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MODELING TOP MANAGEMENT INFLUENCE ON INFORMATION TECHNOLOGY IMPLEMENTATION EFFECTIVENESS

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Abstract

Top management influence has long been considered a critical factor for successful information technology (IT) implementation. However, IT implementation studies rarely seek to find theoretical foundations for top management influence. To bridge this gap, this article intends to study the impacts of top management on IT implementation effectiveness by applying transformational leadership theory to IT implementation research. By applying leadership research to Klein and Sorra's (1996) implementation model, this paper contributes to the theoretical development of both leadership research and IT implementation studies and establishes a stepping stone for further studies on top management influence on IT implementation effectiveness.

Introduction

Adopting and implementing an information technology (IT) is an important way through which an organization increases efficiency and effectiveness and thus strengthens the organization's edge over competitors. Despite organizational strong incentives to implement an IT innovation, implementation success is far from assured. For example, many companies that adopt enterprise resources planning systems achieve only partial implementation, and one in five is scrapped in total failure (Trunick, 1999). Risks for implementing an IT innovation lie in the nature of the IT implementation, which is essentially an organizational change process (Grover, et al., 1995; Kwon and Zmud, 1987; Markus, 1983). Due to the many changes required in people's attitudes, knowledge, organizational structure and business processes during an IT implementation, achieving success becomes a real challenge to organizations (Lucas, et al., 1988).

One key factor that helps achieve IT implementation success is top management influence. Previous information systems (IS) studies confirm that top management plays a key role in successful IT implementation (Grover, et al., 1995; Igbaria and Guimaraes, 1994; Leonard-Barton and Deschamps, 1988; Lucas, et al., 1988). To exploit the business value of IT innovations, managers must understand the needs and scope of an implementation, and facilitate the integration of emerging information technologies with their business processes and organizational context (Grover, et al., 1995). Jarvenpaa and Ives (1991) categorized top management support into involvement and participation, and indicated that top-management involvement is strongly associated with a firm's progressive use of technical innovations.

However, IT implementation studies rarely go beyond this to seek theoretical foundations for top management influence. Lack of a conceptual framework results in diverse definitions of top management influence and various operationalizations of top management influence (Igbaria and Guimaraes, 1994; Ramamurthy and Premkumar, 1995; Sanders and Courtney, 1985; Thong, et al., 1996). This harms the comparison of findings from different studies, and affects conceptual integration of top management influence on IT implementation. A theoretical model that captures and clarifies top management impacts on the IT implementation process is necessary. To make up for the gap, this article intends to study the influence of top management on implementation success. In particular, we will apply transformational leadership theory to IT implementation research and provide a theoretical framework to explore the influence of top management on IT implementation success.

This paper proposes that the introduction of transformational leadership theory to IT implementation study is appropriate for the following reasons. First, leadership studies have long believed that dramatic organizational changes that challenge people's knowledge, organizational structures, and business processes call for the support, vision and the commitment of leaders who

possess top management position (Bass, 1985; Burns, 1978). Transformational leadership theory was thus developed to conceptualize the role of leaders in planning and directing employees through organizational changes (Bass, 1985; Burns, 1978; Conger, 1999). Transformational leadership theory, first developed by Burns (1978), and then elaborated by Bass (1985), differentiates the effects of two dimensions of leadership (i.e., transactional leadership and transformational leadership) on the followers. The differences between transactional and transformational leadership are indicated in Table 1.

Table 1. Summary of Differences between Transactional and Transformational Leadership

	Transformational Leadership	Transactional Leadership
Aim of leadership	To transform the existing order and directly address followers' needs for meaning and personal development (Bass, 1985; Conger, 1999)	To reinforce subordinates for their successful completion of the bargain (Bass, 1985; Burns, 1978)
Degree of organizational changes handled	High order change involving changes in people's knowledge, organizational structures, and business processes	First order change
Approaches for leading	Transcend self-interest Idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985)	Self-interest Contingent reward, active management by exception (Bass, 1985)
Role of leaders	<ul style="list-style-type: none"> – Raise followers' level of awareness, level of consciousness about the importance and value of designated outcomes (Bass, 1985; Burns, 1978) – Get followers to transcend their own self-interest for the sake of organization, or larger polity (Bass, 1985; Burns, 1978) 	<ul style="list-style-type: none"> – Set goals for subordinates on the basis of the efforts they can rationally expect from their subordinates (Bass, 1985) – Exchange rewards and promises of reward for efforts (Bass, 1985) – Is responsive to subordinates' immediate self-interests if these interests can be met by getting subordinates finish work (Bass, 1985)
Followers' values targeted	Intrinsic	Extrinsic
Consequences	Followers become committed to the organization as a consequence of their belief in the leaders. They exerted extra efforts for their leaders (Bass, 1985).	The followers lack commitment (Bass, 1985).

Second, Klein and Sorra (1996) have developed an integrative model conceptualizing the innovation implementation process. Through several case studies presented in their paper, Klein and Sorra proved that their model is testable. We believe Klein and Sorra provide a useful model to study IT innovation implementation. By applying leadership research to Klein and Sorra's (1996) implementation model, this paper contributes to the theoretical development of both leadership research and IT implementation studies and establishes a stepping stone for further studies on top management influence on IT implementation effectiveness.

We begin this paper with a summary of the implementation model developed by Klein and Sorra (1996). By applying transformational leadership theory to Klein and Sorra (1996)'s model, we then present our theoretical framework to examine the influence of leadership on implementation effectiveness. We conclude this paper with potential contributions to information systems and leadership researchers, and business practitioners.

Innovation Implementation Framework

Klein and Sorra's (1996) model of innovation implementation, based on social influence theory, posits two key determinants of implementation effectiveness: (1) climate for implementation (i.e., "employees' perceptions of the events, practices and procedures and the kinds of behaviors that are rewarded, supported and expected in a setting" (Schneider, 1990)) and (2) innovation-values fit (i.e., the extent to which targeted users perceive that the use of the innovations will affect the fulfilment of their values). Implementation effectiveness is categorized into three behaviors: non-use (avoidance of the innovation), compliance (unenthusiastic use), and commitment (skilled, enthusiastic and consistent use) (Klein and Sorra, 1996). The stronger an

organization's climate for the implementation of a particular innovation, the more likely that targeted users will become committed users. Similarly, the greater the innovation-values fit, the more likely that targeted users will become committed users. However, implementation climate does not "ensure either the congruence of an innovation to targeted users' values or internalized and committed innovation use" (Klein and Sorra, 1996, p.1061). Only the combination of strong climate and a good fit of the innovation to targeted users' values leads to skillful, internalized and committed innovation use. Klein and Sorra (1996) defined innovation effectiveness as the benefits an organization receives as a result of its implementation of a given innovation (e.g., improvements in profitability and productivity). They suggested that innovation implementation effectiveness is positively related to innovation effectiveness.

We will apply Klein and Sorra's model to study top management influence because (1) Klein and Sorra's model emphasizes the fact that the benefits of an innovation come from the committed use of an innovation by targeted users, (2) Klein and Sorra's model clarifies the confusion about how to evaluate innovation implementation by differentiating implementation effectiveness from innovation effectiveness, and (3) Klein and Sorra's (1996) theory of innovation implementation provides a theoretical understanding of IT innovation implementation. Thus, although IT innovation studies at individual level have developed several models (e.g., Technology Acceptance Model, Theory of Planned Behavior, Theory of Reasoned Action and Decomposed Theory of Planned Behavior), we believe that Klein and Sorra's model is a more appropriate lens through which to obtain a better understanding of the implementation process, and thus by which we can identify the effect of top management influence on the successful implementation.

Theoretical Model

Applying the theory of transformational leadership to IT innovation implementation framework, we establish a model as depicted in Figure 1. In this model, we propose that implementation effectiveness is determined by implementation climate and innovation-values fit, which are affected by transactional leadership and transformational leadership. Similar to Klein and Sorra's framework (1996), our model proposes that implementation effectiveness is positively related to implementation climate, innovation-values fit, and innovation effectiveness. The following section will focus on how transactional and transformational leadership affect implementation climate and innovation-values fit.

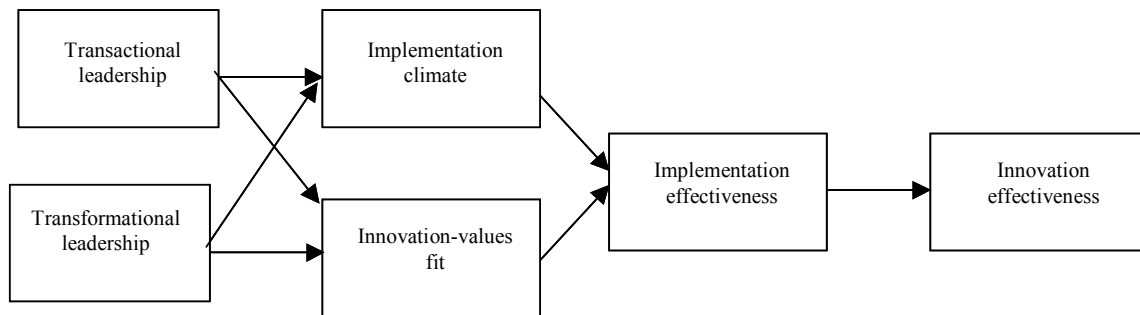


Figure 1. Conceptual Model for the Impacts of Leadership on Implementation Success

It should be noted that we believe that transformational leaders and transactional leaders play an equally important role in leading IT innovation implementation to success. Leadership studies have emphasized the key role of transformational leadership when an organization experiences dramatic changes (Shamir and Howell, 1999), and neglected the role of transactional leadership in ensuring these changes toward the planned direction. Because transformational leaders could (1) develop unrealistic expectations that the leaders could not live up to, (2) cause stifling conformity within the organization, and (3) have an exaggerated opinion of their own ability to get the job done (Conger, 1999; Nadler and Tushman, 1990), we contend that while transformational leadership is necessary to the IT implementation success, it is not sufficient. Only under strong transformational leadership *and* strong transactional leadership will an IT implementation accomplish success. This point is explained in detail in the following section.

The Relationship between Leadership and Climate

Climate reflects a set of perceptually based descriptions of relevant organizational features, events and processes (Schneider, 1990). One way that leaders affect the followers' behavior is to influence organizational climate, which signals to the followers

the types of goals that are deemed important by top management and the ways in which those goals should be accomplished. Followers interpret these signals and establish an impression of them. These impressions affect individual attitudes and/or behaviors. If they sense the environment is beneficial, followers are willing to put their efforts into what the organization requires of them. If they feel the environment is detrimental, they may resist fulfilling their responsibilities. Similarly in an IT implementation context, if targeted users feel the implementation will be beneficial, well organized, and that the leaders are determined to succeed, they tend to use the technology innovation enthusiastically or compliantly. If they feel the implementation is poorly planned and the leaders are unfocused, they tend to resist using the innovation.

Having established the link between leadership and implementation climate, we move on to examine the different effects of the two types of leadership -- transactional leadership and transformational leadership-- on implementation climate.

Transactional Leadership and IT Implementation Climate

During the IT implementation, the role of transactional leaders is to ensure that changes will and do occur throughout the organization. Targeted users get their perceptions of IT implementation climate based on the three types of transactional leaders' actions that were defined by Nadler and Tushman (1990). The first is *structuring*, through which the leaders set goals, establish new standards if necessary, and define new roles and responsibilities. The leaders will also draw a detailed plan about phases of changes, required training, end-user support, and necessary financial and human resource support. The second is *controlling*, through which the leaders create systems and processes to assess targeted users' performance and implementation quality, administrate corrective action and control budget. The third is *rewarding*, through which the leaders employ rewards and punishment based on whether targeted users' behaviors are consistent with the requirements of the IT implementation.

An IT implementation climate is strong if the leaders exhibit all three types of actions, and is weak if the leaders exhibit none of them. Through practicing all three actions, the leaders create a strong IT implementation climate in which targeted users (1) sense leaders' determination to fully support IT implementation, (2) feel strong organizational efforts to reduce uncertainties around technical changes and organizational transformation, and (3) increase perceived self-efficacy due to the training and support provided during the implementation. Based on the argument above, we predict that the stronger the transactional leadership, the stronger the climate will be for an IT implementation.

Transformational Leadership and IT Implementation Climate

Transformational leaders affect the targeted users' perception of an implementation climate by providing a clear vision for long-term organizational development (Slater, 2000). Vision has two interrelated meanings: (1) a perception of a current situation, and (2) a prediction of future events relating to a particular context. By articulating a clear vision, transformational leaders change users' perceptions of the nature of the current status quo (Shamir, et al., 1993), provide rationales for implementing an IT innovation, and raise targeted users' awareness of the necessity of the implementation. As a result, users tend to use the innovation in the way that the organization expects. Therefore, we predict that the stronger the transformational leadership, the stronger the IT implementation climate will be.

Relationship between Leadership and Innovation-Values Fit

Values are "prescriptive or proscriptive beliefs about ideal models of behavior and end-states of existence that are activated by, yet transcend object and situation" (Rokeach, 1979). Values, unique for each person, determine personal attitudes and behaviors (Rokeach, 1979). According to the structuration model of technology, IT is created and changed by human action, and used by humans to accomplish some action (Orlikowski, 1992). This duality of technology (Orlikowski, 1992: 405) determines that an organization and an IT must go through an interaction process in order to adjust to each other (DeSanctis and Poole, 1994). Thus, when an IT innovation is introduced, targeted users assess the characteristics of an innovation and its socially constructed meanings to judge the fit of the innovation to their values. The fit is good when the innovation is highly congruent with targeted users' values, neutral when the innovation is either moderately congruent or moderately incongruent with targeted users' values, and low when the innovation is highly incongruent with targeted users' values (Klein and Sorra, 1996).

Transformational leadership literature argues that leaders influence followers' behaviors by influencing their value systems (Bass, 1985; Burns, 1978). Transformational leaders motivate employees by tying employees' value systems to organizational goals so that these goals become an integral aspect of the employees' value systems. In contrast, transactional leaders motivate employees by appealing to their extrinsic value systems.

Transactional Leadership and Innovation-Values Fit

Transactional leaders influence the followers by emphasizing related and specific goals and by increasing the subjective likelihood that goal attainment will lead to specific outcomes (Locke and Latham, 1990). To encourage users to use an IT innovation, the leaders (1) clarify targeted users' role and responsibilities and make the use of the innovation achievable, (2) give targeted users rewards for their continued use of the innovation, and (3) provide targeted users with recommendations and advice whenever necessary. The leaders also indicate clearly that if users do not abide by the requirements of the implementation, the leaders can impose penalties.

A strong transactional leadership will strengthen a good innovation-values fit because of rewards offered and supports provided. Thus, users with good fit will exhibit committed use of the innovation. A strong transactional leadership will change a neutral fit due to the compelling forces from the leaders to implement the innovation. Thus, the users with neutral fit will exhibit compliant use of the innovation. A strong transactional leadership will not affect a poor innovation-values fit, but will spur user resistance to use of the technology, despite the rewards offered.

Transformational Leadership and Innovation-Value Fit

As opposed to transactional leadership, transformational leadership influence followers by changing followers' core attitudes, beliefs and values rather than by inducing compliant behaviors in them. Individuals can be motivated without immediate self-interests because they want to (1) establish and affirm a sense of identity for themselves and (or) (2) derive meanings from being linked to social collectives (Shamir, et al., 1993).

Transformational leaders bring about three types of changes to followers' values. First, transformational leaders elevate followers' needs from lower to higher levels in the Maslow hierarchy (Bass, 1985; Burns, 1978). Second, transformational leaders raise followers' morality level to "more principled levels of judgment" (Burns, 1978, p. 455). Third, transformational leaders motivate the followers to transcend their own self-interests for the sake of the organization (Bass, 1985; Burns, 1978).

Adjusting users' value systems according to the incongruence between the technology and the targeted users' value systems is crucial to a successful IT implementation. User resistance met by Westinghouse Electric Corp. (now CBS Corp.) at the beginning of its SAP R/3 implementation was due to the fact that the company neither considered the changes that SAP implementation could bring to targeted users nor planned ways to adjust targeted users' value systems (Schneider, 1999). Also Devane (2000) indicated that the new ES made some people's jobs more challenging and creative. Users who did not value challenging and creative tasks disliked the new ES. Many studies have confirmed that efforts spent in helping users to adjust their value systems will serve to encourage users' acceptance of IT innovation, mitigate the misuse and resistance to IT innovation usage, and build users' confidence and enthusiasm in using the innovation (Grover, et al., 1995; Schneider, 1999).

Based on the argument above, we propose that an already-good innovation-values fit will be further strengthened by strong transformational leadership. Similarly, a neutral or poor innovation-values fit can be boosted to a good fit when strong transformational leaders make good use of the three mechanisms mentioned above. Thus, we predict that the stronger the transformational leadership, the greater the likelihood of a good innovation-values fit among targeted users.

Effects of Leadership on Implementation Effectiveness

After analyzing the effects of transformational leadership and transactional leadership on implementation climate and innovation-values fit, in this part, we use combined influence of both types of leadership to predict an IT innovation use. When both transactional leadership and transformational leadership are strong, the organization has a strong implementation climate and high level of innovation-values fit. By removing the obstacles to effective use of an IT innovation by adjusting the users' values-systems, users are likely to be enthusiastic about the innovation, and to be skilled, highly committed and consistent in their use of it.

When an organization has strong transformational leadership but weak transactional leadership, the organization has a weak IT implementation climate. Although the organization has a clear vision, and targeted users are willing to use an IT innovation, they lack skills and experience few incentives and many obstacles to use of the technology. Users with a good innovation-values fit are more likely to feel disappointed and frustrated by the weak implementation climate and by poor use of the technology use by their fellows. As a result, these individuals tend to exhibit sporadic and inadequate use of the innovation. For users with a neutral or poor innovation-values fit, although they are likely to be motivated by strong transformational leadership to use the technology,

their enthusiasm turns into frustration and disappointment due to the pressure and obstacles associated with the IT implementation. Thus, they tend to show inadequate use (i.e., the use is more than no use, but less than compliant use) or no use.

When the organization has strong transactional leadership but weak transformational leadership, the organization has a strong implementation climate, but a low level of innovation-values fit. Users with a good innovation-values fit will likely show committed and consistent IT use because they are enthusiastic about the technology and because the organization provides various supports for their use. For users with neutral fit, they tend to show adequate use (i.e., the use is "more than compliant innovation use but less than committed use" (Klein and Sorra, 1996, p.1067)) because of a strong organizational imperative in favor of the technology use despite their indifference to the prospect of the implementation. For users with poor fit, they resist using the technology and may opt to leave the organization.

When both leaderships are weak, the organization has a weak implementation climate and a low level of innovation-values fit. The users with a good innovation-values fit likely feel frustrated and disappointed and show inadequate use of the technology. The users with a neutral fit will be indifferent to the implementation and are not likely to use the technology at all. The users with a poor fit will feel relieved because they face little pressure from the organization to use the technology. Table 2 summarizes the predicted influence of various combinations of the two types of leadership on targeted users' affective response and on an IT innovation use.

Table 2. Summary of Effects of Leadership on Implementation Effectiveness

Leadership	Implementation Climate	Innovation-Value Fit	Implementation Effectiveness
Strong transformational and strong transactional	Strong climate Climate with clear vision	Good	Employee enthusiasm; Committed and consistent innovation use
		Neutral	Employee enthusiasm at best; likely exhibit committed and consistent innovation use
		Poor	Employee enthusiasm at best; likely exhibit committed and consistent innovation use
Strong transformational and weak transactional	Weak climate Climate with clear vision	Good	Employee frustration and disappointment; inadequate innovation use
		Neutral	Employee frustration and disappointment; inadequate innovation use or no use
		Poor	Employee frustration and disappointment; inadequate innovation use or use
Strong transactional and weak transformational	Strong climate Climate without clear vision	Good	Employee enthusiasm; committed and consistent innovation use
		Neutral	Employee indifference; adequate innovation use
		Poor	Employee resistance; no use
Weak transformational and weak transactional	Weak climate Climate without clear vision	Good	Employee frustration; inadequate innovation use
		Neutral	Employee indifferent; no innovation use
		Poor	Employee relief; no innovation use

Discussion and Conclusion

Top management influence on IT implementation effectiveness is the subject of little research. By bridging transformational leadership studies and IT implementation research, this paper provides a theoretical model conceptualizing managerial influence on successful IT implementation. To academic researchers, the conceptual model proposed in this paper makes up for the scarcity in conceptualizing top management influence on IT implementation effectiveness. As well, this model enriches transformation leadership literature and IT implementation studies by theorizing about the different influences of transformational leadership and transactional leadership on IT implementation effectiveness. To practitioners, this paper is useful in providing an analytical model

for top managers in drawing out strategies for successful IT implementation. Furthermore, our differentiation between implementation effectiveness and innovation effectiveness highlights the importance of organizational implementation policies and practices in determining the strength of the organizational climate for ES implementation. The next step would be to test the theoretical model in companies that have implemented ES.

References

- Bass, B.M. *Leadership and Performance Beyond Expectations*, Free Press, New York, 1985.
- Burns, J.M. *Leadership*, Harper, New York, 1978.
- Conger, J.A. 1999. "Charismatic and Transformational Leadership in Organizations: An Insider's perspective on These Developing Streams of Research," *Leadership Quarterly* (10:2), 145-179.
- DeSantics, G. and Poole, M.S. 1994. "Capturing the Complexity in Advanced Technology: Adaptive Structuration Model," *Organization Science* (5:2), 121-147.
- Devane, T. 2000. "Leading IT Projects," *Executive Excellence* (17:7), 8-11.
- Grover, V., Jeong, S.R., Kettinger, W. and Teng, J.T.C. 1995. "The Implementation of Business Process Engineering," *Journal of Management Information Systems* (12:1), 109 -114.
- Igarria, M. and Guimaraes, T. 1994. "Empirical Testing the Impact of User Involvement on DSS Success," *Omega* (22:2), 157 -172.
- Jarvenpaa, S.L. and Ives, B. 1991. "Executive Involvement and Participation in the Management of Information Technology," *MIS Quarterly* (15:2), 205-224.
- Klein, K.J. and Sorra, J.S. 1996. "The Challenge of Innovation Implementation," *Academy of Management Review* (21:4), 1055 -1080.
- Kwon, T.H. and Zmud, R.W. "Unifying the Fragmented Models of Information Systems Implementation," In *Critical Issues in Information Systems Research*, R. J. Boland and R. Hirschheim (Ed.), John Wiley and Sons Ltd., New York, 1987, pp. 227-251.
- Leonard-Barton, D. and Deschamps, I. 1988. "Managerial Influence in the Implementation of New Technology," *Management Science* (34:10), 1252 -1265.
- Locke, E.A. and Latham, G.P. *A Theory of Goal Setting and Task Performance*, Prentice Hall, Englewood Cliffs, NJ, 1990.
- Lucas, H.C., Walton, E.J. and Ginzberg, M.J. 1988. "Implementing Packaged Software," *MIS Quarterly* (12:4), 537 -549.
- Markus, M.L. 1983. "Power, Politics, and MIS Implementation," *Communications of the ACM* (26:6), 430 -444.
- Nadler, D.A. and Tushman, M.L. 1990. "Beyond the Charismatic Leader: Leadership and Organizational Change," *California Management Review* (32:2), 77-97.
- Orlikowski, W.J. 1992. "The Duality of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science* (3:3), 398-427.
- Ramamurthy, K. and Premkumar, G. 1995. "Determinants and Outcomes of Electronic Data Interchange Diffusion," *IEEE Transactions on Engineering Management* (42:4), 332 -351.
- Rokeach, M. "Some Unsolved Issues in Theories of Beliefs, Attitudes, and Values," In *Nebraska Symposium on Motivation*, 27, University of Nebraska Press, Lincoln, London, 1979, pp. 261-304.
- Sanders, G.L. and Courtney, J.F. 1985. "A Field Study of Organizational Factors Influencing DSS Success," *MIS Quarterly* (9:1), 77 -93.
- Schneider, B. "The Climate for Service: An Application of the Climate Construct," In *Organizational Climate and Culture*, Jossey-Bass, San Francisco, CA, 1990, pp. 383 -412.
- Schneider, P. 1999. "Wanted: ERPeople Skills," *CIO* (12:10), 30-35.
- Shamir, B., House, R.J. and Arthur, M.B. 1993. "The Motivational Effects of Charismatic Leadership: A Self-Concept Based Theory," *Organization Science* (4:4), 577-594.
- Shamir, B. and Howell, J.M. 1999. "Organizational and Contextual Influences on The Emergence and Effectiveness of Charismatic Leadership," *Leadership Quarterly* (10:2), 257-283.
- Slater, D. 2000. "The Integrated Enterprise: The Whole is More than Its Parts," *CIO* (13:15), 116-122.
- Thong, J.Y.L., Yap, C.-S. and Raman, K.S. 1996. "Top Management Support, External Expertise and Information Systems Implementation in Small Business," *Information Systems Research* (7), 2, 248 -267.
- Trunick, P.A. 1999. "ERP: Promise or Pipe Dream," *Transportation and Distribution* (40:1), 23 -25.