

Communications of the Association for Information Systems

Volume 16

Article 47

12-23-2005

Still Not Solved: The Persistent Problem of IT Strategic Planning

George M. Scott

University of Connecticut, george.scott@uconn.edu

Follow this and additional works at: <https://aisel.aisnet.org/cais>

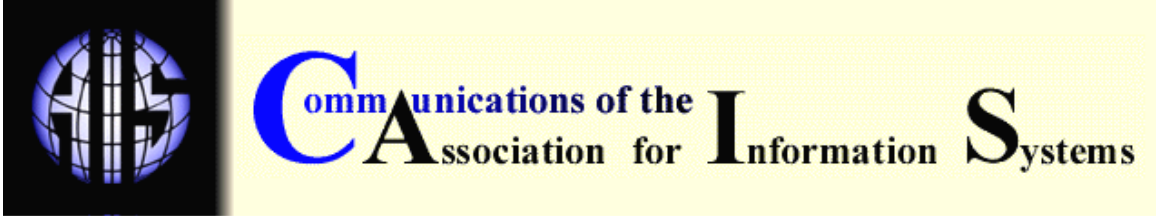
Recommended Citation

Scott, George M. (2005) "Still Not Solved: The Persistent Problem of IT Strategic Planning," *Communications of the Association for Information Systems*: Vol. 16 , Article 47.

DOI: 10.17705/1CAIS.01647

Available at: <https://aisel.aisnet.org/cais/vol16/iss1/47>

This material is brought to you by the AIS Journals at AIS Electronic Library (AISeL). It has been accepted for inclusion in Communications of the Association for Information Systems by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.



STILL NOT SOLVED: THE PERSISTENT PROBLEM OF IT STRATEGIC PLANNING

George M. Scott
School of Business
University of Connecticut
george.scott@uconn.edu

ABSTRACT

The disaffection of information technology managers with IT strategy development and planning goes back a long way. The research that identifies this dissatisfaction is examined briefly.

The technology strategy and planning problem is shown to be multi-faceted, with several possible causes that may be operating simultaneously in a particular company. A major ingredient of the problem is the alignment/linkage of IT planning and plans, and the business plans. For IT planners to achieve the desired linkage requires that the planners possess a deep understanding of their company's business planning. Similarly, business managers must possess solid knowledge of their company's IT planning. Using Kiviat Diagrams, business planning approaches are shown to be bewildering in their variety. This variety indicates that IT planning managers must find it difficult to decipher business planning in general and the nature of their company's business planning in particular.

Nine approaches to plan alignment and linkage are explored, each with respect to its possible value for linking IT planning and plans to business planning and plans. The development of a Theory of Plan Linkages is proposed.

Several sources of the problem are suggested, and several IT management approaches to IT planning are explored briefly. It is unlikely that any single set of IT planning activities can deal satisfactorily with the problem for most companies. Efforts are proposed for developing best practices for IT planning. Steps are proposed for use by IT planners to improve their companies' IT strategy development processes. Areas that merit further academic research are explored.

Keywords: IT strategic planning, strategic planning, business planning, plan alignment, plan linkage, best practices.

I. INTRODUCTION

Business plan design and implementation activities and methodologies--planning approaches--vary greatly from company to company. No set of "best practices" is associated with these methodologies. The many variations of business planning complicate an IT manager's ability to

understand business planning processes and to conduct IT planning that is consistent with a company's business planning. The rapid evolution of information technologies and the need to plan years in advance for information architectures further complicates the difficulty of matching IT planning to business planning.

A constant of IT planning is that IT managers are persistently unhappy with it and its relationship with business planning. Business managers are also unhappy with this relationship, because they are disappointed that IT plans do not readily adapt to meet the needs of their business [Klein, 1991]). With different business planning approaches used in different companies, a company's IT group may find it difficult to see common patterns and gain an understanding of their own company's business planning approach. This problem may be less severe with non-technology executives, in part because they tend to share similar educational and experiential backgrounds in business planning. Without understanding the business planning, IT managers cannot readily link IT planning to business planning.

The primary purpose of this article is to spotlight the persistence of the critical IT strategy design and development problem and the related plan alignment/linkage problem. Over several decades, researchers addressed the problem, apparently with only partial success. The problem continues to bedevil companies, few of which sufficiently conquered it. For example, a power company claims success because it developed an alignment planning model tailored to its own needs that involves tying IT planning directly to each business unit's critical success factors (CSFs) [Peak and Guynes, 2003]. Several other examples of successful approaches to aligning plans are presented in this article; however, most companies do not deal with the problem successfully. It remains an important current problem that deserves attention from researchers and from companies.

This article first presents an overview of the research findings about IT managers' concerns about IT planning. Attention then shifts briefly to business strategy and business planning approaches. Next, selected IT planning approaches are reviewed briefly. Plan alignment/linkage concepts are then considered. Appendix I presents a literature survey on the evidence of the IT strategy problem. Appendices II and III summarize business and IT planning methods.

In this article:

- business planning is intended to mean the strategies' design, the plans, and the plan implementation activities of business line, staff, and senior managers of companies or their planning surrogates.
- IT planning is intended to include both the design and implementation of IT plans, and those specific linkage mechanisms that align the IT plans and the business plans.

II. THE CAUSES OF THE PROBLEM

What or who causes the problems of IT strategy development and alignment? No easy answer can be found. The severity of the problem varies from company to company and from group to group within a company. The existence or absence of a planning group in a company appears to have little influence on whether or not the problem is present. The nature of the planning methodologies used, respectively, for business planning and IT planning does have an influence, however. As a result, when different and even conflicting approaches are used for business than for IT planning, inconsistencies between the business and IT plans are more likely to emerge. The nature of both business and of IT planning approaches is examined in the following subsections. None of the previous studies that establish the existence of the IT planning problem (Appendix I) present a clear picture of why the problem exists. No specific reasons for them are verified empirically. Nor do the research studies establish that good IT planning results in good alignment, or that the alignment problem is always a part of the IT planning problem. Therefore, it

does not follow that good planning methodology will bring about good alignment. These questions merit research attention beyond what is possible here.

Multiple reasons for the IT planning problem are likely beyond the use of differing planning methodologies. In a particular company several of these causes may be in effect simultaneously. Causes are suggested in this section.

1. Senior business unit managers give inadequate attention to IT planning and to integrating IT into company plans.
2. IT governance in which something goes wrong with the management policies and structures that govern how a business makes its major IT decisions and who in the organization makes them. In the best cases an IT governance system helps IT and business managers work together. However, adequate IT governance systems by themselves do not compensate fully for other shortcomings such as differences of opinion about project priorities and lack of trust between IT and business managers [Monnoyer and Willmott, 2005]. In addition, standards that establish how effective IT governance systems should be organized do not exist, although efforts toward establishing standards are being made [Nolan and McFarlan, 2005].
3. The processes of planning. Mankins and Steele [2005] state that, at many companies, a business unit's strategic plan is little more than a negotiated settlement. This view is consistent with findings indicating that traditional business unit strategic planning processes are driven by the calendar. The resulting strategies represent a consensus of managers' ideas that are politically generated and do not offend any of the business managers [Rivkin, 2002]. Planning begins at the designated calendar time when a business unit manager passes along strategic planning responsibilities to lower staff. This strategy development activity is internally focused and not driven by actual strategic issues. Thus, the staff is given little incentive to be receptive to creative solutions, such as from the IT group (which also might be similarly internally oriented). In this scenario, the business unit managers are likely to lock on to one strategy option early in the strategy development processes without seriously considering multiple strategy alternatives. The staff quickly finds a by-consensus "right" strategy which does not necessarily provide consistency because too little effort is made to ensure that all aspects of the plans are mutually supportive. The strategic plan development and approval processes then move forward in tandem with the annual budgeting processes. It is these budgeting processes that receive the primary attention from senior business unit managers¹. The strategic plans that are then approved seek a future "...that is a simple linear extrapolation of the present." [Rivkin, 2002]. This approach suggests a mindlessness with respect to IT potentialities in that little attention is given by either the business unit managers or their staff to the intricacies and impacts of fast-paced changes in ITs or to new alternatives presented by these changed information technologies. For IT this can bode ill for establishing IT strategic planning that captures the opportunities presented by innovative use of IT or that encourages linking of IT strategic planning to the strategic planning of other functions.
4. Faulty alignment/linkage. It is not entirely clear that alignment/linkage is either the cause or the effect of the IT strategic planning problem. In a previous study directed at identifying the issues of technology product planning, linkage was established as the most important dimension of the technology strategic planning problem [Scott, 2001b]. Study participants believed that effective product technology planning was less likely to be present without good alignment/linkage. In many companies explicit attention is not

¹ For example, the budgeting activity absorbs up to 30% of management's time at Ford Motor Company, Their budgeting costs in excess of a billion dollars per year [Hope and Fraser, 2003].

given to plan alignment/linkage. In these firms the planners may not be aware of the kinds of linkages that should be used to integrate the business and IT planning activities better.

In Appendix III, linkage techniques are suggested that companies should consciously consider using when undertaking IT planning processes. However, the academic literature largely ignores possible distinctions between linkage and alignment. A consensus is not established about what is meant by each concept, although none of the research results suggest that the two are entirely separate concepts. Plan linkage is considered here to mean mechanisms, relationships among planners, and planning processes and activities that make two plans (here, the corporate and the IT plans) articulate. That is, make them consistent with one another so that they are in alignment. Linkages, then, become the specific steps, activities, tools, and techniques—the linking mechanisms—that determine the how of alignment and congruence of the business and IT plans

5. The intrinsically complex and indiscernible nature of requirements for new systems. Quite frequently business managers are unable to specify what they seek in terms of new information systems. As the magnitude and depth of complexity of the changes and as a fuller perception of needs gradually unfolds during implementation, the reaction is to make the planning ongoing. Doing so gives the appearance (and often the reality) of haphazard and improvised IT planning. In turn, ongoing planning can give the impression of too little or no prior planning [Austin, 2005].

Even where new system requirements can be foreseen, IT managers may be unable to sift fully through advances in technologies to decide as a part of the initial planning which forms of new technology will properly satisfy the needs. Even when they attempt to select technologies, the technologies may shift as the project is implemented. This inability to anticipate requirements fully may make it appear that IT planning was inadequate, even though it was done well, given the circumstances. For example, when CISCO Systems implemented an ERP system before such systems were well understood, no one realized that CISCO would also need a sales support system. The consequence was a mid-course change in plan, which enlarged the project scope [Austin, 2005].

In some companies IT managers' unhappiness with IT strategy may reflect fundamental differences between modes of management. Business management is trending toward more flexible and less comprehensive forms of planning that permit ready adaptation to rapidly changing business environments. In this situation, the managers are less likely to specify in detail the kinds of specialized systems they need. At the same time, IT also is evolving rapidly. As a result, IT managers find it difficult to specify advanced technology systems fully. Nevertheless they retain a mind set that prefers fully detailed advanced specification of the business managers' IT requirements. Indeed, IT planners are likely to evaluate several alternatives whereas senior managers zero in quickly on one workable solution and then take immediate action. This cultural difference frustrates the carefully analytic IT managers [Stackpole, 2004]. IT managers then lament the inadequate IT planning by business managers.

5. Companies are reluctant to disclose any information that calls attention to their corporate strategic plans. It is difficult to assess the importance of this problem. Strategic plans represent the most zealously guarded information about a company. Companies also may be reluctant to divulge information about IT planning and plans, because these plans support the corporate plans. Such a lack of openness may mean that companies with good IT planning methodologies do not reveal them readily. As a consequence, companies with less effective IT planning methodologies may face difficulty in determining what effective IT planning practices are.

6. The Big Boss syndrome, in which the most senior manager insists that IT be used to transform the organization in major ways. This syndrome may occur in major companies where IT is highly visible. The Big Boss's expectations may be unrealistic or may override IT plans already in existence that provide for measured change or even for a different form of change. An example is GE where the CEO, Jack Welch, more-or-less ignored the Internet until he "got religion." Good management systems at GE enabled the firm to initiate and rapidly carry through massive changes in operations based on Internet technology even though these changes were rushed and somewhat chaotic [Bartlett and Glinska, 2003]. Some of the major GE Internet projects were not successful. While reengineering changes were made based on Internet technology, the human and financial cost was enormous. Another high profile case was Providian Trust where a large customer-focused IT project pursued by the Senior Vice President was poorly planned, resulting in an unsuccessful implementation that contributed to about an 80% decline in assets managed by this trust company [McFarlan and Daily, 1999].

Doubtless, many other possible causes of the problem can be put forward in a given situation.

IV. BUSINESS PLANNING CHARACTERISTICS PREFERRED BY IT MANAGERS

The evidence presented of the dissatisfaction of IT managers with IT planning and its relationship with business planning is empirical. However, no studies were found that establish what characteristics of business planning IT managers prefer as a basis for improving the alignment of IT and business plans. An appreciation of these preferences should help business managers adjust the ways they conduct business planning or improve how they communicate with IT managers about business planning. From various non-empirical sources in the literature reasonable indications of IT planners' preferences can be inferred.

IT managers agree that

- IT systems and projects should support the business operations that will flow from the business plans, and
- To provide this support IT planning processes and plans should be linked with the business plans.

A few companies go beyond using IT to support business operations and develop IT plans that alter and drive business plans and operations. For example, Medtronic followed a vision that used IT to create product differentiation and to create entire new businesses [Marcelo and Applegate, 2000]. In either case IT and business planning and plans should be coordinated. This coordination should include linkages such as a shared vision and shared goals that steer the IT and business activities in the same direction. However, establishment of linkages may encounter obstacles. Here are some of them:

1. Differences in plan duration. While for most aspects of business planning, a three to five year time frame may be satisfactory, a characteristic of some IT development projects is that they require a commitment to longer term IT activities. For example, an overall IT enterprise architecture based on a multi-year plan to develop the company's IT infrastructure may influence a systems' future capabilities and directions, and need for associated resources, for more than a decade. The great length of some commitments associated with an IT plan can reduce the extent to which the shorter business and longer IT plans remain mutually supportive over long periods. IT planners should be encouraged to use very long planning horizons, such as ten years, for some technologies and architectures even if their company's long-term business plans are much shorter. The difficulty of linking these long term plans with shorter term business plans must be

acknowledged. One approach that can be considered by IT managers is technology road maps, used for product technologies by some companies [Groenveld, 1997; Kappel, 2001; Kostoff and Schaller, 2001]. An early exemplar in the use of roadmaps was Motorola. This firm used roadmaps to link business and product technology plans by basing its business strategy on long-term forecasts (as long as fifteen years) of new product technologies [Morone 1993]. General management at Motorola played a prominent role in this road mapping activity by requiring that each business unit forecast the long-term evolution of each of its technology product lines using historical analysis and experience curves. Senior executives then captured these forecasts in their business product strategic plans.

2. A major concern of IT managers is that business managers apparently implicitly assume that technologies such as IT systems can be easily adapted to changes newly expressed in business plans, even if these new plans are established to accommodate operations changes that may be temporary [Klein, 1991]. Often these operations changes are perceived by IT managers to be unduly disruptive of in-place IT plans and activities. Business changes that derail or delay IT projects or introduce a mandate to alter the IT architecture are likely to be of special concern. To the extent that these changes represent beneficial long-term changes in company operations, their urgency can be acknowledged. Often, however, the changes are seen by IT managers to be short-term, opportunistic, and not efficacious.
3. Even where a business plan describes the company's expected business activities, IT managers may find it difficult to translate these planned operations into new information and systems requirements. It is not just *what* a company plans to do as stated in its business plans, it also is how it is going to do it. How usually requires additional communication and coordination links between the business and IT managers. Often, it is these additional linkages that are missing or ineffective. Guidance from business managers on strategic use of technology is limited because an appreciation of technology sometimes flies in the face of conventional wisdom about business [Klein, 1991].

The preceding characteristics and obstacles taken together tell a useful story: From the perspective of IT managers, the IT planning time frame should match the technology activities covered by the plan, even if that time frame is longer than that of the business plans. The business and IT planning should be carefully linked in order to develop IT plans that support business plans. The IT planning managers should expect to play a major role in linking the two types of plans. In turn, this role requires that IT managers be knowledgeable about IT planning, their company's business planning, and how to establish the linkages between them. These linkages should involve coordination of the two sets of planning processes, and also should link the resulting plans directly. To effect this coordination, an understanding of business planning by IT managers is useful. The complexities of this business planning introduce difficulties in acquiring this understanding.

V. AN OVERVIEW OF BUSINESS PLANNING APPROACHES

Two important questions are

1. What are the general characteristics of business planning that influence the alignment of business planning and IT?
2. How are IT planning and plans aligned?

An understanding of business planning by IT managers is a starting point for designing IT plans that align with the business plans. This understanding enables IT managers to interpret the marketplace directions in which the company is heading. As a result, the IT manager can plan for changes in the IT architecture and project portfolio that will support business direction changes. If an effective IT governance system is in place, its structure and policies should provide guidelines

to the IT managers about the architecture changes that are needed and the projects to include in the IT portfolio.

Business planning is characterized by the existence in practice of a wide variety of substantially different approaches. No best practices are associated with the business planning discipline. This diversity makes it difficult for IT managers to understand the discipline and perhaps even to understand the business planning of their own company. Indeed, from the perspective of an IT manager, the company's planning activities may seem to be nearly undecipherable. The technologists may be unable either to relate the company's planning methodology to a broader world-view or to understand their company's approach fully. IT managers with little understanding of business planning may even find it difficult to articulate their concerns about their company's IT planning. For example, they may be unhappy about the apparent absence of alignment, but not know what forms of alignment are needed or possible, but are absent. A few of the basic characteristics common to most business planning are presented in Appendix I. Several approaches that build on these characteristics but can differ widely among companies are described in this Section. These approaches are built on 12 dimensions.

With the caveat that the 12 general dimensions of business planning variation presented here separately are intertwined in practice, the dimensions are shown graphically in Figures 1 and 2. These figures show profiles that might represent two very different companies.

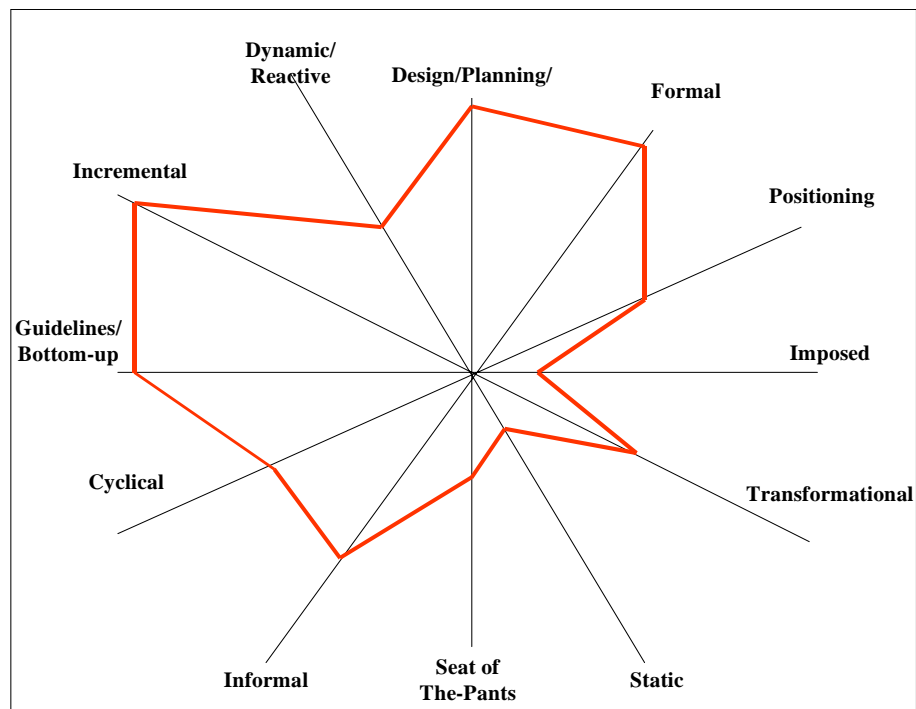


Figure 1. One Company's Business Planning Profile

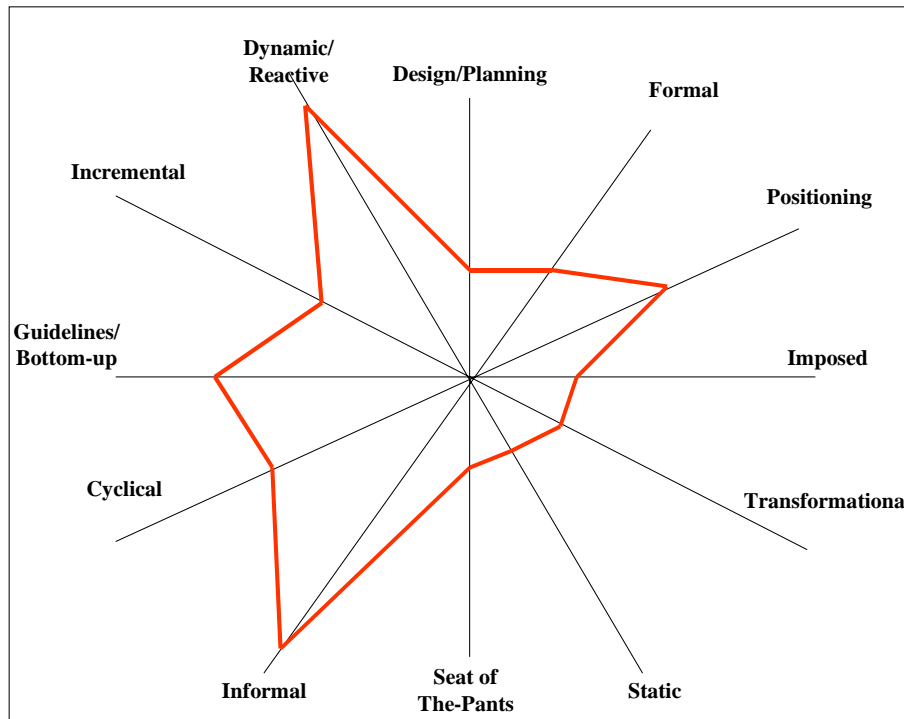


Figure 2. Another Company's Business Planning Profile

Each planning characteristic within each Figure is relative to an opposite characteristic. The pairings are:

- | | | |
|--------------------|---|-------------------------|
| • Design/Planning | → | • Seat of the Pants |
| • Formal | | • Informal |
| • Positioning | | • Cyclical |
| • Imposed | | • Guidelines/Bottoms up |
| • Transformational | | • Incremental |
| • Static | | • Dynamic/Reactive |

The six characteristics are presented as a reasonable but non-exhaustive group of characteristics, and are not mutually exclusive. For example, the profile in Figure 1 shows a combination of cyclical and positioning characteristics within the same company. Multiple lesser variations exist within each category, and strategy theoreticians even disagree with how the categories are defined; one group, for example, portrays ten categories [Mintzberg, et al., 1998]. The portrayal here represents a perspective and a framework for thinking. It can be an approach for IT planning managers to use to establish, approximately, the business planning profile of their company. A particular company may be dominantly one variation or another, but is likely to include the characteristics of several variations.

STRATEGY DESIGN/PLANNING VERSUS SEAT-OF-THE-PANTS

The Strategy Design approach is based on managers' explicit analysis of a set of plan alternative actions to establish the "best" alternative(s). Managers then select strategies intended to achieve the desired outcome of the preferred alternative(s). SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a well-known example of a Strategy Design technique.

The Strategy Design approach is extended by the Planning approach, which establishes a formal set of plans through the use of "a system of planning" [Lorange and Vancil, 1976]. This planning system follows a choreographed series of steps that enable managers at every level to reach agreement about a detailed set of strategies (actions) for the coming year.

If the company still uses a Design/Planning approach that is choreographed step-by-step and that produces detailed strategic plans, the consequences could be an IT environment that produces the long-term consistency useful for building a coherent IT infrastructure. Alternatively, the consequence can be that IT planners produce supporting detailed plans that lock the firm in to an infrastructure that stifles learning, innovation, and adaptability of the IT systems. If, however, the business Design/Planning approach is made more flexible IT planning should similarly be modified to produce plans that are less of a straight-jacket.

Versions of the Design/Planning approach still exist in many companies. An advantage of the Design/Planning systems for technology managers is that the company's plans are clearly and simply shown in ways that permit linking IT plans with the company plans. Even with this approach linkage activity must be the result of explicit intent and is not a natural occurrence.

The Design/Planning contra-characteristic of Seat-of-the-Pants implies little or no planning at all. It suggests that actions are based on the experience of managers. Few companies do no planning, and most that appear to do no planning create at least rudimentary plans but may prefer not to divulge them. In general, the less explicit the planning process and the resulting plans, the more difficult is it for IT managers to align IT planning and plans with corporate business activities in order to develop information systems consistent with future company needs.

FORMAL VERSUS INFORMAL

Formal refers to:

1. the plan development process,
2. the structure of the plans, and
3. the ways in which plan results are reviewed.

Formal processes usually involve a series of scheduled planning and review meetings, coordinated through time. The final plan is formal if it is prepared in written form so that it can be subsequently referenced, reviewed, and revised. Results reviews can be termed formal if meetings are held to evaluate operating results in comparison to plan. In these respects the Formal approach and Design/Planning approach can be similar. The two approaches often are both emphasized in the same company.

If planning is informal,

1. planning discussions may be only casual conversations at any time or place rather than within a scheduled meeting environment,
2. the plan may exist in the minds of the managers rather than in written form,
3. the comparisons of operations to plans are casual or nonexistent, or
4. any combination of these.

In general, the more formal the plan and the planning, the more visible and easily understood it is to technology managers and easier it is to link IT plans to company plans. Formal plans and planning provide the following advantages:

1. The IT plan is more likely to be linked to the business plan.
2. Specific linkage mechanisms and procedures are more likely.
3. Inconsistencies between the business and IT plan are more likely to be visible.
4. IT planners are more likely to be involved in business planning.

The role of IT then becomes more visible to business managers, and the implications of IT systems become more evident. Formality can improve the role of IT in the company, but at the same time, formality can encourage set-piece planning that promotes over-commitment to a pre-established plan in the face of a need for adaptability as circumstances change.

A way to help combat the onset of formality that encourages set-piece planning is to establish an IT Governance Committee at the top levels of the company. This committee's charge would be to establish flexible policies and guidelines that encourage changes in priorities and activities of IT that are consistent with new directions of the business plans [Nolan and McFarlan, 2005]. The IT Governance Committee may also be charged with making the key IT decisions on the basis of the company's known plans. [Ross and Weill, 2002].

POSITIONING AND RESOURCE-BASED VERSUS CYCLICAL PLANNING

The positioning approach involves the use of one or more generic strategy analysis techniques such as value chain analysis [Porter, 1985], modeling of the five forces of the industry [Porter, 1980], and critical success factors analysis [Rockart, 1979]. This strategy development technique can link directly to IT [Porter, 2001]. Positioning techniques lead to a small number of generic competitive strategies considered most appropriate for that company in that industry. The strategies may take into account the resource base of the company and how resources are deployed. [Barney, 2001; Priem and Butler, 2001; Collis and Montgomery, 1995]. If positioning is used alone, the role of IT may become marginalized because the positioning approach does not specifically take IT into consideration. Positioning results may provide little guidance about the future directions that IT should take. If this is the case, positioning exercises are seen as defective planning by IT managers.

The strategies that emerge initially from this positioning process tend to be broad and generic, such as "The company should compete on the basis of product differentiation" rather than specific such as "The company should introduce a new, low cost line of xyz products." Positioning activities do not follow a particular cycle but instead happen at irregular intervals. This contrasts them to cyclical planning where the same planning activities are completed in about the same way each period. In some circumstances, specific strategies selected with a positioning approach may be analyzed further within the cyclical activities of the Design/Planning framework.

IMPOSED STRATEGIES VERSUS GUIDELINES/BOTTOM-UP

In some companies, planning is controlled to a high degree by one or a small group of senior managers and is imposed on the company. The strategies themselves are developed at the top of the organization and force-fed to lower levels of the organization.

Bottom-up planning is at the other end of this continuum. In many companies multiple groups participate in the planning, and often this planning takes place within a framework of guidelines provided by senior management. The ideas and alternatives for strategies are created at the lower levels of the company, and flow upward. After reaching the top levels they are evaluated for their consistency and merit. Good bottom-up strategies are likely to be included in the final business plan.

None of the points on the imposed-versus-bottom-up continuum is necessarily inconsistent with the Design/Planning approach. To the extent that the bottom-up approach increases communication among managers at multiple levels, it may enhance communication that links business and IT plans.

With the bottom-up approach, the role of IT in the organization may be greater. IT is likely to be able to develop ideas and strategies that are then forwarded up the organization for consideration and possible approval. Often, this approach will encourage IT planners to promote the use of innovative systems in the company.

TRANSFORMATIONAL VERSUS INCREMENTAL

Companies normally maintain a high level of continuity with the past as suggested by the phrase "doing things the company way." This continuity is likely to be manifested by incremental planning whereby each new set of business plans brings about only modest change. Few strategies developed with an incremental planning approach are radical or even surprising.

From time to time, however, a company may undertake massive change to reinvent itself or a part of itself, or to alter fundamentally the directions of its business activities. For example, the company moves to a different type of structure, or form of operations, or begins to develop and market new kinds of products. The transformation planning methodology may coexist with any of the other planning approaches in that after the transformation activity is completed, the organization may again achieve a steady (but different) state and return to relying on its previous planning approaches that produce incremental strategies.

Transformation planning and project activities are particularly challenging for IT planning managers. A transformation strategy can develop quickly, and may rapidly and radically alter the needs for information systems. Long-term IT architecture plans, projects in-process, and existing systems can become obsolete almost instantly. When a transformation is initiated, IT managers know that the directions of future IT development will shift. Yet, the full nature and directions of the transformation may not be known until the transformation planning and analysis are well underway or nearly completed. Little time may be available for IT plans to be formulated, especially if IT managers do not participate in the business transformation planning. If the very purpose is to use IT in transforming ways, (e.g., at Medtronic [Applegate, 2000]) IT managers may only become fully engaged after business managers tentatively define the nature of what will be needed from the information systems. In this environment, linkage and alignment of IT planning to future needs is problematic, and even the time available for coherent IT planning may be insufficient. The evidence indicates that IT managers experience frustration in the unstable planning environment [Scott, 2000, 2001a, 2001b]. In unstable environments, the role of IT planning may be diminished.

DYNAMIC/REACTIVE VERSUS STATIC

Some companies compensate for rapid obsolescence of plans and strategies in highly dynamic marketplaces, such as the marketplaces of technology companies. Called dynamic planning, at the extreme it consists of intentionally waiting as long as possible to establish new strategies or to alter existing strategies so that the most recent information about changes in the technology and the market can be incorporated into new strategies. Formal plans may not be completed. Near-future activities are expected to be conducted within longer-term general strategies and general goals as guidelines. The plans emerge by reacting to events as they unfold.

With this emergent strategy approach², operating managers are expected to rely on their up-to-date knowledge of the business and technology marketplaces to decide how to accomplish the company's general goals within the established guidelines. The philosophy is that the managers at the lower levels of the company are the most knowledgeable about how the technologies and the marketplaces are changing, and that they keep up with change as a normal part of their responsibilities. In most companies using this approach, people networks are a critical source of current information [Kotter 1999].

Dynamic planning garners considerable support from researchers who argue that strategies can be encouraged to just emerge rather than be carefully formulated in advance [Mintzberg, 1987b]. Or, as with Honda's rise in the motorcycle marketplace, an effective strategy may appear to be based on luck, experimentation, and skillful adjustments as events unfold [Rivkin 2003]. Another

² Also called logical incrementalism [Quinn 1980a, 1980b]

example is Microsoft, which routinely permits its software developers to make in-process improvements to a new product in response to newly uncovered problems or opportunities [Iansiti and MacCormack 1999]. Others suggest that in dynamic environments, strategy should be a set of simple rules that provide guidelines that emerge more from experience and past mistakes rather than seeking a best strategy [Eisenhardt and Sull, 2001]. A few simple rules (perhaps only a half dozen) set boundaries and directions for actions without greatly confining actions. For example, the rules might specify the circumstances required for establishing alliances or for entering new markets. The flexibility permitted can help a company capture the fleeting opportunities of dynamic marketplaces.

To outsiders, and perhaps even to some insiders, this emergent strategy approach appears chaotic and not to be planning at all. The planning environment of the dynamic strategy methodology can be anathema to IT managers because they may not know how to establish IT alignment to a business plan when the planning process and plan structure in some respects do not appear to exist. Not understanding business planning concepts in general and perhaps preferring a stable, visible, and formal structure of business planning as a basis for IT planning, IT managers are not likely to appreciate that this dynamic marketplace approach is a form of planning.

The dynamic approach to planning design and strategy implementation is at one end of a continuum with stable planning approaches at the other end. Both may exist in the same company. For example, traditional planning and formal plans may be present for stable administrative activities, while dynamic planning is used for the technology and marketplace areas. Alternatively, planning may be informal as indicated by being episodic, disjointed, or even appearing to be non-planning, when in fact the planning processes follow a built-in logic [Stone and Brush, 1966].

OTHER VARIATIONS

As noted, business planning includes an almost endless number of variations. For example:

1. Multiple approaches that combine Design/Planning and “organic” approaches [Farjoun, 2002].
2. Unifying planning, and incremental dynamic/reactive approaches [Brews and Hunt, 1999].
3. Also, as suggested, planning approaches may vary somewhat by industry. Companies in information-intensive industries may strive more than other companies to create a high quality IS planning processes [Premkumar and King, 1991].
4. Planning approaches may vary by company size, with smaller companies more likely to use less formal approaches to planning.

Most large companies’ planning approaches were shaped and implemented by experienced managers trained in schools of management. Therefore, large companies tend to follow one or another of the general approaches described in this article. However, nearly all companies combine characteristics of multiple approaches or use one general approach for one part of their company and another for another. No article such as this one can provide more than a greatly simplified portrayal of business planning design and implementation. The reality is far more complex.

Possible effects on the roles of IT of different approaches were postulated in the preceding pages. More broadly, the lack of an appreciation of IT planning concepts on the part of many business planners can complicate the planning problems of IT managers because the business planners may not appreciate the need for compatible business and IT planning processes, including linkage mechanisms that align the business and IT plans. It should be no surprise that many IT managers also do not fully appreciate business planning and its complexity.

Several examples illustrate the possible effects of IT managers not understanding their company's business planning. An important point is that without this understanding, IT and business managers tend to speak about planning in different languages because they do not share the same communications culture. If the IT manager does not understand the business planning in use, the IT manager is more likely to believe that it is ineffective or not in existence. Therefore this manager is less likely to know that IT plans need to be put into place.

A failure to understand the business planning also tends to confuse or even demoralize the IT manager and perhaps makes the manager less receptive to requests that particular kinds of IT planning analyses be completed. In addition, this lack of understanding may disincline the IT manager to propose particular innovative uses of IT, surmising that a proposal would fall on deaf ears. (However, as noted, the bottom-up planning approach may encourage innovative thinking on the part of IT managers.) A lack of understanding could lead the IT manager not to understand fully that particular business activities, in which the IT group should participate, are about to commence.

In general, IT managers, trained in technical disciplines, tend to expect that systematic actions are preferable to confusion, and may assume that the planning processes they do not understand are chaotic even though they are systematic, cyclical and possess an underlying logical rationale

VI. IT AND CORPORATE PLANNING LINKAGES

Plan alignment and linkage are discussed in the literature [Chan, 2002; Hackney, 1999; Hackney, 2000; Luftman, 2003; Luftman and Brier, 1999; Pickering, 2000; Metz, 1996; Nadler and Tushman, 1988; Turban et al., 2004; Ward and Peppard, 2002]. Nevertheless, as previously noted, the terms "alignment" and "linkage" are not defined in a generally accepted way. My perspective is that alignment refers to congruence of the business and IT plans. This definition implies that IT plans will produce systems that assist with accomplishing business goals and activities. This alignment perspective does not itself deal with how to align.

Alignment rather than linkage is often the focus in the literature. While alignment and linkage are both valuable concepts, more attention to IT linkage would help to establish more specifically *how* to achieve plan alignment. Eight dimensions of linkage (along with an opposite dimension for each) are examined in this Section but are not intended to be exhaustive.

DIMENSION 1. UNDERSTANDING VERSUS NOT UNDERSTANDING IT AND CORPORATE PLANNING

An understanding of IT planning and of corporate planning is a prerequisite for effective linkage of the IT and corporate plans. Just as IT planners need to understand their company's business planning, business planners need a solid understanding of IT planning systems and processes. Otherwise, neither group will be able to communicate which planning linkages are needed. Few indications exist that either group understands the planning methodologies, activities, processes, or motivations of the other.

DIMENSION 2. CIO IS A MEMBER OF SENIOR MANAGEMENT

If the CIO and/or other senior IT manager/planners are full participants in the company's business activities, communications improves and creates perspectives that help establish IT policies that link IT planning to business planning. Furthermore, participation in company business activities give the CIO an intimate knowledge of the directions in which the company is moving, its position in the industry, and the expected and potential role of IT in the company, all of which assist the IT manager in the development of IT strategies. As important as any of these activities is that this participation enables the CIO to be recognized as a member of senior management whose voice on IT matters must be acknowledged as preeminent. This participation also gives the message to other IT planners that they too should participate in the business activities of the company, such as establishing IT Steering Committees that include managers of business operations and

thereby promote communication about these operating activities, and assigning IT group members to temporary line assignments in the operating departments of the company. This participation may even involve participation on the company's IT Governance Committee (although in some circumstances this Committee may be at the Board of Directors' level and independent of day-to-day operations [Nolan and McFarlan, 2005]).

DIMENSION 3. SHARED CULTURE AND GOOD COMMUNICATIONS

This dimension is a category of factors rather than an individual factor. The category includes considerations such as:

- the extent to which IT planners understand and accept "the company way" and the mission of the company, and
- how frequently and effectively the IT planners communicate with their business planning counterparts, with end-users, and, when needed, with customers.

The preferred culture should be "We're all in this together, so let's work together and collectively do what is most useful for the company." Other factors in this category include using the same planning terminology for business and IT planning, and cross-functional training of both IT and business planners to promote culture sharing and understanding of each other's planning approaches. The extent to which the considerations of this linkage category are satisfactory can vary from company to company. Example: Toyota Motor Sales USA headquarters attempted to improve IT alignment with the business side of the company through reorganization of the Office of the CIO. Reporting lines, roles, and responsibilities were altered, and an executive steering committee was established to approve all major IT projects. Also, IT personnel were embedded as divisional information officers (DIOs) in each of Toyota's business units. These DIOs became accountable for IT strategy and each became a member of the division's management committee headed by the top business executive; in this way the DIOs shared the business culture and forged relationships through communication with the executives. The effect of these changes was to promote a shared culture and to improve communications between end-users and IT [Wailgum, 2005].

DIMENSION 4. DEEP COMMITMENT TO IT PLANNING BY SENIOR MANAGEMENT

Vital to establishing effective linkages and to aligning plans is that a company's senior non-IT managers have a deep commitment to IT planning. Senior managers should possess an awareness of how IT can assist the company in achieving success. An important part of the senior managers' commitment should involve communicating to IT managers the company policies and expected directions of operations that will influence establishment of the IT architecture and project portfolio that the company will need. An important strategic linkage is the IT Steering Committee (or its equivalent), composed largely of senior business executives who guide and direct the IT planning activities (Luftman and Brier, 1999). Another useful linkage is a senior business manager as a project sponsor, that is, a well-positioned manager who shepherds a particular project along and clears obstacles from its way.

DIMENSION 5. SHARED PLAN GOALS

Sharing of the business plan goals by the IT plan is accomplished in part by joint and simultaneous development of the two or by carefully sequencing business and IT plan development. While participation by senior managers in IT planning, a shared culture, and good communications promote the sharing of plan goals, nevertheless an explicit effort should be made to evaluate the explicit and implicit goals in the IT plans to ensure that they are consistent with the goals of the business plan.

DIMENSION 6. DEEP END-USER INVOLVEMENT

Plan-to-plan linkages help to establish what projects will need to be in the development portfolio to support business operations. Vital information about what those systems should be, how they

should operate, and what they should accomplish often can be provided by the end-users who understand best what is needed for the systems to fulfill end-user needs. This information must be received systematically from the end-users by the IT analysts and by IT planners. Linkages should be established between the end-users and the planners for this purpose. One type of these linkages is service level agreements that define the responsibilities in writing of the systems developers to end-users. It is possible for analysts to maintain links to end-users that capture the needed information. Linkages should also be established between the IT analysts and the IT planners who need this same information.

Another type of end-user involvement is practiced by Cisco Systems. Each IT project is assigned to both an IT and a business leader, and they are jointly responsible for the success of the project [Hoffman 2003].

At Cuny Mutual Group a different approach was adopted [Overby, 2005]. IT managers were embedded deep within lines of business to drive alignment of IT with the business operations.

DIMENSION 7. JOINT ARCHITECTURE/PORTFOLIO SELECTION

Establishing overall corporate information and IT architecture is an important activity in IT strategic planning. It involves projecting the overall IT framework, or infrastructure, into the mid- and distant- future. It greatly influences both present and future IT resource allocations and project portfolios, which in turn determine future capabilities. As important as this activity is, linking the architecture plans to the strategic business plans is equally as important.

Each company's IT architecture reflects its own form of operations and an understanding of its architecture is necessary for establishing the needed linkages between the planned IT architecture and the company's strategic plans. The starting point is examination of the present architecture, which is represented overall by the firm's key business application systems and how they are used and interconnected. The physical locations, speed, and capacity of the computing systems and networks are also parts of the architecture. Other dimensions of the architecture are the skills as well as the locations of the support and development personnel. Finally, the nature and status of the projects now in the development portfolio also may be considered as parts of the architecture.

A major prerequisite for linking IT architecture plans and strategic plans is a solid understanding of the existing architecture by both the IT and the business planners. The linkages themselves are represented by the interactions between the IT and the business planners that accomplish the allocation of the resources. It is these resources that will direct the existing architecture along a path that is consistent with and supportive of the business plans. Thus, the linkages are the result of senior managers' and business planners' understanding the present status of the IT architecture and, after discussions with IT planners, making coherent allocation resource decisions that impact the future architecture.

Some companies may be concerned that architecture planning as used by IT architects is a specialized, technically complex, and almost exotic activity [McGovern et al., 2004; O'Rourke et al., 2003]. While the results of specialized architecture activities can be beneficial overall, such as by promoting company-wide standards and "agile computing" capabilities, the architects need to exercise great care to ensure that architecture complexities do not reduce communications with operations and senior managers.

DIMENSION 8. IDENTITY OF PLAN FACTORS

Operational Level

A primary linkage between the business and IT plans is at the operating level. For example,

- project start/milestone/completion dates,
- project budget amounts,

- project justification techniques,
- development meeting schedules, and
- other forms of sequencing, timing, and dollar amounts

should be consistent between the plans. Thus, if the business plans are tactical for one year and strategic for five, with a plan roll-forward each quarter, the IT plans should use the same format, and the IT-related dollar amounts and even variance-from-plan amounts should be the same in the business and IT plans³. These considerations are necessary to establish comparability between the plans, and achieving this comparability is one linkage factor that should be routinely used.

Kiviat Diagrams

Figure 3 is a Kiviat diagram⁴ of IT and business planning linkages, similar in construction to Figures 1 and 2, but which portrays graphically the eight factors and their opposites discussed above.

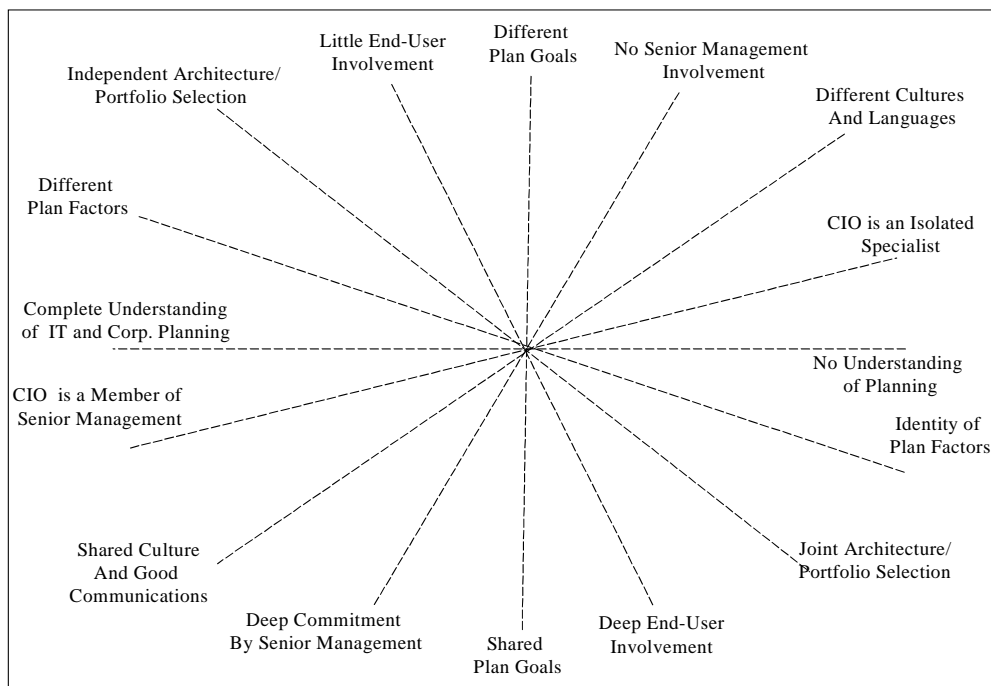


Figure 3. Kiviat Diagram of IT and Business Planning Linkages

Figure 4 represents a company with an enviable linkage profile; most of the area within the connecting lines is below the X-axis, which is intended as the demarcation line between good linkage conditions at the bottom and unsatisfactory conditions at the top. (The connect points above the X axis signify lack of good linkage to the extent that they are above the center. It is possible to have overall good linkage for a particular factor, but for the same factor still have some form of diminished linkage above the line.) Equally or more important is that the graph may portray primarily the linkages in place rather than the effectiveness of those linkages. For example, an IT Steering Committee may be in place, which represents a linkage, but this committee may:

³ The business plans usually will use summary totals for IT

⁴ Kiviat diagrams [Tegarden, 1999] are also be referred to as radial graphs.

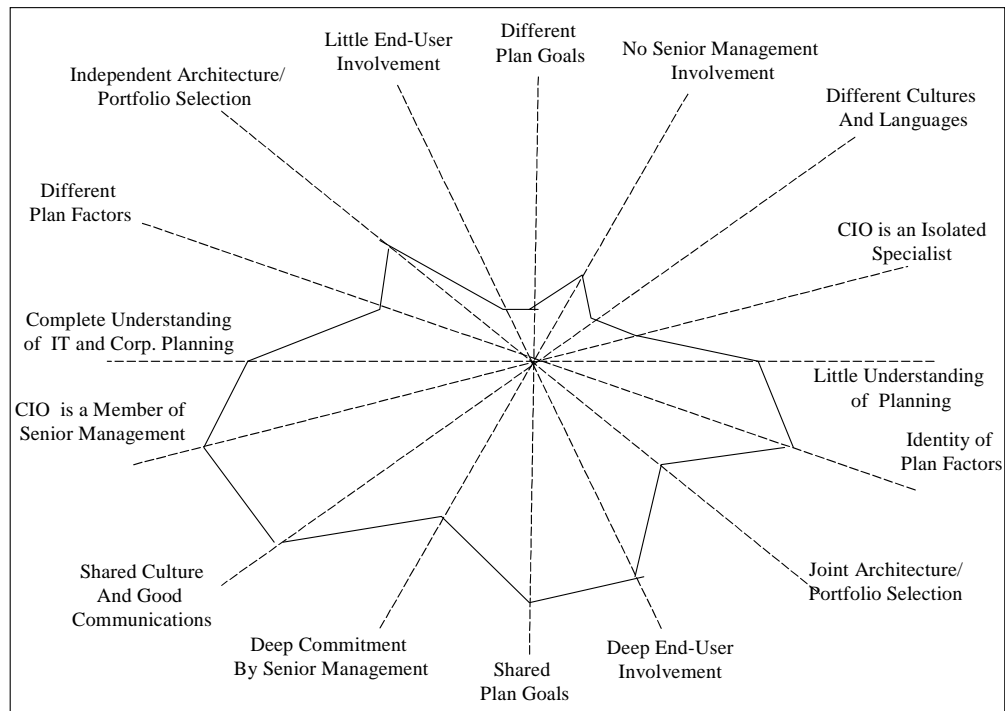


Figure 4. Kiviati Diagram of IT and Business Planning Linkages

- not work collaboratively, or
- include many members who do not understand enough about the status or potential of their company's IT to grapple with the most critical IT concerns of the company, or
- meet too seldom, or
- for other reasons may not provide a good linkage in practice.

Even in circumstances where a particular factor is not as effective as it might be portrayed, however, its existence on the graph increases the likelihood that its effectiveness will be considered carefully.

The Kiviati Diagrams, together with the eight interrelated linkage factors, suggest that there is no "Holy Grail" of plan linkage. Linkage is a combination of factors that together present a pattern of good linkage, not-so-good linkage, or poor linkage for a company. Some of these factors are deeply embedded in the company and are not amenable to rapid change. For example a company's culture is a linkage factor, but is not a factor that can be influenced significantly by the IT planners, or even in the short-run by business managers.

RATING SCHEME

Company analyst-planners can use the Kiviati Diagram methodology to help assess the existence of and the quality of plan-to-plan linkages in their company. This assessment could be accomplished by using a rating scheme. However, a rating scheme is complicated by the probable existence of linkages that are present but do not function effectively [Luftman, 2003]. With or without using a formal rating system, of necessity the evaluation must rely on judgment. The results will not be precise, but should provide insight and serve as the basis for discussions that result in revision and improvement of the company's linkages. Analyst-planners from either the business planning side or the IT planning side (preferably from both as a team) can establish a more detailed analysis of the elements of each category. Then they can evaluate each category

of linkage in different parts of the company by using the Kiviat Graph schema for guidance and to stimulate discussion. Making judgments based on their investigations, the graph can be tailored to the company. Next, action strategies can be initiated to improve the considerations that are thought to contribute to weak linkages.

VII. IT PLANNING METHODOLOGIES

IT planning methodologies differ in perspective from the business planning methodologies in that the business strategic planning reference point is external marketplace conditions, whereas the reference point of nearly all IT planning activities is the business plan. Even where IT is evaluated as enabling entry into new markets, IT planning activities are not completed unless the business plan includes strategies for entering the new markets. IT planning can be done using any of a number of IT planning methodologies. Because most IT planning managers can be assumed to be familiar with these methodologies, which are explained in MIS textbooks [e.g., Laudon and Laudon, 2004; Turban et al. 2004], selected methodologies are described briefly in Appendix III. The number and sophistication of these methodologies suggests that IT managers are aware of the importance of the IT planning. Nevertheless, while some of the methodologies doubtless are quite useful, none is deemed a best practice. King [2000] indicates that half the companies he surveyed conducted systems planning with obsolete technologies.

Ideally, given the importance accorded by the DELPHI studies [Linstone and Turoff, 1968] to plan linkage, these IT planning methodologies would

1. bear a similarity and a clear consistency with business planning methodologies that would make them easily understood by business managers; and
2. include multiple and clearly understood linkage mechanisms and processes.

With respect to item 1, the planning methodologies of business and IT differ significantly, as noted. To an extent this difference can be attributed to the different nature of IT from most other business activities. Nevertheless these differences do indicate that an understanding of either one does not indicate an understanding of the other.

With respect to item 2, the literature emphasizes the importance of alignment/linkage and acknowledges the limited actual alignment but may not be sufficiently specific about what linkages are needed.

VIII. RESEARCH NEEDED

JOINT BUSINESS AND IT PLANNING

IT strategy and planning is a problem that remains current. Researchers and companies paid attention to it for decades. Intuitively appealing research results have been published. Nevertheless, company practices do not converge to define a set of best practices for IT strategy development or for planning processes. Nor are the concept and implications of best practices explored in a research context.

The literature also deals with plan alignment/linkage, a persistent part of the IT strategy and planning problem. However, no agreement exists about what linkages and combinations of linkages provide good alignment, in which circumstances.

On the business planning side of the IT planning activity, theoreticians gave too little attention to the "How to" of IT planning and strategy development, and to IT and business plan linkage. A research project jointly undertaken by a group of IT planning researchers and business planning researchers could usefully explore the interfaces between these two planning realms.

THEORY OF PLAN LINKAGE

Related to joint planning, research activities also can develop a theory of plan linkage, perhaps initially in the form of an organized body of knowledge about linkage. This theory would provide guidelines about how to link IT planning to various types of business planning. Although perhaps most needed for IT activities, a theory of plan linkage also may be useful for aligning the plans of other functional areas, especially other technology areas, to a company's business plans.

MULTIPLE TECHNOLOGY DISCIPLINES

The probable similarity of type and importance of strategy problems across multiple technology disciplines is not widely acknowledged in the research literature. Potentially, the similarity presents an opportunity for collaboration. A variety of technologies, such as engineering design, high-tech product development, pharmaceutical technologies, manufacturing technologies, and medical technologies, may share with IT the high importance of the technology strategy problem. With the expectation that these other areas attempted to deal with their strategy problems and accepting that their attempts may be relevant to IT strategy, researchers in several technology fields can communicate and conduct joint research. Particularly, examination of how non-IT technology disciplines link their plans to companies' business plans should provide valuable insights for IT strategy and plan development. One possible outcome would be the establishment of a common set of "Best Practices for Technology Strategy Design and Implementation."

RELATIONSHIP BETWEEN BUSINESS AND IT APPROACHES

Little attention has been paid to the possible relationship of business planning and IT planning approaches. Which combinations make good matches? For example, if a company's business planning is dominantly Design/Planning and Bottom-Up, what are the implications for IT planning methodologies, and which linkages are needed? The research findings may suggest a need for some companies to modify the IT planning methodologies they use.

Conversely, researchers can consider which business planning methodologies are preferable from the IT planner's perspective. IT planners may perceive some business planning approaches to be more compatible with their needs. All else being equal, the business planning methodology (particularly in companies where IT systems are a major basis for competition) that is most congenial with IT planning should be preferred. For example, a company's IT planners might prefer the Design/Planning approach because it is visible, relatively easy to understand, and tends to be cyclical and consistent through time. Although choosing business planning practices in consideration of IT planning needs may not be appropriate, the analysis should yield useful understanding and insight.

Perhaps more directly useful would be research that establishes that certain business planning approaches are particularly problematic for IT planning. One may be the Dynamic/Reactive approach, which provides little guidance or long-term stability for IT planning, and presents only modest opportunities for linkage with IT planning. Such a finding may suggest a need for additional forms of IT planning. Another is the Positioning approach, which may not provide continuity for IT planning or a ready means for plans linkage. A third may be the transformation methodology, which may be too disruptive of IT operations to provide continuity for IT planning, and so may adversely impact IT projects in process at the time of transformation. An unresolved dilemma is the greater the dynamism of the environment, the greater is the need for planning methodologies that accommodate to these dynamics. Yet these methodologies may be the very ones that provide the least continuity and stability for IT planning.

CONCLUSION

Building on existing research, analyses of existing practices, new research findings and new practices as they emerge, a discipline-wide program can find a set of best practices for IT strategy and planning. Clearly, this research would be inclusive of alignment/linkage practices.

Also included should be general approaches to IT planning for multiple business planning circumstances.

IX. IT PLANNING MANAGER ACTIONS

IT strategy and planning managers who believe that their company suffers from an IT planning and/or linkage problem should undertake a sequence of activities and analyses.

1. Acquire a solid understanding of business planning concepts and of the company's business planning activities.
2. IT planning managers can then develop a profile of the business planning of their company by using a modeling tool such as that represented in Figures 1 and 2. Benefits include information about what linkages are in place, how effective they are, and what additional linkages might be useful. Useful insights should be gained for establishing or modifying an IT planning methodology.
3. The IT planning manager's newfound knowledge of the business' planning methodologies can result in their becoming welcome participants in the business planning activities., which should strengthen their ability to establish plan linkages. At present, IT planning managers and planners tend to be seen as being in their own world and not useful during business planning activities.
4. Another step is for IT planning managers to review the IT planning processes of their companies in the context of the full range of possible IT planning models. This review can be the basis for evaluating the consistency of IT planning with the company's business strategy development.
5. Building on the analysis of the company's business planning, IT strategy planning managers should evaluate the types and effectiveness of alignment/linkage techniques in use by their company. The discussion and the radial chart of linkages in Figure 3 can assist with this evaluation. Many of the linkages may be seen to be in place, but weak, and steps can be taken to increase their effectiveness. Other useful linkages can be implemented.

The results of these steps should be an improved set of IT planning approaches and techniques that link more effectively to the company's business strategies.

X. CONCLUSIONS AND RECOMMENDATIONS

This article directs attention to the several-decades-old problem of IT strategy and planning. Perhaps it has been an IT management problem for so long that researchers do not embrace it as a continuing and current problem that cries out for attention, thereby helping to perpetuate its persistence. Or perhaps research studies focused too much on one dimension or another of the problem, whereas the problem is not just one of:

- planning processes, or
- a need for a set of plan linkages, or
- an understanding by the business managers of IT planning methodologies, or
- an understanding by IT planners of business planning.

Rather, the problem is composed simultaneously of all of these considerations. This study marshals the evidence developed over decades that demonstrates the importance and persistence of this IT strategy problem and that suggests the diversity of its causes. One noted cause is that neither business planners nor IT planners understand fully the planning methodologies, activities, processes, or motivations of the other group. Because IT strategy and planning remains one of the most important among IT management problems, major efforts

should be devoted to this problem. Improvements in IT planning as a consequence of improvements in plan linkages or improvements in other aspects of planning processes would provide substantial benefits to companies.

The evidence presented also suggests that strategy and planning as a major technology management problem may extend beyond IT and into other technology fields, a possibility not yet fully explored. No indications were found that business strategy theorists are—or ever were—particularly concerned about IT strategy and planning, and vice versa. The mutual ignorance may be part of why the problem persists. As a result, the alignment of business and IT plans suffers.

This study takes an integrative approach to the problem. This approach involves melding the analyses of three major aspects of the IT strategy problem:

- business strategy development,
- IT strategy development, and
- the linkage mechanisms that align business and IT plans with strategy development.

The complexity and importance of each of these three areas are considered separately, as are the interactions among them. The discussion of business planning methodologies is illustrated with Kiviat Diagrams (Figures 1 and 2), that portray several of the dominant patterns of business planning. Kiviat Diagrams also are used to analyze plan linkage and alignment dimensions of the IT strategy and planning problem.

RECOMMENDATIONS

Beyond specification of the importance of the problem, the analyses also consider possible causes of the problem and indicate that it is not likely that a one-size-fits-all solution can be found. The analyses also provide five areas of recommendations.

1. All affected groups—IT planners, IT researchers, business planners, and business planning researchers—should recognize the severity of the IT strategy problem, recognize the variety and complexity of IT strategy design and development, and attempt to deal with the problem in an overall way.
2. A set of specific recommendations for a step-by-step process to help IT planning managers deal with the IT planning problem if they believe that it is serious in their company.
3. IT researchers should develop a theory of plans alignment and linkage, because alignment/linkage is a major dimension of the IT planning problem. A beginning of this effort is included as a part of this study. Several linkage mechanisms are set forth, no one of which is considered sufficient. No theory is found that defines or adequately explains alignment and linkage concepts. Additional attention may usefully be given to plan linkage mechanisms, rather than devoting attention primarily to the concept of plan alignment.
4. The IT field should set out to define a set of best practices for IT Planning.
5. IT planning groups should collaborate with planners in other fields of technology. In particular, technology planning problems may be common to multiple fields. A set of best practices at a medium level of generality may be possible that is relevant to all or most technology fields.

ACKNOWLEDGEMENT

The author thanks Paulo Goes for helpful comments on an early draft of this article.

Editor's Note: This article was received on June 7, 2005 and was published on December 22, 2005. It was with the author for 3 revisions.

REFERENCES

- Adler, P., McDonald, D., and MacDonald, F. (1992) "Strategic Management of Technical Functions", *Sloan Management Review* (34)1, Winter, pp. 19-47.
- Adler, P.S., P. Riley, S.-W. Kwon, J. Signer, B. Lee, R. Satrasala (2003) "Performance Improvement Capability: Keys to Accelerating Performance in Hospitals", *California Management Review* (45)2, Winter pp. 12-33.
- Austin, R. "No Crystal Ball for IT", *CIO.com Magazine* (18), July 2005, pp.24-27.
- Barney, J. (2001) "Is the Resource-Based 'View' A Useful Perspective for Strategic Management Research? Yes", *Academy of Management Review* (26)1, pp. 41-56.
- Bartlett, C. A. and M. Glinska (2003) "GE's Digital Revolution: Redefining The E in GE", *Harvard Business School Case*, No. 9-302-001, Boston, MA: HBS Press, pp. 24.
- Bowman, B., G. Davis and J. Wetherbe (1983) "Three Stage Model of MIS Planning", *Information and Management* (6)2, pp. 11-25.
- Brancheau, J., B. Janz and J. Wetherbe (1996) "Key Issues in Information Systems Management: 1994-1995 SIM DELPHI Results," *MIS Quarterly* (20)2, pp. 225-242.
- Brancheau, J. and J. Wetherbe (1987) "Key Issues in Information Systems Management", *MIS Quarterly* (11)1, pp. 23-45.
- Brews, P. and M. Hunt (1999) "Learning to Plan and Planning to Learn: Resolving the Planning School/Learning School Debate", *Strategic Management Journal* (20)10, pp. 889-913.
- Broadbent, M. and P. Weill (1993) "Improving Business and Information Strategy Alignment: Learning From the Banking Industry", *IBM Systems Journal* (32)1, pp. 162- 179.
- Calentone, R., C. A. DiBenedetto, and T. Haggeblom (1995) "Principles of New Product Management: Exploring the Beliefs of Product Practitioners", *Journal of Product Information Management* (17)3, pp. 235-246.
- Cassidy, A. (1998) *A Practical Guide to IT Planning*, Boca Raton, FL: CRC Press.
- Chan, Y. E. (2002) "Why Haven't We Mastered Alignment? The Importance of the Informal Organizational Structure", *MIS Quarterly Executive* (1)2.
- CIO Magazine (2005) "Top 10 Information Management Concerns", *CIO.com Magazine*, (18), February 1, p. 24.
- Collis, D. J. and C. A. Montgomery (1995) "Competing on Resources: Strategy in the 1990s", *Harvard Business Review* (73) 4, July-August. Republished in (1999) *Harvard Business Review on Corporate Strategy*, Boston, MA: Harvard Business School Publishing, pp. 33-62.
- Courtney, H. (2001) *20/20 Foresight*, Boston, MA: Harvard Business School Press, pp. 207.
- Dickson, G., R. Leitheiser, J. Wetherbe and M. Nechis M. (1984) "Key Information Systems Issues for the 1980's", *MIS Quarterly* (8)3, pp. 135-159.
- Eisenhardt, K. M. and D. N. Sull (2001) "Strategy as Simple Rules", *Harvard Business Review* (79)1, January, pp. 107-116.
- Farjoun, M. (2002) "Toward An Organic Perspective on Strategy", *Strategic Management Journal* (23)7, pp. 561-594.
- Groenveld, P. (1997) "Roadmapping Integrates Business and Technology", *Research-Technology Management* (40)5, September-October, pp. 48-55.
- Hackney, R. A., J. Burn and G. Dhillon (2000) "Challenging Assumptions for Strategic Information Systems Planning", *Communications of the AIS* (3)9.
- Hackney, R. A., G. Griffiths and J. Burn (1999) "Strategic Information Systems Planning: A Resource and Capabilities-Based View for Sustainability of Competitiveness", *Proceedings of the British Academy of Management*, Manchester, UK: Manchester Metropolitan University, September.
- Hamel, G. (1996) "Strategy as Revolution", *Harvard Business Review* (74)4, July-August, pp. 69-82.

- Hammer, M. (1990) "Reengineering Work: Don't Automate, Obliterate", *Harvard Business Review* (68)4, pp. 104-112.
- Hayward, R. G. (1987) "Developing an Information Systems Strategy", *Long Range Planning* (20)2, pp. 100-113.
- Henderson, J. C. and N. Venkatraman (1991) "Understanding Strategic Alignment", *Business Quarterly* 55(3), Winter, pp. 72-78.
- Henderson, J. C. and N. Venkatraman (1993) "Strategic Alignment: Leveraging Information for Transforming Organizations", *IBM Systems Journal* (32)1, pp. 4-16.
- Henderson, J. C. and J. G. Sifonis (1988) "The Value of Strategic IS Planning: Understanding Consistency, Validity, and IS Markets", *Management Information Systems Quarterly* (12)2, June, pp. 187-199.
- Hirschheim, R. and R. Sabherwal (2001) "Detours in the Path Toward Strategic Information Systems Alignment", *California Management Review* (44)1, Fall, pp. 87-108.
- Hoffman, T. (2003) "CFOs Cite Poor Alignment Between IT, Business," *Computerworld.com*, October 29.
- Hope, J. and R. Fraser (2003) "Who Needs Budgets?", *Harvard Business Review* (81)2, February, pp. 108-115.
- Hoque, F. (2002) *The Alignment Effect*, Upper Saddle River, NJ: Prentice Hall PTR, p. 244.
- Iansiti, M. and A MacCormack (1999) "Living on Internet Time: Product Development at Netscape, Yahoo!, Net Dynamics, and Microsoft", *Harvard Business School Case No. 9-697-052*, Boston, MA: Harvard Business School Press, pp. 12.
- Kaplin, R. S. and D. Norton (2001) *The Strategy-Focused Organization*, Harvard Business School Press, Boston MA, pp. 400.
- Kappel, T. (2001) "Perspectives on Roadmaps: How Organizations Talk About The Future", *The Journal of Product Innovation Management* (18)1, pp. 39-50.
- King, W. R. (1978) "Strategic Planning for Management Information Systems", *MIS Quarterly* (2)1, March.
- King, W. R. (2000) "Assessing the Efficiency of IS Strategic Planning", *Information Systems Management* (17)1, pp. 81-83.
- Klein, J. A. (1991) "Why Strategists Shun Technologists", *Technology Analysis and Strategic Management* (3)3, pp. 251-256.
- Kostoff, R. and R. Schaller (2001) "Science and Technology Roadmaps", *IEEE Transactions on Engineering Management* (48)2, May, pp. 132-143.
- Kotter, J. P. (1999) "What Effective General Managers Really Do", *Harvard Business Review* (77)3, March-April, pp.103-111.
- Lapointe, L., L. Lamothe, and J.-P. Fortin (2002) "The Dynamics of IT adoption in a Major Change Process in Healthcare Delivery," *Proceedings of the 35th Hawaii Conference on Systems Sciences*, Piscataway, NJ: IEEE Press.
- Laudon, K. C. and J. P. Laudon (2004) *Management Information Systems: Managing the Digital Firm, 8th ed.*, Upper Saddle River, NJ: Pearson Education, Inc., pp. 534.
- Lederer, A. L. and A. L. Mendelow (1989) "Information Systems Planning: Incentives for Effective Action", *Data Base* (20)3, Fall, pp. 13-20.
- Leachley, S., M.J. Roberts and W. A. Sahlman (2002) "Amazon.com—2002," *Harvard Business School Publishing Case 9-803-098*, Boston, MA: Harvard Business School Press, pp. 31.
- Liedtka, J. (2000) "In Defense of Strategy as Design", *California Management Review* (42)3, Spring, pp. 8-30.
- Linstone, H. and M. Turoff (1968) *The Delphi Method: Techniques and Applications*, Reading, MA: Addison Wesley Publishing.
- Lorange, P. and R. F. Vancil (1976) "How to Design A Strategic Planning System", *Harvard Business Review* (54)5, September-October, pp. 77-81.
- Lorange, P. and R. F. Vancil (1977) *Strategic Planning Systems*, Englewood Cliffs, NJ: Prentice Hall, pp. 364.
- Luftman, J. and T. Brier (1999) "Achieving and Sustaining Business-IT Alignment", *California Management Review* (42)1, Fall, pp. 109-122.
- Luftman, J. (2003) "Assessing Business Alignment", *Information Systems Management*, (20)4, Fall, pp. 9-15.

- Lyles, M. A. (1979) "Making Operational Long-Range Planning for Information Systems", *MIS Quarterly* (3)2, June, pp. 9-19.
- Mankins, M. C. and R. Steele (2005) "Turning Great Strategy Into Great Performance," *Harvard Business Review* (83)7, July-August, pp. 65-72.
- Marcelo, S. and Applegate, L. M. (2000) "Medtronic--Vision 2010 (A): Transforming for the 21st Century," *Harvard Business School Publishing Case 9-800-357*, Boston, MA: Harvard Business School Press, pp. 34.
- McAfee, A (2003) "Cisco Systems, Inc: Implementing ERP", *Harvard Business School Publishing Case Teaching Note 5-602-076*, Boston, MA: Harvard Business School Press pp. 21.
- McFarlan, F. W. and M. Daily (1999) "Providian Trust: Tradition and Technology," *Harvard Business School Publishing Case 3-398-008*, Boston, MA: Harvard Business School Press pp. 20.
- McFarlan, F. W. and B. J. DeLacey (2004) "Otis Elevator: Accelerating Business Transformation with IT," *Harvard Business School Publishing Case 9-305-048*, Boston MA: Harvard Business School Press pp. 20
- McGovern, J., S. W. Ambler, M. E. Stevens, J. Linn, V. Sharan and E.K. Jo (2004) *Enterprise Architecture*, Upper Saddle River, NJ: Prentice Hall, pp. 306.
- Menke, M. (1997a) "Essentials of R&D Excellence," *Research - Technology Management* (40)5, September-October, pp. 42-47.
- Martin, E. W., C. V. Brown, D. W. DeHayes, J. A. Hoffer, and W. C. Perkins (1999) *Managing Information Technology*, Upper Saddle River, NJ: Prentice Hall, pp. 716.
- Menke, M. (1997b) "Managing R&D for Competitive Advantage," *Research - Technology Management* (40)6, November-December, pp. 40-42.
- Metz, P. (1996) "Integrating Technology Planning With Business Planning", *Research - Technology Management* (39)3, May-June, pp. 19-22.
- Mintzberg, H. (1987a) "The Strategy Concept II: Another Look at Why Organizations Need Strategies" (30)1, *California Management Review*, Fall, pp. 25-31.
- Mintzberg, H. (1987b) "Crafting Strategy", *Harvard Business Review* (65)4, July-August, pp. 66-75.
- Mintzberg, H., H. Bruce and J. Lampel (1998) *Safari Strategy: A Guided Tour Through the Wilds of Strategic Management*, New York: The Free Press, pp. 406.
- Monnoyer, E. and P. Willmott (2005) "What IT Leaders Do," McKinsey Quarterly, web edition, www.mckinseyquarterly.com/article, 2005, August.
- Morone, J. G. (1993) *Winning in High-Tech Markets*, Boston, MA: Harvard Business School Press, pp. 292.
- Nadler, D., and M. Tushman (1988) "Strategic Linking: Designing Formal Coordination Systems", M. Tushman and W. Moore, (eds.) *Readings in the Management of Innovation*, 2ed., New York: Harper Collins, pp. 469-486.
- Niederman, F., J. Branchau and J. Wetherbe (1991) "Information Management Issues for the 1990s", *MIS Quarterly* (15)4, December, pp. 475-495.
- Nolan, R. and F. W. McFarlan (2005) "Information Technology and the Board of Directors", *Harvard Business Review* (83)10 October, pp. 96-106.
- O'Rourke, C., F. Fishman, and W. Selkow (2003) *Enterprise Architecture: Using the Zachman Framework*, Boston MA: Thompson Course Technology, pp. 716.
- Overby, S. (2005) "Turning IT Doubtters into True Believers", *CIO.com Magazine*, (18)16, June1, pp. 49-56.
- Papp, R. (2001) *Strategic Information Technology Opportunities for Competitive Advantage*, Hershey, PA: Idea Group.
- Peak, D. and C. S. Guynes (2003) "Improving Information Quality Through Alignment Planning: A Case Study", *Information Systems Management* (20)4, Fall, pp. 22-29.
- Pickering, C. (2000) "E-Business Success Strategies: Achieving Business and IT Alignment", *Computer Technology Research*,
- Porter, M. (1980) *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York: Free Press.

- Porter, M. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*, New York: Free Press.
- Porter, M. (2001) "Strategy and the Internet," *Harvard Business Review* (79)3, March, pp. 63-78.
- Premkumar, G. and W. R. King (1991) "Assessing Strategic Information Systems Planning", *Long Range Planning* (24)5, pp. 41-58.
- Price, R. (1996) "Technology and Strategic Advantage", *California Management Review* (38)3, Spring, pp. 38-54.
- Priem, R. and J. Butler (2001) "Is the Resource-Based 'View' a Useful Perspective For Strategic Management Research?", *Academy of Management Review* (26)1, pp. 22-40.
- Quinn, J. (1980a) *Strategies For Change: Logical Incrementalism*, Homewood, IL: Irwin Publishing, p 222.
- Quinn, J. (1980b) "Managing Strategic Change", *Sloan Management Review* (20)3, Summer.
- Rivkin, J. W. (2002) "An Alternative Approach to Making Strategic Choices," *Harvard Business School Case 9-702-433*, Boston, MA: Harvard Business School Press, p. 7.
- Rivkin, J. W. (2003) 'Honda (A), Honda (B), and the British Motorcycle Industry at the Crossroads,' *Harvard Business School Case Teaching Note 5-704-022*, Boston, MA: Harvard Business School Press, pp. 22.
- Rockart, J. (1979) "Chief Executives Define Their Own Data Needs", *Harvard Business Review* (57)2, March-April.
- Ross, J. W. and P Weill (2002) "Six Decisions Your It People Shouldn't Make," *Harvard Business Review* (80)11, November pp. 85-91.
- Sabherwal, R., R. Hirschheim and T. Goles (2001) "The Dynamics of Alignment: Insights from a Punctuated Equilibrium Model", *Organizational Science* (12)2, March-April, pp. 179-197.
- Sherman, E. (2002) "CIOs' New Choice: Get Strategic...Or Else!" *CIO Magazine* (15)July 19.
- Scott, G. M. (1976) "Report of the Committee on Accounting in Developing Countries", *Supplement to the Accounting Review*, pp. 198-212.
- Scott, G. M. (1995) "Downsizing, Business Process Reengineering, and Quality Improvement Programs: How Are They Related?" *Information Strategy: The Executive's Journal* (11)3, Spring, pp. 18-34.
- Scott, G. M. (2000) "Critical Technology Management Issues of New Product Development in High-Tech Companies", *The Journal of Product Innovation Management* (17)1, pp. 57-77.
- Scott, G. M. (2001a) "Strategic Planning for High-Tech Product Development," *Technology Analysis and Strategic Management* (13)3, pp. 343-363.
- Scott, G. M. (2001b) "Strategic Planning for Technology Products," *R&D Management* (31)1, pp. 15-26.
- Scott, G. M. and Z. Walter (2003) "DELPHI Findings about Internet Systems Problems, With Implications for Other Technologies", *Technology Analysis and Strategic Management* (15)1, pp. 103-115.
- Scott, G. M. and P. Troberg (1980) *Eighty-Eight International Accounting Problems in Rank Order of Importance- A DELHPI Evaluation*, Sarasota, FL: American Accounting Association, p.118.
- Scott-Morton, M. S., ed. (1991) *The Corporation of the 1990s: Information Technology and Organizational Transformation*, New York: Oxford University Press.
- Spear, S. J. (2005) "Fixing Health Care from the Inside, Today," *Harvard Business Review* (83)9, September, pp. 78-91.
- Stackpole, B. (2004) "No More Secrets to CIO Success," *CIO Magazine* (17), August 1 pp. 64-68.
- Steiner, G. (1969) *Top Management Planning*, New York: MacMillan Publishing.
- Stone, M., and C. Brush (1966) "Planning in Ambiguous Contexts: the Dilemma of Meeting Needs for Commitment and Demands for Legitimacy", *Strategic Management Journal* (17)8, pp. 633-652.
- Tegarden, David T. (1999) "Business Information Visualization" *Communications of AIS* (1)4, January
- Tucker, A. L. and A. C. Edmonson (2003) "Why Hospitals Don't Learn From Failures: Organizational and Psychological Dynamics that Inhibit System Change", *California Management Review* (45)2, Winter, pp. 55-72.

- Turban, E., E. McLean and J. Wetherbe (2004) *Information Technology for Management*, 4th ed., Hoboken, NJ: John Wiley & Sons, Inc., p.731.
- Wailgum, T. (2005) "The Big Fix," *CIO.com Magazine*, (18) April 15, p 40-44.
- Ward, J. and J. Peppart (2002) *Strategic Planning for Information Systems*, 3rd ed., New York: John Wiley & Sons.
- Wetherbe, J. C. (1993) "Four Stage Model of MIS Planning Concepts, Techniques and Implementation," in Kaufman, R., R. Banker and M. Mahmood (eds.), *Strategic Information Technology Management*, Harrisburg, PA: Idea Group.
- Wiseman, C. (1988) *Strategic Information Systems*, Homewood, IL: Richard D Irwin, Inc. p. 451.

APPENDIX I. EVIDENCE OF IT STRATEGY PROBLEMS

A growing body of evidence from research studies shows that:

- the IT and Internet planning and strategy problem is serious and probably the most serious management problem in information technology;
- the importance of the problem is persistent and most likely did not diminish greatly, if at all, in the two decades since first discussed in the early 1980s; and
- technology strategy is an important, perhaps the most important, management problem in multiple fields of technology.

While the problem's importance is not well measured for some technologies, evidence is compelling for high technology new product development. [Calentone, *et al.*,1995; Metz, 1996; Scott, 2000, 2001a, 2001b]. Research evidence also shows the importance of the R&D strategy and planning. [Menke, 1997a, 1997b].

Healthcare technologies are, to an extent, forms of information technologies (e.g., patient records). Often these information technologies must interface with specialized medical technologies, such as body scanning. Yet, little evidence exists that the coherent and cohesive strategic planning and strategy development concepts penetrated the field. In health care, most improvements and portfolio development activities appear to be driven by political and power dynamics considerations related to the many participating groups and to regulatory factors. Good organization and management have not yet emerged as the means to provide consistently high quality health care [Adler, *et al.*,2003; Lapointe, *et al.*, 2002; Tucker and Edmonton, 2003]. One stream of research in the healthcare field suggests that a route to improvement is a strategy of implementing a process improvement program such as might be found in an industrial company, but that no hospital yet achieved this state [Spear, 2005].

DELPHI STUDIES

The most convincing research evidence about the importance of IT planning and strategy is from seven Delphi Questionnaire studies. Nearly all non-Delphi studies about technology management problems support the Delphi⁵ findings, but space does not permit consideration of all such studies. The multiple-questionnaire nature of Delphi studies is believed by the author to make them more persuasive than other forms of opinion research. These Delphi studies are summarized in Scott and Walter, [2003]. The most relevant results of each study are summarized in Table A-1. In Table A-1 the "Rank/Number of Problems" column indicates, first, the rank in importance of the strategic planning or similarly titled problem, and second, the number of final-ranked problems presented by the study. For example, for the first study, the

⁵ The underlying methodology of Delphi forecasting is presented by Linstone and Turoff [1968].

Long Range Planning for IT problem was ranked most important out of 18 final-ranked IT management problems. Each of the seven studies involved three rounds.

Table A1. Seven Delphi Studies of Technology Management Problems

Study	YEAR	STRATEGY PROBLEM	RANK/NO OF PROBLEMS	FIELD	AUTHORS
1	1984	Long Range Planning	#1 of 18	IT	Dickson, et al.
2	1987	Strategic Planning	#1 of 20	IT	Branchau and Wetherbe
3	1991	Improved Strategic Planning	#3 of 20	IT	Niederman et al.
4	1996	Improved Strategic Planning	#10 of 20	IT	Branchau et al.
5	2000	Tech. Product Development	#1 of 24	Prod. Dev.	Scott
6	2001	Plan Alignment In Prod. Dev.	#1 of 21	Prod. Dev.	Scott
7	2003	Strategic Planning	#1 of 26	Internet	Scott and Walters

Studies 5 and 6 are not IT studies. Study 5 addresses technology management problems in the area of R&D and high-tech product development rather than IT. It is relevant because both areas deal with advanced, dynamic technology activities that are planned for and implemented by technical personnel. These activities often require many years to be brought from the planning stage to completion. In this product technology study, the Strategic Planning for Technology Products problem is evaluated as being easily the most important of technology management problems in the U.K., the U.S., Canada, and continental Europe. The next ten problems of this study also are each related in some way to this top strategy management problem. Study 6 was completed to analyze the Study 5 findings further. It establishes a strong correspondence between technology strategy and plan linkage/alignment by identifying linkage/alignment as the most important dimension of the technology strategic planning problem.

Study 7 deals with Internet systems development management problems. Four of the first five problems in importance (ranked 2nd, 3rd, 4th, and 5th.) are closely related to planning and strategy development for developing of Web systems.

NON-DELPHI STUDIES

Relevant non-DELPHI survey studies are consistent with the Table A1 studies.. For example:

- A 1997/1998 survey by the Society for Information Management found “improving the information systems planning process” to be the number one issue for senior IT executives.
- A 2003 survey by *CIO Magazine* of 500 chief information officers indicates that senior information technology executives identify “Strategic Thinking and Planning” as their number one concern [Turban, et al., 2004].
- A 2005 listing of the “10 Top Information Management Concerns” shows “IT and business alignment” as the top concern, and “IT strategic planning” fourth as a concern [CIO Magazine, 2005].

Although many efforts over the years attempted to help resolve the IT strategic planning and alignment problem, clearly the problem remains of importance. An early effort by King [1978] proposed a methodology for establishing an “intrinsic linkage” between business and MIS strategy by transforming an organization’s strategy set into an MIS strategy set. A later examination of the linkage issue notes that the link between IT plans and corporate plans can be

achieved via timing, content, and personnel [Lederer and Medlow, 1989]. That study also notes the “paradox” that many firms provide no suitable corporate plan to which the IT plan can be linked. Other studies are shown in Table A-2.

Table A-2. Other Studies

SOURCE	
Lyles [1979].	A proposed strategic planning process for MIS
Hayward [1987]	A planning model methodology for use in developing an information systems strategy
Henderson and Sifonis [1988]	A strategic IS planning approach was formulated that uses critical success factors (CSFs) to identify manager’s goals and link them to IT strategy.
Bowman et al. [1983]; Ward and Peppart [2002]; Wetherbe [1993]; Cassidy, [1998]; and Papp [2001].	Several IT planning models
Scott-Morton [1991]	An MIT research project on plan alignment, based on concepts of integration

Numerous other studies also deal with the problem area [Henderson and Venkatraman, 1991; Henderson and Venkatraman, 1993; Broadbent and Weill, 1993; Hirschheim and Sabherwal, 2001; Luftman and Brier, 1999; Luftman, 2003; and Hoque, 2002]. All of these efforts are meritorious. In conjunction with the Delphi studies, they amply show that alignment/linkage is a critical part of what is the overall problem of IT strategy.

Unfortunately, the alignment/linkage studies share little in common with each other. For example, even by combining elements of all of the alignment studies, no reasonably complete body of theory is found that explains the concept of alignment or of linkage, nor does any consider the relationship of linkage and alignment. Wiseman [1988, p. 49] states that the linkage between competitive strategy and the information systems plans “...depends primarily on identifying current SIS (strategic information systems) and future SIS opportunities and threats.” Furthermore that linkage is accomplished by conducting “...a systematic study to discover the set of current SIS and future SIS possibilities. If this set is empty, there is no need for linkage.” Wiseman does not give attention to how to conduct the advocated “systematic study,” nor to why linkage may not be necessary “if this set is empty,” nor to alignment concepts.

Sabherwal et al.[2001], define alignment as the extent to which the organizational dimensions of business and IT strategy meet theoretical norms of mutual coherence. These authors note that little work exists on the dynamics of alignment. They examine the ways in which alignment evolves over time. They use three case studies to gain insights into how companies’ alignment changes dynamically in response to changes in business strategy or structure.

Peak and Guynes [2003] developed an alignment methodology and then applied it in industry. This methodology emerges from an IT and corporate strategic planning alignment study project that gave attention to critical success factors. It involved building a business unit IT alignment roadmap so that IT planning takes a strategic view of information and IT systems. A highlight of the process used is that it explicitly identifies information concerns that suggest IT solutions.

In this paper, plan linkage refers to all of the mechanisms, social and cultural constructs, communications, scheduling, planning process and related time-sequencing activities that interconnect the IT plan and the business plans. Presumably the purpose is to aligning business and IT planning processes and plans so that they are in concert. Thus,

- joint planning processes,
- overlapping membership on planning teams,

- use in both types of plans of the same dollar amounts for future IT investments,
- cross-communication about the business plans and IT plans and
- the cross-communication provided by CIO membership on the company's senior management committee

are all forms of linkages that can provide alignment. However, this list is incomplete and not a generally accepted concept of linkage. A comprehensive research study by Luftman [2003], well-along in its development, is an alignment maturity model directed to identifying specific recommendations for improving the alignment of IT and business. This model uses six categories of alignment criteria: communications, competency/value measurements, governance, partnership, technology scope, and skills to assess the maturity of alignment of IT and business in a company. Although this model has been tested at multiple major companies and holds promise as the basis for a theory of linkage/alignment, it is not widely deployed in practice and is not established as a best practice methodology.

APPENDIX II. COMMON ELEMENTS OF BUSINESS

PLANNING AMONG COMPANIES

While business planning approaches vary widely, company planning tends to share several common characteristics. The characteristics put forward here are assumed in this article to be present in the planning of most companies.

First, a company's business managers and/or planning staff members generally participate in and take the primary responsibility for the business planning processes. The objectives of business planning usually are to:

- analyze the present status of the organization and its competitive environment,
- evaluate opportunities for growth and profitability, and
- establish actions (strategies) to be taken to maneuver the organization toward a desired future marketplace position.

Usually, business planning is done periodically for strategic activities that involve long-term actions. This effort is combined with intermediate or short-term plans and actions. The output is often embodied in a set of plans that summarize the activities to be conducted. However, some business planning may consist of "one-off" analysis techniques that are used once with no specific expectation that they will be repeated. The results of these techniques' may not be directly reflected in or become a part of a set of completed plans.

Often planning activities are cyclic, with different planning steps scheduled to be completed at a particular time each period (e.g., annually in November for a particular planning meeting). Therefore, a step scheduled to follow another step nearing completion can be initiated on schedule and the step-by-step process can be continued until planning is completed. When the steps are completed, a new planning cycle begins, sometimes after only a brief pause. A complete planning cycle may be one year in length, and a complete set of short-term, medium-term, and long-term (strategic) plans may be established for several years (e.g. for five years). In addition, even shorter plans, (e.g., bi-annual, quarterly, and monthly) may be created.

With such a set of plans, the short-term plan (the first year) contains great detail whereas the strategic plan (the last year) is a broad form of guidelines and general expectations. Funding may be committed to first-year planned activities, but a later year's activities may not be funded until that year becomes the first year.

While business planning approaches and techniques vary widely, they correlate broadly with organization structures and management processes. A centrally managed company is likely to use a tightly controlled cycle with guidelines (or perhaps directives rather than guidelines) that

describe performance expectations. These guidelines are provided by each organization unit's senior management. Lower level planners then develop specific actions to be taken to fulfill the stated expectations. Guidelines provided by senior managers may specify how each unit's plan should integrate (link) with the overall company plan. However, because senior managers typically understand information technologies and related activities less well than they understand the activities of marketing, production, distribution, and other line operations, guidelines or directives to IT managers may be less detailed or less reasoned than those provided to other organization units.

In a distributed company organized by divisions and profit centers, the organization's unit managers control their unit's resources and usually receive less direction about planning from central company managers. Accordingly, in a distributed company, IT planning may pay less attention to how IT should support the goals of the entire company. The result may contribute to a variety of information systems among the divisions. Here, the result can be systems incompatibilities, differing capabilities, and even an overall architecture which cannot easily be adapted to strategic direction changes by the company. This decreased attention from senior company managers of distributed companies to IT planning may be perceived as a problem by IT managers unless senior division managers ensure that IT plans articulate with those of the corporation level and of other divisions.

A fully decentralized organization consists of independent organization units. IT planning coordination is unlikely among the units or between each unit and the central holding company. This situation results in highly disparate information systems. The lack of coordinated planning may mean that fewer synergies can be gained among the organization units.

APPENDIX III. IT PLANNING METHODOLOGIES

THREE FRAMEWORKS

A four-stage IT planning model uses stages of strategic IT planning [Wetherbe, 1993]. Collectively these four stages produce an applications portfolio of existing and planned information systems. Another planning model is that of Business Systems Planning (BSP), originally developed by IBM in the 1970s and now used as modified by several different groups. BSP builds upon the analysis of information needed by current business activities. Linkage of the architecture to business plans is implied but not specifically provided for as a part of the BSP model.

A particularly extensive and insightful framework for technology planning that encompasses the mission, objectives, strategic plan, and key policies of technical functions was published in 1992 by Adler et al. While not developed primarily for new product technology development, the framework is represented by the authors as relevant to IT and to other technical functions. It contains an important concept. Suggesting that the framework is relevant to multiple technical functions also suggests strong similarities in planning needs and processes among technical functions in their technology strategy development. In turn, the framework suggests that researchers and managers from different technical functions should make common-cause efforts to deal with the technology planning and strategy problem.

THE SEARCH FOR AN EXAMPLE

A long search of the literature found no exemplar company that sets the standard for IT strategy development, and is a model in its IT planning processes. The search does suggest that the reason there is no full set of exemplary IT plan development activities is that IT must react to the business strategies rather than formulate its own strategies according to its preferred processes. Thus, the problem of IT strategic planning arguably could be stated as identifying and implementing IT planning approaches that best fit with the company's business strategy approaches. This argument makes the problem no less important however. While the focus

might shift somewhat, equivalent attention would need to be devoted to developing IT planning processes that are well-suited to specific business planning approaches. Indeed, Sherman [2002] reported that 47% of CIOs and business executives in a CIO magazine study said IT is a reactive problem solver at their companies. Presumably CIOs are reacting in part to their company's strategic planning.

It seems possible, though, to identify criteria and principles that should be satisfied by IT strategic planning processes which are similar to those for business strategy development processes. One set of principles for achieving strategy and focus are put forward in brief and then considered in detail while extolling the "balanced scorecard" [Kaplan and Norton, 2001]. These are:

- Translate the Strategy to Operational Terms,
- Align the Organization to the Strategy,
- Make Strategy Everyone's Everyday Job,
- Make Strategy a Continual Process, and
- Mobilize Change Through Executive Leadership.

Certainly, these principles are as valid for IT strategy as for business strategy. These principles, however, were developed specifically for business planning, not IT planning.

EXAMPLES OF SUCCESSES

One example of a successful IT strategy activity was seen at General Electric. This strategy made GE a leading company in Internet activities [Bartlett and Glinsky 2002]. At the initiation of this activity, GE already used an "Operating System" that specified month-by-month what business planning activities take place, making no distinction between business and IT planning. This Operating System was unique to GE. GE's culture featured very strong CEO leadership and acknowledged the need to adopt innovative management methods. The GE Internet and e-business development activities flowed through as an integral part of this same Operating System planning activity. In this way Operating System planning appeared to be intricately and inextricably linked to business planning. One outcome was that in July 2000 *Internet Week* magazine elevated GE to the first position on its "Internet 100" list of top e-businesses.

Otis Elevator also integrated its IT planning and business planning activities. It initiated its e*logistics IT activity to facilitate its business process reengineering activity directed toward overall customer service excellence [McFarlan and DeLacey 2004]). The Otis CIO indicated that this e*logistics system would make Otis "infinitely information enabled." Previously, under the leadership and at the insistence of another strong CEO, Otis implemented OTISLINE, its innovative and successful IT-based elevator repair application. The strongest similarities between the GE Internet and the Otis IT activities are cultures that are receptive to change, strong executive leadership, and the integration of IT and business planning activities. The findings suggest critical ingredients of successful IT planning.

A third example of successful IT planning is Medtronic, a biomedical engineering firm headquartered in Minneapolis. As a part of its company-wide redefinition of its business directions and product lines, Medtronic carefully examined the future of IT technologies [Marcello and Applegate, 2000]. Believing that information based on emerging information technologies would be a major driver of patient and other health care products in the future, Medtronic specifically analyzed the implications for itself of information technologies emerging during the next decade, including the threats that information could pose to its current operations. This analysis helped to shape a reorganization of Medtronic's future product lines and operating activities; in this example, Information technology is not reacting to business plans, but instead plays a major role in helping to shape business plans.

PLANNING SYSTEMS

Going beyond principles and overall approaches presented above, is there one set of steps and procedures in the nature of “a planning system” that can serve the IT planning needs of most companies? Having considered multiple general approaches to business strategy development (and there are variations to each in practice) it is clear that no one of the several IT planning systems or approaches considered is likely to align with all of them. Further, one set of IT planning steps or processes cannot be developed that can serve all companies satisfactorily because the circumstances among companies vary widely. Companies’ needs differ. They seek different degrees of flexibility and different levels and kinds of alignment between business and IT planning. In a particular company one group may seek tighter linkages for greater control and another may believe that looser linkages are needed to facilitate greater freedom of action. For example, the business managers prefer a loose form of planning while IT managers prefer tightly linked plans that permit them to know years ahead of time what new systems will be needed. One well-known company, Amazon.com, in some respects is an exemplar of best practices of linking business strategy and IT strategy. Consistently through time the founder and CEO, Jeff Bezos, created new visions of business strategy. He then determined how to link these visions with Amazon’s already advanced IT systems to create new categories of products. Bezos’ first-implemented vision was to become the dominant online bookstore. This vision was supported by developing highly innovative and advanced IT systems. Other visions followed quickly, such as online selling of other products (e.g., music, video, electronics, and toys), offering online auctions, providing the IT platform for small businesses, and online apparel sales. With each new vision that was implemented, Amazon integrated its vision with new forms of IT. The “best practices” involved can be represented as development of innovative business strategies in concert with development of innovative strategic planning for new forms of IT systems. This form of linkage can be effective, although most companies would find it difficult to use as consistently as has Amazon [Leachley, *et al.*, 2003].

For a comprehensive legacy system replacement project, in 1994 Cisco Systems used several techniques that may qualify as “best practices” for aligning business planning and operations with strategic IT planning and systems development [McAfee, 2003]. As a result of these linkage techniques and of rapid development methodologies, Cisco replaced its major legacy systems in nine months. The project started badly, however, when the best-placed persons to link the business and technology plans and to manage the project—the top functional managers from marketing, manufacturing, accounting, purchasing, and other functions--were not willing to do so. Perhaps the most important linkage established was a steering committee of senior Cisco executives. Also important were the people at the next- lower project level who did the implementation. They were organized into five process area teams with representatives on each from a cross section of Cisco’s community. Another linkage mechanism consisted of hiring outside business consultants for the process team and for the steering committee. These consultants understood the technologies and Cisco’s business strategies but had no vested interests in the business strategies.

Amazon’s and Cisco’s best practices were unique to their circumstances but do indicate that it is possible to develop recommendations about good practices for aligning and linking IT and business strategic planning. Companies that acknowledge (or want to forestall) a problem with their IT strategic planning should implement a variation of a best practice that is suitable to their circumstances.

ABOUT THE AUTHOR

George M. Scott is Professor of Information Management at the University of Connecticut. His research and teaching experience is in accounting and accounting theory, international financial management, computer auditing, strategic planning, technology management, and (for two decades) in MIS Research activities. Since 1975 he used the Delphi methodology for identifying and assessing management issues in accounting, in technology management, and in Internet

systems development. Recent publications appeared in *R&D Management*, *Technology Analysis and Strategic Management*, *The Journal of Product Innovation Management*, *Global Focus*, *Information Strategy: the Executive's Journal*, *The Academy of Management Executive*, and *Communications of the ACM*.

Copyright © 2005 by the Association for Information Systems. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and full citation on the first page. Copyright for components of this work owned by others than the Association for Information Systems must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists requires prior specific permission and/or fee. Request permission to publish from: AIS Administrative Office, P.O. Box 2712 Atlanta, GA, 30301-2712 Attn: Reprints or via e-mail from ais@aisnet.org.



Communications of the Association for Information Systems

ISSN: 1529-3181

EDITOR-IN-CHIEF

Paul Gray

Claremont Graduate University

AIS SENIOR EDITORIAL BOARD

Jane Webster Vice President Publications Queen's University	Paul Gray Editor, CAIS Claremont Graduate University	Kalle Lyytinen Editor, JAIS Case Western Reserve University
Edward A. Stohr Editor-at-Large Stevens Inst. of Technology	Blake Ives Editor, Electronic Publications University of Houston	Reagan Ramsower Editor, ISWorld Net Baylor University

CAIS ADVISORY BOARD

Gordon Davis University of Minnesota	Ken Kraemer Univ. of Calif. at Irvine	M.Lynne Markus Bentley College	Richard Mason Southern Methodist Univ.
Jay Nunamaker University of Arizona	Henk Sol Delft University	Ralph Sprague University of Hawaii	Hugh J. Watson University of Georgia

CAIS SENIOR EDITORS

Steve Alter U. of San Francisco	Chris Holland Manchester Bus. School	Jaak Jurison Fordham University	Jerry Luftman Stevens Inst. of Technology
------------------------------------	---	------------------------------------	--

CAIS EDITORIAL BOARD

Tung Bui University of Hawaii	Fred Davis U. of Arkansas, Fayetteville	Candace Deans University of Richmond	Donna Dufner U. of Nebraska - Omaha
Omar El Sawy Univ. of Southern Calif.	Ali Farhoomand University of Hong Kong	Jane Fedorowicz Bentley College	Brent Gallupe Queens University
Robert L. Glass Computing Trends	Sy Goodman Ga. Inst. of Technology	Joze Gricar University of Maribor	Ake Gronlund University of Umea,
Ruth Guthrie California State Univ.	Alan Hevner Univ. of South Florida	Juhani Iivari Univ. of Oulu	Claudia Loebbecke University of Cologne
Michel Kalika U. of Paris Dauphine	Munir Mandviwalla Temple University	Sal March Vanderbilt University	Don McCubbrey University of Denver
Michael Myers University of Auckland	Seev Neumann Tel Aviv University	Dan Power University of No. Iowa	Ram Ramesh SUNY-Buffalo
Kelley Rainer Auburn University	Paul Tallon Boston College	Thompson Teo Natl. U. of Singapore	Doug Vogel City Univ. of Hong Kong
Rolf Wigand U. of Arkansas, Little Rock	Upkar Varshney Georgia State Univ.	Vance Wilson U. of Wisconsin, Milwaukee	Peter Wolcott U. of Nebraska-Omaha
Ping Zhang Syracuse University			

DEPARTMENTS

Global Diffusion of the Internet. Editors: Peter Wolcott and Sy Goodman	Information Technology and Systems. Editors: Alan Hevner and Sal March
Papers in French Editor: Michel Kalika	Information Systems and Healthcare Editor: Vance Wilson

ADMINISTRATIVE PERSONNEL

Eph McLean AIS, Executive Director Georgia State University	Reagan Ramsower Publisher, CAIS Baylor University
---	---