that the process will work as intended
3)   is implemented and functioning as designed
4)   is actually achieving the desired management objective(s)

Suggested procedures for each of these four analysis steps are detailed below. In executing these procedures, remember to identify and analyze both strengths and weaknesses.

Identify and review the steps in the actual process to determine if the process is designed to accomplish the management objective(s). Possible procedures include, but are not limited to the following:

- Determine if all major steps in the criteria are included in the information management process. If steps are missing, determine if the absence is likely to have a materially negative effect on the entity you are reviewing.
- Determine if all the steps in the process appear to add value. If there are steps that do not appear to add value, try to get additional information on why they are included in the process.
- Review the order of the steps in the process to determine if it promotes productivity.
- Review the management techniques used in the process, such as Gantt charts, process maps, decision matrices, etc. See the appendix to the module on Problem-Solving and Decision-Making for additional information.
- Determine that the entity's Biennial Operating Plan is in alignment with the entity's Operating Plan.
- Determine that the entity's Strategic Plan for Information Resources is in alignment with the entity's Strategic Plan.
- Align programs to business functions and goals and rank programs in accordance with alignment to business functions and goals
- Determine if the major functions or programs are supported by the information systems, databases, and reports.
- Determine whether information provided to executive management is readily available, easy to use, easy to understand, and useful.
    - Is report content appropriate?
    - Is report at a proper level of detail?
    - Is the information reliable and complete?
- Determine whether information is provided on a timely basis for executive management, for major program areas, and to satisfy statutory requirements.
    - Is the information produced daily, weekly, monthly, or annual?
    - Does it offer historical comparisons?
    - Is the information available in time to make decisions?

- At the program level, identify problems and opportunities by focusing on the individual programs. Answers must be available to these questions:
  - Is the information that each program needs available?
  - Is the information reliable?
  - Is the information understandable and useable?
  - Is the cost of obtaining the information appropriate?
  - Is the information gathered by other agencies?
  - Is the information available from another agency?
  - Do other entity databases require the same information?
  - Why is the information needed?
  - What is done with the information once it is accumulated?
  - Is all the information being maintained still valuable?
  - Will the information that each program currently gets satisfy the needs of the entity in the future?
  - Are there opportunities for providing programs with better information, or for meeting any of their additional needs?
- Determine if the reports highlight exception-based information or results. Information that is summarized and categorized is easier to use in decision-making.
- Determine problems and opportunities associated with the information requirements. Sources of information include audit reports and reports prepared by the programs.
- Determine if costs to obtain certain information exceed the benefits. Focus on information of questionable usefulness.
- Review the level of technology used in the process to determine if it is up-to-date and appropriate for the task.
- Review any significant information technology projects being considered or implemented.
  - Is the upgrade or new technology really needed?
  - Are sufficient resources available for the project?
  - Does the entity have sufficient expertise to implement the project?
  - Have all feasible alternatives been considered?
  - Has adequate consideration been given to potential federal or private funding sources for information technology projects? What benefits or hazards might be related to pursuing these avenues?
  - If projects are underway, are they on time and on budget?
  - Are lines of authority and responsibility clearly defined for the project?

- Evaluate the entity's methods for monitoring the cost of information systems.
  - Can direct costs, support costs and overhead be allocated among entity programs?
  - Determine if system costs regularly undergo evaluation.

Identify the controls over the information management process to determine if there is reasonable assurance that the process will work as intended. These controls should be appropriate, placed at the right point(s) in the process, timely, and cost effective. Possible procedures include, but are not limited to the following:

- Draw a picture of the information collection process, the controls, and the control objectives. Flowcharts of the process can help identify inputs, processes, and outputs.
- Determine if the control objectives are in alignment with the overall management objective(s).
- Identify the critical points of the process (i.e. those parts of the process most likely to determine its success or failure or expose the entity to high levels of risk) and the controls related to them.
  Consider whether the controls are:
  - in the right location within the process (input, processing, output)
  - timely (real time, same day, weekly, etc.)
  - effective
- Compare the cost of the control(s) to the risk being controlled to determine if the cost is worth the benefit.
- Determine what controls are in place for monitoring and evaluating the overall effectiveness of the process and ensuring that changes are made if the desired results are not achieved.
- Identify, describe, and assess the process used to gather input from employees who might reasonably discover flaws in the information system.

Review observations, interviews, documentation, and other evidence and design specific audit procedures as needed to determine if the process and/or the controls have been implemented and are functioning as designed. Depending upon the objectives of the project, these procedures may include both tests of controls and substantive tests. (Additional information is found in *The Hub*, pp. 2-B-8, ff.)

- Determine if any evidence of management override exists.
- Walk through the actual information management process. Compare the actual process to the official process.

Review and analyze the outcome(s) of the information management process to determine if the process is actually achieving the desired management objective(s). Possible procedures include, but are not limited to the following:

- Analyze reports over time for trends.
- Discuss any material negative or positive trends with management.

- Determine how management acts upon these trend reports and what changes, if any, were made in the process or controls as a result. Some process refinements, especially those affecting entity mission, goals, and outcome measures, may need to wait until the next appropriations cycle.

Determine causes

Determine what circumstances, if any, caused the identified weaknesses in the information management process. Possible procedures include, but are not limited to the following:

- Determine if the participants in the information management process understand the entity's mission, goals, and values and support them through their actions.
- Determine if the participants understand both the purpose of management information and their role in the process.
- Assess the nature and scope of the communication and coordination among multiple locations of the entity.
- Ascertain whether adequate human, dollar, time, information, and asset resources have been assigned to information management. If inadequate, determine if entity resources have been allocated according to the materiality of information management relative to other entity processes.
- Determine if the entity has considered using alternatives such as industry associations, non-profit organizations, academic institutions, or other governmental entities to meet its resource needs.
- Determine if available resources have been allocated and used in a manner consistent with the importance of that resource to the overall information management strategy.
- If there are negative trends in the reports used to monitor the outcome(s) of information management, determine if these reports are communicated to and used by the appropriate parties to modify the process.

Determine what internal or external constraints or barriers, if any, must be removed in order to overcome identified weaknesses. Possible procedures include, but are not limited to:

- Review the applicable entity, state, or federal laws or regulations to determine if any of these prevent the necessary changes from being made to information management.
- Determine if any key employees are unwilling to change the process for information management and why they are unwilling.

Determine effect

Compare the actual process to a recommended alternative process(es) and determine if each weakness in the entity process is material. Alternatives can be developed by using the criteria contained in this module, applying general management principles to the process, using the processes at comparable entities, etc. Materiality can be measured by comparing the dollar cost, impact on services (either quantity or quality), impact on citizens, impact on the economy, risks, etc., of the actual process to the recommended alternative process(es). Measurements can be quantitative, qualitative, or both. Possible procedures include, but are not limited to the following:

- Identify performance benchmarks (industry standards, historical internal data, other comparable entities, etc.) for the process in question and compare to actual performance. Measure the difference, if possible. Include the cost of the additional controls or changes in information management.
- Estimate the cost of information management and the alternative process(es) and compare.
- Estimate the quantity and/or quality of services provided by the current and alternative process(es) and compare.
- Identify the risks associated with the current process and with the alternative process(es). Measure and compare the risks.

Develop recommendations

Develop specific recommendations to correct the weaknesses identified as material in the previous section. In developing these recommendations, consider the tailored criteria, kind of process and control weaknesses identified, causes and barriers, effects, and additional resources listed at the end of this module. Possible procedures include, but are not limited to the following:

- Identify alternative solutions used by other entities.
- Identify solutions for removing barriers.
- Provide general guidelines to the objectives each solution should meet; the entity can then tailor the solution to its specific situation.
- Provide specific information, if available, on how each recommendation can be implemented.

RESOURCES

Articles

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Location: SAO Library

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Location: SAO Library

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Location: University of Texas, Perry-Casteñada Library (T58.6 T47 1991)

Treadway Commission, Committee of Sponsoring Organizations of the Treadway Commission, *Internal Control-Integrated Framework*, September 1992.
Location: Methodology Project Information Resource Folders

Watne, Donald A. and Peter B.B. Turney, *Auditing EDP Systems*, Prentice-Hall, Inc., New Jersey, 1984.
Location: University of Texas, Perry-Casteñada Library (HF 5548.35 W37 1984)

Data Bases

Uniform Statewide Accounting System (USAS)
Human resource Information System (HRIS)
Uniform Statewide Payroll System (USPS)
Automated Budget and Evaluation System for Texas (ABEST)
Public Education Information Management System (PEIMS)
State Real Property Inventory Data Base
Boards and Commissions System
Statewide EDP Application Risk Assessment
Higher Education Data Base
Statewide Consolidation
Agency Profile
Cash Management System
Statewide Property Inventory Data Base

Human Resources

The following staff members have specialized training or ongoing interest in managing information:

Employee	Title/Function
Judy Anderson, CISA	
David Conner, CISA	EDP Specialist Team
Anne Marie Palmer, CPA, CISA	
Nancy Hennings, CPA, CISA	
Carla Jennings, CISA	EDP Specialist Team
Cheng Hoe Mah	
Teresa Menchaca, CISA, CDP	EDP Specialist Team
Jon Nelson, CISA	
Carol Noble, CISA, CDP	
Marios Parpounas	
Patricia Perry-Williams, CISA	EDP Specialist Team
Ed Pier, CPA, CISA, CDP	
Brenda Winkler, CQA	

Brenda Winkler, CQA Ken Lovoy Julie Cleveland	Module Writers/Editors
Will Hirsch, CPA Charlie Hrncir, CPA Cathy Smock, CPA	Reviewers

Periodicals

"Datapro Reports," Datapro Research, monthly
Location: Department of Information Resources Library (475-4728)

"DIR Tech Times," Department of Information Resources, bimonthly
Location: Department of Information Resources Library (475-4728)

"EDPACS," Auerbach Publishers, monthly
Location: Department of Information Resources Library (475-4728)

"IS Audit and Control Journal" (formerly "The EDP Auditor Journal"), Information
Systems Audit and Control Association (EDP Auditors Foundation), quarterly
Location: Department of Information Resources Library (475-4728)

Professional Associations

Information Systems Audit and Control Association
(EDP Auditors Association)
Rolling Meadows, IL
708-253-1545