Information Technology and Corporate Strategy: A View from the Top

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Letters to shareholders in 649 annual reports published between 1972 and 1987 were analyzed for CEOs' views about information technology. Significant differences were found across industries—banking, publishing, petroleum, and retailing—in the number of times information technology was mentioned, the types of applications discussed, and the content of the discussion. The results of the industry analysis were in keeping with expectations based on the relative information intensity of the various industries. An analysis of the letters over time suggests that the position of IT in the firm, at least as seen by the CEO, was not much different n 1987 than it had been in 1982, but has expanded considerably from its position in 1972 and 1973. Reassuringly, we also found that the number of IT related phrases in the CEOs' letters to the shareholders was positively correlated with the firm's yearly net profits as a percentage of sales. A lagged analysis on profitability data could not, however, resolve the competing explanations for the correlation between profits and the number of IT-related phrases. These findings contribute new insights concerning strategic information systems and support the use of annual report data in analyzing organizational information technology phenomena.

Information technology management—CEOs—Senior management—Annual reports—Strategic information systems—Longitudinal data—Industry comparisons

Introduction

I am convinced that one of the key factors for success for any bank in the future will be its ability to marshal the resources of computing and telecommunications in direct support of its business objectives.   . The Group has begun to consolidate and standardize its various data centres . . . much has been done to achieve a proper partnership and mutual understanding between the business sectors and specialist IT managers to allow the Group to extract a full return from its investment in IT . . . IT has helped the Bank to maintain its competitive edge; in the development of completely new corporate banking systems . . . a major programme of IT education at all levels of management has begun   . we were fortunate to obtain the services of Gene Lockhart as our first IT director. (Chairman's Letter, 1987 Annual Report, The Midland Group)

The Chairman's letter of the annual report: a status report to the shareholders, but also an opportunity to impress financial analysts, reassure suppliers, cajole customers, signal competitors, or revitalize employees—a few pages to capture the highlights of the year while summarizing the firm's plans and aspirations for the future. For publicly traded companies the letter to the shareholders provides a consistent set of windows from which an observer can watch as strategy evolves or comes unglued.

If information technology plays a significant role in corporate strategy, then the letter to the shareholders may reflect that role. For example, in his 1987 letter to the shareholders, abstracted above, Sir Kit McMahon, Chairman of the United Kingdom's Midland Group, proclaims that Information Technology (IT)[1] will play a significant role in the Bank's corporate strategy for 1988 and beyond. Twelve sentences of McMahon's letter discuss issues related to IT reorganization and IT strategy, while only three are devoted to the Bank's dramatic decision to write off £916 million in bad loans.

The Chairman's letter to the shareholders presents a unique observation deck for the researcher interested in examining strategy (Ginsberg, 1988). Bowman (1984) demonstrates that, "content analysis of annual reports can be of real usefulness for understanding some issues of corporate strategy" (p. 70). Bettman and Weitz (1983) contend that the chairman's letter, which is a standardized component of the report[2], provides comparable, and more objective data on organizations than interviews. Although public relations departments may assist in writing the letters, Bettman and Weitz (1983) point out that the letters "are subject to a great deal of public scrutiny," thus leading to "severe consequences if obvious biases are shown in the causal reasoning presented" (p. 171). Salancik and Meindl (1984) argue convincingly that the "president of a firm could not easily disclaim the contents of a letter he signed and published" (p. 243). Pfeffer (1981), recognizing the utility of the chairman's letter as a source of "objective" data on organizations, has called for increased research use of annual report data.

The chairman's letter of the annual report hence provides a well established research window into the highest levels of publicly traded corporations. Within this paper we use that window to observe CEOs' perspectives on IT and strategy.

IT and Corporate Strategy: The Status of Current Research

Since the early 1980's the terms "information technology" and "corporate strategy" have been coupled with recurring regularity in the information systems literature. IT, we are told, can provide new forms of customer service, new distribution channels, new information based products, or can even rearrange industry boundaries (Cash et al. 1988, Cash and Konsynski 1985, Porter and Millar 1985). Examples of such strategic IT[3] applications are frequently cited (Wiseman 1985, Keen 1981) and frameworks are proposed to help understand (e.g., Benjamin et al. 1984),

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[1] Information technology refers to computer, communications, or office technology.

[2] The letter reviews (1) the financial position of the company and provides explanation for the results, briefly discusses (2) the major events such as acquisitions, divestitures, new product introductions, changes in senior management, etc., and puts forth (3) the outlook and the short- and long-term strategies and how to reach them.

[3] A strategic IT implies that IT "changes a firm's product or the way a firm competes in the industry."

identify, and categorize similar opportunities (e.g., Johnston and Vitale 1988, Porter and Millar 1985, Ives and Learmonth 1984, Gerstein and Reisman 1982).

But, as an area of academic research, IT and corporate strategy has been soundly criticized. With some exceptions (e.g., Runge 1985, Reich and Benbasat 1988), the work in the area has been anecdotal or conceptual rather than empirical or theoretical. The studies have used convenience samples—companies which have already achieved public acclaim for successful strategic uses of information technology. Bakos and Treacy (1986) state "Much of the current work on the strategic impacts of information technology . . . makes little or no use of bodies of theory related to either strategy or competition" (p. 117). Similarly, Clemons and Kimbrough (1986) find,

> This literature largely relies on a common and perhaps overworked collection of examples.
> . . Unhappily, neither the literature nor the oral tradition goes into much depth; both are
> largely anecdotal. Little is understood by way of general principles or theory about why
> certain moves work or are likely to work, or why others fail (p. 99).

The lack of rigor is not surprising. Empiricism is hampered by the immaturity of the research area, the necessity of treating the organization as the unit of analysis, the lack of measures to assess the effects of strategic IT, and the understandable reluctance of management to let researchers get too close to the formulation and communication of strategy. Capturing the Chief Executive's perspective presents further challenges due to scheduling and availability constraints and, occasionally, a reluctance to expose their ignorance of the phenomena in question. A single exception is the work of Brancheau and Wetherbe (1987) in which they included 12 "general managers" in addition to 68 information systems executives in a Delphi study designed to ascertain the key issues in information management[4].

The current study is a small step toward empiricism. Using eight years of CEO-level data drawn from 88 companies, the study evaluates the state of strategic IT from the view point of the firm's Chief Executive.

IT and Corporate Strategy: The CEO's Perspective

In an earlier era, when IT expenditures were considered to be back office investments, the Chief Executive Officer's view of IT, though interesting, was not usually seen as vital to success. Back office investments in IT tended to be based on expense reductions; an IT steering committee backed up by an accountant with a return on investment calculator assured senior management that investments in IT were well founded. The chief executive's only role was to ensure that expense controls were in place and to referee resource disputes among the business units or functional areas. But as the IT portfolio moved out of the back office and into new products, product delivery systems, and customer service applications, the benefits have tended to move from the expense to the revenue category. Justifications here are often driven by intuition and gut feel, with a push from the top often required to lubricate or circumvent approval processes best suited for justifying applications solely on the basis of hard savings (Runge 1985, Ives and Vitale 1988).

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[4] A general manager was the president, vice-president, or corporate general manager to whom the firm's chief IT executive reported.

It is now widely believed that to exploit strategic opportunities from IT, the Chief Executive must view IT as a component of corporate strategy. As applications of IT become a necessary element of organizational strategy, the Chief Executive Officer's views and leadership about investments in IT are anticipated to become considerably more relevant and, presumably, more instrumental in corporate success or failure (Clemons and Row 1988). Parsons (1984), among others (Benjamin et al. 1984, Dooley and Kanter 1985, Bakos and Treacy 1986), argues that "in order for IT to become a viable competitive weapon, senior management must understand how IT may impact the competitive environment and strategy of the business" (p. 4). The importance of senior management commitment to IT initiatives has been echoed by many others (Cash et al. 1988, Izzo 1987, Keen 1988). Rockart (1988), for example, claims that "information technology is far too important, in 1988, to be left to infor- mation technologists" (p. 59). IT may also provide opportunities to engender econo- mies of scope across diverse business units or functional areas—opportunities that may only be obvious or implementable from corporate offices. Porter and Millar (1985) argue that "general managers must be involved to ensure that cross-functional linkages [made possible by IT] are exploited" (p. 159).

Some empirical evidence supports these assertions. King's (1986) survey of 51 IT executives found that the lack of top management support was seen as the strongest inhibitors of a company's efforts to create strategic applications. In a study of eleven strategic IT applications in nine Canadian companies, Reich and Benbasat (1988) found that 50% of respondents reported the support of the Chief Executive officer as being very important in developing strategic applications; eighty percent of the sys- tems had been given a high profile by senior management during the development process. Johnston and Carrico (1988) cite an instance where a CEO took it upon himself to promote IT as a competitive weapon; the CEO persistently challenged both his line executive cadre and IT people to "find ways to change the rules in our business so that we can use our IS resources to win" (p. 41). A strong positive orienta- tion toward IT from the CEO's office seems essential for the corporation to have an IT vision and a conducive environment for developing strategic applications.

The Research Questions
But, what are the Chief Executives' perceptions about the role of IT as a tool of corporate strategy? How instrumental do business leaders view IT to be to their plans? What problems and opportunities do they perceive that IT presents? And how do the Chief Executives' perceptions of the importance of IT vary over time in a firm, across industry, and between firms that are doing well and firms that are doing poorly? We will study these perceptions by analyzing the reasoning expressed in CEOs' letters to shareholders.

Industry Differences
The strategic role of IT and the CEO's perceptions of the importance of IT are believed to vary across industry boundaries. Such differences, if they exist, should be reflected by CEOs' comments about IT in their letters. Cash et al (1988) argue via their Strategic Grid framework that IT is more strategic in some industries than in others. Porter and Millar (1985) propose that industries characterized by high "infor- mation intensity" in their products and processes will have greater opportunities to exploit IT than those that do not. Johnston and Carrico (1988) also hypothesize

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differences in the utility of IT across industry boundaries, providing some tentative support for this claim based on interviews with IT executives and senior line management. By contrast, Reich and Benbasat (1988) did not find support for the notion that competitive advantage is more likely when organizations' products have high versus low information content. However, the study by Reich and Benbasat had a "preponderance of financial institutions in it" (p. 35), thus decreasing the likelihood of detecting industry differences.

Changes Over Time

Information technologies' hypothesized strategic role is frequently postulated to have grown over time. If so, we might expect to find a corresponding increase over time in the extent to which IT was mentioned in the Chairman's letter to Stockholders. Gibson and Nolan (1974) first predicted IT's maturation in the organization through stages. Although the Gibson and Nolan stage model has proven difficult to validate (Drury 1983, Benbasat et al. 1984, King and Kraemer 1984), some modest evidence supports the elevation of the IT's role in the organization over time. Rockart (1988) envisions that IT has moved through a series of "eras," and has most recently entered an era which he describes as the "wired society." In the wired society, systems "almost always require major, sometimes radical, alternations in an organization's structure, personnel, roles, and business processes" (p. 60), and therefore require "change processes effectively managed by those responsible for the management of the business itself" (p. 60). Cash et al. (1988) also postulate that the strategic role of IT changes over time in industries and firms within industries.

There is some empirical evidence demonstrating an escalation of IT's role in organizations. A Delphi study conducted by Brancheau and Wetherbe (1987) found that respondents viewed the use of information for competitive advantage as a critical issue of information systems management in 1986, though the issue had not arisen in a similar study done three years earlier (Dickson et al. 1984). There is also evidence that over time more senior "technology officers" report to the highest level in the organization. Benjamin et al. (1985) found that in 1983, sixty percent of the chief IT executives surveyed were positioned within two levels of the CEO and 20% reported directly to the CEO. A 1968 survey by Davis (1974) reported that only 32% were within two levels from the CEO and 12% reported directly to the CEO.

The nature of services and applications provided by the information systems group is also believed to have changed over time. The production and installation of home grown systems has to some extent given way in priority to the provision of services such as education, consultancy, and package evaluation (Benjamin et al. 1985). The new, strategic applications also tend to be targeted at the customer or the distribution channel rather than on systems for internal efficiency. For industries where information is itself a product, we would expect to see an increasing number of IT applications that pertain directly to the product. Such differences, if in fact true, should be reflected in the events discussed by the CEO in the annual report.

Winners versus Losers

The view that industry leaders, or "winners," will make more aggressive use of IT than "losers" is at the heart of the argument promoting IT for competitive advantage. We hoped to verify this assumption by relating the firm's performance with the extent to which IT was mentioned in the CEO's letter to shareholders. Although some

studies (e.g., PIMS 1984) have found that high performing companies allocate a significantly greater proportion of their revenues to IT expenditures than companies with lower performance, there is little empirical evidence to conclude that the existence of IT vision or the extensive use of IT increases organizational performance. The lack of evidence is largely due to the nonexistence of measures to assess IT impact. Even within a single industry, e.g., airlines, it is very difficult to directly link changes in a competitive position to particular investments in IT (Copeland and McKenney 1988). The CEO's views might, however, be considered as one possible surrogate measure for IT impact on the organizational and industry level. If events related to IT have been noticed by the CEO, and discussed and tied to strategy in the Chairman's letter, strategic IT may have had some positive impact on organizational performance and position in the market. Hence, we expected that in those firms where strategic IT has had a notable impact on performance, the Chairman's letter was likely to focus on IT issues.

Methodology

The annual report's letter to the shareholders presents a modest opportunity to examine the CEO's views about IT, and to cast some light on the above research questions. Whether the letters actually represent the true beliefs of the CEO, or complete and accurate statements of past corporate behaviors or future intentions, is unknown and somewhat irrelevant given that the letters are largely undeniable by the CEO. For this exploratory research then, the letters can effectively serve as rough surrogates for CEOs' views and the status of IT in the organization. In this section we describe how the Chairman's letters were used in the study[5].

Preliminary Methodology Check

The first step was a simple validation of the methodology. If the Chairman's letter to the stockholders was to serve as a surrogate measure of the Chairman's actual views about IT, then we required reassurance that annual reports were a reasonable source of such statements. To test this assumption, we identified 10 firms that had developed systems which had become popular success stories as strategic applications of IT, and whose CEOs were known to have made public statements about applications. The firms and the applications are listed in Appendix A. For each firm we examined annual reports from 1982–1987, looking for some mention of the application in the Chairman's letter.

As Appendix A shows, the results were reassuring. CEOs' letters from all of the ten organizations examined included statements of the application and its organizational implications in one or more annual reports during the years examined. The Chairman's letter seemed to be a reasonable source of information on CEOs' views about IT, at least for the success stories.

Sample Selection

A total of eighty-eight firms were included in the main study—the firms were selected from four industries including banking, publishing, petroleum, and retailing. Industries were selected so as to provide a wide diversity of IT potential. We contend

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[5] Recently, several papers have been published in the *Administrative Science Quarterly* that have used CEO's letters as the primary source of data on corporate strategy and reasoning (see Bettman and Weitz 1983, Salancik and Meindl 1984).

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that banking is an industry whose product, like publishing, is information; they are long time users of IT, invest a large percentage of their operating budgets on IT, and are generally considered to be strategic users of IT (Cash et al. 1988). Retailers are increasingly dependent on cost-effective, reliable IT operations. Nonetheless, retailers generally do not use information within their products and have only recently begun to aggressively use the massive point-of-purchase data at their disposal, to fine tune their operations. Publishing has long been a user of IT in support of the production and delivery process (e.g., electronic editing and composition systems, satellite transmission), but recently has begun to move toward platforms based on emerging information technologies (e.g., videotext, CD-Rom) as vehicles for packaging information products. Petroleum, with the exception of oil exploration, seems to rely little on strategic IT, using it instead primarily as a back office, support tool. Johnston and Carrico (1988), for instance, note that, "the executives in the oil . . . companies do not perceive as much information content in the key relationships, have products whose value is not as strictly time dependent, and do not perceive competitive pressures that dictate an all-out effort to build IT advantages" (p. 41).

In each industry "winners" and "losers" were initially selected based on growth in revenues over the years from 1982 to 1987. The choice of sales growth as an indicator of a firm's success is a debatable one. Bettman and Weitz (1983), however, felt that revenue growth "was the most visible and easily interpretable indicator," and "depends on accounting conventions to a lesser extent that other potential indicators" (p. 176). Revenue figures, and total assets in case of banks, were obtained from the Fortune 500 lists appearing in special issues of *Fortune* in 1983 through 1988[6,7]. Firms selected were among Fortune 500 firms for the last six years[8]. The twelve firms with the greatest average annual growth in a given industry over the six years were selected as the "winners" while the thirteen with the least growth were the "losers." The firms in each industry are shown in Appendix B.

Content Analysis of Letters

Annual reports were obtained for each of the firms for the years 1982 through 1987, resulting in 528 reports[9]. The 1982–1987 period was selected because it includes the years in which "information for competitive advantage" was discovered and enshrined by the business and academic press. The Chairman's letter was copied, read, and all words related to IT were underlined. The analysis proceeded following the general principles put forth by Krippendorff (1980) for the content analysis method. An IT-related phrase was a unit of analysis and was defined as an instance of a word or a set of words that, "Discusses the management, application, investment, organization of computer, communications, or office technology for improving or

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[6] Caution must be used in cross-industry comparisons because of the different criterion (assets versus revenue) used to select banks versus the firms in the other three industries.

[7] *Fortune* lists the company only if more than 50% of their operating revenues come from that industry-related activities the companies are listed in Fortune 500 on the basis of their revenues; only public firms are ranked.

[8] In petroleum annual reports for only 22 out of the 25 companies were available. The eleven highest growth petroleum companies that issued annual reports constituted the winners; the eleven lowest growth firms that issued annual reports were treated as the losers. Publishing had only sixteen Fortune 500 companies in total. The eight with the highest growth were declared as the winners; the eight with the lowest growth were the losers

[9] We were unable to obtain 10 of the 528 letters to shareholders. Thus the actual sample was 518 letters.

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modifying operations, establishing linkages with customers, suppliers, competitors, channel partners, or the development of new products." Each IT-related phrase referred to only one instance of an IT-related event, opportunity, or problem. An initial test with a subset of reports found that two readers were in near 97% agreement concerning the identification of IT-related phrases. Therefore this task was subsequently carried out by a single reader.

46.9 percent of the 1982–1987 annual reports were found to have one or more IT-related phrases. For these 243 reports a rater counted up the total number of IT-related phrases. Two raters, who were unfamiliar with the purpose of the study, independently coded each of the IT-related phrases using the coding scheme shown in Appendix C.

Given the exploratory and descriptive nature of the study, we sought a coding scheme that captured the main IT issues discussed by CEOs in annual reports while providing evidence to examine the questions and propositions put forth in the previous section. The coding scheme was empirically derived based on a set of recent annual reports from banks and retailers in the UK. The coding scheme had two levels, each capturing a different aspect of the IT-related phrase: (1) the context in which IT was discussed in the letter (financial performance, major event of the year, or future outlook) and (2) the nature of IT investment/problem/opportunity expressed (increase in general IT expenses, investment in IT to offer new products, investment in IT to change a production or service process, IT executive change, consolidation of systems, etc.). The context of each IT-related investment/problem/opportunity discussed by the CEO was coded, in keeping with Salancik and Meindl's (1984) warning that views are context dependent. Three sets of pilot data were used to test and refine the coding scheme.

Two raters were trained using the above mentioned sample of UK annual reports. Disagreements between the raters on the training sample were discussed and resolved before the raters moved on to the study sample. To assess the degree of agreement in the study sample, the raters' responses were statistically compared and found to be acceptable[10]. The ratings of the rater who was more knowledgeable in corporate management and strategy were used in the subsequent analysis.

Final Methodology Check

We also conducted a field validation of the methodology to assure that there is indeed a relationship between the CEO letter content and both the CEO's views of IT and the strategic use of IT within the organization. We sent a questionnaire to the senior IT executive in each of the 88 companies. The questionnaire asked them to evaluate their CEO's views about IT and to rate the state of IT in the organization. Each company in the sample was contacted via telephone to obtain the name of the most senior IT executive in the firm. Fifty-six IT executives contacted responded.

Encouraging support was found for the use of CEO letters to study the information technology phenomenon. Exhibit 1 shows that IT executives' responses to the

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[10] The phrases were compiled into an agreement matrix, and the proportion of agreement and the Kappa Coefficient were calculated. The raw proportion of agreement was 0.92 for Level 1 codes and 0.90 for Level 2 codes. The Kappa Coefficient, which measures the proportion of agreement between raters after agreement which can be attributed to chance has been removed (Cohen 1960), was 0.84 and 0.86, respectively. These reliabilities are very comparable to those reported in Bettman and Weitz (1983) and Salancik and Meindl (1984).

EXHIBIT
Correlation between the Field Questionnaire Responses and the IT-Related Phrases in CEO Letters

Field Questionnaire	IT-Related Phrases	
	1987 CEO Letter	1986 CEO Letter
CEO perceived importance of IT for the firm	0.35 ($p < 0.01$)	0.33 ($p < 0.05$)
Company's current strategic use of IT	0.40 ($p < 0.01$)	0.39 ($p < 0.01$)

All statistics are Pearson Product Moment Correlation Coefficients.

question of "How important does your CEO perceive IT to be for your firm?" significantly correlated with the number of IT-related phrases in the company's 1987 and 1986 Chairman's letters. The 6-point Likert-like scale for the question ranged from "no concern for IT" to "IT is single most critical factor for firm." A significant correlation was also found between the IT-related phrases and the responses to the question of "How would you describe your firm's use of information technology?". The latter question had a 5-point scale that ranged from "laggard" to "industry leader." The results of the methodology check were reassuring given that independent responses on the CEO views were obtained from the IT executive rather than the CEO's office (for more details on the survey, see Jarvenpaa and Ives 1989).

Results

Exhibit 2 shows a breakdown, by industry, of the percentage of companies and the percentage of 1982–1987 letters in which the chief executive mentioned information technology to the stockholders. Over 90% of the companies in banking, publishing, and retailing had included IT-related phrases in the Chairman's letter at least once during the 1982–1987 timeframe. However, in keeping with the expectations of Johnston and Carrico (1988), IT was rarely mentioned in the petroleum industry. Exhibit 3 shows the average number of phrases per chairman's letter for those letters that had references to IT. As a basis for comparison, in his Chairman's letter to the 1987 annual report for the Midland Group, Sir Kit McMahon used 16 phrases to discuss information technology, far more than the three phrase average for his U.S. banking peers who chose to discuss IT. Publishing led the four industries, although petroleum, lagging far behind, was the only industry to statistically differ from the other three.

EXHIBIT 2
Percentage of Companies and Letters with IT-Related Phrases during 1982–1987

Industry	Companies with IT-Related Phrases	Letters with IT-Related Phrases
Banking	92%	53%
Publishing	94%	64%
Petroleum	50%	16%
Retailing	92%	57%

EXHIBIT 3

Mean Number of IT-related Phrases in Letters with IT Phrases during 1982–1987

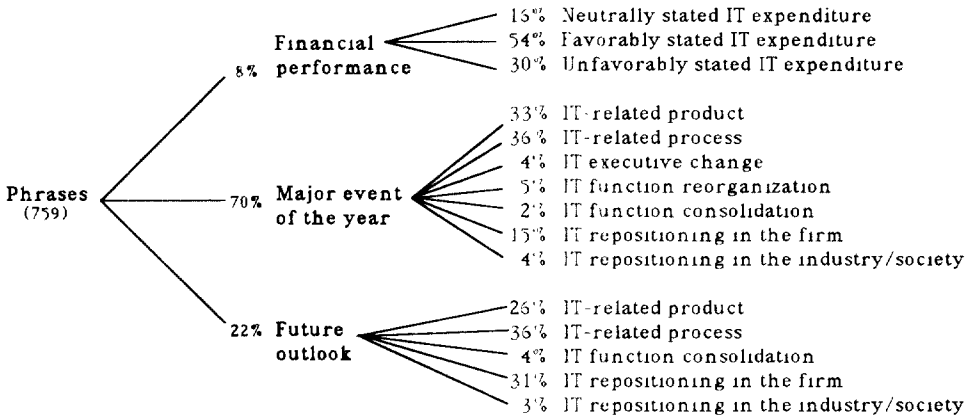|	(Number of companies)	Letters with IT Phrases (N = 243)	
		Mean	Std
Total	(88)	3.1	2.5
Banking	(25)	3.3	2.8
Publishing	(16)	3.9	2.7
Petroleum	(22)	1.3	0.9
Retailing	(25)	2.8	1.9

Content analysis of the IT-related phrases demonstrated that CEOs are far more likely to discuss IT in the context of the past year's events rather than they are to link IT to either financial performance or future events. From Exhibit 4 we see that 70% of the IT-related phrases focused on IT activities over the previous year ("we equipped 305 stores with checkstand scanning systems" [Safeway, 1983]) while a relatively small, 8%, placed IT statements within a financial context ("The information systems arm . . . bringing in more than $30 million in annual revenues" [Norwest, 1986]). Where financial performance was linked to statements about IT, as at Norwest, it was generally done in a favorable way. Of the eighteen phrases that included unfavorable statements about IT investments, many represented major strategic failures that shareholders would have already learned about from other sources ("The 1982 loss was due mainly to costs associated with *The New York Times* Information System" [*The New York Times,* 1982]). Less costly failures, including some such as home banking or videodisk that had been enthusiastically endorsed in previous annual reports, were generally allowed to slide into obscurity with no further notice in the report.

The phrases reporting the major IT events of the year dealt mostly with new IT-related products ("NCNB became the first bank to offer home banking in North Carolina" [1985]), production processes ("Our electronic pre-press system was expanded with the installation of satellite receiving earth stations . . ." [Donnelly, 1983]), or umbrella statements about the increasing importance of IT (i.e., repositioning) in the firm (". . . We view technology as the key to our delivery of both wholesale and retail banking products and services" [First Interstate, 1985]). A few announcements of executive changes were included in the letters, and announcements of corporate reorganizations and consolidations were occasionally found ("We continue to improve our efficiency and productivity through the consolidation of backroom processing activities in centralized locations . . ." [Bank of America, 1985]). Industry- or society-wide implications of technology were discussed in some letters ("How can we invest in a proven technology that I am certain can fill the void in classrooms left by the miserable failure of computers as teaching instruments?" [Harcourt, 1985]).

The research questions described previously predicted that the CEO's perspective on information technology, as reflected in the letters to the shareholders, would vary from industry to industry, over time, and between successful and less successful firms. The following sections describe the results in each of these three areas.

EXHIBIT 4

Context and Nature of IT-Related Phrases and Attributions to Strategy

Phrases
(759)

— 8% Financial performance
- 15% Neutrally stated IT expenditure
- 54% Favorably stated IT expenditure
- 30% Unfavorably stated IT expenditure

— 70% Major event of the year
- 33% IT-related product
- 36% IT-related process
- 4% IT executive change
- 5% IT function reorganization
- 2% IT function consolidation
- 15% IT repositioning in the firm
- 4% IT repositioning in the industry/society

— 22% Future outlook
- 26% IT-related product
- 36% IT-related process
- 4% IT function consolidation
- 31% IT repositioning in the firm
- 3% IT repositioning in the industry/society

Industry Differences

There were significant industry differences in the quantity of IT phrases as well as in the nature of those phrases.

Quantitative Differences. As was evident from Exhibit 2, there were some wide variations across industry in the number of chairmen who elected to discuss IT. Not surprisingly, there were similar industry differences in what and how much they said about IT, if they elected to say anything at all. Exhibit 5 shows, by industry, the number of companies who never mentioned IT from 1982–1987, the number who mentioned it only one year, the number who mentioned it twice during 1982–1987, and so on. Over 60% of the companies in retailing, banking, and publishing discussed IT in at least half of their annual reports. In petroleum only one of 22 firms mentioned IT in more than half of their 1982–1987 annual reports, and that consisted of a set of very similar short statements concerning credit card processing that appeared in five successive letters to shareholders (e.g., "Automating credit transactions is a major part of our effort to minimize costs and serve customers more efficiently" [Shell Oil, 1983]).

Notably, industry differences also existed in terms of the length of the letter. On average, the letter in retailing was 17 paragraphs long, 21 in publishing, 25 in banking, and 26 in petroleum. But what percentage of the letters was actually devoted to IT rather than other topics? IT-related phrases accounted for 2% of the letter (of those which discussed IT) in petroleum, 6 percent in retailing, 8 percent in banking, and 11 percent in publishing. Reassuringly, a comparison of the percentage of the chairmen's letters devoted to IT and the total phrases devoted to IT (from Exhibit 3) produced similar results, with petroleum at the bottom and publishing at the top of both lists.

Content Differences. Perhaps more interesting, however, are the industry differences in the topics addressed. The results of the analysis of phrases regarding financial performance, displayed in Exhibit 6, are interesting though they do not reach statisti-

EXHIBIT 5

Consistency with which IT was Mentioned by Companies during 1982–1987 Timeframe

Industry	Percentage of Companies with IT Phrases						
	None in 6 years	Only in 1 yr	Only in 2 yrs	Only in 3 yrs	Only in 4 yrs	Only in 5 yrs	In all 6 yrs
Banking	8%	8%	20%	16%	24%	24%	0%
Publishing	6%	19%	6%	13%	13%	6%	37%
Petroleum	50%	27%	9%	9%	0%	5%	0%
Retailing	8%	20%	4%	16%	16%	20%	16%

cal significance[11]. Here we see that banks had proportionally more IT expenditures being described as a burden to the company ("non interest expenses rose 24% during 1984, this was primarily due to increases in . . . systems investments" [First Chicago, 1984]), while retailers and publishers were more inclined to describe IT investments as contributing to profitability.

Generally, the results in Exhibit 6 were in keeping with the expectations put forth in the strategic IT literature. Banks and publishers during 1982–1987 had more IT phrases pertaining to the firm's products rather than to the production processes, both in describing the past year's activities and future outlook. Retailers focused IT-related phrases on operations rather than on products (exceptions included Toy's-'R-Us's interest in computer-based toys). This pattern held for the past year's events and future outlook. Retailers were more likely than other industries to use the shareholders' letter as a vehicle for announcing IT executive changes. But the retailers were joined by the publishers and bankers in using the chairman's letter to make announcements about the repositioning of IT within the firm. Such repositioning phrases were usually stated either in terms of past or present events rather than future outlook. Bankers were significantly more likely to discuss the reorganization or consolidation of IT functions that had occurred within the year. Publishing had more overall statements on the implications of IT in industry and society than the other three industries.

The industry differences must be viewed with caution, however, as the shareholders letter seems to be used in different ways by different industries. For instance, a retailing executive explained to us that retailers have long used their shareholders' letter to confer star status on their managing executives. He, therefore, found it unsurprising that retailing mentioned the promotion of an executive more often than other industries, but he noted that it has only been in recent years that IT executives had begun to be so honored.

In a subsequent analysis we also looked at the specific types of technology and applications mentioned by chief executives to understand the types of IT investments that capture the CEO's attention and are considered significant enough to report to

[11] The raw data for all dependent variables were transformed to a square root scale to achieve the homogeneity of the variances for the variables across industries and years, a necessary precondition for the use of analysis of variance (ANOVA).

EXHIBIT 6

Total Number of Phrases in Content Categories during 1982–1987

Content Categories	Industry			
	Banking	Publishing	Petroleum	Retailing
Financial performance	15	28	0	18
Neutrally stated IT expenditure	1	4	0	5
Favorably stated IT expenditure	5	18	0	10
Unfavorably stated IT expenditure	9	6	0	3
Major event of the year	203	153	21	153
IT related product	83	70	3	13
IT related process	40	43	10	96
IT executive change	3	3	2	14
IT function reorganization	12	7	2	6
IT function consolidation	9	0	0	0
IT repositioning in the firm	45	20	1	20
IT repositioning in the industry or society	7	9	1	4
Other	4	1	2	0
Future Outlook	43	55	7	64
IT related product	13	24	0	9
IT related process	10	10	4	39
IT executive change	0	0	0	0
IT function reorganization	0	0	0	0
IT function consolidation	3	0	1	0
IT repositioning in the firm	17	18	1	15
IT repositioning in the industry or society	0	3	1	1

shareholders. Industry differences here were strong. Exhibit 7 presents the technologies and applications that were mentioned by the chief executives for at least three firms in a given industry. It is noteworthy that, except in petroleum, corporate networks and satellites were among the four most frequently mentioned technologies in letters to the shareholders. In comparison, the recently much ballyhooed applications of "expert systems" did not appear a single time in the letters of any of the industries, although applications have been reported in other public sources for all four industries. *Business data processing systems* was the only entry to appear on all four lists, and was number one in both the petroleum and retailing industries. Bread and butter applications such as inventory control (retailing), credit card processing (petroleum), and advertising and circulation (publishing) continue to attract senior management attention.
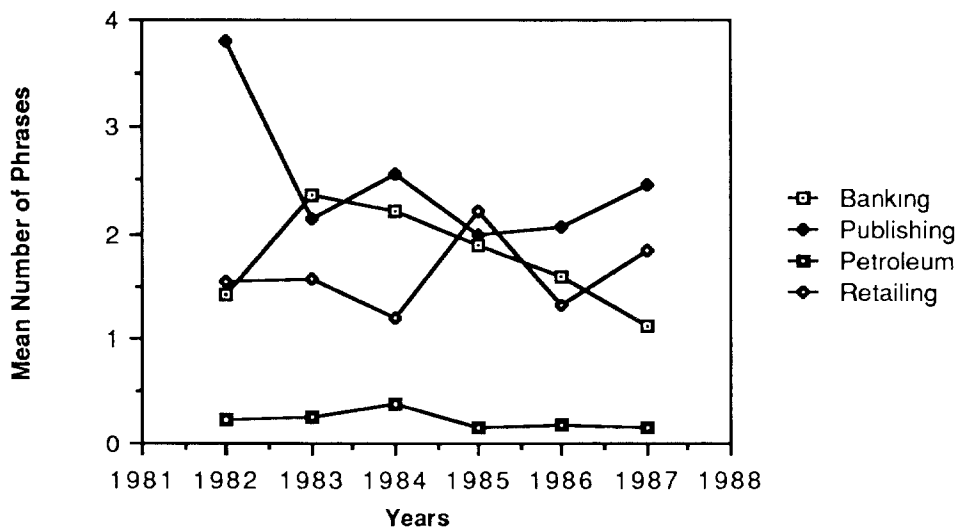
Time Differences

As Exhibit 8 demonstrates, we did not find the increase we had expected in the number of phrases devoted to IT as we moved from 1982 to 1987. In fact, if the average phrases from the years of 1982 and 1983 are compared with those from 1986 and 1987, we see a decline. The decrease is mainly attributable to the banking industry, where the average for 1986–1987 is 37% lower than that for 1982–1983. The other industries held essentially the same over time, except that in 1982 publishing had considerably more IT-related phrases than in any subsequent year (primarily due

EXHIBIT 7

Types of IT-Technologies and Applications Mentioned in Letters

Industry	Technology/Application	Letters mentioning technology	Companies mentioning technology
Banking	ATM	29	13
(25 firms)	Integrated retail banking system	12	10
	Corporate networks & satellite	11	8
	Home banking	10	8
	Data processing services	9	7
	Treasury management system	9	7
	Point-of-sale	9	5
	Management info system	5	5
	Business DP system	5	4
	Electronic funds transfer	5	4
Publishing	Online information & database services	26	9
(16 firms)	Corporate networks & satellite	22	11
	Electronic production systems	14	12
	Videotext	11	6
	CD-ROM	5	3
	Business DP systems	3	3
Petroleum	Business DP systems	9	3
(22 firms)	Production automation	4	4
Retailing	Business DP systems	28	12
(25 firms)	Optical scanning	24	9
	Point-of-sale	15	10
	Corporate networks & satellite	14	6
	Management info systems	12	8
	Instore computers	8	4

EXHIBIT 8

Mean Number of IT-Related Phrases over 1982–1987 Timeframe

to that industry's fascination with videotext, which peaked in 1982). Comparisons of phrase content over the 1982 to 1987 timeframe revealed no significant differences.

These results ran counter to our expectations and certainly flew in the face of the literature boasting both the successes and value of strategic information systems. Our initial analysis suggested that the position of IT in the organizations as reflected in the chief executives' letters to the shareholders had not changed, or perhaps had deteriorated somewhat, during the 1982–1987 timeframe. Perhaps the time frame we examined had been too short to adequately capture the changes that had occurred in CEOs' perceptions concerning IT. Consequently we decided to also examine the letters from 1972 and 1973 and to compare those with the later set.

Exhibit 9 compares, by industry, the average number of phrases in which the Chief Executive discussed IT for the years of 1972–1973, 1982–1983, and 1986–1987. From Exhibit 9 it is apparent that there have been dramatic increases in the number of phrases that CEOs' have devoted to IT in the last 15 years. The most recent data suggests, however, that this attention to IT may have peaked or even begun to decline in the industries examined.

Winners versus Losers

We initially selected the industry "winners' and "losers" on the basis of average annual growth in revenues over the years from 1982–1987. This selection was done on the basis of previous research (Bettman and Weitz, 1983) which argued that the choice of sales growth as an indicator of a firm's success is the most visible and interpretable indicator, and is less influenced by accounting conventions than other potential indicators. An analysis of total IT-related phrases and the content of IT-related phrases in the four industries found no relationship with the average annual growth of the firms over the 1982–1987 timeframe.

EXHIBIT 9

Mean Number of IT-Related Phrases in 1972–1973, 1982–1983, and 1986–1987
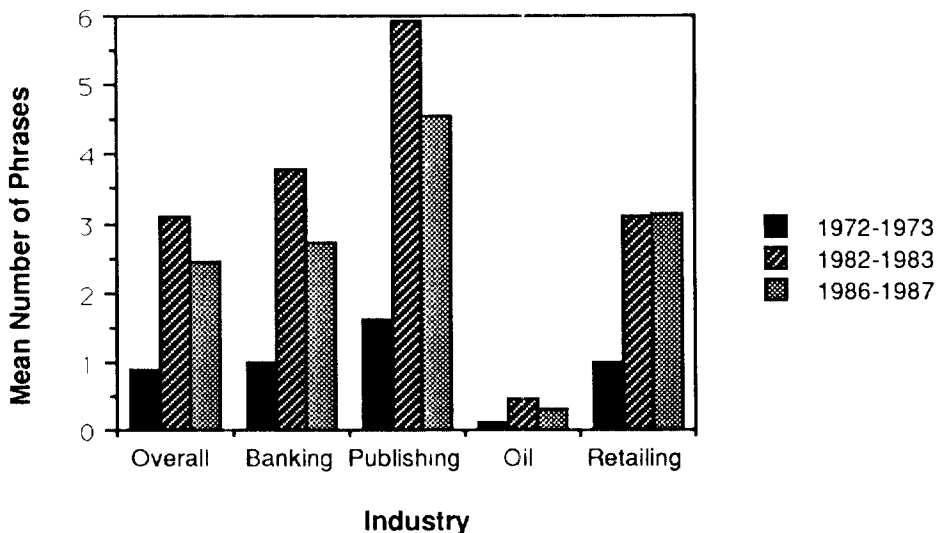
Our original approach to categorizing winners and losers was questionable, given the six-year time horizon. As the time horizon lengthens, the sensitivity of profits to accounting conventions tends to dissipate, while the bias introduced by firms electing to grow through acquisition increases. Hence, we decided to examine whether the firm's yearly profits as a percentage of revenues (or total assets, in the case of banks) were related to the number of IT-related phrases and the content of the IT-related phrases in letters to shareholders. The results for our sample of 88 companies, shown in Exhibit 10, were encouraging. Total phrases within the CEO's letter were significantly related to profitability—the more the CEO talked about IT the better the firm's profitability. An analysis within industries showed that the significance of the relationship was strong ($p < 0.01$), except in retailing ($p < 0.1$). The correlation coefficients for banking, publishing, petroleum, and retailing were 0.21, 0.22, 0.26, and 0.14 respectively. However, caution is necessary in making comparisons across industries, because of the use of assets rather than sales in determining the profitability of banks. Numerous differences were evident among the content of the phrases— again, with the direction of the relationship favoring the more profitable firms. Moreover, the results are probably somewhat conservative given that the firms selected for inclusion in the study were chosen on the basis of strong or weak revenue growth rather than profits.

Still, the correlational analysis depicted in Exhibit 10 permits no inferences about causality. Some critics may convincingly argue that profitable firms have more money to spend and therefore elect to invest more on, and talk more about, fashionable information technology initiatives. Therefore, we conducted two lagged analyses on the profitability data. In the first we compared profits in one year (ranging from 1982 to 1985) with total IT-related phrases for two subsequent years (ranging in from 1983–1987). In the second we reversed the procedure, comparing number of phrases for a given year with profits in two subsequent years. The results show a positive correlation between profits and IT-related phrases on both lagged analyses. A slightly stronger relationship between the IT-related phrases and two subsequent years' profits was found (correlation coefficient = 0.23) than between a particular year's profit and two subsequent years' phrases on IT (correlation coefficient = 0.17). The data hence suggests that the more the CEOs talked about IT, the higher the company's profits in the future years; but the competing hypothesis—higher profits will

EXHIBIT 10

Correlation between a Firm's Yearly Profits as a Percentage of Sales and CEO Letter Phrases†

	CEO's letters for 88 Companies during 1982–1987			
	Total Number of Phrases	Number on Financial Performance	Number on Major Event of the Year	Number on Future Outlook
Firm yearly net profits as a percentage of sales	0.20*	0.15*	0.15*	16*

† All statistics are Pearson Product Moment Correlation Coefficients.
* Significance level 01.

cause CEOs to talk more about, and perhaps invest more in, IT during subsequent years—cannot be refuted.

Discussion

Information for strategic advantage has received considerable attention in the general business and information systems literature over the last five years. But what do the leaders of large U.S. business organizations perceive the impact of IT to be, and how do those perceptions vary over time, from industry to industry, and across successful and less successful firms? The current study casts some empirical light on those questions. First, there are clearly a number of senior managers who do not see information technology as a critical issue to present to the shareholders. Eighty-four percent of CEOs' letters in the petroleum industry never mentioned IT over the 1982–1987 timeframe; even in banking, long a bastion of information technology, 8% of the firms and 47% of the letters never refer to IT. Where IT is mentioned, the discussion is often brief—such a letter on average contains three phrases about IT. Still, there are CEOs that enthusiastically discuss IT in their annual reports, and the amount of such discussion has increased since 1972.

The notions of information intensity put forth by Porter and Millar (1985) received limited empirical support. Petroleum, an industry that we characterized as having relatively low information intensity within the product and within the production process, proved to rarely contain references to IT within the CEO's letter to the shareholders. Retailing, where information plays an important role in the production process but a minor one in the product, produced results reflecting the CEOs' focus on information intensity in the production process. Likewise, the letters in banking and publishing mirrored the information intensity predicted for their industry on both the product and the production process.

As we expected, there was an increase in the attention the shareholders' letters devoted to information technology through the 1970's and early 80's. We were surprised, however, to find fewer mentions in the most recent years surveyed. One might hypothesize that IT has recently become a less important agent of change to the CEO. Alternatively, it may have become less necessary to educate an increasingly more sophisticated shareholder concerning the potential of IT initiatives.

The analysis of phrase content also revealed some interesting findings reflecting both changes over time and within particular industries. Both publishing and banking discussed the repositioning of IT within the firm, perhaps highlighting the need within those two industries to increasingly retarget IT initiatives from a focus on the production process to a focus on products. For publishing, in particular, this may reflect a new understanding of the role IT can play in producing new "knowledge dissemination platforms." Retailer's increasing use of the prestigious shareholders' letter to note a change in the staffing of the IT function may underscore a new understanding of the potential, strategic role of IT within retailing. This is further supported in that retailing was the single industry in which mentions of IT actually increased in 1986–1987. CEOs of banks, on the other hand, have become less inclined to talk about IT, perhaps reflecting their attention on the recent spate of bank mergers and acquisitions. When bankers do talk about IT, they have become more likely than their colleagues in other industries to view expenditures on IT in an

unfavorable light. This may reflect the current drive towards systems-derived economies of scale that are usually expected to result from bank mergers.

Caution is advised in interpreting these results, as there are numerous competing explanations for these findings. For instance, increases in an organization's performance might make IT investments more feasible, or, as noted by Bowman (1978), Bettman and Weitz (1983), and Salancik and Meindl (1984), CEOs of firms that are in trouble have been found to focus their letters on external, uncontrollable or environmental, rather than internal, controllable, events. The letters also tend to be positive, and probably intentionally avoid negative issues whenever possible. Negative statements concerning IT performance probably already have been brought to the attention of the shareholders via the business press. The reader should also note that this sample included large Fortune 500 companies. The size of the organization might influence the CEO's views of IT, IT usage, and the relationship of IT use and organizational performance. Finally, the uses and length of annual reports varies by industry.

In general the results, characterized by infrequent, brief, and recently decreasing mentions of IT, might give cause to question the strategic information systems concept. But one result, the profitability analysis, can be viewed with some cautious optimism. Organizations in which the CEO talks to the shareholders about IT initiatives appear to do better than those organizations of our sample in which the CEO does not share such information. The results are also tentatively confirming on an industry level. The relationship between profitability and the number of IT-related phrases was highly significant for the industries except for retailing, where only a weak relationship was found. Perhaps the poor showing for retailing may reflect the industry's position as a relative newcomer to the strategic application of information technology.

A number of previous studies (e.g., Bender 1987, Cron and Sobol 1983), as suggested by Weill and Olson (1988), have investigated the relationship between IT investments and corporate performance. None has demonstrated the direction of causality. The current study makes a modest attempt to examine the alternative explanations for the profit/IT investment relationship and finds evidence for a reciprocal relationship. That is, investment in IT may lead to greater profits, and greater profits may, in turn, increase the company's willingness to invest in IT. More work needs to be done in this area, however.

It is notable that technologies and applications that CEOs chose to discuss in their letters to shareholders focused on a firm's life blood (i.e., primary products and production processes), customer linkages, and platforms—not on administrative systems, decision support applications, or facilitative (e.g., 4th generation language, data base, expert systems) technologies. The technologies and applications mentioned might suggest what types of IT investments attract the CEO's attention. The investments discussed appeared to meet one of the following three criteria: (1) an industry fad such as videotext in 1982 or homebanking in 1984, (2) a major cost of doing business such as optical scanners and point-of-sale systems, or (3) new infrastructure or platform that made *new* products or production processes possible (e.g., satellite networks). Interestingly, the letters suggested a disappearance of some industry boundaries that are commonly associated with technologies and applications. For example, a publisher was investing in home banking (Knight Ridder); a retailer

(Southland) discussed major investments in ATM networks, while another (JCPenney) was providing a credit checking network for gasoline retailers.

Our findings also suggest that a broad, industry-wide survey of the Chairman's letter to shareholders can provide a number of useful insights for a firm's IT management, such as: (1) strategic IT developments n rival firms, (2) technology developments among lead users of IT, and (3) readiness of suppliers and customers for IT linked vertical partnerships. An analysis of the type of technologies mentioned in the letters of lead users might provide some valuable information for a firm's technology audit as well as the basis for design of educational programs. The chairman's letter also provides IT management with another window with which to observe the CEO's perspective on information technology. Further understanding this perspective may be of some help in framing justifications for investments in technological infrastructure. An executive who has made the transition from IT management to executive management demonstrated to us how an understanding of the senior executive's perspective would have helped him in his IT management position:

> When I was managing IT, I was concerned with such issues as selling my boss on the latest release of IMS. When I got to be the boss, I wanted my IT manager to come to me with ways to turn this organization around—upgrading IMS was the last thing on my mind unless someone could show me how such an upgrade could get us new customers, and then I was all ears.

For the academic reader, this study demonstrates that the CEO's letter to the shareholders presents a useful research tool for analyzing the relationship between strategy and information technology, and also perhaps the relationship between strategy, IT, and organizational performance. Unlike many methodologies used for information systems research, the methodology is replicable and can readily be applied to other industries and other research questions. Moreover, it provides the means to tap the perspectives of executive-level management in a format that is readily available, longitudinal, and somewhat consistent across publicly held firms.

Other sources of secondary data may prove useful for research relating IT and organization's strategy. Future investigations might use the Profit Impact of Market Strategic (PIMS) program and database (see Buzzell and Gaze 1987) to better understand how information technology impacts corporate strategy and performance. As of mid-1986, the database contained financial, strategic, and market data (for at least 4 years) for more than 2,600 business units. In the field of strategic planning, Wills and Beasly (1982) contend that "the PIMS program has produced the most comprehensive set of research findings (p. 437)". Computerized indices of newspaper and magazine articles can also provide powerful tools for tracking technological innovations through time.

Conclusion

The paper examined executive managers' views of IT across industries, and the state of IT in those firms. An analysis of CEOs' views of IT is important. The recent literature on executive leadership, and specifically the metamorphosis model by Romanelli and Tushman (1988), maintains that senior executives, via their perceptions and decisions, can and do systematically influence the content and character of organizational activity. The letter to the shareholders by Midland's Sir Kit McMahon, abstracted at the start of this paper, provides an apt illustration of McMahon's

use of IT interventions, both substantive and symbolic, to reorient the organization during low organizational performance and drastic environmental changes. After recognizing earlier in his 1987 Letter that the Midland Group was writing off £916 million in bad loans, McMahon went on to describe with some enthusiasm his hopes for IT and his appointment of a new IT head to the Group's board of directors. The Letter symbolizes McMahon's vision for IT by legitimizing, explaining, and rationalizing the organization's recent investments in IT—investments which he clearly hoped could restore Midland to a state of satisfactory performance.

Finally, transitions in information technology seem to hit industries in waves. Publishing appears to be in the midst of one (electronic publishing), retailing is harvesting the benefits of others (POS, scanning, corporate networks), while banking (ATMs, corporate networks) and petroleum (the operations research models of the late 60's and early 70's) are waiting for a new set of technologies to break around them. Our research tentatively suggests that it is no longer worthwhile to discuss the generic notion of information for competitive advantage. Each technology, and the information transformations which that technology engenders, should be considered on an industry by industry basis.*

APPENDIX A

Company/Strategic Application	Sample Quotes from CEOs' Letters
Federal Express/COSMOS	The company's new package tracing system, COSMOS, has set a new standard for the industry. Optical scanners track packages . . . making it possible to provide customers with prompt and accurate information as to the status of their shipments. Cosmos IIB tracking system was phased into operation during 1987. Virtually instantaneous package-status information will be available to all of our customers. This is part of our strategy to give our customers the kind of complete service none of our competitors can match.
Federal Express/ZapMail	ZapMail is an important new communications service . . . electronic transmission of high-quality duplicates of documents almost anywhere in the country. The decision to phase out ZapMail was a difficult one.
Bergen Brunswig OMNIPhase/ Compuphase/AIM	Our company leads the industry in distribution technology . . automated systems for order entry and inventory control. We completed development of Compuphase, a pharmacy computer that will greatly increase the

APPENDIX A (*continued*).

Company/Strategic Application	Sample Quotes from CEOs' Letters
	efficiency of the pharmacist by automating numerous tasks.
	Due to electronic order entry and other computerized services, our prices are sufficiently competitive.
	The latest upgrading of CompuPhase supports prescription processing in pharmacies. Omniphase, the first point-of-sale system marketed by a drug wholesaler improves management of the pharmacy's non-prescription business. AIM, a third new program, will provide a wide range of management reports and analysis for pharmacies.
	The future will belong to strong national companies that use advancing technology to control distribution costs and offer customers continually improving services.
Baxter Travenoll/ASAP (developed by AHS)	Within the company and at customer locations, our computerized systems assist in ordering, tracking and managing supplies
	American also offers added value through services such as computer software packages that help hospitals and laboratories know their true costs.
	Our network of highly modern distribution centers is linked by the computerized network that has been developed over many years by American.
CitiBank/Electronic Banking/ Home Banking	. . . 7000 of them [terminals] in our customers' offices or homes-to keep us at the forefront of the industry
	Citicorp's ability to deliver prompt, accurate information electronically to the corporate treasurer's desk, to the consumer's home, or to our account officers in 95 countries . . . is vital part of our ongoing business.
	In the emerging financial world, technology and telecommunications are eliminating barriers of time and distance that once isolated national markets . . . symbolic of leadership [in technology] was the last June's launching of Western Union's Westar satellite, which made Citicorp the first financial institution to own its own satellite transponders. . . . To build productivity and service, we continue our support of new systems and electronic banking efforts.
Merrill Lynch/Cash Management Account	We believe in backing our staff with the best possible technology . . . such technology simply enhances the value of personalized financial service which requires highly professional account executives.
	Our pioneering Cash Management Account . . . we expanded its scope, created a version for business.
	Our landmark Cash Management Account, adding a series of new features designed to respond to changing client needs

APPENDIX A (*continued*).

Company/Strategic Application	Sample Quotes from CEOs' Letters
McKesson/Economost	As part of a major program to improve productivity and continually upgrade the quality of our customer services, we are making major expenditures for the expansion of our advanced automated order-entry and other computer-based systems.
	Perhaps the single greatest advantage that the McKesson distribution companies enjoy has been —and will continue to be—in computer technology.
	Our ability to adapt the Drug Group's "Econo" computer services and materials handling expertise to office products demonstrates that our systems and skills are clearly applicable to a wide range of distribution businesses.
General Electric/Business Information Center	GE began a major business-to-business marketing campaign in 1984 that included the opening of the Business Information Center. Staffed by company experts, the Center helps make GE more accessible and responsive to businesses looking for commercial or industrial products and services.
	To be competitive, our service businesses must use the latest technology.
American Airlines/SABRE Reservation System	The highlights of 1982 . . . the success of our travel agency automation program.
	Our SABRE computer reservation system continues as a principal source of other revenue.
	Our great frustration in 1987 was our inability to market SABRE, the finest computer reservations system in the world, to travel agents in Europe.
United Airlines/APOLLO Reservation System	Covia markets our Apollo Travel Services computerized travel reservations system and our business-management systems to travel agents and others.
	United, British Airways, KLM Royal Dutch Airlines and Swissair announce a new venture to provide a computer information and reservations systems for the travel industry in Europe.
American Express/Corporate Travel Card, Gold Card Report Credit authorizer's assistant	To remain as a leader in the application of new technologies, ensuring quality service and further advancing productivity.

APPENDIX B. Companies Included in the Study Sample by Industry
Banking

BancOne	J.P. Morgan
BankAmerica	Manufacturer's Hanover
Bank of Boston	Marine Midland
Barnett Banks of Florida	National City BanCorporation
Chase Manhattan	National City Corporation
Citizens and South	NBD
Continental Illinois	NCNB

APPENDIX B. (*continued*). Companies included in the Study Sample by Industry

First Interstate	Norwest
First Chicago	PNC Financial Corp.
First City BancCorp	Republic of N.Y.
First Union	Security Pacific
Irving Bank	Sovran
	Texas Commerce

Publishing

American Greetings	McGraw-Hill
Deluxe Checks	Media General
Donnelly	Meredith
Dow Jones	N.Y Times
Gannett	Time Inc
Harcourt Brace Jovanovich	Times Mirrow
Knight Ridder	Tribune
MacMillan	Washington Post

Petroleum

Agway	Mobil
Amerada Hess	Murphy Oil
American Petrofina	Pennzoil
Ashland Oil	Phillips
Atlantic Richfield	Shell Oil
Coastal Corp	Sun
Crown Central	Tenneco
Diamond Shamrock	Texaco
Exxon	Tosco
Kerr McGee	USX
Mapco	Witco

Retailing

Allied	May Department Stores
American Stores	Melville
Best Products	Safeway Stores
Carter-Hawley	Service Merchandise
Dayton-Hudson	Southland
Federated Department Stores	Stop and Shop
F.W Woolworth	Toys 'R' Us
Great Atlantic & Pacific Tea	Waldbaum
JCPenney	Walgreen
KMart	WalMart Stores
Kroeger	Winn-Dixie Stores
Lucky Stores	Zayre
Marriotts	

APPENDIX C. Coding Scheme (and examples)
A Overall Quantitative Measures
  # of reports with IT-related phrases.
  # of companies with IT-related phrases.
  # of IT-related phrases
B. Content Analysis Measures (All examples, where appropriate, are from the Midland Group's 1987 letter to shareholders)

APPENDIX C. (*continued*). Coding Scheme (and examples)

Context of IT phrase (Level 1 codes)	*Nature of IT phrase* (Level 2 codes)
Financial performance (Definition: review of the financial position of the company and provide explanation for results)	—*Neutrally stated IT expenditure.* —*Favorably stated IT expenditure.* —*Unfavorably stated IT expenditure*
Major event of the year (Definition: discusses the year's major happenings in the firm and in the industry)	—*Investment in IT to offer products* ("the launch of Telepath a sophisticated treasury workstation"). —*Investment in IT to change production or production economics* ("branch cashiers are equipped with automated counter terminals"). —*IT executive change* ("we were fortunate to obtain the services of Gene Lockhart as our first director"). —*IT reorganization* ("we had an opportunity to reorganize a number of support functions, notably information technology"). —*IT consolidation* ("the Group has begun to consolidate and standardize its various data centres"). —*IT repositioning in the firm* ("Last year was a landmark year for IT in Midland Group"). —*IT repositioning in the industry* or society ("IT is one factor which will progressively determine the basis for competitive success in the banking industry").
Future Outlook (Definition: puts forth future short and long-term activities of the company)	[Same as for 'Major event of the year'].

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