

Association for Information Systems AIS Electronic Library (AISeL)

ICIS 1986 Proceedings

International Conference on Information Systems
(ICIS)

1986

LINKING INFORMATION TECHNOLOGY AND CORPORATE STRATEGY: AN ORGANIZATIONAL VIEW

Michael R. Vitale
Harvard University

Blake Ives
Dartmouth College

Cynthia M. Beath
University of Minnesota

Follow this and additional works at: <http://aisel.aisnet.org/icis1986>

Recommended Citation

Vitale, Michael R.; Ives, Blake; and Beath, Cynthia M., "LINKING INFORMATION TECHNOLOGY AND CORPORATE STRATEGY: AN ORGANIZATIONAL VIEW" (1986). *ICIS 1986 Proceedings*. 30.
<http://aisel.aisnet.org/icis1986/30>

This material is brought to you by the International Conference on Information Systems (ICIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICIS 1986 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

LINKING INFORMATION TECHNOLOGY AND CORPORATE STRATEGY: AN ORGANIZATIONAL VIEW

Michael R. Vitale
Harvard Business School
Harvard University

Blake Ives
Graduate Program in Computer
and Information Systems
Dartmouth College

Cynthia M. Beath
School of Management
University of Minnesota

ABSTRACT

Considerable attention is currently focused on using information technology to obtain and maintain competitive advantage. Numerous mini-cases have been used to illustrate the use of information systems for competitive advantage, and various conceptual frameworks have been proposed to aid in the identification of such applications. Much of this work is grounded in a single concept of strategy formulation, an approach that we refer to as "top-down." A survey of senior information system executives demonstrates the potential problems of relying on a top-down approach. A second, "adaptive" approach, appears to offer potential value for the identification of competitive applications in organizations facing considerable environmental turbulence or in which senior strategists are relatively uninformed about information system resources. Five organizational roles are defined that can help support this adaptive approach.

INTRODUCTION

Continued decline in the unit cost of computer hardware and steady improvement in the flexibility and power of computer software have led to dramatic growth in the use of information technology in American business. Applications have proliferated rapidly beyond corporate walls to encompass suppliers, distributors and consumers, and consequently, some applications of information technology have acquired the ultimate label of respectability: they are called "strategic" in business journals (McFarlan, 1985), and featured within, and even on the

cover of widely read business magazines (*Fortune*, 1985; *Business Week*, 1985).

Such attention is welcome legitimization for information systems managers who have worked for years to communicate the exciting potential of information technology. But management's new interest in competitive information systems presents a difficult challenge for information systems managers, who frequently find themselves charged with responsibility for identifying and implementing strategic applications. Although management attention has been focused on the potential of competitive information systems, there is a dearth of practical, and even

theoretical, advice as to *how* to identify such applications. While some information systems have clearly had major strategic impact, at least in the short term, we may be unable to *deliberately and reliably* identify and implement information systems that make lasting improvements in competitive position.

Mini-case studies or exemplars, usually used in conjunction with a conceptual framework such as Porter's Competitive Forces (Porter, 1980; Porter and Millar, 1985), or Wiseman's Strategic Thrusts (Wiseman, 1985), are currently the method of choice for raising awareness about competitive information systems (McFarlan, 1985; Frohman, 1982; Cash and Konsynski, 1985; Benjamin, *et al.*, 1984), for facilitating the identification of such systems (Rackoff, *et al.*, 1985; Wyman, 1985), and for developing and illustrating new conceptual models (Ives and Learmonth, 1984; Beath and Ives, 1986; Sullivan, 1985). But the repetition of a few well-known anecdotes may be an idea generation catalyst of insufficient utility (Bakopoulos and Treacy, 1985), even for the competing airlines or hospital suppliers who find the original stories to be frighteningly motivating. Furthermore, the most popular anecdotes, like many myths, are often inaccurate and usually exclude details critical to successful imitation. The mini-cases rarely describe how the initial idea of the system was identified, how the system was initially justified, the costs of the system, or its eventual bottom line impact.

Moreover, much of the literature lends a Pollyanna tone to the issues surrounding strategic information systems; the emphasis has been on describing opportunities and success stories rather than attempting to produce a well balanced presentation recognizing the high risks often assumed, the false starts undertaken, and the failures that must inevitably occur. Wiseman (1985), for example, identifies 118 competitive information systems, some of which are no longer functioning, but never adequately deals with the potential down-side of competitive information systems — the risks assumed, the write-offs incurred, the possibility of competitive retaliation (Cash, 1985; Vitale, forthcoming).

In what follows we first review some of the existing work on the strategic use of information technology. We are interested primarily in the process of selecting business strategy and the process of connecting business strategy and in-

formation technology. We review some data that suggest that the traditional approach may not be appropriate in the IS arena, and we then pose an alternative view of this relationship, one that we think will be helpful in thinking about competitively important applications. Finally, we make some suggestions for developing an environment in which strategic information systems will be identified.

THE PROCESS OF STRATEGY DEVELOPMENT

The degree to which information technology is integrated into a firm's strategic planning process varies from firm to firm, with important consequences in industries with information intensive processes. Consider, for example, the airline industry.

The two largest trunk carriers, American and United, are premier examples of what can be done with effectively applied information technology. In both companies the information systems function reports at a very high level within the organization and plays an integral part in the formulation and implementation of corporate strategy. Both carriers have done well enough with information technology to be sued by competitors on the grounds of unfair competition, allegedly related to their Sabre and Apollo reservation systems.

The cases of Braniff and Frontier contrast markedly with American and United. Immediately after deregulation, Braniff and Frontier both expanded rapidly from their regional niches and began to compete on routes formerly served exclusively by their larger competitors. Neither Braniff nor Frontier had expanded their reservations systems to include travel agents; both were dependent on systems owned by their major competitors for ticket sales and distribution. The relatively infrequent flights that these smaller carriers could sustain to a given city, and the hub-and-spoke arrangements that they, like other airlines, were developing, in fact depended heavily on information technology, but neither carrier seems to have recognized this until it was too late.

In the airline industry some carriers recognized early that information systems were to play a

strategic role, while others pursued strategies that did not involve information technology. Here, and in several other industries, organizations that recognized the strategic role of information systems technology have obtained competitive advantage. We believe that in the near future many organizations will greatly improve their competitive position through the use of information technology – in the long run perhaps to an even greater extent than they can by making more effective use of marketing, logistics, manufacturing, or other functional strengths. The question is: what must we do to insure that information technology is appropriately linked to corporate strategy?

The Top Down Model

Much of the existing work on strategic uses of information technology (McFarlan, 1984; Parson, 1983; Wiseman, 1985) assumes, at least implicitly, a "top down" model of strategy development (Chaffee, 1985; Chandler, 1962). According to this view:

...strategy consists of integrated decisions, actions or plans that will set and achieve viable organizational goals. Both goals and the means of achieving them are results of strategic decision. To reach these goals, organizations vary their links with the environment by changing their products or markets or by performing other entrepreneurial actions (Chaffee, p. 90).

The top down model assumes managers are well-informed about the organization's resources, in particular, the organization's "distinctive competences" (Selznick, 1957) – the unique strengths of an organization that, if leveraged, can produce competitive advantages that a competitor will be unable to easily duplicate – as well as about the constraints and opportunities in the environment shared with their competitors. This model suggests that strategy selection is a rational response to competitive forces (Porter, 1979) in a relatively predictable world. The next step after strategy selection is to maintain or adjust the organization to the requirements of the new strategy, if necessary, by acquiring assets from outside the organization (Andrews, 1971).

In the 1970's, as computing use grew beyond the transaction processing stage, the information systems literature began to include calls for involvement by information systems managers in the strategic planning process (King, 1978; Kriebel, 1968; McLean and Soden, 1977). The rationale for their participation followed directly from the top down approach. Involving IS-aware and IS-responsible people during strategy formulation is more likely to lead to applications that bring sustainable competitive advantage because:

- It signals to the organization that top management recognizes the strategic potential of IS.
- It involves IS management at a time when fewer decisions have been made, thus opening up more avenues of exploration.
- It shortens the lead time for new applications, since IS is aware sooner of management's thinking and can start "learning" the right technologies.

This is not surprising. By analogy, we would not expect to find successful implementation of a low-cost strategy in a firm that first decided to pursue a low-cost position and only later asked how to use marketing and production to support that strategy. In general, however, the appeal for IS involvement fell on deaf ears. IS managers have not been notably successful in interjecting themselves into their firms' strategic planning processes.

As an alternative to direct participation in the organization's strategic planning process, IBM promoted their Business Systems Planning (BSP) process (IBM, 1984). Using this process, a management systems team infers or recreates the firm's goals and strategies through a series of structured interviews with top management, from which specific application proposals are eventually derived. The Critical Success Factors (CSF) methodology, another frequently used information systems planning methodology, also circumvents the problem of direct involvement in the firm's strategic planning process. Instead, general managers are asked to identify those few key areas where "things must go right" for the business to flourish for information systems designers who are not assumed to be well informed about the business (Rockart, 1979, p. 85).

More recently, but still in the spirit of the top down model, Wiseman (1985) and others (Benson and Parker, 1985) have resurrected the call for IS involvement in strategic planning, suggesting that information technology can shape or impact (influence the selection of strategy) in addition to support or align (help the organization realize its strategies).

In general, the typical IS manager does not participate in his or her firm's strategic planning process, but may be under serious pressure from senior management to identify applications which support the firm's competitive strategy. If IS managers are skeptical that the processes proposed to date will, in fact, reveal proposals that will shape corporate strategy, it is not surprising. After-the-fact support for corporate strategies developed without regard for information assets or opportunities will rarely result in competitive applications of the technology, and then usually only by luck. By their very nature, these applications are initially not deeply integrated with the firm's other operations. We identify three reasons that the current top down based methods for identifying strategic applications are likely to be unsatisfactory:

1. Overall strategy does not exist --

Many IS managers would feel very fortunate to have a clear picture of where their organization is headed so that they could match IS and organization efforts. But many organizations have no well defined strategy. The absence of an explicit strategy will preclude either mapping information systems plans to long-range organizational plans or impacting organizational plans with information systems technology.

2. Strategists are uninformed about information systems technology --

Without sufficient knowledge about information system possibilities and capabilities, organizational strategists have a difficult time making effective decisions about the application of information system technology. Such expertise should include familiarity with:

- a. The current applications portfolio, including knowledge of customer and product data-

bases, existing information linkages with other organizations, cost accounting information, et cetera.

- b. The information architecture, including existing and planned communications networks, distributed processors, planned and existing work stations and personal computers, et cetera.
- c. Systems development management, including a workable understanding of the tradeoffs among system costs, schedules, and functionality, and a knowledge of the uncertainties connected with system development estimates.
- d. Future or relatively untested technologies that might have a strategic impact on the organization, its products, or its customers.

3. Environmental turbulence -- Considerable change in the information systems environment may reduce the appropriateness of strategies formulated using a top down process in achieving competitive advantage (Emery and Trist, 1965). Long lead times in the information technology arena increase the risk that a strategy will be valueless before it is fully implemented. Environmental turbulence might be felt in any or all of the following categories.

- a. **Products** - product changes will become increasingly dependent on information system enhancements as economic considerations drive product designers towards making products more information intensive.
- b. **Customers** - both the customer base and customer needs will change. Existing customers may insist on electronic linkages for order entry or

- automated inventory replenishment.
- c. **Competitors** - may change the basis of competition. Information systems technologies may be used to implement these changes, to introduce barriers to entry to lock out potential competitors or to break down barriers to entry to potential markets.
 - d. **Suppliers** - will change as new materials technologies, new production methods, and economic pressures affect the supplier pool. Relationships with existing suppliers will also change. Electronic linkages may prove necessary or competitively advantageous for production planning, inventory control, online ordering, quality control, et cetera.
 - e. **Production Methods** - may change, adding turbulence to the environment. Many of these changes will be related to information system technology, including robotics, CAD/CAM, et cetera.

AN EXPLORATORY RESEARCH QUESTION

As an exploratory research question we propose that for many organizations the environment will not support a top down process for identifying competitive information systems. To test this notion we surveyed 24 participants drawn from 20 companies attending a conference entitled "Information Processing in American Business." The questionnaire (shown in the appendix) focused on the process that these organizations used to identify strategic uses of information systems technologies.

Responses were received from 17 (71%) of the 24 chief information officer or information systems manager participants, representing 13

business units in eleven Fortune 500 (or equivalent) companies, one somewhat smaller company, and three consulting firms. Organizations represented among the respondents included financial services, petroleum, communications, computer vendors (3), business equipment, retailing (2), aerospace (2), food processing, and consulting/public accounting (3). In general, the respondents were highly placed in their organizations. Eleven of the 17 hold positions at the vice president level or above, and another four report to vice presidents.

All but one of the organizations included in the survey have or plan to have a process for identifying strategic uses of information systems technology. Eleven of 17 have a specific ongoing set of activities intended to identify strategic uses of information systems technologies. Of the six who do not currently have a specific process, four plan to implement a specific process within a year, one plans to do so within two years, and one does not plan to do so, having tried it and failed.

Eight of the 11 respondents who currently have a process for identifying strategic applications have used one or more methodologies prescribed for identifying competitive information systems. Seven of the eight had used the CSF approach; four of these had also used IBM's BSP process; and four had used one of the Porter-based approaches (Competitive Forces, Competitive Strategies, or Value Chain). We also asked the respondents to tell us about specific characteristics of the process currently being used. All 11 include a review of the business strategy, and all but one review the applications portfolio or see presentations of new technologies. Eight review the competitive environment and the company's strengths and weaknesses. Based on this information, we argue that the processes being used in these organizations are predominantly top down in nature.

RESULTS

Our exploratory research question predicted a relationship between satisfaction with the process of identifying strategic uses of information systems technology and three organizational factors:

1. Knowledge about information assets and opportunities

2. Turbulence in the organization's competitive environment
3. The presence of a strategic plan for the organization.

Items addressing these three organizational factors appear at the beginning of the questionnaire shown in the appendix. The item measuring satisfaction with the existing system identification process is the last item on the questionnaire. Descriptive statistics for the four measures, for those organizations with a formal process for identifying strategic applications, are shown in Table 1. In the following discussion we review the results for each of the organizational factors.

Presence of a Strategic Plan

Considering the size and maturity of the organizations represented, it is not surprising that we found the level of formal planning to be relatively high. All but two of the 17 do strategic planning, and all but two do information systems planning. Given the lack of variance in the responses to this item we did not include it in our further analysis, but the prevalence of

strategic plans does lend some support to the potential utility of the top down model for identifying strategic applications for most of the organizations included in the survey.

Knowledge About Information Technology

We also predicted that the top down approach will be most apropos if the organization's strategists are knowledgeable about information assets and information opportunities. The underlying assumption here is that managers with limited understanding of information system possibilities and constraints will be unable to formulate viable and effective information-based strategies. As shown in Table 2, the data convincingly demonstrated that there is a strong relationship between IS knowledgeable manage-

Table 2.
Pearson Product-Moment Correlation Coefficient.

	Satisfaction			
	r	r-squared	t	p
Knowledge	0.86	0.73	4.70	< .001
Turbulence	-0.61	0.38	-2.20	< .05

Table 1: Descriptive Statistics.

Variable	N	Mean	Median	Standard Deviation	Range
Satisfaction	10	3.2	3 [marginally satisfied]	0.60	2-4
Knowledge	10	10.1	10	2.88	6-16
Turbulence	10	14.2	14	3.09	10-20

Unit level strategic planning: Of 10, 9 responded "yes", 1 responded "no".

The Knowledge and Turbulence scores were obtained by assigning values to sub-item responses and summing these values. The sub-items can be seen in the Appendix. Values were assigned to the responses as follows:

Knowledge	Turbulence
1 = Uninformed	1 = No Change
2 = Somewhat Informed	2 = Minimal Change
3 = Well Informed	3 = Moderate Change
4 = Very Well Informed	4 = Major Change
(possible scores range from 4-16)	(possible scores range from 4-20)

ment and system identification processes that are viewed as satisfactory (a Pearson product-moment correlation coefficient of .86 is statistically significant at $p < .001$).

Environmental Turbulence

Our third prediction was that environmental turbulence associated with frequent changes in products, suppliers, customers, production processes, or competitive environment would make top down planning more difficult, if not irrelevant, and should be associated with lower levels of satisfaction with the planning process. As shown in Table 2 this prediction was also validated by the survey data. Organizations facing high levels of environmental turbulence were less satisfied with their existing process for identifying strategic applications of information systems.

Summary

In an environment characterized by considerable turbulence, a top down planning process is susceptible to wasted efforts, misdirected investments, and low morale as the organization pursues strategies based on incomplete or inaccurate predictions of the future. Clearly our data suggest that, at least in the organizations surveyed, respondents perceived high levels of environmental turbulence. Moreover, in those organizations experiencing the most turbulence there was a much higher degree of dissatisfaction with the process being employed to identify competitive applications.

High levels of environmental turbulence cast shadows on the utility of the top down planning process as an instrument for identifying competitive applications of information system technology; so too do senior strategists with limited understanding of information technologies and resources. Information technology can shape the firm's strategy only if consideration of information assets and opportunities is incorporated into a firm's strategic planning process in some way. Technological opportunities available in the marketplace to all competitors in an industry (personal computers, commercial software, optical fiber, etc) may permit short-term strategic gains or catch-up moves. But to achieve defendable, long-term strategic benefits,

those external opportunities will probably have to be linked to unique assets currently among the organization's resources, and most likely to the organization's distinctive competences, the factors which give it advantage over its competitors. That is, pure technology probably offers little strategic advantage; advantage flows from using technology to leverage or exploit inimitable assets of the firm -- its history, reputation, culture, management skills, market power, etc. (Barney, 1985). That is why, as our data suggest, that it is so important for strategists to be familiar with information technology opportunities when they strategize.

In addition, the firm must recognize that it may have exploitable information assets -- historical customer or supplier data, order entry and production linkages, communications infrastructures, system development team work skills -- that might also be used as the basis for sustained strategic advantage, either in combination with new information technology opportunities, or in combination with other distinctive competences, or unique assets of the firm. Again, this suggests the need for strategists to be familiar with their current information assets.

THE ADAPTIVE MODEL

A second model of strategy, not as yet explicitly referenced in the strategic IS applications literature, emphasizes continuous adaptation, creating "satisfactory alignments of environmental opportunities and risks, on the one hand, and organizational capabilities and resources on the other" (Miles and Cameron, p. 14). This adaptive model (Chaffee, 1985), unlike the top down model, deals less with predetermined goals, and more with evolution and incremental change. "The adaptive model's definition of strategic behaviors goes beyond that of the top down model to incorporate not only major changes in products and markets, but also subtle changes in style, marketing, quality, and other nuances" (Chaffee, 1985). Quinn (1980) contends that the adaptive model seems closer to the way most firms actually produce and implement strategy than the top down model.

Hayes (1985) suggests that managers typically approach the problem of strategic planning the wrong way around; it makes more sense, he says, to develop resources and then to identify

tactics and strategies that are feasible. This concept is highly relevant to the information systems environment. For example, Hays suggests that the firm "acquire and experiment with new technologies and techniques so that workers and managers gain experience with them and come to understand their capabilities and constraints," (p. 118). The broadly based knowledge that results contrasts sharply with the pockets of expertise that are typical with the top down approach.

Hayes suggests mechanisms for dealing with the turbulence problem. As knowledge spreads throughout the organization, "The company should encourage managers well down in the organization to exploit matches wherever they occur," (p. 118). The point is to "seek continuous improvement in a dynamic environment" by reacting quickly, at relatively low levels of the organization, to perturbations in the competitive environment.

The top down model for identifying competitive information systems is normally implemented as a process. Hayes suggests, instead, changes in organization structure to facilitate the development of technical means and the innovative application of those means in exciting new ways. For example, rather than relying on a specific process for identifying competitive applications, with its attendant roles of process facilitator, executive sponsor, and participant, Hayes' approach suggests permanent changes be made to the organization. Alternative permanent roles seem to offer potential for helping to integrate information technology and strategic planning. The illustrative role descriptions that follow draw from the works of Maidique (1980) and Morrison (1950) on managing technical innovation.

Wizards

Wizards are the corporate experts and librarians for technologies that are judged to have potential strategic impact on the firm. A wizard must be familiar with how the technology operates, what its costs and capabilities are today, what its costs and capabilities are expected to be next year or in five years, what the limitations of the technology are, and how it compares with substitute technologies in terms of costs, capabilities, and limitations. He or she should also be aware of the organization's own strengths and weaknesses vis-a-vis the technology. The wizard should also maintain (or contribute to) a library

of expertise about the technology, including materials suitable for management readers. Finally, the wizard should maintain a file of example applications of the technology including applications both within and external to the organization. Periodically, the wizard should prepare a short summary paper on the technology which is consistent in format with papers prepared for other technologies and understandable to a general management reader.

Marriage broker

One or more relatively senior information systems executives might be designated to act as intermediaries between user managers with interesting ideas and wizards. These marriage brokers will be charged with the responsibility for seeking out and encouraging new ideas for competitive applications, ensuring their technical feasibility, and nurturing budding systems. Like the original marriage broker, ours carefully avoids meetings between the user and the wizard before the plan has reached a certain level of maturity. This marriage broker serves not as a dating service, but instead as a translator, a chaperon, and even, where necessary, a barricade. The marriage broker should ensure that library materials made available to a prospective user are suitable for his or her needs and background, and that the applications presented to the user are understandable and appropriate.

Rich uncle

Money needs to be available to acquire experimental technologies that appear to have potential merit. Prototype applications need initial support that might not otherwise pass the organization's investment hurdles. The rich uncle pays for seeds that users plant, in hopes that trees will grow. These research and development funds need to be available in proportion to the perceived strategic importance of information systems to the organization.

Weed puller

Seeds sometimes produce weeds instead of trees; prototypes and experimental technologies may take on fascinating lives of their own that far exceed their utility to the organization. Periodically such investments must be reexamined and their current utility assessed. The weed puller must be in a position high enough in the organization to be able to avoid the pressures of the

status quo or of special constituencies. He or she also, however, has a responsibility to ensure that those who grew the weeds are not branded as having somehow failed, but rather are viewed as temporarily unlucky horticulturists.

Teacher

The teacher plays an important role in the adaptive organization. Systems analysts, wizards and others within the information systems group, must learn more about the organization's products, customers, competitors, suppliers, and distribution channels. The teacher provides an environment for this learning. The teacher also educates users about the possibilities presented by various technologies. Although the subject of such lessons is ostensibly technology, the presentations cannot be purely technical. They need to be short introductions to the technology with most emphasis placed on existing applications and the identification of potential applications. Wizards are typically no better suited to be teachers than they are to staff the information center. Moreover, teachers need high levels of credibility with their intended audience. In one organization we are familiar with, the head of information systems sees his most important role as being the technology teacher to the management committee. He invests considerable time (and patience) to ensure that senior executives are aware of the potential of cutting edge technologies. Obviously, external experts and consultants frequently fill this role. Job rotation policies, when rigorously adhered to, may provide some of the function of the teacher.

CONCLUSION

Both the literature on strategic information systems and current management practice include mechanisms for identifying strategic applications. The idea generation processes in use are illustrative of the top down approach -- senior strategists attempting to fit information systems technology to organizational goals, or using technological possibilities to derive organizational goals. Our data suggest that such strategies are not likely to be particularly satisfactory if the senior strategists are relatively unaware of technical possibilities, or if the organizational environment is particularly turbulent. The current focus on process issues risks ignoring the

distinctive information-related competences of the firm, thus potentially overlooking opportunities that might result in sustainable competitive advantage. Development of an organizational structure conducive to the identification and implementation of strategic applications may, in the long run, prove to be sustainable competitive advantage in its own right -- that is, an organizational structure that continually assures that the firm is a leader in the strategic use of information technology.

REFERENCES

- Andrews, K. R. *The Concept of Corporate Strategy*, D. Irwin, Homewood, Illinois, 1971.
- Bakopoulos, J. A. Y. and Treacy, M. E. "Information Technology and Corporate Strategy: A Research Perspective," CISR Working Paper #124, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1985.
- Barney, J. B. "Strategy and Organization." UCLA Graduate School of Management, Los Angeles, California, 1983.
- Beath, C. and Ives, B. "Competitive Information Systems in Support of Pricing," *MIS Quarterly*, Volume 10, Number 1, March 1986.
- Benjamin, R. I., Rockart, J. F., Scott-Morton, M. S. and Wyman, J. "Information Technology: A Strategic Opportunity," *Sloan Management Review*, Volume 25, Number 3, Spring 1984, pp. 3 - 10.
- Benson, R. J. and Parker, M. M. "Enterprise-wide Information Management: An Introduction to Concepts," Enterprise-wide Information Management Workshop Report, Washington University, St. Louis, Missouri, June 19-21, 1985.
- Business Week*, "Information Power," October 14, 1985, pp. 108-116.
- Cash, J. I. "Interorganizational Systems: An Information Society Opportunity or Threat?" *The Information Society*, Volume 3, Number 3, pp. 199.
- Cash, J. I. and Konsynski, B. "IS Redraws Competitive Boundaries," *Harvard Business Review*, Volume 63, Number 2, March-April 1985, pp. 134-142.
- Chaffee, E. E. "Three Models of Strategy," *Academy of Management Review*, Volume 10, Number 1, 1985, pp. 89-98.
- Chandler, A. D. Jr. *Strategy and Structure*,

- MIT Press, Cambridge, Massachusetts, 1962.
- Emery, F. E. and Trist, E. L. "The Causal Texture of Organizational Environments," *Human Relations*, Volume 18, February 1965, pp. 21-32.
- Fortune*, "How to Keep Your Customers Happy Captives," September 2, 1985, pp. 42-46.
- Frohman, A. L. "Technology as a Competitive Weapon," *Harvard Business Review*, January-February 1982, pp. 97-104.
- Hayes, R. H. "Strategic Planning - Forward in Reverse?" *Harvard Business Review*, Volume 63, Number 6, November-December 1985, pp. 111-119.
- IBM, *Information Systems Planning Guide: Business Systems Planning*, (4th Ed), IBM Corporation, New York, New York, 1984.
- Ives, B. and Learmonth, G. "The Information System as a Competitive Weapon," *Communications of the ACM*, Volume 27, Number 12, December 1984, pp. 1193-1201.
- King, W. R. and Cleland, D.I. "A New Method for Strategic Systems Planning," *Business Horizons*, August 1975.
- King, W. R. "Strategic Planning for MIS," *MIS Quarterly*, Volume 2, Number 1, March 1978, pp. 27-37.
- Kriebel, C. H. "The Strategic Dimensions of Computer Systems Planning," *Long-Range Planning*, September 1968.
- Maidique, M. A. "Entrepreneurs, Champions, and Technological Innovation," *Sloan Management Review*, Volume 21, Number 2, Winter 1980, pp. 59-73.
- Morrison, E. E. "A Case Study in Innovation," *Innovation and Science Monthly*, April 1950.
- McLean, E. R. and Soden, J. V., *Strategic Planning for MIS*, John Wiley and Sons, New York, New York, 1977.
- McFarlan, F. W., McKenney, J. L. and Pyburn, P. "The Information Archipelago - Plotting the Course," *Harvard Business Review*, Volume 61, Number 1, January-February 1983, pp. 145-156.
- McFarlan, F. W. "Information Technology Changes the Way You Compete," *Harvard Business Review*, Volume 62, Number 3, May-June 1984, pp. 98-103.
- Miles, R. H. and Cameron, K. *Coffin Nails and Corporate Strategies*, Prentice-Hall, Englewood Cliffs, New Jersey, 1982.
- Parsons, G. L. "Information Technology: A New Competitive Weapon," *Sloan Management Review*, Volume 25, Number 1, Fall 1983, pp. 3-14.
- Porter, M. E. "How Competitive Forces Shape Strategy," *Harvard Business Review*, Volume 57, Number 2, March-April 1979, pp. 137-145.
- Porter, M. E. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, New York, New York, 1980.
- Porter, M. E. and Millar, V. I. "How Information Gives You Competitive Advantage," *Harvard Business Review*, Volume 63, Number 4, July-August 1985, pp. 149-160.
- Porter, M. E. *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York, New York, 1985.
- Quinn, J. G. *Strategies for Change: Logical Incrementalism*, D. Irwin, Homewood, Illinois, 1980.
- Rackoff, N., Wiseman, C. and Ullrich, W. A. "Information Systems for Competitive Advantage: Implementation of a Planning Process," *MIS Quarterly*, Volume 9, Number 4, December 1985, pp. 285-294.
- Rockart, J. "Chief Executives Define Their Own Data Needs," *Harvard Business Review*, Volume 57, Number 2, March-April 1979, pp. 81-92.
- Rockart, J. and Scott-Morton, M. S. "Implications of Changes in Information Technology for Corporate Strategy," *Interfaces*, Volume 14, Number 1, January-February 1984, pp. 84-95.
- Selznick, P. *Leadership in Administration: A Sociological Interpretation*, Harper & Row, New York, New York, 1957.
- Vitale, M. "The Growing Risks of Information Systems Success," forthcoming in the *MIS Quarterly*, Volume 10, Number 4, December 1986.
- Wiseman, C. *Strategy and Computers: Information Systems as Competitive Weapons*, Dow Jones-Irwin, Homewood, Illinois, 1985.
- Wyman, J. "Technological Myopia - The Need to Think Strategically About Technology," *Sloan Management Review*, Volume 26, Number 4, pp. 59-64.

APPENDIX

Name of company (Optional) _____ Your Title _____

Industry _____ Report To (title) _____

Please answer the following questions for the business unit of your firm that you are associated with. If you are at the corporate level answer for the entire corporation, unless the units of the corporation are diverse in the way they do strategic planning or manage information system resources. In that case, please respond to the questions for the single business unit with which you are most familiar or for the corporate staff. Please check one:

	Corporation <input type="checkbox"/> 9	OR	Business Unit <input type="checkbox"/> 4	OR	Corporate Staff <input type="checkbox"/> 4
How well informed is the top management of this unit about:					
			Somewhat Informed		Very well Informed
			Uninformed		Well Informed
The current applications portfolio	<input type="checkbox"/>		<input type="checkbox"/> 11		<input type="checkbox"/> 3
The information architecture	<input type="checkbox"/> 5		<input type="checkbox"/> 7		<input type="checkbox"/> 1
Systems development management	<input type="checkbox"/> 1		<input type="checkbox"/> 8		<input type="checkbox"/> 2
Future technologies	<input type="checkbox"/> 1		<input type="checkbox"/> 7		<input type="checkbox"/> 2

	No Change	Minimal Change	Moderate Change	Major Changes
How much change has this unit experienced over the past three years for:				
Products	<input type="checkbox"/>	<input type="checkbox"/> 2	<input type="checkbox"/> 5	<input type="checkbox"/> 10
Customers	<input type="checkbox"/> 2	<input type="checkbox"/> 4	<input type="checkbox"/> 8	<input type="checkbox"/> 3
Competitors	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 9	<input type="checkbox"/> 4
Suppliers	<input type="checkbox"/> 1	<input type="checkbox"/> 6	<input type="checkbox"/> 6	<input type="checkbox"/> 4
Production methods	<input type="checkbox"/>	<input type="checkbox"/> 3	<input type="checkbox"/> 10	<input type="checkbox"/> 4

Does the business unit carry out:

Yes	No		
15	2	<input type="checkbox"/>	Strategic planning at this unit level
15	2	<input type="checkbox"/>	Information systems planning

Does the unit have a specific ongoing set of activities intended to identify strategic uses of information systems technologies (IST)?

6 No

Yes 11

If not, do you intend to implement a specific process to identify strategic uses of IST?

- 5 Yes, in the next ___ years
 No,
because (check all that apply):
- Too expensive
 - Too time consuming
 - Won't work here
 - 1 We tried and it failed
 - No strategic opportunities for IST here
 - Other _____

Thanks for your help.

Who participates and what role do they play in this process?			
	Sponsors	Facilitates	Participates
General manager	8	6	3
Functional execs	7	6	7
I.S. managers	7	8	7
Internal consultants	1	4	6
External consultants		4	4
Functional staff		1	8
I.S. staff	2	7	11
"Creative types"	2	3	4
Other _____			

Please turn to the back

The following methodologies have been prescribed as useful for identifying competitive information systems applications.	How familiar are you with the methodology?				If you have used the methodology to identify strategic applications, how well does it work?				
	Not at all	Heard of	Familiar with	Have used	Unknown	Too soon to tell	Poorly	Okay	Excellent
Porter's <i>Competitive Forces</i> (new entrants, substitute products, suppliers, buyers, nature of competition)	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 4	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/> 2	<input type="checkbox"/> 1
Porter's <i>Competitive Strategies</i>	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 3
Porter's <i>Value Chain</i>	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 5	<input type="checkbox"/> 3	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 2
Wiseman's <i>Strategic Thrusts</i>	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>
Ives & Leamonth's <i>Customer Resource Life Cycle</i>	<input type="checkbox"/> 9	<input type="checkbox"/> 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IBM's <i>BSP</i>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<i>Critical Success Factors</i>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/> 3	<input type="checkbox"/> 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<i>Grey Cells</i> (Nolan & Norton)	<input type="checkbox"/> 2	<input type="checkbox"/> 7	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>
<i>Information for Competitive Advantage</i> (Arthur Andersen & Co.)	<input type="checkbox"/> 5	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>
<i>Market Power Position</i> (AT&T)	<input type="checkbox"/> 10	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Impact-Value Matrix</i> (Hammer Inc.)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1	<input type="checkbox"/>

How often is the process for identifying strategic uses of IST carried out?

6 Annually

Quarterly

5 Unscheduled

Does the process include use of (check all that apply):

- 11 A review of business strategy
- 8 A review of competitive environment
- 8 A review of our strengths & weaknesses
- 10 A review of applications portfolio & data resources

- 5 A review of examples
- 10 Presentations of new technologies
- 5 Team building exercises
- 3 Creativity training sessions
- 7 Brainstorming, etc.

What is the single most common way that you establish priorities for potential applications of IST identified through this process (check only one)?

- 3 Cost benefit analysis
- 5 Strategic importance

- 3 Negotiation
- Other _____

How satisfied are you with the results of your process for identifying competitive applications of information systems technologies?

- | | | | | |
|--------------------------|----------------------------|----------------------------|----------------------------|--------------------------|
| Completely Dissatisfied | Dissatisfied | Marginally Satisfied | Reasonably Satisfied | Very Satisfied |
| <input type="checkbox"/> | <input type="checkbox"/> 1 | <input type="checkbox"/> 6 | <input type="checkbox"/> 4 | <input type="checkbox"/> |

What single aspect of the process most needs improvement? _____

Thanks for your help