1-02-10 Strategic and Long-Range Information Systems Planning
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Payoff
IS executives can significantly influence the effectiveness and success of the organizations they support by building a solid working partnership with their colleagues in senior management. One important element that supports this partnership is the active participation by IS in broad-based strategic and long-range business planning. This article suggests guidelines for establishing the information technology components of the business planning process and for strengthening the overall process.

Problems Addressed
IS planning is a major concern of CEOs and of senior IS executives whose primary responsibility is the management of the information resource. Both seek to realize an increasingly greater return on investments in information technology. Both know that information technology provides the framework for corporations, and both understand how intimately that framework is intertwined with the corporate structure—and how vulnerable the corporation is to weakness in that framework.

Both CEOs and senior IS executives realize the central role and competitive potential of information technology in dynamic business environments, and they realize the need for information systems planning to support—indeed, to be a part of—business planning. In every survey of chief information officers, or CIOs, information systems planning appears among the top ten issues. (The term CIO, although not universally accepted, is used to refer to the senior executive charged with managing information resources, regardless of title and reporting relationship.) This article examines the strategic and long-range planning process and the pivotal role the IS executive plans in making the process work.

Nature of Strategic Decisions
Planning is an especially important tool for coping with the rapid change that characterizes many aspects of life today. Planning provides the understanding necessary for reallocating resources with minimal damage to the ongoing organization. Reallocation of resources is necessary in order to take advantage of opportunities, which surface ever more quickly, and to avoid or combat threats, which continually endanger the survival of organizations. Planning helps people anticipate and even influence change, which is an empowering and much more effective approach than merely reacting to change.

IS executives and their CEO partners face major strategic decisions. Information technology consists of an unprecedented combination of computers of all sizes and descriptions, communications networks of similar variety, a software portfolio to match, and a vast and growing set of electronically published information resources. The IS executive must make decisions about:

· Whether to outsource the organization's primary information technology operations.
• Whether to replace traditional mainframe and minicomputer networks with client-server architectures.

• How to take advantage of emerging technologies to deliver competitive advantage.

• How to design and manage an enterprisewide information architecture—and how to maintain congruence among the enterprise architecture, the information architecture, and different technology architectures (e.g., computing, communications, application, processing environment) as change occurs.

• How to design and maintain a user support infrastructure that helps users more easily and effectively design, build, operate, and enhance their own applications.

• How to implement emerging tools (with choices ranging from Computer-Aided Software Engineering, object-oriented approaches, and various forms of reusable code) for improving productivity and effectiveness in applications development and portfolio management.

• How to help the organization reengineer itself to take advantage of both technology developments and new thinking about business processes, so that reengineering becomes an effective tool for bringing about dramatic improvements in competitiveness.

• How to ensure that all elements of information technology—platforms, networks, operation environments, and applications (especially new cross-functional applications)—work effectively together: the systems integration concept.

That these strategic decisions must be made is evidence that the world of information resource management continues to evolve dramatically, yielding an ever-increasing richness in options available for corporations. They are framed within four forces that are at work in most organizations:

• An accelerating rate of change in the business environment.

• An accelerating rate of change in information technologies, which becomes exponential as these technologies work together.

• An ever-growing dependence upon the effective use of the information technologies for survival.

• A growing appreciation by senior management of the crucial role of information resource management for effectiveness of the organization overall.

**Pivotal Role of the IS Executive in Planning**

The senior IS or CIO-level executive plays a pivotal role in addressing these forces. Never before has the effective use of the information resource been so central to the organization’s success or so visible from the top. Never before have the changes in technology taken place across so many fronts.
Traditional approaches to planning continue to provide help with many aspects of the ongoing business, but they must be supplemented by other, newer techniques, and the whole must be part of a new planning framework that is based on process and interpersonal relationships.

The pivotal role of the senior IS executive extends to this new planning framework. Successful planning in the fast-paced business world depends much more upon the IS executive's personal strengths, knowledge, and flexibility than upon following established practices. IS executives must demonstrate personal characteristics that lead to acceptance as a full, equal, contributing partner on the senior executive team. IS executives must understand the several businesses of the organization in-depth and have a track record of making significant contributions to organizational success. They must understand the information technologies and their trends as well as information resource management issues in sufficient depth to recognize and communicate opportunities and threats as well as the technologies and management strategies for addressing them. The leadership by IS executives of the several information resource management groups throughout the organization should result in their being perceived as excellent, or at least effective.

This new planning framework involves personal participation by IS executives in a process of self-development and of corporate governance, in which an evolving view of the future guides daily activities throughout the organization. This personal participation extends to the education role IS executives must fill daily for their executive peers through their own ability to communicate and to persuade. (The education role is more effective if senior management colleagues are pleased with the IS executive's track record of substantial contribution to the business's bottom line.) The issues to be considered, the questions to be answered, and the documentation of planning results fit well within traditional conceptual categories of planning, even though the intensity and complexity have increased. The planning process and its products—the conceptual categories—are considered in the following section, keeping in mind the leadership role required of the IS executive.

The Planning Process

Planning is a process and a way of life. Organizations that plan successfully operate that way. Their line managers keep the strategic vision and the planning issues in mind constantly as a background for even the most routine of daily operational decisions. They monitor the business environment at all times and meet frequently to refine their understanding of changes in the environment and the implications of those changes for strategies currently being pursued. Such an organization is fine-tuned to respond effectively to and influence change. Planning serves as a compass that guides the organization's responses.

The products of planning—the plans—are obsolete as soon as they are published. Successful planners recognize that it is the process that counts. It is during the process that the results are conceived and everyone learns what direction the organization is heading and why and commits to the support of that direction. The written plans provide guidance for the organization as a whole; they are subject to review and updating. It is the evolving understanding and team spirit fostered by the process that keeps the organization effective and responsive.

Nevertheless, careful documentation of the status of plans that result from this process is a way of ensuring that all relevant elements fit together as a coherent whole. This plan
should be considered a living document, however, that must evolve to keep in
synchronization with the planning process.

As Exhibit 1 shows, planning is a cyclic process, directing actions that cause results
and that are modified by the results. An understanding of the organization's business
environment plays a key role in the formulation of plans.

The Planning Process

Exhibit 2 shows that the ultimate product of the planning process is a set of action
plans for each manager that support the mission and goals of the organization as a whole.
The planning process takes place at every level and in every unit of the organization; in
effective planning-driven organizations, all of these processes are articulated so that
everyone is working toward the same set of goals and objectives.

The Objectives of Strategic Planning

Exhibit 3 shows how the basic planning questions are brought to bear in the
development of action plans. The organization's mission and the businesses it operates
define its customers and vice versa. The organization seeks to serve those customer needs
that take advantage of its strengths, its competitors' weaknesses, and opportunities in the
business environment while avoiding threats, all with respect to each of its businesses.
Because all of these elements change over time, planning must be a continuing process that
anticipates and responds to the changes as they occur.

Strategic Business Planning

The planning process at every level of the organization follows this same general
pattern. A staff department that is a cost center looks toward the needs of its customers
(i.e., those who use the products of its efforts) just as a line department looks toward the
needs of the customers of its line of business. Furthermore, it is important for planners to
remember that it is the customers' perception of value that determines effectiveness, not the
value as derived from any objective measure. Planning concepts for making the planning
process more effective are discussed later in this article.

The Products of Planning

Though a continuous planning process at all levels is a crucial element of successful
planning, there is considerable value in documenting the status of the process from time to
time, usually each year. The discipline of organizing goals, objectives, and strategies into a
coherent plan clarifies understanding by all participants, and the plan can be distributed
throughout the organization, providing direction and encouraging feedback at all levels.
Documentation helps ensure that no important information is overlooked and that
everything fits together. Documentation also becomes a baseline for assessing and
implementing change.

Writers of planning documentation can learn from systems analysis about functional
decomposition, or breaking down a complex entity into smaller parts that can be better
understood. This systems engineering technique is one of the most effective ways of dealing with complexity without getting bogged down in details or losing track of the whole picture.

The strategic plan deals with the organization's mission, the businesses it will operate, and the environment in which it operates. Strategic planning sets the vision and the strategies for achieving it. The strategic plan is brief and clear, intelligible to anyone, and provides the imagery and framework within which the more detailed planning documents fit. It corresponds to the context diagram or first-level decomposition in a hierarchy.

The tactical plan details the strategies and action plans necessary for acquiring and deploying resources in order to achieve the goals and objectives of the strategic plan. The tactical plan for information resource management details the projects to be carried out according to a priority-based schedule, specifies the resources required for the successful completion of these projects, and identifies the strategies for acquiring the necessary resource. The tactical plan corresponds to the second-level decomposition in a hierarchy. The long-range plan is often a tactical plan.

The operational plan provides details concerning the daily actions necessary for the success of the action plans in the tactical plan. Usually the operational plan for information resource management is a collection of project plans, each of which is subject to project management techniques. The operation plan corresponds to the third-level decomposition in a hierarchy.

**Information Technology Projects**

For years the long-range information systems plan was based primarily on a set of application development projects. Actions to keep the technology environment current in light of the increasing workload and of price/performance parameters of advancing technology (through the acquisition of computers, peripherals, and systems software) made up a separate plan that rarely received scrutiny outside of the IS department and its direct executive leadership.

Several forces have led to a much broader concept of an information technology project. An information technology project may be anything that enhances the effectiveness of the information resource. Although application development projects often still dominate the plan, many other types of projects are now included, such as plans for:

- Building a backbone communications network.
- Converting departments from mainframe to client-server architectures.
- Developing an enterprisewide information architecture.
- Converting mainframes from processing uses to data server uses.
- Implementing significant processing environment changes (e.g., converting from hierarchical to Relational Data Base Management System).
- Implementing Computer-Aided Software Engineering technology.
- Implementing Object-Oriented Analysis and design techniques.

**User Empowerment**
In most cases, the strategic vision that guides an information resource plan is the development of an information technology infrastructure that increases the user community's ability to keep its support systems current with rapidly changing business conditions with little direct support from the IS department. Empowering users is the current approach.

With a properly managed information architecture and communications network in place, and with a set of user-friendly application development tools and consulting support, users can develop and modify the applications they need and keep abreast of the changes in the business environment far better than was possible when applications were developed by a separate system development group. Large enterprisewide applications built by such a group are still needed occasionally, though they tend to be projects that build the user support infrastructure rather than support daily operations.

**Plan Contents**

A strategic plan for information resource management describes the infrastructure and demonstrates its support of the business direction. A long-range information resource plan identifies projects in the order in which they will be conducted in order to bring about the strategic result.

In addition to an executive summary and introduction, the plan should contain the necessary information to help those with information resource management responsibilities at all levels do their jobs more effectively. The strategic section should demonstrate to senior management that the plans are supportive of the organization's business directions.

Beyond this, the plan should be consistent with the culture of the organization in which it is developed. It should describe the organization's understanding, management, and use of the information resource and how these are likely to change. The plan often describes the organization's relationships with the business environment as they affect the nature and use of the information resource. Enough quantitative information should be included or incorporated by reference to characterize the several elements of the information resource (e.g., hardware, software, and data) and to monitor its evolution. Sections should address such key issues as security and disaster recovery. Any planning document should identify the assumptions on which it is based. It should also identify the important issues that need continuing high-level attention.

**Planning Concepts: Making the Process Work**

**Strategic Planning**

The direction-setting level of planning requires a sophisticated understanding of the organization, its mission, the businesses it will be in and why, the customers of those businesses and their needs, and the competitors seeking to satisfy similar needs. IS executives can make their greatest impact at this planning level. If they understand these concepts and can identify uses of information in pursuit of objectives at this level, they can help their organizations use the information resource to gain a competitive advantage. This must be a synergistic process among all members of the senior executive team, with all members contributing their experience, expertise, and perspective. Out of the dialogue solid strategies evolve.

There are two keys to effective strategic planning. The first is having a strategic vision—the view of the future that is at once challenging, desirable, and achievable. this
serves as a touchstone for employees at every level in the organization in their daily decision making. NASA’s strategic vision was not to achieve preeminence in space exploration but to land a person on the moon and bring that individual back safely. This criterion is effectively applied for every decision (will this help land a person on the moon?) and the strategic vision is specific and measurable.

The second key element for strategic planning is a thorough understanding of the business environment and how it is evolving. This includes the evolution of customer needs and perceptions, competitor effectiveness in satisfying those needs and perceptions, and opportunities and threats from other sources, including social, political, and economic changes. Selwyn Enzer, formerly of the Center for Futures Research at the University of Southern California, recommends posting sentries to observe the evolving business environment; in other words, identifying and regularly monitoring pertinent information to detect changes that may signal the beginning of a trend. Many business failures can be attributed to the lack of a detailed understanding of the current business environment.

Documentation of the strategic plan should be crisp and concise and directed at senior management. It should be quickly prepared and frequently revised as a snapshot of the current state of the process. When major changes in the business require major revisions to the plan, a skunk works or tiger team approach may be best. All other planning efforts flow from the strategic plan and take direction from it.

**Tactical Planning**

As previously mentioned, this level of planning is where the action plans for carrying out strategies are developed. Budgets, plans for specific projects, and master manufacturing plans are examples of tactical plans. Often, long range information resource plans are more tactical than strategic despite their longer time frame.

**Operational Planning**

Operational planning addresses the daily work to accomplish the action plans. Shop-floor scheduling in manufacturing and production scheduling in a data processing shop are examples. At a level below operational planning are practices and procedures, desk or workstation instructions, and other detailed plans that are needed to ensure that the operational plans are effectively accomplished.

**Long-Range Planning**

Often confused with strategic planning, this term applies only to the time frame of the planning horizon. Generally speaking, any plan covering more than a two-year period should be considered a long-range plan. It is also strategic if the process that produces it takes into consideration the strategic issues discussed previously. If those issues have not been addressed, then the long-range plan is not strategic, but tactical.

Conversely, a strategic plan may not be long range. A major change in organizational mission or direction may require a plan that at first cannot be extended beyond a year or two, at which point experience can point toward a clearer future. This is an example of a strategic plan that is not long range.
Comprehensiveness of Planning

A comprehensive information resource plan would address, for example, the following elements:

- The information needs of the organization (strategic, tactical, and operational), which are often expressed as an information architecture.

- The resources required to supply those needs, including:
  - **Human resources.** Managerial, professional and technical, operational, recruitment, skills and training, the human support infrastructure, career planning, and management succession.
  - **Physical resources.** Information technology (e.g., hardware, software, communications, and their evolving configurations) as well as file cabinets, typewriters, telephones and other tools for the storage, retrieval, movement, and processing of non-machine readable information. This category also includes other equipment and supplies and facilities.
  - **Financial resources.** Operating and capital expenditures.
  - **Information resources.** That which is handled by information technology as well as by libraries, mail rooms, file cabinets, conversations, and people's memories.

Organization plans for acquiring, developing, deploying, managing, and disposing of the resources.

Reasons for Planning

A formal planning process forces managers to articulate their objectives, priorities, and action plans. The advantages of a formal, documented information resource plan include:

- Better information regarding when and where it is needed, in a usable form.

- Better justification for budgetary support for information technology projects, which also ensures that resources will be available when needed.

- Better use of the money invested in information technology.

- Fusion of the many parts of the complex information technology environment (i.e., planning ensures the parts fit and work together).

- Less waste of money supporting the information technology environment.

- Reduction of costly maintenance and corrective work.

- Identification of cost-saving and cost-sharing opportunities in distributed environments.
Enterprisewide Strategic Information Resource Planning

This article focuses on planning at the organizationwide, or enterprisewide, level. Many of the principles are equally applicable, properly translated, at any level. For example, the strategic planning process must be driven by the chief executive of the organization or of the organizational unit doing the planning. Tactical and operational planning may be delegated, but not strategic planning.

As discussed previously, the strategic planning process is more important than the products. It is the interaction leading to shared understanding and a shared direction that produces results, not the prescriptive steps of an action plan. Furthermore, the success of the process is directly proportional to the degree to which the right people are involved. Even then, strategic thinking must undergird all their activities and they must participate substantively. A planning methodology can only ensure that most of the right questions are asked. The answers must come from the people who know them or can participate in developing them.

Strategic planning is a line management responsibility. The term strategic management is frequently used to recognize the importance of a planning perspective in every aspect of management, as discussed above. A successful strategic planning process requires the substantive participation of the key line executives of the organization.

The role of the professional planner is support. Planners catalyze, facilitate, and support the process, usually through a methodology that ensures that the process occurs on a continuous basis, that it involves the right people in the right way, and that it addresses the relevant issues. Among other things, this means focusing on those 20% of activities that determine 80% of the organization's effectiveness. To whatever degree is reasonable within the culture of the organization, strategic information resource planning should be an integral part of strategic business planning. This strategic planning process includes three primary steps: enterprise analysis, environmental analysis, and strategic synthesis.

Enterprise Analysis

The critical first step in information resource planning is to acquire an understanding of the organization being supported. It is helpful to think of an organization as a single enterprise, in which the flow of information and material is used to deliver a family of products and services to meet a need. Human resources and the available tools for them to use determine the effectiveness of this flow. In the private sector, the marketplace determines the order in which needs are carried out because the organization earns a profit from the sale of the products and services. In the public sector, political considerations provide the basis for the ranking of needs.

The basic business processes of most organizations are remarkably stable, although the way they organize to carry out those processes changes frequently, and the details of each process must change to reflect a changing product mix and marketplace. The basic structure of information and material flow is surprisingly constant, however.

A model of the organization or enterprise can be developed to show the relationships among these stable elements, the business processes. This model may be constructed at several levels of detail; the level chosen depends upon the organization's cultural view of highly quantitative approaches to any issue. For strategic planning, the focus is on issues, directions, and strategies. A simple model that focuses attention on the activities affecting...
critical success factors usually suffices and is an effective starting point in any organization. For more detailed long-range tactical and operational planning, the entire organization should be modeled. The business processes may be dissected into their component parts: the entities involved in information and material flow and the relationships among them. This entity-relationship approach can lead directly to the design of enterprise data bases, often through the use of automated tools.

When the enterprise model is complete, it is used to derive an information architecture that illustrates the flow of information through the organization. (Separately, a material flow architecture can be derived that provides the basis for planning for other organizational resources.) This information architecture becomes the basis for applying the information technologies that support the organization. This approach to information resource planning ensures that the plans are driven by the organization's business needs.

For optimal effectiveness, both the enterprise model and the architecture derived from it must be subjected to rigorous Configuration Management to ensure that both remain valid and current as the business evolves. Among the common approaches to enterprise analysis for information resource planning are IBM's Business Systems Planning (BSP), Nolan's Application Portfolio Analysis, Rockart's Critical Success Factors, James Martin's Information Engineering, Chen's Entity-Relationship Analysis, and systems engineering approaches such as IDEF and SADT. It is important to choose a methodology that fits well with the organization's culture. Some of the more powerful modern methodologies require a commitment of resources and a level of understanding that is beyond what some cultures are willing to attain, even when the payoff is high.

From a historical perspective, BSP has been the standard against which other methodologies are judged, even though many organizations today prefer newer alternatives. If a strong CEO-CIO partnership exists in an organization with a strong quantitative culture, the BSP approach works well. It forms part of the foundation upon which the Information Engineering approach is built, although Information Engineering, with its many support tools in front-end Computer-Aided Software Engineering technology, is supplanting BSP.

Environmental Analysis

The second step in strategic planning is environmental analysis. Because change is so important in all aspects of life, effective environmental analysis is usually the most important critical success factor in strategic information resource planning.

An organization's information resource is embedded in a complex milieu that includes the enterprise itself; the business environment and marketplace in which it operates; the social, cultural, political, and economic environment within which it conducts business; and the information resource management profession, including the dynamic world of the information technologies. Successful information resource management depends upon having an understanding and awareness of this environment in order to anticipate and detect change, assess its impact, and trigger corresponding changes in the strategic plan (see Exhibit 4).

Environmental Analysis

In addition to the organization's strategic business plan, the evolving environment of information resource planning includes:
• Changing ideas about the nature and use of the information resource, and cultural attitudes toward these changes.

• Changing technologies for managing the information resource, including changing cost/performance relationships.

• Changing attitudes toward and understanding of technology.

• Changing characteristics, perceptions, and availability of IS professionals.

• Changing characteristics and perceptions of information resource users.

Unfortunately, environmental analysis is rarely done as a part of information resource planning. As a result, the information resource management function often fails to anticipate change. The pressure for distributed processing and the explosion of microcomputers resulted in part from a failure of IS professionals to appreciate the substantial implications of changes in their environment.

The environment can be studied in many ways. Among them are business planning techniques that focus on customers (i.e., users), competitors (i.e., vendors and other information services suppliers), strengths and weaknesses, and opportunities and threats. In addition, futures research methodologies seek to identify the most probable range of alternative futures in order to develop robust strategies for dealing with them. Information about futures research techniques, including Delphi, inferential scanning, and cross-impact analysis, can be obtained from many academic centers for futures research, such as that at the University of Southern California.

**Strategic Synthesis**

If environmental analysis is the most critical success factor in strategic information resource planning, building the strategic synthesis is the key step. This is the point at which the information collected in enterprise analysis and environmental analysis is blended together into a strategic plan. This step requires the active participation and leadership of top corporate executives supplemented by the organization's most strategic thinkers, regardless of their role in the enterprise.

Many times this strategic synthesis is carried out by the organization's chief executive but is not documented. However, because of increasing participatory management and increasing organizational and environmental complexity, a documented plan, developed through a group process involving the senior executives, is preferable. This approach builds team commitment to the plan by providing a sense of ownership. The result is to focus the energies of the group toward achieving the planned results. Properly disseminated throughout the entire organization, the plan (or at least its basic strategic vision and directions) can act as a powerful catalyst for getting the entire organization on board.

Opportunities for the use of the information technologies as competitive weapons are determined at this point as well. Applying Michael Porter's value chain analysis or Blake Ives's customer resource life cycle in an environment encouraging synergy between business thinking and information technology thinking gives such opportunities an excellent chance of becoming visible.
Recommended Course of Action

Putting into practice the principles and ideas presented in this article is not likely to be easy. The following guidelines may help IS managers and executives get started:

- Determine what role the IS executive plays in the organization and what steps (if any) need to be taken to make that role an effective reality.

- Consider the current role of the IS department in the organization with respect to the following questions:
  - Is the IS department effective?
  - Does it meet the expectations of others in the organization?
  - Is the department positioned to help the organization strategically? What steps (if any) need to be taken to bring about change?

- Assess the current planning processes, especially with respect to the following questions:
  - Is planning a continuous process that can detect and respond to change as well as create change?
  - Are the right people involved? Substantively?

- Have the organization and its information requirements been documented effectively?

- Have the main forces in the environment likely to affect the organization been identified and analyzed?

- Has support of the organization been documented?

- Have strategic issues been documented, and is that documentation maintained so that it is current and progress toward resolution is evident?

- Where deficiencies occur, develop objectives, strategies, and action plans for either repairing or circumventing them.

- If the planning process appears too complex or is subject to information overload, step back and focus on critical success factors. A thorough understanding of the mission and the expectations of management, customers, and other stakeholders is necessary.

- Keep abreast of current thinking in the field and apply what is relevant to the planning process. Identify a few leading-edge model companies and get acquainted with them.

- Structure planning documents so that the key elements of the plan stand out and are persuasive to senior management.
Consider adopting an annual reporting process that sets forth in lay terms the accomplishments versus the plan for the current year, the benefits the organization realized from them, and their projected benefits for next year.

Bibliography


Author Biographies

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