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## Managing Information Systems: Policy Planning, Strategic Planning and Operational Planning

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Organizational benefits realized from, and organizational investments in, computer based information systems (IS) are both increasing at accelerating rates. These costs and benefits are being "driven" by dramatic technological improvements occurring in virtually every aspect of the IS arena--hardware, software, telecommunications, word processing, etc. While considerable new investment is required for an organization to exploit these new technologies, the potential benefits in terms of operational and administrative productivity and, hence, organizational effectiveness, far outweigh expected costs.

The adoption of even a fraction of the technological innovations currently available--e.g., electronic mail, micro-computers, teleconferencing--is profoundly changing organizations and the ways in which they function. Most directly impacted is the basic viewpoint that organizations hold toward the role of information and of the IS function (Dertouzos & Moses, 1979). The IS function can no longer be a relatively modest "service" function. With these new technologies, the IS function will "intrude" into the lives of virtually everyone in the organization. No longer will IS be the province of a small number of "computer-nicks"; rather, it will be a part of the milieu of most people in an organization.

This intrusion can be a pleasant one in which everyone from production line workers...to secretaries...to top executives have their jobs made "easier" in the sense that they are freed to apply their talents

to the limit; or, it can be negative in the sense that the computer becomes used as an excuse or alibi when tasks are not completed (Wall Street Journal, 1981).

The manner in which the IS function is managed will have much to do with the organizational roles, and hence the realized benefits, of computer based technologies. As the varied organizational roles selected for information and for the IS function should dramatically influence organizational capability, productivity, and effectiveness, it is reasonable that the information function will become comparative advantages for some organizations (those that manage information well) and not for others (those that do not) (Grant & King, 1982).

This is seen today in business firms that have created comprehensive databases used for strategic decision support. Other firms whose managers cannot systematically obtain the necessary data to accurately determine items such as true costs, the relative profitability of different products and of different market segments, and the direct and indirect impacts of enacted strategies, will necessarily make poor allocations of resources, be less responsive to changing conditions, and inevitably lose their position relative to completion.

When computers are primarily applied toward achieving administrative cost savings, accrued benefits have a relatively limited impact on overall organizational performance. With IS technology being broadly applied to administrative and

operational functions as well as to supporting strategic decision making, the benefits are becoming wider in scope, longer in duration, and much more significant. In the future, the potential benefits are enormous and as such may very probably come to represent the difference between success and failure in most organizations.

Such admonitions would be mere pontifications were it not clear that the roles that information and the IS function are to play are strategic variables to be manipulated by an organization's planning body. This has not been so in the past, when the basis for adopting computational resources was often for image purposes or "to keep up with the Jones." Then, although the cost of a single central processor was high, total organizational investments in computational resources were a relatively small portion of the organization's budget. As the expected value of both success and failure were relatively modest, computers could be adopted with minimal real risk and, thus, were rarely included among the multitude of issues addressed by organizational planners.

Now, although the unit cost of processing data has become quite low, the total cost of incorporating new technologies throughout an organization is very large. There is, for example, a substantial front-end investment required for computer-controlled robots for production lines, word processing terminals for secretaries, electronic mail and teleconferencing apparatus for executives. Coupled with this are the tangible costs of the human resources and the organizational disruptions associated with implementing and operating IS, and the perhaps even greater intangible costs associated with the energies and emotions of personnel who must face the difficult task of learning and adapting their formal and informal work behaviors to "new ways" (Lodahl, 1980).

The new information era being entered thus carries great risk. Decisions placing greater task and functional reliance on information and integrating information systems more completely within organizations will incur considerable costs before benefits are felt. If it were clear that the promised benefits will be realized, choices would be clearcut. However, in the past similar promises have not been fulfilled, and prudent executives should be wary of being carried along on a wave of technological euphoria.

Thus, the act of selecting roles for information and for the IS function in an organization is real, crucial, and difficult. Despite the current technological "hoopla," it may well be that organizations deciding to have the computer continue to play a relatively minor and passive role will prosper, while those that invest heavily in the new technologies will find their overall costs to be so great that failure results. Or, as many predict, it may well be that those organizations who place emphasis on information as the critical organizational resource and who integrate IS's into every aspect of their operations will come to dominate their respective industries.

It is not our role to be prognosticators in this regard. However, we do wish to emphasize that the potential implications of information technologies are such that their organizational roles are a crucial strategic choice.

Organizations are now choosing, explicitly and implicitly, the future roles that information resources will play. In some cases, this choice is a conscious, systematic, and careful one; in others, the choice is being made through a series of incremental decisions concerning hardware, software, the role of the EDP department, etc., in a fashion that obscures the long term path being adopted.

Some businesses and other organizations are adopting concepts and processes such as "information resources management" (IRM), and "strategic planning for information systems" (King, 1978). The usage of these ideas does not ensure that the resulting choices will be correct; indeed, the luck of some of those who fail to make conscious choices may well serve to "protect them from themselves." However, the concepts and processes associated with comprehensive IS management do ensure that the strategic choices concerning the role of information and the information function will be made consciously and carefully rather than implicitly and haphazardly. As a result, a greater likelihood should exist for information resource utilization to become a proactive, driving force rather than a reactive, defensive component of an organization's strategic arsenal.

## PLANNING FOR IS

A majority of past attention toward "managing information systems" has focused on issues associated with the implementation of specific information systems (Mason and Mitroff, 1973). With the advent of a new "information" era, attention has increasingly turned to "higher-levels" of information management. Various terms such as "strategic planning for IS," "IS master planning," etc., have been used to describe such concerns.

We propose to adapt a taxonomy, previously used by Jantsch (1973) in other contexts, to the IS arena. This framework defines three critical and distinct levels of planning: policy planning, strategic planning, and operational planning. These deal, respectively, with the "ought to," "can," and "will" aspects of strategic management. We shall introduce these three levels in a "bottom-to-top" sequence, starting with the reasonably-developed topic of operational planning, and conclud-

ing with the least-developed level, that of policy planning.

Prior to discussing these three planning levels, an important distinction must be noted. Two IS planning contexts exist in organizations: one concerned with IS products, i.e., the deployment of information services in support of organizational functioning; the other concerned with the processes by which IS products are made available, i.e., the activities associated with identifying, selecting, and implementing IS products. These two IS planning contexts can be termed, respectively, information resource planning and information function planning. Figure 1 illustrates the six IS planning realms that are identified by combining the three planning levels and these two planning contexts.

The desirability of conceptually separating these two planning contexts lies in the differences arising regarding the scope and the "knowledge" requirements of planning efforts. One might expect quite distinct information, time horizons, planning participants, and planning frameworks to be invoked by the two contexts. As will be shown, however, these six planning realms cannot be viewed as being independent of one another. The six realms, on the contrary, should be tightly linked in order to achieve effective exploitation of the new technology.

### Operational Planning

Operational planning focuses on the "will" aspect of strategy. Most of the existing literature of "IS planning" is illustrative of the information function realm of this planning level in that it focuses on the planning necessary when developing a specific IS. This type of planning normally begins with some form of "requirement analysis" (Bariff, 1977) leading toward a "general design" for an IS that is subse-

		<u>Planning Context</u>	
		Information Resource	Information Function
Planning Levels	Policy		
	Strategic		
	Operational		

Figure 1. An IS Planning Taxonomy

quently translated into a "detailed design" by systems specialists and then developed and introduced into the organization (King, 1977).

This "single system" variety of planning has more recently been broadened to include the need to plan for the integration of all the IS deployed in an organization. This type of planning effort is illustrative of the information resource realm of operational planning. Too often in the past, organizations have developed "successful" systems to perform a variety of functions without due regard for their eventual integration. King and Cleland (1975), for example, describe bank systems for checking, savings, loans, etc., that were not sufficiently well integrated to routinely provide management with a list of customers that reflect which bank services were being used by each customer. Thus, the separate systems adequately performed their transaction processing functions, but could not be interrelated through their data files in a fashion facilitative of decision support.

The need for hardware and software compatibility is another important aspect of systems integration. Many companies are now experiencing the same incompatibilities in the new technologies of "office automation" as they experienced some years ago with EDP equipment. Two units of a firm may each purchase or lease an item of equipment and successfully put it to use only to later discover technical incompatibilities that prevent integration of the two systems. Any subsequent attempts to functionally consolidate the two organizational units to enable higher-level decision support are inhibited (Ketrn, 1980).

Thus, traditional "single system" operational planning has been broadened to include operational "master planning" in which each proposed system is examined in terms of both existing and anticipated

organizational systems. That quite different planning contexts (participants, objectives, constraints, time horizon, etc.) are required with each realm of operational planning should be clear. This enlargement of the domain of operational planning to include system integration is becoming even more important in an era in which organizational IS include such diverse entities as automated offices and telecommunications, as well as more traditional DP and MIS applications.

This variety of "enlarged" operational planning has been termed "strategic planning" by some (Ein-Dor & Segev, 1978) because it must take into account some environmental factors that are often associated with strategic planning. However, these environmental factors are viewed as constraints in this variety of planning. Hence, despite its enhanced domain, it does not meet the criteria generally thought of as denoting "strategic planning."

### Strategic Planning

IS "Strategic Planning" has been prescribed by King (1978) as a process that serves to relate the organization's mission, objectives, and strategies, and other salient characteristics to an "IS strategy set." The IS strategy set is the product of the strategic planning process for IS in that it is derived from the organization's "strategy set" through the application of strategic planning methods to the IS function. Figure 2 illustrates this planning process. The dotted line indicates that explicit consideration of IS capabilities contributes directly to the formation of the organizational strategy set. King (1978) provides illustrations of this approach, which has been adopted by IBM as a foundation of its Business Systems Planning (BSP) process (1981).

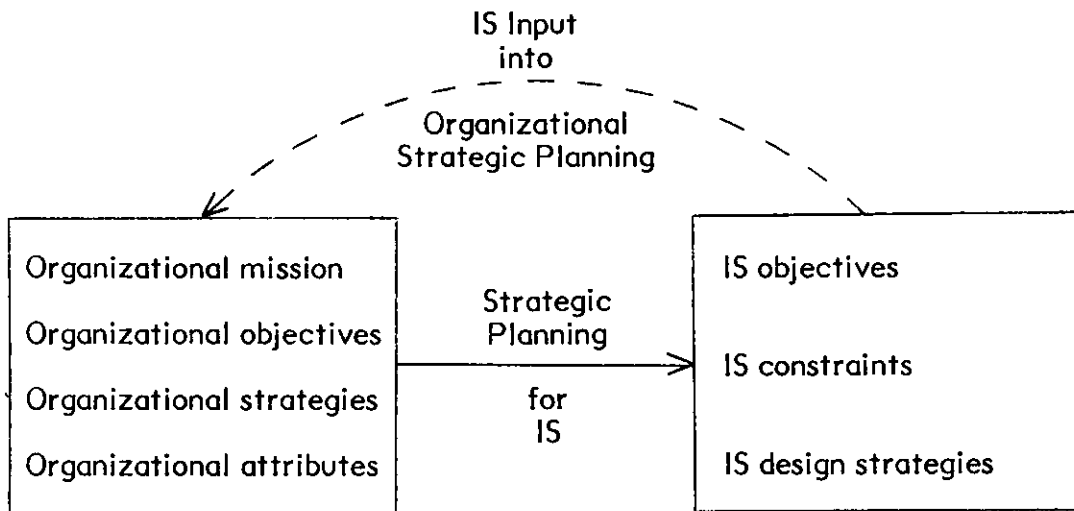


Figure 2.

The intent of this form of IS strategic planning is twofold: to insure that information resources when applied will directly contribute toward the attainment of enacted organizational strategies, and to insure that the information resource is seen during organizational strategic planning as a competitive tool. As such, this form of IS strategic planning fits within the information resource realm of IS planning.

McLean and Soden (1977) have developed a comprehensive model of MIS planning that concentrates on those processes prior to the specification and implementation of a master plan. Their concept of MIS "strategic planning" involves (a) establishing an MIS mission reflective of the organization's mission, (b) assessing the risks and opportunities regarding the organization's domain, the organization's "culture" regarding MIS, the state of MIS technology, and capabilities both internal and external to the organization, (c) setting MIS objectives and strategies (broad courses of action in terms of types of services, technologies employed, etc.) to achieve these objectives, and (d) specifying policies (pertaining to organizational structures,

resource allocation procedures, standards, etc.) to guide the implementation of MIS strategies.

While (a)-(c) of the McLean and Soden conceptualization are similar to the ideas expressed above, (d) seems out of context. Rather than specifying how IS are to be used in enacting the organizational strategy set, the specification of means to facilitate the implementation of IS strategies are focussed on the information function and not the organization-in-the-large. As such, this strategic planning activity would best fit within the information function realm of IS planning. Issues expected to be included when considering strategies to facilitate IS implementation are, among others, design and development strategies (methodologies, standards, team compositions, life cycle orientations, etc.), hardware/software strategies (database concerns, distributed processing, networking, acquisition guidelines, etc.), training strategies, and risk positions.

Certain of the issues included in (d) still seem out of context even accepting that they lie in the information function realm

of IS strategic planning. Resource allocation procedures, for example, seem to address a high-order, organization-wide concern: that of changing attitudes within the user community. As will be shown, such concerns are at a policy, rather than a strategic, level.

## POLICY PLANNING

"Policy Planning" deals with the "ought" aspect of strategic management. Little in the IS planning literature adequately treats this planning level, although it provides a basis for conceptualizing this highest level of IS management.

While a critical concern in any conceptualization on IS planning is that of policy, a considerable amount of semantic confusion exists regarding the term. Often, it is used synonymously with that of "strategy." In other instances, policies are expressed as guidelines for carrying out strategies. A third view holds policies to be the first expressions and guiding images of strategy (Vickers, 1970). This paper adopts this latter perspective, which is expressed by Lewin and Shakun (1976).

...at the policy level, we must design the system's 'culture' or capability with respect to its goal (and underlying values), structures, technology, information processing, and the perceptions, attitudes, and skills of its people.

The relationship between an organization's "culture" and a specific sphere of action, such as IS planning, is perhaps best conceived to be represented by the constraints faced in execution. Some of these constraints are real; that is, concrete limits most typically operationalized as resource scarcities. The remaining constraints are artificial; that is, value premises imposed by the organization upon itself that, once determined, restrict the space of feasible

actions. An example of such an artificial constraint is a decision by corporate officers that it would not be in the best interests of the organization's stakeholders to be a pioneer in the application of new information technologies. This view is similar to that of Simon (1964), who asserts that the objective in most decision situations is the satisfaction of action requirements, or constraints. Generally, one of these constraints is singled out as being most critical and is referred to as "the goal."

The aim of IS policy planning, hence, is to establish an appropriate organizational culture regarding information technologies. Thus, the initial focus should be to identify the real constraints that restrict organizational information utilization. Certain of these are reflective of resource limitations deriving from organizational internal and external environments. Others are reflective of domain limitations imposed by external bodies, e.g., regulatory agencies, clientele, who have "claims" on the organization and the manners in which it conducts itself. (King (1978) incorporates "clientele analysis" within the IS strategic planning process; here, this higher-level concern is dealt with at the policy planning level.)

Once these real constraints have been identified and evaluated as to their implications, policy planners must design the cultural identity desired. Often IS-related behaviors of organizational members depend upon those individuals possessing particular values, attitudes or beliefs, and accepting particular organizational norms. Considered together, organizational norms and members' values, attitudes and beliefs create the context, i.e., the organizational culture, within which all other aspects of IS management and IS activities take place. Designing a cultural identity, thus involves identifying those norms, values, attitudes and beliefs that are desired to be held by the organization as a whole.



The final aspect of IS policy planning involves the specification of artificial constraints intended to explicitly or implicitly result in the instillation of the desired organization culture. These constraints are termed IS policies.

Again, two planning realms are invoked. If an IS policy is directed at the total organization, it would be an information resource policy. Likely policy issues might include: location of the information function within the organizational structure, location of where particular information resource decisions are to be made, budgeting and charge-out mechanisms, certain technical decisions of organizational-wide impact such as adoption of the database concept, etc. If an IS policy is directed primarily at information specialists, it would be an information function policy. Likely policy issues might include: internal structure of the information function, career paths for information specialists, corporate positions regarding the adoption of modern development methods and tools, reward systems, etc. The key element in identifying the realm of an IS policy is recognizing what norms and whose values, attitudes, and beliefs are targeted for change.

### Relations Among Planning Levels

Figure 3 illustrates the major linkage between the three planning levels. While influence primarily flows downward, the necessity for upward flow is recognized. Even with carefully developed plans, it is inevitable that a higher level plan creates lower level constraints that seem unreasonable to those individuals responsible for lower level planning. In such instances, negotiations directed at clarifying, relaxing, or respecifying the higher level plans would commence.

## CONCLUSION

The intent of this paper was to provide a mechanism for critically evaluating the current state of IS management research. Is it fairly safe to surmise that, once normative prescriptions are discounted, the existing literature is rather sparse. Even at the operational planning level, little has been empirically studied outside of the extensive IS implementation literature (Schultz & Slevin, 1975) and recent efforts toward developing contingency frameworks for selecting design methods (Munro & Davis, 1977). Both of these research areas are clearly limited to the information function context. Only a few studies have been directed toward the strategic level (as discussed earlier) and none have been directed at the policy level.

What kind of research is advocated? At this early stage of inquiry, very similar types of analyses would be beneficial for all six IS planning realms.

- Identification of critical planning issues.
- Categorizations of planning constraints, situations, and strategies.
- Construction of generalized, economic frameworks for use in situational diagnosis.
- Development and evaluation of contingency models that link effective strategies to specific situations.

Research programs aimed at such investigations would not only provide a base of knowledge and insight to spur future research, but would likely prove invaluable to those organizations selecting to directly confront the new information technologies via conscious, systematic planning efforts.

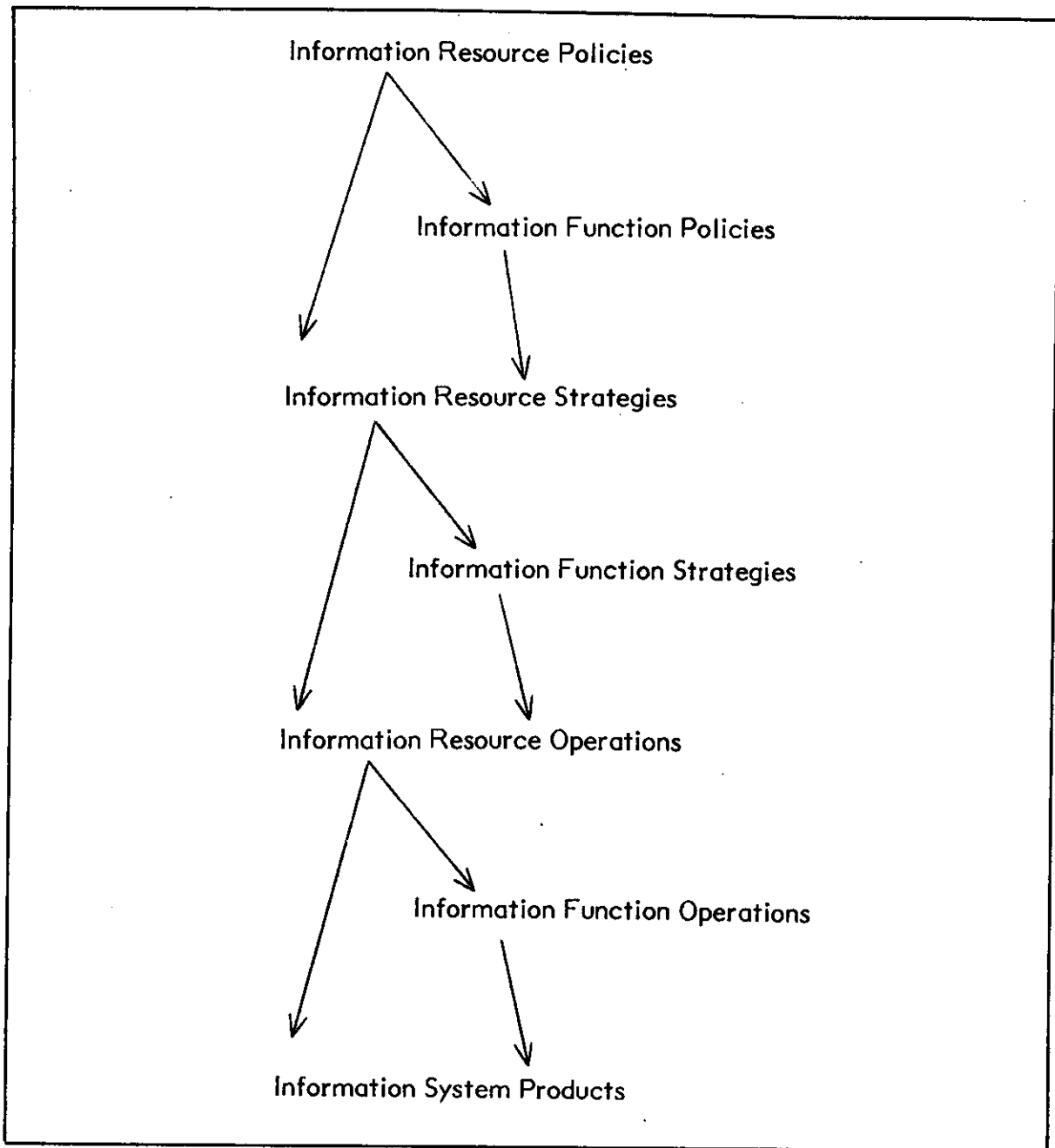


Figure 3. Relations among Planning Realms

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