

The performance effect of computer-mediated communication and decentralized strategic decision making

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Abstract

Organizing effective strategy-making processes is challenging in contemporary environmental settings characterized by dynamic competition and intense use of information technology. Scholars have long argued for the pertinence of emergent strategy processes and the effectiveness of nonhierarchical decentralized decision structures in rapidly changing environments. However, little empirical research has investigated the direct and moderating effects of communication-enhancing information technology in this context. Consequently, the relationships between computerized information systems, strategic decision making, and organizational performance remain largely unexplored. To fill this gap, this paper presents a recent empirical study, which confirms that decentralized strategic decision making is related to higher organizational performance in dynamic environments. Furthermore, the study indicates that computer-mediated communication is associated with superior performance and that decentralized strategic decision making in conjunction with computer-mediated communication is associated with even higher performance across environmental settings.

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1. Introduction

Contemporary business environments are characterized by decentralized organizational configurations (Galbraith, 1994, 1995), intense use of new communication technologies (Bettis and Hitt, 1995; Fulk and DeSanctis, 1995), and dynamic competition across industries (D'Aveni, 1994; Thomas, 1996). This highlights a need to improve our insights about the interaction between decentralized decision processes and information technology and the effects on organizational performance in different environmental settings. Various scholars have analyzed the economic benefits of investment in information technology (Brynjolfsson and Hitt, 1996; Bharadwaj et al., 1999; Dewan and Kraemer, 2000; Im et al., 2001), but none of these studies have addressed the relationships between computerized information systems, strategic decision processes, and performance. It has long been argued that decentralized decision structure, emergent strategy processes, and the use of computerized information systems are appropriate organi-

zational traits in dynamic environments (Galbraith, 1977; Mintzberg, 1978; Burgelman, 1988; Huber, 1990). However, little empirical research has been conducted to investigate these contentions in a cross-section of industrial environments. To fill this gap, this paper presents a recent study of firms sampled from manufacturing industries representing different levels of environmental dynamism. The study provides new evidence about the performance effects of computer-mediated communication in conjunction with decentralized strategic decision making across environmental settings. In the following sections, the paper outlines the underlying theory and hypotheses, describes the empirical study and its results, and discusses the implications of the findings.

2. Theory and hypotheses

2.1. Emergent strategy processes and decentralized decision making

Strategy has been depicted as a pattern of resource committing decisions made by managers in the firm (Bower, 1970; Andrews, 1971; Mintzberg, 1978). From this per-

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spective, strategy can emerge from a variety of decisions made over time by lower level managers located in different parts of the organization (Burgelman, 1983, 1988; Jelinek and Schoonhoven, 1990; Mintzberg, 1990). When managers in operations make investment decisions, when research associates choose between development projects, and when sales managers cater to new customer segments, organizational resources are deployed in ways that eventually can have a profound influence on the firm's strategic development. Along this vein, Mintzberg (1994) even suggested that important strategies can emerge without the awareness of top management. Hence, decentralized strategic decision making where middle managers within the organization can take initiatives in response to changing conditions may determine the organization's strategic direction over time (Burgelman, 1983, 1988; Burgelman and Grove, 1996) and build capabilities that eventually shape the strategic options available to the firm (Noda and Bower, 1996).

2.2. Computer-mediated communication and decentralized decision structure

The use of information technology is an essential feature of dynamic environments (Bettis and Hitt, 1995; Fulk and DeSanctis, 1995). It is argued that task uncertainty deriving from dynamic environments increases the amount of information that organizational decision makers must process to monitor the environmental changes and coordinate interdependent tasks between subunits in the organization (Galbraith, 1974, 1977; Tushman and Nadler, 1978). Galbraith (1977) suggested that computerized information systems could accommodate the needs for both vertical and lateral communication to cope with task uncertainty. Vertical communication links up and down the managerial hierarchies can provide top management with internal reporting and connect middle managers to higher level decision authority. Lateral information systems constitute more informal communication channels to facilitate the exchange of soft information and elements of tacit knowledge among middle managers needed in the coordination of nonroutine activities. The vertical information systems are seen as rather mechanic and geared to the exchange of structured and quantified information, while lateral communication links are seen as organic and more prone to the exchange of unstructured and nonquantifiable information (Tushman and Nadler, 1978). Vertical information systems could arguably facilitate the centralization of decisions around executives at the top of the organization's hierarchy (King, 1983; Zuboff, 1988), although ethnographic studies indicate that the use of computerized information systems, such as email and Intranet, are more likely to achieve the opposite outcome (Romm and Pliskin, 1998; Cecez-Kecmanovic et al., 1999). A decentralized decision structure is considered more effective in dynamic environments because managers are able to make faster and better decisions in response to environmental developments (Mintzberg, 1978, 1983;

Huber, 1990). This environmental contingency view is supported by organization theoretical perspectives, which argue that nonroutine responses in uncertain task environments call for a decentralized decision structure where actions are coordinated through mutual adjustments (e.g., Perrow, 1966; Thompson, 1966). The use of lateral computerized information systems can accommodate the exchange of soft and unstructured information and facilitate the informal communication among middle managers in the firm's subunits. This reduces coordination cost and thereby increases the efficiency of decentralized organizational decision processes (Huber, 1990; Fulk and DeSanctis, 1995; Joyce et al., 1997). It is further argued that computer-based communication technologies can support emergent strategy processes, as relevant environmental and organizational information is made more accessible, while it becomes easier for middle managers to exchange information across time and space. Computer-mediated communication may also be used to reduce inhibiting organizational barriers (Sproull and Kiesler, 1986), increase influence (Romm and Pliskin, 1998), further collaborative practices (Cecez-Kecmanovic et al., 1999), and support exchange of knowledge that allows managers to develop more responsive actions (Gallupe et al., 1992; Kettinger and Grover, 1997). Computer networks can provide decentralized decision makers with instantaneous access to relevant information, which will speed up the decision-making process, compared with formal approvals moving along several hierarchical levels of authority, where information overload can prohibit timely decisions (Andersen and Segars, 2001). Accordingly, researchers have noted a trend towards decentralized organizational structures using computerized information systems (Galbraith, 1994, 1995; Fulk and DeSanctis, 1995; Joyce et al., 1997).

Transaction cost economics and agency theory have been used to analyze how information technology may relate to the firm's decision structure (Gurbaxani and Wang, 1991). An hierarchical decision structure imposes standardized routines on organizational processes that normally constitute low cost coordination mechanisms. Conversely, the coordination costs associated with mutual adjustment processes in a decentralized structure are substantial due to the higher information processing requirements (Galbraith, 1977; Tushman and Nadler, 1978). However, with the advent of computerized communication capabilities, the transaction costs associated with the intense handling of soft unstructured information in a decentralized decision structure are vastly reduced. On the other hand, decentralization may impose higher agency costs if middle managers act in greater disharmony with corporate owners than the top management team does. The optimal decision structure should be determined by tradeoffs between technology-induced savings on information processing associated with a decentralized decision structure and higher agency costs associated with autonomous decisions. However, the result of this theoretical analysis remains inconclusive, as the

outcome arguably depends on industry-specific factors, and a resolution therefore calls for empirical investigations of cross-sectional industry samples.

2.3. Hypotheses development

Computerized information systems, comprising local area networks and Intranet, reduce the firm's information processing cost (e.g., Gurbaxani and Wang, 1991; Clemons et al., 1991) and make the coordination of organizational activities more economical (e.g., Tyran et al., 1992; DeSanctis and Jackson, 1994). Furthermore, computer-mediated communication can reduce the inhibiting organizational barriers and facilitate collaborative and creative interactions that support the development of effective strategic responses (e.g., Sproull and Kiesler, 1986; Gallupe et al., 1992; Cecez-Kecmanovic et al., 1999). This reasoning leads to the following hypothesis.

Hypothesis 1: Higher levels of computer-mediated communication among the organization's middle managers are associated with higher levels of firm profitability.

Standardized processes in a centralized organizational structure are considered cost effective, but they also make the organization less responsive to changing environmental conditions. In rapidly changing environments, a decentralized organizational structure where middle managers can take actions on their own is more responsive but, also, more costly because nonstandardized actions must be coordinated through mutual adjustments. As a consequence, the benefits associated with the higher responsiveness of a decentralized decision structure are more likely to outweigh the cost disadvantages of mutual adjustment processes in dynamic environments (Burns and Stalker, 1961; Perrow, 1966; Thompson, 1966). Furthermore, decentralized decision making can increase the overall information processing capacity of the organization that is needed to respond to uncertain task environments (Galbraith, 1974, 1977; Castrogiovanni and Macy, 1990). A decentralized decision structure may also enable middle managers to take initiatives that ultimately affect the firm's strategic development. For example, middle managers' decisions can influence the creation of firm-specific capabilities (Bower, 1982), strategy formulation (Burgelman, 1988), product innovations (Jelinek and Schoonhoven, 1990), and strategic options (Noda and Bower, 1996). Decentralized decision making can furnish responsive actions that influence the firm's strategic path (Mintzberg, 1978; Burgelman, 1983) and may lead to better decision outcomes because middle managers in possession of relevant insights can act in response to changing environmental conditions (Huber, 1990). This argues for the following hypothesis.

Hypothesis 2: Organizational structures characterized by decentralized strategic decision making are associated with higher levels of firm profitability in dynamic environments.

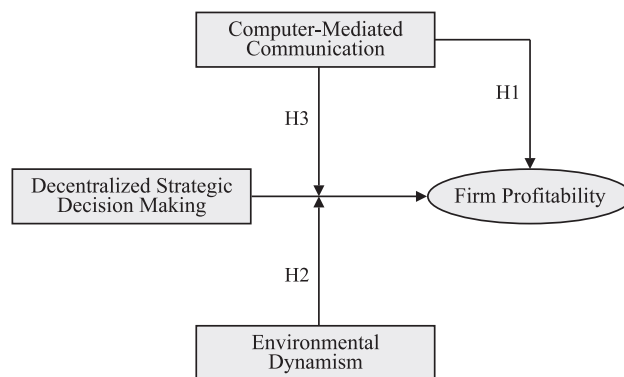


Fig. 1. Strategic decision-making model and hypotheses.

Company-wide computer networks can facilitate access to different types of information located in diverse parts of the organization (e.g., Malone et al., 1987; Malone and Rockart, 1990). The availability of relevant information at decentralized decision nodes enables middle managers to make faster and more effective decisions (Huber, 1990). The ability to exchange information among middle managers in different organizational subunits can support more comprehensive analyses and lead to better decision outcomes. Computerized information systems can facilitate communication among middle managers and allow them to discuss alternatives, coordinate actions, and thereby reach higher quality decisions (Huber, 1990). Computer networks reduce the cost of informal communication and thereby make the coordination of mutual adjustment processes more economical (e.g., Gurbaxani and Wang, 1991; Clemons et al., 1991). These rationales motivate the following hypothesis.

Hypothesis 3: Higher levels of computer-mediated communication among the organization's middle managers increase the positive relationship between decentralized strategic decision making and firm profitability.

The relationships expressed in the hypotheses are shown in Fig. 1. The subsequent sections outline the research design adopted to test the hypotheses.

3. Methodology

3.1. Research design

The model constructs were measured on the basis of previously tested item scales. Executive responses to a questionnaire were used to develop firm-specific measures of decentralized strategic decision making, computer-mediated communication, environmental dynamism, and firm profitability. Items were assessed on five-point Likert scales and aggregated into the respective construct measures. The questionnaire was aimed at the member of the executive board in charge of the firm's market-related activities because market-oriented managers generally are found to

be engaged in the strategy-making process (Floyd and Wooldridge, 1992; Mintzberg, 1994).

3.2. Measures, instrumentation, and control variables

Decentralized strategic decision making was assessed on the basis of Aiken and Hage's measure of decision authority (Price, 1972; Dewar et al., 1980). It indicates the extent to which managers one level below the top management team, i.e., middle managers, are able to take actions on their own that may influence the firm's strategic development. The items originally developed by Aiken and Hage were modified to reflect decisions of strategic importance, e.g., new market activities, product and service developments, changes in practices and policies, etc. (Miller, 1987). Computer-mediated communication indicates the extent to which managers use computer-based technologies to exchange information and to communicate (Kettinger and Grover, 1997). The measure refers to the use of electronic mail, internal computer networks, and other computerized information systems (Andersen, 2001). The items do not reflect investment in particular types of equipment but capture the extent to which communication among middle managers in different functional areas is enhanced by computer-based technologies, i.e., the measure reflects the actual usage of information technology (Sarv and Rajiv, 2003). Environmental dynamism was measured by items indicating perceived changes in demand for different products, changes in product and service technologies, and changes in the profitability of different products (Miller, 1987), which depicts the task environment confronting the organization. All measures were computed by adding the assigned item responses. Firm profitability was assessed vis-a-vis the firm's closest competitors using return on assets as the comparative scale (Dess and Robinson, 1984) and captures a basic dimension of the organizational performance. Indicating profitability in relation to the firm's close competitors eliminates the problems associated with systematic differences in industry returns that arise from the use of archival performance indicators in cross-sectional samples (Schmalensee, 1985; Rumelt, 1991). The use of a relative performance measure also reduces potential biases arising from periodic changes in accounting practices and reporting irregularities.

Several variables representing possible confounding effects were considered. Firm size may influence organizational structure (Blau, 1970), and because size implies past success, it may constitute economic slack that influences current performance (Aldrich, 2000). Consequently, the natural logarithm of total assets was included as a control variable in view of the sample's skewness towards large organizations. International engagements can have a negative influence on performance (e.g., Christophe, 1997). Hence, internationalization, measured as the percentage of international over total sales, was included as control variable. Organizations operating in industries with high fixed asset commitments may be more inclined to centralize

resource, committing strategic decisions to gain more control over capital investments. Therefore, the percentage of fixed assets over total equity was included as control variable. Finally, empirical research has found that a lower number of direct reports can improve team performance (Gittell, 2001), thus, the supervisory span of the executive respondents was included as control variable as well.

To test the validity of the model constructs, all item responses were subjected to factor analysis, which supported the existence of distinct constructs of decentralized strategic decision making, computer-mediated communication, and environmental dynamism. The internal consistency of the measures was assessed by calculating Chronbach's alpha. The coefficient alphas derived on the three construct measures were .72, .81, and .74, respectively, which was considered satisfactory (Nunnally and Bernstein, 1994). To test the reliability of the respondents, the profitability indicator was compared with firm-level archival data on return on assets and showed a correlation coefficient of .41, which is comparable with similar analyses (Dess and Robinson, 1984). An alternative measure of dynamism was derived from an analysis of aggregate annual sales over a 10-year period in industries identified by their four-digit SIC codes. The archival dynamism measure was calculated as the standard error of the regression slope coefficient of the 10-year trend line divided by mean sales in the industry during the period (Dess and Beard, 1984). The archival measure was assigned to the firms in the sample in accordance with their industry coding. The correlation coefficient between the subjective and archival measures of environmental dynamism calculated across the sample was .63, which was deemed satisfactory. An average tenure of 8.8 years among the responding executives suggests that they should have deep insights about their firms and provides some credence to the self-assessed measures. To check the reliability of the executive respondents further, secondary respondents were sought among other managers in 25 randomly chosen firms. Secondary responses were obtained from 53 managers in 12 of the chosen organizations, constituting approximately 10% of the full sample, which was deemed sufficient for this purpose (Powell, 1992). The average interrater reliability between primary and secondary respondents was .70, which was considered satisfactory (Rosenthal and Rosnow, 1991).

3.3. Sampling and data collection

The study targeted firms in different manufacturing industries to ensure comparable differentiation between the functional areas across the sampled organizations (Blau, 1970). Firms were extracted from industries in the Compu-stat database classified by four-digit SIC codes including meat packing (SIC: 2011–2015), flour and cereals (SIC: 2040–2046), sugar products (SIC: 2060–2063), beverages (SIC: 2082–2089), various food items (SIC: 2090–2099), men's clothing (SIC: 2300–2329), women's clothing (SIC:

2331–2341), household furniture (SIC: 2511–2514), electronic computers and storage devices (SIC: 3571–3572), computer terminals and calculators (SIC: 3575–3578), industrial machinery (SIC: 3547–3559), and measuring and analytical instruments (SIC: 3825–3827). Hence, the sample includes North American firms spread across manufacturing industries representing different levels of environmental dynamism. The household industries are often considered moderately dynamic environments (Powell, 1992), whereas the computer industries typically are described as dynamic environments (Eisenhardt, 1989). An analysis of variance confirmed the expected differences in the average levels of dynamism between these two industry groups using both subjective and archival measures.

The sampled organizations consisted of single business firms with at least 5 years of consecutive business performance to avoid confounding corporate strategy effects and influences from extraordinary organizational transformation processes. The top executives were identified on Compustat and verified from annual reports and direct phone calls to firm headquarters. Interviews with executives in four firms in the chosen industries supported the development of the questionnaire, which was subsequently tested by managers in the firms. The questionnaire defined the top management team as the firm's executive board and managers as subordinates reporting to members of the executive board.

The initial sampling process identified 234 eligible firms in the chosen industries. A questionnaire was mailed to the executives in charge of the firm's market-oriented functions, and their participation was solicited through direct phone calls. Follow-up mail was sent to nonrespondents after 2 months, and the respondents received a promised summary report of preliminary findings five months after the first mailing. Useable questionnaires were returned to provide 101 complete data sets, corresponding to a response rate of 43.2%, which compares favorably with other executive surveys (Hambrick et al., 1993). Potential response biases were tested by comparing archival data on total sales, total assets, sales growth, return on assets, and profit margin between respondents and nonrespondents.

4. Empirical results

4.1. Descriptive statistics

Table 1 provides mean values, standard deviations, and bivariate correlations among the construct measures and major control variables. The correlation analysis revealed a positive relationship between computer-mediated communication and decentralized strategic decision making. Computer-mediated communication had a positive relationship to environmental dynamism. No strong associations were detected between computer-mediated communication, decentralized strategic decision making, and firm profitability.

4.2. Regression analyses and hypotheses testing

The hypotheses were tested using multiple regression analyses (Aiken and West, 1991). A set of regressions was performed, with firm profitability as the dependent variable and decentralized strategic decision making, computer-mediated communication, environmental dynamism, and their interaction terms as the independent variables. The independent variables were added in an hierarchical regression analysis to assess performance effects beyond the control variables, including environmental dynamism, organizational size, internationalization, fixed asset investment, and supervisory span. Computer-mediated communication was added to the regression equation to test Hypothesis 1. The interaction term between decentralized strategic decision making and environmental dynamism was added to the regression to test Hypothesis 2, and the interaction term between computer-mediated communication and decentralized strategic decision making was added to test Hypothesis 3. The results from this hierarchical regression analysis are shown in Table 2. All independent variables, control variables, and interaction terms were tested for possible multicollinearity effects by regressing each variable against the other variables. These regressions had R^2 below .90, corresponding to variance inflation factors well below 9.5,

Table 1
Descriptive statistics and correlation analysis

(n = 101)	Mean	S.D.	1	2	3	4	5	6	7
Computer-mediated communication	11.43	3.17	–	–	–	–	–	–	–
Decentralized strategic decision making	13.64	4.29	.244**	–	–	–	–	–	–
Environmental dynamism	11.94	2.51	.284**	.184***	–	–	–	–	–
Size [ln(assets)]	4.36	1.98	.061	.265**	–.156***	–	–	–	–
Internationalization	8.47	17.60	.238**	.048	–.036	.124	–	–	–
Fixed asset investment	13.35	3.45	–.046	–.023	–.124	.182***	.069	–	–
Supervisory span	6.31	5.72	.116	.041	–.080	.183***	.090	.074	–
Firm profitability	3.72	1.29	.202***	.122	.051	.291**	–.055	–.096	.094

* $P < .10$.

** $P < .05$.

*** $P < .01$.

Table 2
Hierarchical regression analysis [standardized regression coefficients]

(<i>n</i> = 101)	MODEL I	MODEL II	MODEL III	MODEL IV
	Firm profitability			
Environmental dynamism	0.062 (0.064)	−0.017 (−0.173)	−0.045 (−0.454)	−0.096 (−0.946)
Size [ln(assets)]	0.321** (3.210)	0.314** (−3.082)	0.307** (3.109)	0.308** (−3.179)
Internationalization	−0.124 (−1.290)	−0.189*** (−1.937)	−0.182*** (−1.921)	−0.176*** (−1.900)
Fixed asset investment	−0.158 (−1.616)	−0.152 (−1.582)	−0.154 (−1.650)	−0.164*** (−1.788)
Supervisory span	0.064 (0.659)	0.037 (0.392)	0.023 (0.251)	0.035 (0.383)
Computer-mediated communication	–	0.264** (2.505)	0.308** (2.979)	0.316** (3.107)
Decentralized strategic decision making	– (−0.472)	−0.047 (−0.805)	−0.079 (−1.308)	−0.130
Decentralized strategic decision making by environmental dynamism	–	–	0.243** (2.614)	0.208* (2.247)
Decentralized strategic decision making by computer-mediated communication	–	–	–	−0.211* (2.156)
Multiple <i>R</i> ²	.127	.182	.239	.276
Adjusted <i>R</i> ²	.081	.121	.173	.204
<i>F</i> significance	0.021	0.007	0.001	0.000
<i>F</i> change	–	0.048	0.010	0.033

* *P* < .10.

** *P* < .05.

*** *P* < .01.

which is a common threshold indicating multicollinearity problems (Lomax, 1992; Kleinbaum et al., 1998). The error terms in the regressions were checked for outliers, heteroscedasticity, and normality.

The regression analyses revealed a significant direct and positive relationship between computer-mediated communication and firm profitability, providing support for Hypothesis 1. The regressions showed a significant, positive relationship between the interaction term between decentralized strategic decision making and environmental dynamism and firm profitability; that is, there was support for Hypothesis 2. The interaction term between computer-mediated communication and decentralized strategic decision making indicated a significant, positive relationship with firm profitability, which provided support for Hypothesis 3. Because the full regression model explained more than 20% of the total variance, the proposed model relationships seemed to represent relationships of material importance.

4.3. Limitations of study

The results of this study were exposed to some limitations. The model constructs were measured on the basis of indicators assessed by top executives in the sampled firms, although the use of single informants can expose results to common method biases. However, this practice is quite common in organizational research where executives are chosen as prime respondents be-

cause they are considered reliable informants. Executives are seen as well versed in the inner workings of their respective organizations, which also should be the case here since the executives were assessing processes and practices pertaining to managers reporting directly to them. Furthermore, the high average tenure of the executives in this study suggests that respondents were familiar with the decision processes and communication practices in their firms. Accordingly, the executive responses showed satisfactory comparability to secondary responses from managers chosen randomly among the sampled firms. The high correlation between archival and subjective measures provided further support for the reliability of executive responses.

No time lags were incorporated between the dependent and independent variables, thus, there could be a potential issue of reverse causality; that is, it may be argued that economic slack from higher performance can induce new investment in information technology and lead to a reduction in centralized control. However, computer-mediated communication reflects an organizational trait rather than an investment behavior, and there is no automatic relationship between investment in information technology and particular organizational uses of the acquired technologies. In fact, the literature is replete with examples of technology investments gone wrong because expected usage failed to materialize (Brynjolfsson and Hitt, 1996). Furthermore, all the regressions were con-

trolled for the possible effects of economic slack. Therefore, adherence to decentralized decision processes and the use of computerized information systems are likely to reflect inherent organizational phenomena. This is consistent with views of technology adoption where the usage of new information technologies constitutes gradual processes influenced by ongoing practices and accommodation to organizational circumstances (e.g., Orlikowski, 1996, 2000). Hence, the current study does not suggest a direct causal link between the use of information technology and the adoption of a certain organizational structure, but rather look upon these phenomena as conjoined organizational features. Accordingly, the study comprised firms with at least five years of consistent business practices, and the executive respondents were specifically asked to indicate the firm's situation over recent years to reinforce the contemporaneous nature of the construct items.

The research proceeded with a careful initial scanning of the firms in the sample and performed a meticulous identification of all the executive respondents. These efforts resulted in a high response rate and a seemingly representative data set. Although the regressions analyze relatively complex relationships with several direct variables and interaction terms based on a finite number of observations, the full regression model had an adjusted R^2 above 20%, which is quite comparable with other organizational studies of this nature.

5. Discussion

The empirical evidence indicates that the use of communication-enhancing information technology is associated with higher organizational performance. That is, computer-mediated communication between middle managers located in different functional areas in the firm seems to increase profitability. These results are consistent with arguments that computer networks can reduce communication and coordination costs and thereby increase the efficiency of organizational processes (e.g., Clemons et al., 1991; Fulk and DeSanctis, 1995) and facilitate better and more responsive decision outcomes (e.g., Sproull and Kiesler, 1986; Huber, 1990; Gallupe et al., 1992). They also extend other findings of positive performance relationships to cross-functional interaction (Krohmer et al., 2002) and improved strategic consensus from communication (Rapert et al., 2002) by showing that positive performance outcomes can be derived from the use of computerized information systems, as they enhance internal communication and coordination. Whereas other recent studies identified a link between different industries and the performance effect of information technology (Li and Ye, 1999; Rajiv and Sarv, 2003), this study found a direct performance effect from computer-mediated communication, regardless of industry setting.

The study finds no direct relationships between decentralized strategic decision making and organizational performance. However, the results confirm that decentralization has a positive performance association when organizations are exposed to dynamic environmental conditions, as the benefits from increased strategic responsiveness outweighs the higher coordination cost associated with decentralized decision processes (e.g., Perrow, 1966; Thompson, 1966). These findings are consistent with prevailing views that nonhierarchical, decentralized organizational designs are more effective in dynamic environments (e.g., Burns and Stalker, 1961; Perrow, 1966), and also extend them to comprise effects of decentralized strategic decision processes.

Finally, the study indicates a positive interaction between decentralized strategic decision making and computer-mediated communication, as computer networks reduce the cost of intensive information processing requirements associated with the coordination of mutual adjustment processes (e.g., Thompson, 1966) and facilitate responsive actions (e.g., Gallupe et al., 1992). Hence, the computerized communication systems extend the advantage of a responsive decentralized strategic decision structure (e.g., Galbraith, 1977, 1994, 1995; Heydebrand, 1989) and allow dispersed decision makers to make faster and higher quality decisions (Huber, 1990). Hence, the study also provides empirical evidence to enlighten the debate about the centralization–decentralization effect of information technology (Gurbaxani and Wang, 1991; King, 1983; Zuboff, 1988).

Based on a cross-sectional sample of firms, the current study investigated the performance association of strategic decision power dispersed to the organization's middle managers in the context of environmental dynamism and computer-mediated communication capabilities. The study demonstrates that the increased information processing capacity derived from computer-mediated communication can improve the effectiveness of decentralized strategic decision making and increase the efficiencies of cross-functional coordination efforts. Computerized information systems allow middle managers to take a variety of information into account, which, combined with their market insights, leads to more timely and better decision outcomes (Huber, 1990), while computer-mediated communication reduces information processing and coordination costs (Galbraith, 1977, 1994). That is, decentralized strategic decision making in the organization's market-oriented functions, in conjunction with computer-mediated communication among middle managers throughout the organization, is associated with superior performance across all environmental settings. The results illustrate that the higher information processing capacity of computer-mediated communication can enhance the economies of decentralized strategic decision making processes, e.g., by making information accessible to the dispersed decision makers and by enabling them to coordinate responsive strategic actions among organizational subunits.

6. Conclusions

The study finds that the actual usage of communication-enhancing information technology has a direct relationship to performance (Sarv and Rajiv, 2003). The study also provides empirical support for a recognized research stream that has emphasized the importance of strategic emergence derived from decentralized decision processes (e.g., Bower, 1982; Burgelman, 1983, 1988; Mintzberg, 1978, 1994), although these performance effects are contingent on the level of environmental dynamism and the influence exerted by the use of computerized information systems. The study shows that decentralized strategic decision making in conjunction with computer-mediated communication has a positive incremental performance relationship across all industrial environments. In short, these results suggest that there are direct performance effects associated with the use of computerized information systems and that decentralized strategic decision processes supported by computer-mediated communication improve organizational performance even further.

Appendix A. Construct measures (alphas) and item scales:

Decentralized strategic decision making (.72)

1. Managers do not start important market activities unless top management has approved the decision.
2. Managers only market to new major customer segments with approval from top management.
3. Top management must approve new product and service developments before they can be initiated.
4. Managers cannot introduce new practices without approval from top management.
5. Approval from top management is always needed before new internal capabilities can be developed.

[1. *Definitely true*–5. *Definitely false*]

Computer-mediated communication (.81)

1. To what extent do managers use electronic mail, etc., to communicate with different people across the organization?
2. To what extent do managers access information and data from other parts of the firm via the computer network?
3. To what extent do managers use electronic means to exchange information with manufacturing, engineering, and other functional areas?

[1. *Hardly at all*–5. *All the time*]

Environmental dynamism (.74)

1. To what extent has product and service technologies changed in your industry?

2. To what extent has the demand for different products changed in your industry?
3. To what extent has the profitability of different products in your industry changed?

[1. *Hardly at all*–5. *All the time*]

Organizational performance—firm profitability

Using return on assets as a performance standard, please assess how your firm is positioned relative to your close competitors.

[1. *Top 20 percent*–5. *Lowest 20 percent*]

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