Executive Involvement in IT Management

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Abstract

Executive support is often prescribed as critical for fully tapping the benefits of information technology (IT). However, few investigations have attempted to determine what type of executive support is likely or organizationally appropriate. This article puts forward alternative models of executive support. The models are tested by examining chief executive officers' behaviors in and perceptions of IT activities. CEOs and information systems executives are surveyed and further data collected from industry handbooks and from chairmen's annual letters to shareholders. The results suggest that executive involvement (a psychological state) is more strongly associated with the firm's progressive use of IT than executive participation (actual behaviors) in IT activities. Executive involvement is influenced by a CEO's participation, prevailing organizational conditions, and the executive's functional background. CEO's perceptions about the importance of IT in their firms were generally positive, although they participated in IT activities rather infrequently.

Keywords: Management of information systems, executive support, information systems success, CEOs, information systems managers, survey research, annual report methodology

ACM Categories: H.4.0, K.6.0, K.4.3

Introduction

Few nostrums have been prescribed so religiously and ignored as regularly as executive support in the development and implementation of management information systems (MIS). Since the advent of management information systems, executive support has been considered necessary to fully exploit the benefits of information technology (IT) (e.g., O'Toole and O'Toole, 1966). In 1968, Rockwell argued that "a good MIS must begin at the top with the chief executive officer" (p. 20). A year later, Freeman (1969) suggested to top executives that they "take an active personal interest: learning what advantages the computer can offer their organization, recruiting talented specialists for the technical staff, encouraging communication and interaction between technical and 'line' personnel, and putting the new system to use in their own daily activities" (p. 253). In 1972, Adams claimed that "the successful implementation of an MIS depends on the active and informed participation of executive management" (p. 54).

A decade later, information technology applications began to be viewed as central to business strategy (McFarlan, et al., 1983). With this new role came more fervent cries for executive support of investments in IT. Doll (1985) warned that, "information systems are just too important to leave development in the hands of technicians" (p. 17). Izzo (1987) cautioned top management to "take an active stance . . . guiding and shaping business technology's role in helping the firm attain its goals" (p. 64). Rockart (1988), viewing IT as a strategic "weapon," proposed that "the deployment of information technology is far too important, in 1988, to be left to information technologists" (p. 59). Rockart and Crescenzi (1984) claimed that executives are indeed "recognizing that information is a strategic resource . . . and increasingly feeling the need to become informed, energized, and engaged in information systems" (p. 3).

Executive support has been frequently documented in the case study literature. For example, Stoddard (1986) chronicled how Chief Operating Officer George David personally championed Otis Elevator's development of a centralized customer service center for dispatching elevator service personnel. Bob Crandall, chairman of AMR, has been presented as a prime force be-
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Behind the Sabre reservation system, American Airlines’ frequent flyer program, and the airline’s use of yield management software (Harrar, 1986). Executive support has also been described for major systems implemented at Frito-Lay (Linder, 1986), Lockheed-Georgia (Houdeshel and Watson, 1987), USAA (Elam, 1988), Buick (Vitale, 1988), and Phillips 66 (Applegate and Osborn, 1988).

Despite the enthusiastic calls for executive support and the intuitively compelling evidence in the case study literature, little is known about the concept, and its utility remains largely unproven. Researchers must still determine if, when, how much, and what type of executive support is likely or organizationally appropriate. In this research, we focus on the chief executive officer (CEO)—the leader of the top management team—and his or her role in IT management. Alternative models of executive support in facilitating an organization’s progressive, primarily strategic, use of information technology are presented and tested.

The Concept of Executive Support

The terms “executive participation” and “executive involvement” have been used interchangeably in much of the information systems literature to describe or prescribe the chief executive’s role in IT activities. In this article, we use executive support to encompass both participation and involvement, but, following Barki and Hartwick’s (1989) work in user involvement, we consider participation and involvement to be two distinct constructs. Drawing upon research from psychology, organization behavior, and marketing, Barki and Hartwick conclude that while there has been confusion about the two concepts, “researchers in these disciplines now show strikingly similar patterns of thought, having converged in their conceptualizations of the involvement construct” (p. 61). According to Barki and Hartwick, involvement is defined as a subjective psychological state. Participation, on the other hand, refers to the behaviors and activities performed.

Consequently, in this article, executive participation is used to refer to the CEO’s activities or substantive personal interventions in the management of IT. Executive participation is concerned with CEO behaviors related to information systems planning, development, and implementation. Such behaviors are as varied as chairing an executive steering committee, requesting or scanning progress reports for an important project, or approving a new, corporate-wide, office automation system. Executive participation entails the CEO’s investment of some of his or her time and energy in IT-related matters.

Executive involvement, on the other hand, is concerned with the psychological state of the CEO, reflecting the degree of importance placed on information technology by the chief executive. Involvement refers to a CEO’s perceptions and attitudes concerning IT—that is, the degree to which a CEO views IT as critical to an organization’s success. To be involved, a CEO does not need to take a “hands-on” role in managing IT—that is, to spend his or her personal time in IT matters. Rather, the involved CEO only needs to view IT as contributing to the firm’s success. In this article, we make no distinctions between perceptions and attitudes, following Robey (1979) and Schultz and Slevin (1975).

Alternative Models of Executive Support

Which type of executive support is required to facilitate progressive uses of information technology? To study this issue, alternative models of executive support are proposed. The initial two models are constructed from the implicit and explicit assumptions embedded in previous studies on executive support. Most of this research has addressed top management in general rather than CEOs in particular. We are interested to find out, however, if a CEO’s support is in agreement with what is argued in general about top management’s support. A third model, building on the initial models, draws upon the organizational behavior and psychology literature on participation and involvement.

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1 A strategic use of IT implies that IT “changes a firm’s product or the way the firm competes in the industry” (Cash, et al., 1988). We assume that the more strategic an organization’s use of IT, the more progressive that firm will be in its investments in information systems.
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Model 1

The prescriptive literature, including text books on information technology management (e.g., Izzo, 1987; Sprague and McNurlin, 1986), suggests that the CEO's proper role is to personally participate in IT management and that personal participation contributes to the employment of information technology in a firm (Adams, 1972; Lederer and Mendelow, 1988; Rifkin, 1989; Rockwell, 1968). Brandon (1970) argues that the top executive's role is to establish controls, perform long-range planning, conduct post-installation audits, plan for equipment, and so on. Dinter (1971) proposes a long list of duties, including viewing plans and programs, monitoring schedules, and following up on results. Emery (1990) describes how a corporate president participated in the development of an important information system,

He was the primary instigator of the project and was responsible for the choice of hardware vendor and implementation tool (with some considerable internal opposition within the firm). Over the course of the development, the president maintained close tabs on progress and was quite willing to step in where necessary to remove any organizational barriers (p.xi).

Kunde (1989) proposes that the CEO not be an expert on the "hows" of technology, but instead become familiar with what the technology can do for the firm. Others have suggested that the CEO must regularly communicate with IT management (Lederer and Mendelow, 1988; Rohan, 1988), be familiar with the firm's IT activities (O'Toole and O'Toole, 1966), and be well informed about competitive IT capabilities and initiatives (Lane, 1985). The literature has been less helpful in describing where the interchange between the CEO and IT management occurs or how a CEO learns about IT opportunities. Frequent informal exchanges between a CEO and an IT manager might be as effective a forum as a CEO's chairing an IT steering committee.

Table 1 summarizes five studies that have, to various degrees, empirically tested Model 1. In

Table 1. Previous Research on Executive Participation

<table>
<thead>
<tr>
<th>Study</th>
<th>Independent Variable</th>
<th>Method of Measurement</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garrity, 1963</td>
<td>Top management involvement</td>
<td>Observations</td>
<td>Successful use of systems: (1) return from the systems investment, (2) intangible benefits, (3) application portfolio</td>
</tr>
<tr>
<td>Vanlommel &amp; De Brabander, 1975</td>
<td>Top management involvement</td>
<td>8 Questionnaire items (each item had 3 categories)</td>
<td>Quality of EDP result: (1) perception of EDP manager, (2) perception of main user(s)</td>
</tr>
<tr>
<td>Lane, 1985</td>
<td>Top management involvement</td>
<td>Case studies</td>
<td>Competitive information technology applications</td>
</tr>
<tr>
<td>Doll, 1985</td>
<td>Top management involvement</td>
<td>Interviews</td>
<td>MIS development success: project success + software + database + adaptability + project sequence + maintenance</td>
</tr>
<tr>
<td>DeLone, 1988 (2 variables)</td>
<td>Top management knowledge about computers</td>
<td>Questionnaire item (3 categories)</td>
<td>System success: (1) CEO's use of reports, (2) impact of computers on business</td>
</tr>
<tr>
<td></td>
<td>Top management involvement in computerization</td>
<td>Questionnaire item (3 categories)</td>
<td>Same as above</td>
</tr>
</tbody>
</table>

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Table 1, we have indicated the terms used by the studies' authors for the independent variable. Their use of the term "involvement" appears to reflect what we refer to as "participation" in this study. For example, Garrity defines "top management involvement" to constitute the personal time that top management devotes to information technology activities. Lane refers to "involvement" as a CEO's active participation in setting the direction for a firm's information technology.

After examining the computing function in 27 firms, Garrity (1963) concludes that "in every lead [successful IT] company, . . . top management time is spent in reviewing the plans and programs for the computer systems efforts and then in following up on the results achieved" (p. 10). In less successful companies, Garrity found that top management participated in the successful launching of a computer system, but failed to provide the critical, continuing, "dynamic . . . momentum and sense of direction." On the basis of two case studies, Lane (1985) argues that "Recent history demonstrates that the chief executive who actively participates in and, in fact, directs first hand, the implementation of technology can provide his firm with substantial competitive leverage." Doll (1985) interviewed top IS managers in 33 organizations and concludes that firms with more MIS development success are more than twice as likely (55 percent vs. 23 percent) to use an executive steering committee to provide top management guidance than firms with less MIS development success. In the context of 93 small businesses, DeLone (1988) found that "If the small business is to succeed in its computer use, the chief executive must be willing to commit substantial personal energy to the realization of that aim" (p. 57). Vanlommel and De Brabander (1975), however, discovered from a sample of 17 firms that a high degree of positive covariation exists between information systems success and top-management participation in the design, implementation, and audit phases when viewed through the eyes of information systems management, but not when viewed from the perspective of the users of the systems.

McFarlan, et al. (1983) have acknowledged that the top executives' personal participation is not equally critical for all types of information systems. They argue that the chief executive officer's leadership is most needed in applications of strategic importance to the firm. Many of the strategic systems discussed in the literature, such as Economost at McKesson Drug Company (e.g., Clemons and Row, 1988), cross business units or functional areas. Such systems are often claimed to be only implementable from the executive office (Porter and Millar, 1985). 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 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). Doll and Vonderembse (1987) maintain that top executives must champion a partnership among functional area executives to explore the strategic impact of information technology. For firms that seek to be among the more progressive users of IT within their industries, there will be motivation to identify such strategic applications of IT.

The following hypothesis is advanced to test Model 1 further:

Hypothesis 1: A CEO's active personal participation in IT management is associated with a firm being highly progressive in its use of IT.

Model 2

Other researchers have argued less for a CEO who personally intervenes in IT than for a CEO who creates a "climate of support" for systems initiatives. This supportive CEO is seen to function much as a "back-seat driver," blessing the IT manager's initiatives, signaling the importance of IT to line management, and perhaps providing a general business direction, but not personally participating in decisions and activities related to IT. Bedell (1985), who himself has served in both IS management and general management roles, stresses that interest and excitement, rather than action, from the top of the organization is the single most critical factor for the successful management of IT. But the CEO's interest and excitement are not always targeted at information systems. Lederer and Mendelow (1986; 1988) have demonstrated that chief executives often still need to be convinced of the potential strategic impact of information systems.
There is some limited empirical evidence supporting a link between executive involvement and the firm’s IT use. Table 2 lists four studies that examine this relationship to some extent although many are concerned with top management in general, not with CEOs. Moreover, in many of these studies, the dependent variable was the success of a single system rather than the overall use of IT within a firm. The studies are generally more robust than those addressing Model 1 (see Table 1), although several are weakened by small samples and a lack of attention to measurement reliability and construct validity.

Sanders and Courtney (1985) found that the level of executive involvement (i.e., “support” and “feeling that the time and resources spent on the development of DSS models is wisely invested”) was an important correlate of DSS success. In another DSS study, Meador, et al. (1984) found that involvement, labelled as “top management emphasis,” was the most important factor in the project approval process. In the implementation and innovation literature, Bean, et al. (1975) have provided evidence that “top management’s support” for management science innovations is important to those innovations’ success. Reich and Benbasat (1990), in a study of 11 successful strategic systems in nine Canadian firms, found that 80 percent of the systems had been given a “high profile” by top management, including the CEO, during the development process.

To test Model 2 further, the following hypothesis is examined:

Hypothesis 2: A CEO’s high involvement in IT (or favorable perception of IT) is associated with a firm being highly progressive in its use of IT.

Although Hypothesis 2 need not refute Hypothesis 1, we view them as rival hypotheses. The rivalry arises from the relative effect of executive involvement versus executive participation on a firm’s use of IT. The explained variances attributed to these two components of executive support will serve to judge their relative influence on the progressive use of IT within the firm.

**Model 3**

Both Models 1 and 2 are based on implicit and explicit assumptions embedded in the IS literature regarding the supposed role of top management in IT decisions and activities. However, conceptualizations of “involvement” in the organizational behavior and user involvement literatures (for a review see Barki and Hartwick, 1989) suggest that a more complex theoretical formulation may provide a better understanding of executive support. Model 3 summarizes this
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formulation. We will next discuss each of the linkages in Model 3.

Executive Participation → Executive Involvement

In studying user involvement in information systems, Swanson (1974) demonstrates that managers who engage in system development activities (i.e., a priori involvement) become more appreciative of the system. That is, participation influences appreciation. Swanson describes the construct of appreciation as a manager's "belief about the relative value of MIS as a means of inquiry" (p. 179). We define executive involvement to reflect the degree to which the CEO views IT as critical or instrumental to accomplishment of organizational goals. Appreciation and involvement are both subjective psychological states of an individual in a firm although executive involvement is seen to be motivated primarily by organizational goals; appreciation, by personal goals.

Willoughby and Pye (1977) also found that, when executives are involved in the evaluation of the systems, the determination of objectives, and/or meetings with the heads of data processing, their perceptions of information systems are more favorable. Consequently, an executive's personal participation in IT management might lead to increased positive psychological involvement with IT. That is, CEOs who spend a significant portion of their time in IT-related decisions might be most likely to view IT as of critical importance to their firms.

An explanation for the anticipated relationship between participation and involvement is behavior-attitude congruence. To minimize cognitive incongruence and the resulting feeling of dissonance, people tend to hold attitudes that are consistent with their actions (Festinger, 1957). Another explanation is related, but within an interpersonal context (for balance theory, see Heider, 1958). A CEO who participates in IT management has frequent face-to-face contacts with the IT manager. To minimize conflict in meetings, those with more weakly held views or attitudes will converge their opinions with those holding stronger views on the issues. Consequently, an IT manager who is convinced of IT's value to a firm and who has frequent contacts with a CEO may positively influence the CEO's views of IT. If the two individuals' views remain in constant disagreement, the CEO can be expected to eventually avoid or replace the IT manager.

Organizational Conditions → Executive Involvement

The organizational behavior literature suggests that organizational conditions influence individuals' psychological involvement in organizational activities (e.g., Argyris, 1964; Likert, 1961). An activity that provides opportunities to make important organizational decisions or to significantly contribute to the organization captures the individual's psychological involvement. Porter and Millar (1985) propose that firms in industries that are characterized by high "information intensity" in the products and processes will have greater opportunities to exploit IT. Cash, et al. (1988) argue, via their Strategic Grid framework, that IT can be more strategic in some industries and firms than in others. Namely, they claim, "For some organizations, IT activities represent an area of great strategic importance; for other organizations, they play and appropriately will continue to play a cost-effective and useful role but one distinctly supportive in nature" (p. 76). In organizations with greater strategic IT potential and importance, CEOs may be more likely to have favorable views of IT because in these companies IT provides a potential means for the CEO to reorient the organization and to improve organizational performance.

Executive Background → Executive Involvement

Similarly, a CEO's background might influence the degree of his or her psychological involvement in IT management. Significant CEO differences along dimensions such as age, educational background, and functional experience have been demonstrated (Song, 1982). The background has been shown to affect the views the individual
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Executive Involvement→ Progressive Use of IT

But do positive CEO views about IT lead to progressive use of IT? Our premise is that CEOs as chief leaders make a difference in their organizations' activities. This premise is supported by the literature. For example, Hambrick and Mason (1984) argue, in their "upper echelon" perspective, that organizational outcomes are largely reflections of the top executive's values and selective perceptions. Peters and Waterman (1982), in their book *In Search of Excellence*, claim that the values and behaviors of top managers have a significant influence on the fortunes of their firms. Others are less supportive about the direct impact of CEOs on organizational success or failure, but acknowledge that CEOs create important variation in organizations (see Thomas, 1988).

A number of IS researchers have maintained that, as IT applications become a significant element of industry structure and competition, the chief executive officer's views about investment in IT become considerably more relevant and instrumental in shaping IT use in a firm (Bakos and Treacy, 1986; Benjamin, et al., 1984; Clemons and Row, 1988; Parsons, 1984). For example, with their broad perspective on the organization, CEOs may be singularly positioned to recognize the value of large-scale, IT-based integrations that cannot be justified strictly by a return on investment calculation in the early stages. Perhaps more importantly, a CEO's strong signals in support of IT usually can be expected to get line management personally active in proposing and developing IT-related initiatives. Such signals may come in verbal statements in corporate planning meetings, written statements in corporate newsletters, or off-hand comments during casual contacts. As Markus (1981) has demonstrated, while executive support is necessary, it is not a sufficient condition for progressive use of IT. Line and operational management support is also needed.

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3 The basic thesis in the "upper echelon" perspective is that an organization is a reflection of its top managers. Hence, if we want to improve our explanations for why organizations behave and perform as they do, we must look to the top managers—their experience, values, cognitive styles, and aptitudes—as an important source of variation.
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To test Model 3, the following hypothesis is studied:

Hypothesis 3: A CEO's high involvement in IT, which is associated with a firm that is highly progressive in its use of IT, is determined by a CEO's participation, an organization's industry conditions, and the CEO's background.

The following section reports on an investigation intended to ascertain whether executive involvement or participation better accounts for the variance in a firm's IT use and whether our formulation of antecedents of involvement have any empirical support. For purposes of clarity, the three models are viewed as alternatives although Model 3 expands on Models 1 and 2.

A Preliminary Test of Alternative Models

The hypotheses derived from the three models were tested by surveying CEOs and information systems managers and by collecting independent data from the chairmen's annual "Letter to Shareholders." Secondary data on the CEOs' backgrounds were drawn from industry handbooks. Organizational conditions related to competition, customers, products, and so on were represented by an industry to which a firm belonged. In the remainder of this section the survey sample, the data collection methodology, and the preliminary analyses are discussed.

Sample

Eighty-three firms were selected from four industries—banking, publishing, petroleum, and retailing. All firms from the four industries were either Fortune 500 industry or service organizations (see Appendix A for firms). Industries were selected so that they represented a wide diversity in the information intensity of the products and thereby hopefully provided differing opportunities for progressive use of IT within firms. Banking and publishing are industries whose products and processes focus on information, whereas retailing and petroleum have little information within the product but considerable information within the production, distribution, and/or selling processes. Banks are long time users of strategic IT. Most publishers have long used IT to support their production and delivery processes (e.g., electronic editing and composition systems, satellite transmission) and have, in the last five years, begun to use IT strategically as vehicles for packaging information products (e.g., videotext, CD-ROM). The operations of firms within the retailing industry are dependent on cost-effective, reliable IT operations, but retailers have only recently begun to use IT for competitive purposes (e.g., electronic data interchange, corporate communication networks). Firms in the petroleum industry, with the exception of oil exploration activities, appear to see little potential for strategic IT. 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).

Each industry was assigned a rating or score. The firms in the banking industry received a score of 4, in the publishing industry a score of 3, in the retailing industry a score of 2, and in the petroleum industry a score of 1. The scores reflect the relative organizational potential for progressive use of IT. The more prevailing the strategic use of and search for IT within an industry, the more likely the organizational conditions are favorable for the progressive use of IT within the firm.

Data collection

Chief executive officers were asked in a mail survey to rate their firms' current use of IT relative to

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4 To ensure variability in firms in each industry, we selected firms based on growth in revenues over the years from 1982 to 1987. Revenue figures (total assets in the case of banks) were obtained from the Fortune 500 lists appearing in special issues of Fortune in 1983 through 1988. On average, the 11 firms with the greatest average annual growth in a given industry over the six years were selected as were the 10 with the lowest growth average.

5 Also, while we believed that some firms in an industry might map to very different quadrants of the grid, the majority of the firms in an industry were expected to cluster in a particular quadrant.
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The scales ranged over a five point scale from laggard to industry leader. The same question was asked of the IT managers. Where both executives responded, the average of these responses constituted the measure of progressive use of IT within a firm.

Additional measures were obtained from a mailed questionnaire sent to the topmost IT manager at the 83 firms. This instrument asked the IT managers to assess their respective CEO’s involvement with IT and participation in IT management. For analysis purposes, all the items on executive involvement and executive participation were transformed to conform to the following rule: the higher the score on the item, the greater the CEO’s involvement or participation in IT management as reported by the IT manager. Where respondents provided multiple responses for the same item, the more conservative response (i.e., the lower score) was coded. The items were developed on the basis of the prescriptive literature and one of the author’s experiences working with senior IT managers. The questionnaire was purposefully short, requiring less than 10 minutes to complete, to ensure a high response rate and the complete attention of the respondent. The questionnaire is attached as Appendix B (with the transformed scores).

Information on the CEOs’ backgrounds (i.e., age, tenure in a firm, tenure in a position, number of years in college, and functional background) was retrieved from Business Week (1988) and Who’s Who in Finance and Industry (1988). Age, tenure in the company, and tenure in the position were measured in years. Education was measured as years in college. Functional background was captured by a dummy variable. The variable was assigned 1 if the executive’s background was in output or a data processing function. Output functions were marketing or retailing for retailing CEOs; banking or lending for banking CEOs; editorial for publishing CEOs; and exploration, distribution, or R&D for petroleum CEOs. The variable was assigned 0 if the executive’s background was in throughput or a staff function. The throughput and staff functions were production, engineering, manufacturing, accounting, administration, and legal.

Fifty-seven of the 83 IT managers contacted responded (69 percent). Two responses were not used because it was apparent that the executive had not personally completed the survey. No statistical differences were found in the background characteristics of CEOs (i.e., age, functional background, education, tenure in a company and in a position) among respondents and non-respondents within particular industries, thus providing some support for the representativeness of the sample among Fortune 500 firms within the four industries.

On average, CEOs were 58 years of age, had 28 years of organizational tenure, and had served eight years in the office of the CEO. Twenty-four of the 55 CEOs had a background in “output functions.” Only two executives had extensive background in information systems, one in banking and one in retailing. Forty-six percent of the CEOs had a bachelor’s degree and another 40 percent had an advanced degree. The IT managers who responded to our survey had been in their current position on average of 4.2 years. Thirty-three percent of the IT executives reported directly to the CEO, 44 percent were two levels from the CEO, and the rest were three levels from the CEO. No major industry differences were detected in the IT directors’ tenure or in the reporting level.

Preliminary analyses: Construct validity and reliability

The validity of the participation and involvement scales were assessed using one of the methods of construct validity suggested by Kerlinger (1986)—factor analysis.

Factor analysis helps one to determine which items measure the same construct. Hence, to assess whether the items on the questionnaire in fact constituted different scales of executive involvement and executive participation, a
varimax rotated principal component factor analysis was performed on 10 items in the questionnaire. The factor loadings for the two-factor solution are shown in Table 3.

The first factor appeared to tap aspects of the CEO's participation in IT-related matters in the firm as reported by the IS managers. Included within this factor were items concerning a CEO's role in corporate IT steering committees, the frequency of a CEO's personal participation in issues related to the firm's use of IT, and a CEO's familiarity with a firm's and its competitors' IT use. This factor was labeled as Executive Participation. Items related to CEO perceptions of IT, including a CEO's prevailing thinking about IT spending, a CEO's perceived importance of IT for a firm, vision for IT, and endorsement of applications not meeting traditional criteria all loaded on a common factor that we called Executive Involvement.

The factor analysis and reliability calculations for the IT manager responses suggest that the six-item executive participation and the four-item executive involvement scales are moderately reliable and demonstrate initial evidence of validity. Cronbach alpha reliability for Executive Participation (factor 1) was .83 and for Executive Involvement (factor 2) was .75. Future research on executive support should conduct further validation studies using multi-trait/multi-method procedures (see Kerlinger, 1986). The scores used for hypothesis testing were the simple average of respondents' responses for the items that loaded on their associated factor beyond .5.

The firm's progressive use of IT was the dependent measure in all three models of executive support. This measure appeared on the IT manager and the CEO questionnaires as a single-item subjective performance item. The measure asked the respondents to rate their company's relative IT use within their industry, ranging from industry leader to laggard. Dess and Robinson (1984) have argued that subjective performance measures examining a firm's relative performance within an industry can be appropriate substitutes for objective performance measures. Jarvenpaa and Ives (1990) propose and provide support that counting IT-related phrases in the chairman's letter can be an alternative way to measure the state of IT use in a firm, particularly strategic IT use. In this sample, the IT manager ratings of the firm's progressive use of IT correlated .41 (p < .003) with the number of IT-related phrases in the chairman's Letter to the Shareholders in the firm's 1988 annual report. The combined IT and CEO responses on the progressive use of IT (where a CEO response existed) correlated .43 (p < .002) with the number of IT-related phrases in the 1988 chairman's letter. These significant correlations suggest that the measure of the firm's progressive use of IT has some convergent validity with at least one objective measure. Also, the item analysis of questionnaire data indicate that individual items measuring executive involvement and executive participation were more highly correlated with their own theoretical constructs from the factor analysis (correlations from .64 to .87) than with the progressive use of IT (correlations from .10 to .51). Hence, the variable appears to have some construct validity.

Results and Discussion

The correlations among study variables, shown in Table 4, suggest that executive involvement, executive participation, executive age, and functional background are significantly associated with the criterion variable—progressive use of IT within the firm. Executive involvement is correlated with executive participation and organizational conditions, and weakly associated with an executive's functional background. Executive participation is associated with a CEO's age and tenure in a company.

Testing of alternative models

Table 5 displays the results of stepwise regression analyses designed to test the study's research hypotheses and the respective models. The ΔR² values reflect the amount of additional variance explained in the criterion variable as each predictor variable was entered in the regression equation. Regarding Model 3, only those predictors that met the .15 significance level for entry into the model are included.

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7 As pointed out by an anonymous reviewer, the computation of Cronbach alpha on the same sample as that used for factor analysis "stacks the deck" for favorable results on the reliability coefficient.
Table 3. Composition of the Factors—IT Executive Responses

<table>
<thead>
<tr>
<th>Factor 1: Executive Participation</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CEO's personal participation in firm's use of IT</td>
<td>.80</td>
</tr>
<tr>
<td>1 = less than once a year . . . 5 = daily.</td>
<td></td>
</tr>
<tr>
<td>2. CEO's role in corporate IT steering committee</td>
<td>.76</td>
</tr>
<tr>
<td>1 = no committee, 2 = no CEO input, 3 = CEO a member,</td>
<td></td>
</tr>
<tr>
<td>4 = CEO a chair, 5 = CEO a defacto committee.</td>
<td></td>
</tr>
<tr>
<td>3. CEO's knowledge of competitors' use of IT</td>
<td>.70</td>
</tr>
<tr>
<td>1 = weakly informed . . . 5 = extremely knowledgeable.</td>
<td></td>
</tr>
<tr>
<td>4. CEO's informal contacts with IT management</td>
<td>.69</td>
</tr>
<tr>
<td>1 = less than once a year . . . 5 = daily.</td>
<td></td>
</tr>
<tr>
<td>5. CEO's knowledge of IT opportunities in the firm</td>
<td>.67</td>
</tr>
<tr>
<td>1 = weakly informed . . . 5 = extremely knowledgeable.</td>
<td></td>
</tr>
<tr>
<td>6. Number of levels between IT head and CEO</td>
<td>-.67</td>
</tr>
<tr>
<td>1 = one level from the CEO, 2 = two levels, etc.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 2: Executive Involvement</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CEO's prevailing thinking about IT spending</td>
<td>.81</td>
</tr>
<tr>
<td>1 = expense to be controlled; 3 = resource to be allocated fairly;</td>
<td></td>
</tr>
<tr>
<td>5 = strategic investment.</td>
<td></td>
</tr>
<tr>
<td>2. CEO's perception of IT's importance to the firm</td>
<td>.77</td>
</tr>
<tr>
<td>1 = no concern for IT . . . 6 = IT is single most critical factor for firm.</td>
<td></td>
</tr>
<tr>
<td>3. CEO's vision for IT</td>
<td>.74</td>
</tr>
<tr>
<td>1 = no vision, 2 = technical vision, 3 = functional vision, 4 = strong,</td>
<td></td>
</tr>
<tr>
<td>generic vision.</td>
<td></td>
</tr>
<tr>
<td>4. CEO's endorsement of applications not meeting traditional criteria</td>
<td>.69</td>
</tr>
<tr>
<td>1 = rarely, 3 = occasionally, 5 = frequently.</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Correlations Among the Study Variables†

<table>
<thead>
<tr>
<th>Criterion variable</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Progressive use</td>
<td>.57***</td>
<td>.39***</td>
<td>.09</td>
<td>-.28**</td>
<td>-.11</td>
<td>-.12</td>
<td>-.03</td>
<td>.27*</td>
</tr>
<tr>
<td>of IT within the firm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Executive involvement</td>
<td>.34**</td>
<td>.27*</td>
<td>-.11</td>
<td>-.04</td>
<td>-.16</td>
<td>.09</td>
<td>.24*</td>
<td></td>
</tr>
<tr>
<td>3. Executive participation</td>
<td>.19</td>
<td>-.25*</td>
<td>-.06</td>
<td>-.29**</td>
<td>-.04</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Organizational conditions</td>
<td>-.14</td>
<td>.26*</td>
<td>-.16</td>
<td>-.08</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Age</td>
<td>-.40***</td>
<td>.47***</td>
<td>.43***</td>
<td>-.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Education</td>
<td>-.34***</td>
<td>-.25*</td>
<td>-.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Tenure in company</td>
<td>.39***</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Tenure in position</td>
<td>.16</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>9. Functional background</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

† All statistics are Pearson Product Moment Correlation Coefficients: * .10; ** .05; *** .01.
Table 5. Stepwise Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>F</th>
<th>R²</th>
<th>△R²</th>
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</thead>
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<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive Use of IT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive participation</td>
<td>.49</td>
<td>10.54***</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive Use of IT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive involvement</td>
<td>.46</td>
<td>22.02***</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td><strong>Model 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Progressive Use of IT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive involvement</td>
<td>.38</td>
<td>25.10***</td>
<td>.36</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.04</td>
<td>6.26**</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Executive participation</td>
<td>.25</td>
<td>3.43*</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>b. Executive Involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive participation</td>
<td>.52</td>
<td>7.69*</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Functional background</td>
<td>.52</td>
<td>3.66*</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>Organizational conditions</td>
<td>.20</td>
<td>3.02*</td>
<td>.05</td>
<td></td>
</tr>
</tbody>
</table>

*0.1; **0.05; ***0.01.

**Model 1**
Moderate support was found for Hypothesis 1, which predicted that a CEO’s personal participation in IT management is associated with a firm’s progressive use of IT. The predictor explained 16 percent of the variance in the criterion variable. Overall, the current pool of CEOs, however, participated relatively little in IT-related activities. According to the IT managers, CEOs in banking, publishing, and retailing were involved only on a monthly basis in managing IT. In petroleum firms, CEOs apparently concern themselves with IT matters only a few times a year. Even informal IT-related meetings were likely to occur only monthly, except in banking where weekly meetings were common. Most CEOs were reported to be “well informed” about the firm’s own and competitors’ IT innovations. Steering committees, however, operated with minimal CEO input or awareness. Four companies mentioned that when the steering committee was first installed, the CEO served as a chair, but over time the role migrated to vice presidents or others and the CEOs became either members or dropped off the committee.

**Model 2**
Strong support was found for Hypothesis 2, which predicted that executive involvement would be associated with a firm’s progressive use of IT. A CEO’s executive involvement correlated .57 with the firm’s progressive use of IT, accounting for 32 percent of the variance in the criterion variable. Hence, the CEO’s psychological state about IT appeared to be a more powerful predictor of the firm’s progressive use of IT than a CEO’s personal participation in IT management.

**Model 3**
Partial support was found for Model 3 and subsequently for Hypothesis 3 (Table 5). An overall test of the variables in Model 3—using the progressive use of IT as a criterion variable—provides support that among all the variables considered, executive involvement explains most of the variance in the criterion variable. Executive participation explains relatively little over and
above that explained by executive involvement. A CEO’s age was also found to be a significant predictor of the progressive use of IT. The existence of a “young” CEO might signal an organization that has gone through rapid organizational restructuring. Such restructuring might have involved information technology. Alternatively, younger executives, now generally used to IT in the workplace, might be more likely to rely on new IT-based change strategies than would older executives who have grown reliant on more traditional change mechanisms. A third potential explanation is that firms who have turned to younger CEOs have done so in partial recognition that their firms require fresh approaches and innovation.

Hypothesis 3 specifically predicted that a CEO’s high psychological involvement in IT, which is associated with a firm that is highly progressive in its use of IT, is determined by a CEO’s participation, background and his or her organization’s industry conditions. As hypothesized on the basis of cognitive dissonance theory, executive participation was related to executive involvement. Those CEOs that participated tended to have more favorable views of IT (i.e., higher involvement). Executive participation explained 14 percent of the variance in involvement (see Table 5). The youngest and those with least tenure in a firm tended to be the most personally participative in IT management. These more “junior” CEOs were more likely to chair the IT steering committee and were perceived to be significantly better informed about the IT opportunities in the firm than their older, more seasoned peers.\(^9\)

This finding might suggest that the new generation of CEOs—many of whom have experienced the power of computers in their previous appointments or have been acclimated to computers in their non-business lives—might be much more participative in IT management than the current breed of CEOs who, on average, were already CEOs when the term “strategic information technology” was coined and enshrined by the business and academic press. The participative decision-making literature (Locke and Schweiger, 1979) also suggests that “relevant skills and knowledge” is an important conditional factor for participation; only if individuals possess necessary information do they feel their participation is legitimate. Alternatively, one might speculate that the veterans better understand the relative value of psychological involvement rather than rely on participative, hands-on, management; in short, the more experienced executives might be more skilled at delegation.

Executive involvement was weakly related to organizational conditions. Executives in the petroleum industry were likely to see IT as less important than their peers in banking, retailing, and publishing. The difference was only significant in the pair-wise comparisons of perceptions between the retailing and petroleum CEOs. The retailing IT managers typically agreed that their CEO’s involvement was that “IT is one of the vital parts of the competitive strategy,” whereas the petroleum IT managers were far more likely to feel that their CEO’s involvement was that “IT is vital for smooth functioning of operations.” A possible explanation for the retailing CEOs’ strong psychological involvement in IT is that retailers are in the midst of the “turnaround stage” or using IT (Cash, et al., 1988). CEOs conceivably may become more involved, at least psychologically, when the role of IT is changing or increasing in the organization. This is a subtle variation of the common assumption that CEOs are closely involved in IT only if they perceive IT to be critical to the organization. Perhaps it is the potential of IT rather than the present realities within the firm that trigger a CEO’s psychological involvement.

Executive involvement was also weakly, but significantly, correlated with the functional background of the CEO. CEOs with output-related functional backgrounds were more likely to view IT as critically important to the firm than CEOs with throughput or staff backgrounds. Overall, Model 3 accounted for 49 percent of the variance in a firm’s progressive use of IT and thus provides a reasonable starting point for explaining executive support in IT management (see Table 5).

**Additional check on the results—annual report data**

The findings in the previous section were based on the progressive use of IT in a firm as meas-
ured by the IT managers and CEOs positioning their firms' IT use relative to other firms in the industry. As an additional validation, three alternative models of executive support were also tested using a surrogate measure for a firm's progressive use of IT, that is, the number of IT-related phrases in a chairman's letter to share-holders in the firm's 1988 annual report.

An IT-related phrase in a chairman's letter was defined as an instance of a word or a set of words that discussed "the management, application, investment, or organization of computer, communications, or office technology for improving or modifying operations, establishing linkages with customers, suppliers, competitors, or channel partners, or developing new products." Each IT-related phrase referred to only one instance of an IT-related event, opportunity, or problem. Our rationale for analyzing the chairman's letter was that, if IT had a significant impact on an organization, it was considered likely that the events and consequences related to IT had been discussed in the chairman's letter. Two evaluators were in 96 percent agreement concerning the identification of IT-related phrases.

Table 6 reports the results on Models 1, 2, and 3 using the number of IT-related phrases as the criterion variable. The results are nearly identical to those in Table 5 with the exception that "organizational conditions" has an effect on the criterion variable. This organizational condition effect might be the result of uses and length of annual reports varying somewhat from industry to industry (Jarvenpaa and Ives, 1990). Nevertheless, the strong similarity between these results and those in Table 5 is reassuring. Table 6 suggests that executive involvement explains more of the variance in the criterion variable than executive participation. This result increases our confidence that executive involvement is a more powerful predictor of a firm's progressive use of IT than executive participation in the context of the current sample of U.S. firms and industries.

Nevertheless, it is important to note that the above results are tempered by the limited sample of firms and industries used in this research. The results might be very different for smaller firms, for firms in industries with different structures from those studied in this article, or for firms operating in different cultural and technological environments.

#### Follow-Up Interviews

We emerge from this study—and subsequent open-ended interviews with five CEOs—with a

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive Use of IT—IT-Related Phrases</td>
<td>Progressive Use of IT—IT-Related Phrases</td>
<td>Progressive Use of IT—IT-Related Phrases</td>
</tr>
<tr>
<td>Executive participation</td>
<td>Executive involvement</td>
<td>Executive involvement</td>
</tr>
<tr>
<td>.89</td>
<td>.54</td>
<td>.53</td>
</tr>
<tr>
<td>11.24**</td>
<td>15.41***</td>
<td>10.46***</td>
</tr>
<tr>
<td>.18</td>
<td>.25</td>
<td>.51</td>
</tr>
<tr>
<td>.33</td>
<td>.24</td>
<td>.41</td>
</tr>
<tr>
<td>6.14**</td>
<td>4.91**</td>
<td>3.81*</td>
</tr>
<tr>
<td>.05</td>
<td>.14</td>
<td>.05</td>
</tr>
<tr>
<td>.05</td>
<td>.06</td>
<td>.05</td>
</tr>
</tbody>
</table>

* 0.1; ** 0.05; *** 0.01.
feeling that CEOs heading large organizations need not personally be very participative in IT management. Instead, if the firm is to be progressive in its use of IT, the CEO must send the right supportive signals regarding IT to his or her organization. CEOs' personal participation tends to be short and highly temporal. For example, one CEO of a large insurance company told us that he participated in a multi-hundred million dollar project only through attendance at quarterly progress meetings. In another firm, frequently cited as an industry leader in the use of IT, the CEO speaks with the IT manager for about 30 minutes a month, often about issues unrelated to IT.

Some CEOs consider themselves unqualified to participate directly in decisions regarding IT. They express personal frustration at being unable to effectively evaluate IT proposals. One insurance CEO described his participation in a major IT investment decision:

Our IT people were hiring consultants who were in turn hiring their own consultants. Consultants and the computer vendors reinforced each other while diffusing responsibility for the decision. I know nothing about IT. I didn't know what questions to ask or what options were available.

Our findings are consistent with the picture Gupta (1988) recently painted of CEOs in large firms. Gupta maintains that chief executives have neither the time nor the expertise to deeply participate in sales, purchasing, R&D, and other decisions through which corporate strategies are realized. CEOs mainly set broad guidelines within which the firm operates. This does not, however, mean that CEOs do not considerably influence organizational decisions indirectly by shaping the context within which they are made. After all, they are responsible for selecting, appointing, rewarding, and removing key executives who are directly involved in implementing strategy. For example, the CEO of a large financial institution had hired a new IT manager 18 months before we interviewed him. The CEO later promoted him to the bank's board of directors and, as described below, relied on him heavily in using IT to redirect the organization:

I couldn't do this without him [the IT manager.] I am very comfortable with him. He brings me solutions, not problems, most of the time. He knows the business.

Future Research

Generally, we believe that this study and its predecessor (Jarvenpaa and Ives, 1990) demonstrate that executive support is a fruitful research area. Future research needs to test the generalizability of our findings and seek a better understanding of the conditions and mechanisms governing the effects of participation and involvement on the progressive use of IT in a firm. Because our measures were developed partly by exploratory data analysis, psychometric weaknesses may exist in the current results. Causal linkages between participation, involvement, and progressive IT use remain unexamined and tangled. Additional theoretical constructs, such as decision-making style or leadership style, may be profitably brought into subsequent analysis. More powerful measures of the progressive use of IT in a company also need to be developed since subjective and indirect measures do not provide the same strength as direct objective measures could. Also, in this study, organizational conditions were measured crudely and on an industry level. Future measures of this variable should focus at the firm level and might take into account such factors as the major constituencies (e.g., suppliers, customers, and distributors) use of IT, the major competitors' use of IT, the information intensity in the firm's major services and products and in the production process, the degree of predictability in the firm's environment, and so on.

This study focuses on large organizations, often with diversified business units. Future researchers need to study the differences that exist in executive support between diverse, highly decentralized organizations and single business, highly centralized organizations. In the latter case, where contact with IT management can be frequent and direct, a CEO's views and visions for IT can be perhaps tied to specific business needs. For the highly decentralized, multi-business operation, the CEO's perspective might be less likely to focus on specific IT activities or applications. Here the CEO might instead seek to establish a nurturing climate for the progressive use of IT throughout the firm. This is consistent with Gupta and Govindarajah's (1984) and Leontides' (1982) findings that organizations falling on different points along the spectrum from single business to unrelated diversified business units require the CEO to play varying roles.
Organizational size may also influence the role of executive support. For example, DeLone (1988), studying small businesses with less than 300 employees, found a strong relationship between the CEO's personal participation and the firm's successful use of IT. Hands-on management in IT might be much more important in a small firm or business unit where a CEO commonly makes most key decisions and is perhaps the only one who can harness IT to corporate objectives and strategy.

Further studies need to examine the factors that influence the participation of CEOs in IT management. Our study found that CEOs appear to participate infrequently in IT-related activities. Perhaps CEO participation in IT is of limited utility. Alternatively, this finding may reflect a lack of exposure to, experience with, or comfort in computers and information technology among the current cadre of CEOs among the sampled firms. CEOs' participation might increase as managers who have become accustomed to using computers as well as championing and initiating innovative uses of information technology in their line management roles reach the top of the firm. A similar speculation regarding the actual hands-on use of computers among future CEOs has been proposed by Jones and McLeod (1986).

We suspect, however, that participation of the CEO in IT planning, development, and implementation-related activities will remain rather limited and commonly delegated to others. Nevertheless, certain types of participation appear to offer powerful motivating opportunities for the CEOs to change the behavior of others regarding IT. For instance, when CEO Michael Jordan (1989) unexpectedly used Frito-Lay's sophisticated new executive information system to quiz a marketing manager about the unhappy status of "pretzels on promotion in Pittsburgh," it said far more about the future important role he perceived for the organization's new executive support system than it did about pretzels, promotions, or Pittsburgh. Such "moments of truth" can provide powerful opportunities for the CEO to, by their action, demonstrate psychological involvement in a new IT initiative. Similarly, a CEO may not spend much time with his or her information systems executive, but, as one information systems executive explained to us, "If I need 15 minutes of his time I can always get it." Future researchers may find it rewarding to distinguish between the quality and quantity of participation.

The study results must be treated with some caution because of several inherent limitations. For instance, a reviewer of this article encouraged us to look at the construct "commitment" in addition to those of "involvement" and "participation." Commitment is a construct of interest in organization behavior (e.g., Salancik, 1977) and is defined as a "pledging or binding of the individual to behavioral acts" (Kiesler, 1971, p. 30). Although an empirical investigation of commitment goes beyond the objectives of this article, we encourage subsequent investigators to broaden their inquiry to include this construct in examining the CEO's role in promoting progressive use of IT.

Another limitation of this study is that it does not examine the top management team's aggregated views and behaviors, only those of the CEOs. Increasingly, more firms use an "office of the chief executive officer," which melds three to six top officers into a team led by the CEO, to carry out the top management leadership function (Bennett, 1989). In these teams, the CEO shares tasks and, to some extent, power with these other team members. Future researchers may wish to consider the entire top management teams' support for IT.

We have also tested only a subset of particular types of activities a CEO might participate in. There may be other types of activities that may more directly relate to the progressive use of IT in a firm. For instance, we interviewed a CEO of a major bank who was excited about having been the first CEO in the history of a firm to appear as a featured speaker at an annual information technology conference. Another, who travels widely, felt that he played a useful role in identifying technologies employed in other organizations (e.g., customers, suppliers) that might have applicability within his own firm. Neither of these two types of activities are particularly time consuming, and the latter is a by-product of time invested for other purposes.

Finally, longitudinal studies should test whether, as the case study literature suggests, organizational disequilibrium provides an impetus for IT-based interventions initiated and championed by the CEO. The metamorphosis model of Romanelli and Tushman (1988) maintains that, during
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satisfactory organizational performance (i.e., equilibrium), the core task of leadership is to sustain commitment to established patterns of activity. During periods when the environment is changing rapidly or the firm is performing poorly (i.e., disequilibrium), the leaders' primary task is to interrupt the established patterns and to redirect the organization toward activities that are responsive to changes in the environment. Our initial interviews with several CEOs tentatively suggest that CEOs in large firms are most likely to participate in IT when the organization has a problem, and the CEO perceives IT as a way to reorient or change the organization.

Acknowledgements
We want to thank Chino Rao and Edward Chiu for providing assistance on the project, and Sandra Dewitz who provided detailed comments on an earlier version of this article.

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**Blake Ives** is the Constantin Distinguished Professor of Management Information Systems at the Cox School of Business at Southern Methodist University. Professor Ives has been a distinguished fellow at the Oxford Institute for Information Management at Templeton College, Oxford, and a Marvin Bower Faculty Fellow at the Harvard Business School. He is currently an honorary research associate at Victoria University of Wellington, New Zealand, and an associate fellow at Templeton College. He received his Ph.D. in management information systems from the University of Minnesota. He is a frequent contributor to *MIS Quarterly* and has published in numerous management and information systems journals; he also serves on several editorial boards. Professor Ives’ recent research focuses on customer service, the competitive use of information technology, global information systems, and the role of the senior information systems executive.

### Appendix A

**Companies in the Study Sample, by Industry**

#### Banking

- BancOne
- BankAmerica
- Bank of Boston
- Barnett Banks of Florida
- Chase Manhattan
- Citizens and South
- Continental Illinois
- First Chicago
- First City BankCorp
- First Union
- Irving Bank
- J.P. Morgan
- Manufacturer's Hanover
- Marine Midland
- National City BanCorp.
- National City Corporation
- NBD
- NCNB
- PNC Financial Corp.
- Republic of N.Y.
- Security Pacific
- Sovran

#### Publishing

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

#### Petroleum

- Agway
- Amerada Hess
- American Petrofina
- Ashland Oil
- Atlantic Richfield
- Mobil
- Murphy Oil
- Pennzoil
- Phillips
- Shell Oil

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Coastal Corp.  Sun
Crown Central  Tenneco
Diamond Shamrock  Texaco
Exxon  Tosco
Kerr McGee  USX
Mapco  Witco

Retailing
Allied
American Stores
Best Products
Carter-Hawley
Dayton-Hudson
Federated Department Stores
F.W. Woolworth
Great Atlantic & Pacific Tea
J.C. Penney
KMart
Lucky Stores
Marriotts

May Department Stores
Melville
Safeway Stores
Service Merchandise
Southland
Stop and Shop
Toys 'R' Us
Walgreen
WalMart Stores
Winn-Dixie Stores
Zayre

Appendix B
IT Manager Questionnaire

ID Number: ____________________________

This questionnaire is intended for the most senior Information systems executive within your firm. If you are not that individual please forward the entire packet to him or her.

1. Please provide the title of the person you report to: ____________________________

2. How many levels are you from the Chief Executive Officer of the corporation?

   1  2  3  4  5  6

3. How many years have you held your current position?

   1  2  3  4  5  more than 5

4. To the best of your knowledge, how many years has your firm's Chief Executive Officer been in his or her current position?

   1  2  3  4  5  6  7  8  9  10  more than 10

5. Which of the following statements best describes the importance that your CEO perceives IT to be for your firm?

   6  5  4  3  2  1

   Considers IT as the single most critical factor for the firm.
   Considers IT as one of the vital parts of the competitive strategy.
   Considers IT to be vital for smooth functioning of operations.
   Considers IT to be one of many ways to cut costs in the firm.
   Considers IT to be the concern of technologists, not managers, but is supportive of IT.
   Has little concern for the potential utility of IT.

Optional Comment: ____________________________

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### Appendix B - cont.

6. How often does the CEO get personally involved in matters related to the use of IT within the firm?

<table>
<thead>
<tr>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Few Times</th>
<th>Less than Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

| Optional Comment |

7. How frequent are informal contacts between the CEO and the firm’s senior IT management?

<table>
<thead>
<tr>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Few Times</th>
<th>Less than Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

| Optional Comment |

8. How knowledgeable is the CEO about IT opportunities and possibilities for your firm?

<table>
<thead>
<tr>
<th>Extremely</th>
<th>Very</th>
<th>Well</th>
<th>Somewhat</th>
<th>Weakly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed</td>
<td>Informed</td>
<td>Informed</td>
<td>Informed</td>
<td></td>
</tr>
</tbody>
</table>

| Optional Comment |

9. How knowledgeable is the CEO about IT innovations that have been developed by major competitors?

<table>
<thead>
<tr>
<th>Extremely</th>
<th>Very</th>
<th>Well</th>
<th>Somewhat</th>
<th>Weakly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed</td>
<td>Informed</td>
<td>Informed</td>
<td>Informed</td>
<td></td>
</tr>
</tbody>
</table>

| Optional Comment |

10. How would you describe your firm’s use of information technology?

<table>
<thead>
<tr>
<th>Industry Leader</th>
<th>Close</th>
<th>Middle</th>
<th>Somewhat</th>
<th>Laggard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leader of the Pack</td>
<td>Follower</td>
<td>Behind</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Optional Comment |

11. Is there a research and development (R & D) budget for investments in IT?

<table>
<thead>
<tr>
<th>Yes</th>
<th>Yes, but inadequate budget for piloting our needs for new technologies</th>
<th>Yes, we have a modest budget for piloting new technologies</th>
<th>Yes, we are probably an industry leader in discretionary funding for investments in emerging information technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

| Optional Comment |

12. Which of the following best describes the CEO’s prevailing thinking about funds the firm spend on IT?

<table>
<thead>
<tr>
<th>Views IT as an expense to be controlled</th>
<th>Views IT as a resource to be allocated fairly across organizational units</th>
<th>Views IT as a strategic investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

| Optional Comment |

13. How often does your CEO endorse major IT investments that have not been endorsed by traditional justification criteria and procedures?

<table>
<thead>
<tr>
<th>Rarely</th>
<th>Occasionally</th>
<th>Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

| Optional Comment |

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Executive Involvement in IT Management

Appendix B - cont.

14. Which of the following best describes the CEO's role in the corporate IT steering committee?

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Is the defacto steering committee chairs an IT committee and actively participates in meetings.</td>
</tr>
<tr>
<td>4</td>
<td>Is a member of the IT steering committee.</td>
</tr>
<tr>
<td>3</td>
<td>IT committee exists, but with minimal CEO input or awareness.</td>
</tr>
<tr>
<td>2</td>
<td>No steering committee exists.</td>
</tr>
</tbody>
</table>

Optional Comment

15. What is the CEO's vision for IT?

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A strong, but generic vision, (<em>we will be the industry leader in the use of advanced information technology.</em>)</td>
</tr>
<tr>
<td>3</td>
<td>A technical vision of how the firm will use IT (<em>we will install a worldwide communications network.</em>)</td>
</tr>
<tr>
<td>2</td>
<td>A functional vision of how the firm will use IT (<em>95% of customer calls will be handled with no call back.</em>)</td>
</tr>
<tr>
<td>1</td>
<td>No stated vision expressed for IT.</td>
</tr>
</tbody>
</table>

16. Does the CEO personally use information technology?

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>CEO makes heavy use of IT via electronic mail, personal computer, executive information system.</td>
</tr>
<tr>
<td>3</td>
<td>CEO makes symbolic use of IT (e.g., PC in the office, but only occasional use.)</td>
</tr>
<tr>
<td>2</td>
<td>CEO is not a user of IT but insists that his or her office make use of IT.</td>
</tr>
<tr>
<td>1</td>
<td>CEO has no personal involvement with computers.</td>
</tr>
</tbody>
</table>

17. What firm do you consider to be the information technology leader in your industry?

Would you like a copy of the paper we referred to in the cover letter?

No
Yes [If new address please specify]

Thank you very much for your assistance.