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Alice Johnson

North Carolina A&T State University

Albert Lederer

University of Kentucky

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AN EMPIRICAL INVESTIGATION OF CEO/CIO COMMUNICATION

Alice M. Johnson

University of North Carolina, Charlotte
ajohnson@email.uncc.edu

Albert L. Lederer

University of Kentucky
lederer@uky.edu

Abstract

A study of 202 pairs of CEOs and CIOs investigated the effect of communication frequency and communication channel richness on CEO/CIO convergence (i.e., mutual understanding). More frequent communication between the CEO and CIO predicted convergence about the current and future role of IT. The use of richer channels did not predict convergence about the current role of IT. However, the use of richer channels predicted convergence about the future role of IT when the extent to which the organization relied on IT to support future projects was used as a covariate. The study provided contributions for researchers and practicing managers.

Keywords: CEO/CIO communication; convergence; media richness

Introduction

Mutual understanding – often referred to as convergence – between the chief executive officer and chief information officer is critical to an organization’s successful exploitation of information technology. Such understanding can facilitate the organization’s alignment of IT with business strategy (Keen 1991), which in turn predicts both improved IT and business performance (Chan et al. 1997).

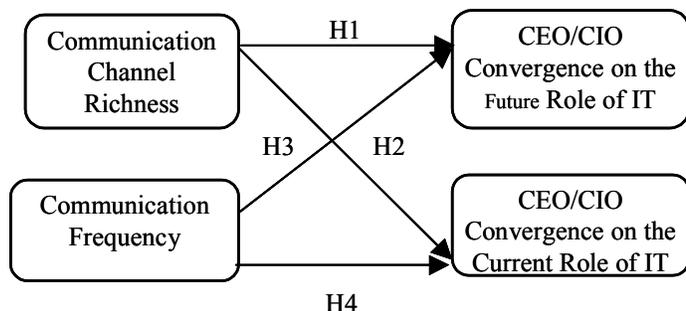


Figure 1. Research Model

Convergence about the current role of IT increases the likelihood of proper support for critical, existing functions that rely on IT for daily operations. However, IT support for current functions does not guarantee support for future operations. In fact, plans and strategies for an organization’s current IT may be counterproductive for future corporate strategies (Applegate et al. 1996). Therefore, convergence about the future role of IT is also important.

The objective of this paper is to examine the role of communication in achieving convergence in the CIO/CEO relationship. The research question is: Do the frequency of communication and the richness of the communication

channel between the CEO and CIO influence convergence about the current and future roles of IT in an organization? Figure 1 illustrates the research model.

Communication Frequency

Frequent communication is important in IS management in several respects. First, it helps IS personnel and their users to have a common understanding of the organization’s business functions and how IT can be used to support these functions (Lind and Zmud 1991).

Second, it positively affects an organization's competitive use of IT. For example, when CEOs communicate frequently with IT managers, the organization is more progressive than its competitors in its use of IT (Jarvenpaa and Ives 1991).

Third, frequent communication between IS and business executives positively influences the alignment of IT with business strategy. A case study of organizations in the insurance industry identified such communication as a factor that influenced alignment (Reich 1992).

Communication Channel Richness

Communication richness refers to the ability for information to overcome different frames of reference, clarify ambiguous issues, and thus facilitate understanding between communicating individuals (Daft and Lengel 1986). Certain communication media have a greater capacity than others to facilitate understanding. Thus, they are termed richer media or channels (Daft and Lengel 1986; Daft et al., 1987).

Media selection is important in IS communication. The use of richer channels to communicate strategic information systems planning requirements helps IS managers to minimize the complexity of the planning task (Watson 1990). Similarly, when IS personnel and their users employ rich communication channels, they jointly understand the organization's business functions and how IT can be used to support these functions (Lind and Zmud 1991).

Convergence

Convergence is defined as the tendency for two or more individuals to move toward one point, and to unite in a common interest or focus. According to Rogers and Kincaid (1981), it is the objective of communication.

The IS function and the organization in general can benefit from convergence. When an organization's technology providers and users converge on both the importance of the firm's activities and the potential for technology to support the activities, more innovative proposals for using IT result (Lind and Zmud 1991).

Convergence between IS and business executives is also beneficial. Such convergence exists when IS executives understand and are able to articulate business objectives, and when business executives understand and are able to articulate IS objectives. Convergence between these executives facilitates IT success (Sabherwal and Kirs 1994). Moreover, it supports the development of a shared vision of the role and contribution of IT to the organization (Reich 1992).

Hypotheses

Rogers and Kincaid's (1981) convergence model described communication as a cyclical process, which involved the repetitive exchange and sharing of information between two or more individuals in order to reach a mutual understanding. Each cycle of information-exchange results in incremental changes in an individual's accuracy regarding a point of interest.

Lind and Zmud (1991) suggested further that frequent contact between communicating individuals implied a certain level of intimacy, which had the potential for reducing barriers to achieving convergence. They found that frequent communication between IS providers and users of technology resulted in a higher degree of convergence regarding the importance of business activities and the potential for IT to support these activities.

The convergence model of communication (Rogers and Kincaid 1981) and Lind and Zmud's (1991) findings can be extended to CEO/CIO communication. Frequent communication between the CEO and CIO would provide an opportunity for exchanges of information. Such exchanges would promote mutual trust, reduce barriers between the functional roles, and thus facilitate convergence.

More specifically, frequent communication between the CEO and CIO would promote mutual understanding about functions that the organization is critically dependent upon for daily operations. Therefore:

H1: When an organization's CEO and CIO communicate more frequently with each other, the degree of convergence about the current role of IT is higher than when they communicate less frequently with each other.

Likewise, it is reasonable to expect that frequent communication between the CEO and CIO would result in exchanges of information about the organization's future. Frequent exchanges would promote mutual trust and understanding about the organization's strategy and how IT could be deployed to support or enable that strategy. Therefore:

H2: When an organization's CEO and CIO communicate more frequently with each other, the degree of convergence about the future role of IT is higher than when they communicate less frequently with each other.

An individual's choice of communication channels could also affect convergence. Because communication channels vary in their ability to convey information (Daft and Lengel 1984, 1986; Lengel 1983), they probably vary in their ability to facilitate convergence (Lind and Zmud 1991). More specifically, richer channels would more likely facilitate convergence than less rich channels.

Managers prefer richer media for equivocal communication tasks and less rich media for unequivocal ones. Equivocality (i.e., ambiguity) exists when managers have multiple and conflicting interpretations about organizational situations (Daft et al. 1987; Weick 1979). It has been associated with lack of convergence between managers. It is high between managers from different functional areas of an organization because their frames of reference differ (Daft et al., 1987). Thus, it is often high between an organization's CEO and CIO (Earl and Vivian 1993; Jones 1995; Keen 1991; Miller and Gibson 1995; Reich 1992; Watson 1990). It is reasonable to expect that by providing multiple ways to convey a message, rich media would diminish equivocality, facilitate mutual understanding, and thus increase convergence.

Moreover, use of richer communication channels would provide faster feedback. The ability to provide such feedback would be particularly valuable when applying IT to support the organization's current operations. Inability to quickly resolve misunderstandings about the current role of IT could result in disruptions in company operations.

The opportunity for faster feedback about the current role of IT would increase convergence and thus ensure that existing IT resources are used, as needed, to maintain smooth company operations. Therefore:

H3: When an organization's CEO and CIO use richer channels to communicate with each other, the degree of convergence about the current role of IT is higher than when they use less rich channels.

As a result of using richer channels to communicate with the CEO, IS managers are less concerned with IS strategic planning issues (Watson 1990). This suggests that IS managers who use rich communication channels have a better understanding of organizational goals and strategy and consequently find strategic planning a less difficult task. A further implication is that the use of richer channels to communicate with the CEO reduces equivocality and thus increases convergence about the organization's strategy and the strategic significance of IT in the future.

Likewise, it is reasonable to expect that the use of richer channels to communicate strategic planning information would also enable the CEO to better understand IS and its future role in the organization. Therefore:

H4: When an organization's CEO and CIO use richer channels to communicate with each other, the degree of convergence about the future role of IT is higher than when they use less rich channels.

Operationalization of Variables

The communication frequency construct was measured with Jang's (1989) single item scale. Subjects responded on a 1 (very infrequent) to 5 (very frequent) scale about their communication during a typical month via five channels. The measure contained one item for each of the channels and one for overall communication. Two other measures were used to validate the communication frequency construct. One was an adapted version of Bacharach and Aiken's (1977) communication frequency measure which required subjects to respond to an item about the number of times they used each communication channel during a typical month. The other was Jarvenpaa and Ives' (1991) measure. It required that subjects categorize their overall frequency of communication as less than once a year, a few times a year, monthly, weekly, or daily.

The media richness construct was measured with an adapted version of Webster and Trevino's (1995) instrument over five channels. Subjects responded on a 1 (no extent) to 5 (great extent) scale about the extent to which a channel had the ability to give and receive timely feedback, convey multiple types of information, transmit varied symbols, and tailor messages to fit the sender or receiver's requirements when communicating with each other. The five channels were face-to-face, telephone, e-mail, business memo, and voice mail (Rice et al.'s 1998).

These 20 items (i.e., four characteristics for each of the five channels) were used to determine the richness rating for each medium across all CEOs and all CIOs. Subjects' responses to the four richness items for a specific medium were averaged to determine the richness rating for that specific medium for his or her group (CEO or CIO).

The items were also used to determine a standardized communication channel richness measure for each respondent. These calculations were consistent with Lind and Zmud's (1991) measure for communication channel richness. An average of the CEO's and CIO's standardized communication channel richness score provided an overall communication channel richness measure for hypothesis testing.

The current and future role of IT constructs were measured with Raghunathan et al.'s (1999) strategic grid instrument. The current role of IT construct was comprised of one factor. Subjects indicated on a scale of 1 (strongly disagree) to 5 (strongly agree) the extent to which they agreed to six items about the current portfolio of information systems for their organization. The future role of IT construct was comprised of three factors, namely managerial support, differentiation, and enhancement. Subjects indicated on a scale of 1 (low significance) to 5 (high significance) the significance of nine specific types of projects as they related to the firm's future portfolio. CEO/CIO convergence about the current and future role of IT for each item was determined by calculating the absolute value of the difference between the CEO and CIO response for that item.

Methodology

This study used a field survey consisting of two questionnaires. The CEO completed one and the CIO or top IS executive completed the other. Five IS professors critiqued and five sets of executives (one CEO and one CIO per set) pilot tested the surveys. CEOs of 1,011 organizations in two southeastern states were then contacted to solicit their participation in the research. CEOs who were willing to participate provided the name of the organization's top IS manager. The survey packets were then mailed directly to the CEO and CIO. Subjects returned 204 matched surveys for a response rate of 20%. Two of the matched surveys were unusable due to incomplete responses, so 202 were used as the sample for the study.

A time-trend extrapolation (Armstrong and Overton 1977) was used to assess the presence of non-response bias. Using the first 25 percent of the returned surveys as early respondents and the last 25 percent as surrogates for non-respondents, a multivariate analysis of variance of the fifteen current and future role of IT variables showed no difference in responses due to the response time. This suggested the absence of response bias.

Reliability and Validity Tests

Correlation analysis was used to validate the communication frequency construct. Jang's (1989) communication frequency items correlated highly with Bacharach and Aiken's (1977) items for corresponding channels, but not so highly with items for other channels. Jang's scaled item about overall frequency of communication correlated highly with Jarvenpaa and Ives' (1991) categorical communication frequency item.

Confirmatory factor analysis (CFA), with the software package EQS, version 5.2, was used to validate the communication channel richness, current role of IT, and future role of IT constructs. The maximum likelihood method of parameter estimation and robust statistics were employed.

A model was deemed a good fit for the data if the Satorra-Bentler scaled chi-square to degrees of freedom ratio was less than 3 (Carmines and McIver 1981), and the non-normed fit index (NNFI) and robust comparative fit index (RCFI) were at least .90 (Bentler 1995).

The model respecification procedure resulted in the elimination of two factors (voice mail and business memo) and three other items from the channel richness construct. The enhancement factor was dropped from the future role of IT construct. The final

run for each construct resulted in acceptable fit indices. Cronbach alphas and composite reliability scores exceeded the minimum acceptable value of .60 (Hatcher 1994). Convergent validity was shown by the significance of factor loadings ($p < .001$) for all indicators for each factor. Variance extracted tests supported discriminant validity.

Hypothesis Testing

Structural equation modeling was performed to test the hypotheses. First, CFA was used to develop an acceptable measurement model. Then, a structural model, which represented the hypothesized relationships, was specified. Table 1 shows the results of the hypotheses tests.

Table 1. Results of Hypotheses Tests

Hypothesis	Independent Variable	Dependent Variable	Path Coefficient	t	p
H1	Communication frequency	Current role of IT	.20	3.09	.01
H2	Communication frequency	Future role of IT	.36	4.29	.001
H3	Channel richness	Current role of IT	.00	0.02	NS
H4	Channel richness	Future role of IT	.11	1.33	.10

Discussion of Findings

The study supported the notion that frequent communication between an organization’s CEO and CIO predicted greater convergence about the current and future role of IT. Support for both hypotheses 1 and 2 were consistent with previous research. For example, the convergence model of communication (Rogers and Kincaid 1981) posited that frequent communication between two or more individuals enabled them to converge towards a more mutual understanding. Similarly, Lind and Zmud’s (1991) study of communication in a large multinational firm confirmed that more frequent communication predicted convergence between providers and users of technology regarding the importance of business activities and the potential for IT to support those activities.

In general, support for H1 and H2 in this study showed that the relationship between frequency and convergence was generalizable to IS management settings. It showed the value of frequent communication between a dyad of highly ranked executives. Further, the study extended the concept across multiple organizations and industries.

The lack of support for H3 (the use of richer communication channels predicts more convergence about the current role of IT) could have occurred because information would most likely be available about the organization’s current operations and the role of IT in supporting those operations. Such availability of information would reduce uncertainty (Daft et al. 1987) and thus decrease equivocality about the current role of IT. If equivocality is low, the use of rich channels would not be necessary, nor desired, to achieve convergence. This reasoning could account for the extremely low path coefficient (.00) shown for H3.

The minimal support found for H4 ($p < .10$), which predicted that the use of richer channels to communicate would promote greater degrees of convergence about the future role of IT, may have occurred because some organizations planned to use IT as a strategic resource to support future operations, whereas others did not. It seems reasonable that the future role of IT would be more equivocal for organizations that plan to use IT to support future operations than for those that do not. The marginal support shown for H4 may reflect these different plans.

ANCOVA was therefore used to explore whether the relationship between communication channel richness and convergence about the future role of IT was influenced by the organization’s plans to use IT to support future operations. Communication channel richness was the independent variable. Convergence about the future role of IT was the dependent variable. The covariate was the future role of IT variable because it represented data about the organization’s planned use of IT to support future operations. CEO and CIO responses differed about the future role of IT. Therefore, an ANCOVA using both subjects’ responses was performed. Both showed that convergence about the future role of IT was significantly related to the organization’s future plans to use IT ($F(1,30) = 5.60$ for CEO responses; $F(1,30) = 4.31$ for CIO responses) at the .05 level. The main effect for communication channel richness was also significant for both ($F(170,30) = 2.07$, $p < .01$ for CEO responses; $F(170,30) = 1.83$, $p < .05$ for CIO responses). Table 2 shows the results.

Table 2. ANCOVA for Convergence About the Future Role of IT

Variable	CEO Responses		CIO Responses	
	F	p	F	p
Richness	2.07	.01	1.83	.03
Future Role of IT	5.60	.02	4.31	.04
<i>Adjusted R-squared</i>	.48		.45	

An interesting finding unrelated to the hypothesis testing was that email was a richer medium than telephone. It was interesting because it contradicted much earlier findings where telephone was richer than email (e.g., Zmud et al. 1990). CEO rankings for the face-to-face, email, and telephone channels were 4.34, 4.03, and 2.13, respectively. The CIO rankings were 4.33, 4.08, and 2.01, respectively. Larger values indicated greater richness. Multiple t-tests showed that the ranking for each channel was statistically different ($p < .001$) from that for other channels for both CEOs and CIOs. Thus, subjects in the current research indicated that email was richer than telephone.

Implications for Researchers and Practitioners

The study indicated that research is needed to further examine the relationship between communication channel richness and CEO/CIO convergence. Research is needed to empirically examine the effect of equivocality on the role of IT and identify other potential reasons why communication channel richness did not predict convergence.

In general, the study indicated that the communication channel richness and convergence constructs were more complex than initially thought. Consequently, two factors were dropped from the channel richness construct and one from the future role of IT. Further research is needed to improve and validate measures for both constructs.

A surprising finding was the channel richness rankings, which were inconsistent with previous research. Both CEOs and CIOs indicated that email was a richer medium than telephone. In contrast, other studies had ranked telephone as a richer medium than email. Further research is needed to examine this inconsistency. Researchers could investigate the possibility that highly ranked executives perceive media richness differently than other subjects. They could also examine the extent to which media characteristics, particularly richness, have changed over time.

The study found evidence that frequent communication predicted more CEO/CIO convergence. This might stimulate further research about other factors that could affect this relationship. Perhaps, the combined effects of communication frequency and content of the communication is more important than the single effect of communication frequency. Perhaps, the duration of the communication episodes would affect the results of the study.

From a practitioner perspective, the study suggested that it might be beneficial for organizations to become more involved in encouraging activities that produce frequent communication between the CEO and CIO. It also implied that CEOs and CIOs might be more successful if they possessed certain communication attributes. More specifically, it reinforced the popular notion that individuals both comfortable with and willing to communicate frequently might be more suitable for the positions of CEO and CIO.

Preliminary findings indicated that the use of richer channels to facilitate convergence about the future role of IT might be more beneficial for managers in some organizations, than others. It seems reasonable that the use of rich channels would be more important for managers in organizations that plan to use IT to support future operations. Thus, managers in these organizations might more diligently consider using richer channels to communicate about the future role of IT because such use may facilitate more convergence.

Channel richness rankings showed that CEOs and CIOs perceived email as a richer medium than had earlier research. Richness was characterized in the current study as the channel's ability to: (1) give or receive timely feedback, (2) convey different types of information, (3) transmit a variety of symbols such as words or pictures, and (4) tailor the message to fit the sender's or receiver's requirements. Thus, managers might consider using email, rather than the telephone, when one or more of these four characteristics are important to the communication process.

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