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Research article

Top management support of enterprise systems implementations

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Abstract

Despite the general consensus regarding the critical role of top management in the information systems (ISs) implementation process, the literature has not yet provided a clear and compelling understanding of the top management support (TMS) concept. Applying metastructuring (Orlikowski *et al*., 1995) as a guiding framework for understanding TMS behaviors, this paper attempts to address the gap by focusing on two key questions: (1) What supportive actions do top managers engage in during IS implementations? (2) How do these actions affect IS implementation outcomes? Analyses of in-depth case studies at two Canadian universities that had implemented a large-scale enterprise system revealed three distinct types of TMS actions: TMS – resource provision (TMSR – actions related to supplying key resources such as funds, technologies, staff, and user training programs); TMS – change management (TMSC – actions related to fostering organizational receptivity of a new IS); and TMS – vision sharing (TMSV – actions related to ensuring that lower-level managers develop a common understanding of the core objectives and ideals for the new system). Results suggest that different support behaviors exercise different influences on implementation outcomes, and that top managers need to adjust their support actions to achieve the desired outcomes. In particular, TMSR affected project completion, TMSC impacted formation of user skills and attitudes, and TMSV influenced middle manager buy-in. Theoretical and practical implications of these findings are discussed.
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Introduction

Empirical studies indicate that organizations have been challenged in their implementation of large-scale information system (IS) projects. For example, the Standish Group International Inc. (2006) reported that only 35% of companies in the United States completed their IS implementation on time and within budget. A similar study conducted in Canada concluded that only 39% of companies achieved the expected benefits from their information technology (IT) projects (Whittaker, 1999). Organizations regularly make huge capital investments to build up backbone ISs, only to toss them away as a result of failed implementations. For example, Sobeys (the second largest supermarket chain in Canada) abandoned its $54 million project after a 2-year implementation effort failed (Mearian and Songini, 2001), while Telecom New Zealand gave up its customer sales and service project at a cost of $58 million (Jackson, 1998). These are not isolated examples. In 2003, KPMG reported that among 230 of the largest global companies they surveyed, 57% had written off at least one IT project in the previous 12 months, and of those experiencing a failure only 41% were able to determine how much the failure had cost their organization (the average loss was $10.4 million).

A substantial body of research has linked top management support (TMS) to large-scale IS implementation success. Senior managers perform 'the crucial functions of transformational leadership, facilitation, and marketing the project to the users' (Akkermans and van Helden, 2002: 37). Studies have shown that TMS can lead to increased system usage (Bardi *et al*., 1994; Guimaraes and Igbaria, 1997), positive user perceptions (Igbaria *et al*., 1997), improved IT adoption and diffusion (Ramamurthy and

Table 1 Top management support studies

Paper/context	*Concept/definition*	*TMS measures*	*Key findings*	*Theoretical basis*
Bardi *et al.* (1994) – personal computer adoption and use – 112 managers and 26 presidents	*Top management support (attitude)* 'top management awareness and support for LIS' (p. 76)	Top management: • … supports logistics information systems (LIS) • … is knowledgeable of LIS • … is involved in development of LIS • … understands the importance of LIS	• Strong top management support was associated with effective application of LIS	• IS innovation adoption and diffusion (Rogers, 1983)
Bruque-Cámara *et al.* (2004) – organizational determinants of IT adoption – 16 executives, 14 IT directors, 6 users	*Top management support (behavior)* 'explicit and active support of the top management towards the introduction and development of new information technology' (p. 138)	• New technology projects are unequivocally supported by the company management • The company management has lead the renovation of IT in the firm • Training in the use of IT is a priority for our firm	• Top management support positively affected IT adoption	• IS innovation adoption (Rogers, 1983)
Compeau and Higgins (1995) – computer usage – 919 subscribers of a Canadian business periodical	*Support (behavior)*: 'The extent to which assistance was available in terms of equipment selection, hardware difficulties, software difficulties, and specialized instruction' (p. 197)	Assistance is available in terms of: • … equipment selection • … hardware difficulties • … software difficulties • … specialized instruction • Coworkers are a source of assistance in overcoming difficulties • Perceptions of the organization's overall support for computer users	• Support did not affect computer efficacy	• Social cognitive theory (Bandura, 1977)
Igbaria *et al.* (1997) – personal computing acceptance factors in small firms – 358 respondents (51 top managers, 186 middle managers, 121 non-supervisory staff)	*Management support (behavior)* 'refers to the perceived level of general support offered by top management' (p. 289)	Management: • … is aware of the benefits that can be achieved with the use of computers • … always supports and encourages the use of computers for job-related work • … provides most of the necessary help and resources to enable people to use computers • … is really keen to see that people are happy with using computers • … provides good access to hardware resources when people need them • Management provides good access to various types of software when people need them	• Management support is positively associated with perceived usefulness and perceived ease of use	• TAM (Davis, 1989)

Table 1 Continued

Paper/context	*Concept/definition*	*TMS measures*	*Key findings*	*Theoretical basis*
Gottschal (1999) – IT strategy implementation matrix – 471 CIOs	*Management support* – no definition given	Management: • … expectations of the implementation • … participation in the implementation • … monitoring of the implementation • … knowledge about the implementation • … time needed for the implementation • … enthusiasm for the implementation	• Management support did not affect the pace of IT strategy implementation	• Theory of strategic information planning (Lederer and Salmela, 1996)
Guimaraes and Igbaria (1997) – client/server system success – 148 IS managers and end-user department managers	*Management support (behavior)* 'includes top management encouragement and allocation of resources' (p. 859)	• Management's understanding of the Client Server System's (CSS) potential benefits • Encouragement by managers for the use of CSS in the employee's job • Providing the necessary training needed for effective use of the CSS • Providing the necessary resources needed for effective use of the CSS • Management's interest in having employees satisfied with CSS technology	• Management support is positively associated with system usage and CSS impact on user's jobs, but not significantly associated with user satisfaction	• DeLone and McLean's (1992) IS success model

Jarvenpaa and Ives (1991) – executive involvement and participation – 83 senior IT managers assessed their 'CEO's involvement with IT' (p. 213)	*Executive involvement (attitude)* 'is concerned with the psychological state of the CEO, reflecting the degree of importance placed on information technology by the chief executive' (p. 206)	CEO's:
		• … prevailing thinking about IT spending
		  • … perceptions of IT's importance to the firm
		  • … vision for IT
		  • … endorsement of applications not meeting traditional criteria
			• Executive involvement was more strongly associated with the firm's progressive use of IT than executive participation	• Participation and involvement (Barki and Hartwick, 1989)

	Executive participation (behavior) refers to 'the CEO's activities or substantive personal interventions in the management of IT' (p. 206)	CEO's: • … personal participation in firm's use of IT • … role in corporate IT steering committee • … knowledge of competitors' use of IT • … informal contacts with IT management • … knowledge of IT opportunities in the firm • Number of levels between IT head and CEO	• Top management involvement was associated with more successful usage in small firms	

Table 1 Continued

Paper/context	*Concept/definition*	*TMS measures*	*Key findings*	*Theoretical basis*
Keil (1995b) – a longitudinal case study	*Escalation (attitude)*: 'Continued commitment in the face of negative information about prior resource allocation' (p. 422)	NA	• Top managers contributed to project failures by continuing to provide resources to doomed projects • Top managers turned around troubled projects by adjusting the level of resource provision and leadership	• Escalation (Staw and Ross, 1987)
Leonard-Barton and Deschamps (1988) – 93 salespeople reported managerial influence of their sales unit manager	*Perceived management support (attitude)*: 'Perceived opinions or desires of powerful sources' (p. 1254)	• My sales unit manager supports my using LAYOUT • My district manager supports my using LAYOUT • My sales management in general supports my using LAYOUT	• Perceived management support did not significantly affect use	• Innovation literature
Lewis *et al.* (2003) – 161 full-time faculty members from one university assessed support from top managers and local managers	*Top (local) management commitment* – no definition given	The university (my department): • … is committed to a vision of using course Web sites in teaching • … is committed to supporting my efforts in using course Web sites for teaching • … strongly encourages the use of course Web sites for teaching • … will recognize my efforts in using course Web sites for teaching • The use of course Web sites for teaching is important to the university (my department)	• Top management commitment affects perceived usefulness, not ease of use • Local management commitment impacts ease of use, not perceived usefulness	• Institutional theory • Technology acceptance model
Liang *et al.* (2007) – 77 managers reported top management atttitudes and actions	*Top management belief (attitudes)*: 'a subjective psychological state regarding the potential of ERP' (p. 5)	The senior management of our firm believes that: • … ERP has the potential to provide significant business benefits to the firm • … ERP will create a significant competitive arena for firms • … it is not necessary to use ERP to conduct business activities	• Top management participation significantly affects enterprise system assimilation	• Institutional theory
	Top management participation (action): 'behavior and actions	The senior management of our firm actively: • … articulates a vision for the organizational use of ERP		

Table 1 Continued

Paper/context	*Concept/definition*	*TMS measures*	*Key findings*	*Theoretical basis*
	performed in facilitating ERP assimilation' (p. 5)	• … formulated a strategy for the organizational use of ERP • … established goals and standards to monitor the ERP project		
Purvis *et al.* (2001) – 176 respondents including data administrators and system designers	*Management championship (behavior)* 'the extent to which an organization's senior management advocates the use of a technological innovation' (p. 123)	• IS management support for CASE implementation • Compared to other information technologies implemented within the IS organization, priority on CASE implementation • IS management is convinced that the implementation of CASE is necessary.	• Management champion significantly affected the current methodology, use and knowledge embeddedness	• Institutional theory • Theory of technology assimilation
Ramamurthy and Premkumar (1995) – determinants and outcomes of electronic data interchange diffusion – 201 IS leaders and functional managers	*Top management support (behavior)* refer to 'active involvement and support of top managers' (p. 337)	• Top management desire to project the company as a leader in the use of new technologies • Top management support for use of EDI in the firm's operations • Top management willingness to take the (financial and organizational) risk involved in the adoption/development and implementation of EDI • Top management commitment to provide adequate financial and other resources for the development and operation of EDI systems	• TMS significantly influenced external EDI diffusion, but not internal EDI diffusion	• IT innovation adoption and diffusion (Rogers, 1983)
Sanders and Courtney (1985) – organizational factors influencing DSS success – 378 DSS users including 18 senior managers	*Top management support (attitude)*	• Top management feel that the time and resources spent on the development of DSS models is wisely invested • Top management is strongly in favor of the concept of DSS	• Top management support was associated with DSS success	• NA
Sultan and Chan (2000) – object-oriented technology adoption – Software and systems engineers, IS managers, system support, and other managers; 'the in-house person who is administratively responsible for the IS implementation' (p. 256)	*Top management support (attitude)*: 'The continual active and enthusiastic approval of senior executives for a proposed innovation' (p. 111)	• Is top management willing to make changes? • Does top management support OT adoption?	• TMS significantly affected adoption of object-oriented computing	• IS adoption (Rogers, 1983)

Table 1 Continued

Paper/context	*Concept/definition*	*TMS measures*	*Key findings*	*Theoretical basis*
Thong *et al.* (1996) – IS implementation in small business – 114 managers responsible for the IS implementation	*Top management support (behavior)* Active involvement of top managers in various aspects of IS implementation	• CEO attendance at project meetings • CEO involvement in information requirements analysis • CEO involvement in reviewing consultant's recommendations • CEO involvement in decision making • CEO involvement in monitoring project	• Support was not related to user satisfaction	• Theory of innovation diffusion (Attewell, 1992)
Venkatesh *et al.* (2003) – 215 users across four organizations	*Subjective norm (attitude)*: 'Person's perception that most people who are important to him think he should or should not perform the behavior in question' (Fishbein and Ajzen, 1975: 302)	• People who influence my behavior think I should use the system • People who are important to me think I should use the system	• Subjective norm was significant under mandatory settings, but not significant when system usage was voluntary	• Theory of reasoned action (Fishbein and Ajzen, 1975) • Theory of planned behavior (Ajzen, 1985)
Wixom and Watson (2001) – data warehousing success – 111 pairs of data warehousing managers and data suppliers	*Management support (behavior)*: 'widespread sponsorship for a project across the management team' (p. 29)	• Overall, management has encouraged the use of data warehousing (DW) • User satisfaction has been a major concern of management	• Top management support significantly affected data warehouse success	• IS implementation literature • Data warehousing literature • IS success literature
Zmud (1984) – 47 software development managers	*Management attitude (attitude)*: Attitudes of 'power elite' towards an IT innovation (p. 729)	• Modern software practice's impact on work performance • Modern software practice's impact on work behaviors • Modern software practice's 'state-of-art' • How successful software groups in general had been in using the practice • How easy it was to experiment with the practice • How easy it was to observe the benefits of the practice	• Management's favorable attitudes towards an innovation significantly affected implementation success	• Push–pull theory (Fisher, 1980)

Premkumar, 1995; Bruque-Cámara *et al*., 2004), and better performance (Bardi *et al*., 1994).

Nonetheless, our literature review, which spans research on innovation diffusion, IS participation, IS escalation, strategic IS planning, and IS implementation, reveals a weak understanding of TMS. Conceptual definitions and construct measures are inconsistent and under-specified, and conflicting findings have been reported as a result. Furthermore, the literature presents a limited set of support actions, and fails to establish how TMS actions impact implementation outcomes.

To address this gap we ask two critical research questions: (1) What supportive actions do top managers engage in during IS implementations? (2) How do these actions affect IS implementation outcomes? We conducted case studies (Eisenhardt, 1989; Yin, 2002) of two large-scale enterprise system (ES) implementations – a context in which top management interventions are especially critical (Sharma and Yetton, 2003). We then evaluated the case data through a metastructuration perspective (Orlikowski, 1992; Orlikowski *et al*., 1995).

Background

Definitions

TMS has been studied in various research domains. Table 1 summarizes some of the key articles dealing with this topic. Sifting through the diverse definitions shown in column 2, it is apparent that prior research has adopted either an attitudinal or a behavioral interpretation of TMS (Jarvenpaa and Ives, 1991). Attitudinal interpretations cast TMS as a set of favorable attitudes that are manifested in such ways as 'active and enthusiastic approval' (Sultan and Chan, 2000: 111), involvement ('psychological state of the CEO, reflecting the degree of importance placed on information technology by the chief executive') (Jarvenpaa and Ives, 1991: 206; Liang *et al*., 2007), commitment (Keil, 1995b: 422), and 'opinions or desires' (Fishbein and Ajzen, 1975; Zmud, 1984; Leonard-Barton and Deschamps, 1988: 1254; Teo and King, 1997). The behavioral interpretation, on the other hand, defines TMS as a set of direct managerial behaviors such as offering technical assistance to help solve hardware and software difficulties (Compeau and Higgins, 1995: 197), engaging in 'activities or substantive personal interventions' (Jarvenpaa and Ives, 1991: 206), taking on 'sponsorship for a project' (Wixom and Watson, 2001: 29), and 'facilitating ERP assimilation' (Liang *et al*., 2007: 5).

These interpretations reflect two distinct underlying views on roles that should be played by top managers. The attitudinal interpretation of TMS promotes a 'back-seat driver' view (Jarvenpaa and Ives, 1991) in which top managers are seen to take a hands-off approach and focus on creating a generally supportive climate. The behavioral interpretation, on the other hand, advocates an 'active participant' view (Jarvenpaa and Ives, 1991; Markus and Mao, 2004) in which top managers are encouraged to directly influence the mutual adaptation between the technology and the organization (Leonard-Barton and Deschamps, 1988).

The differing perspectives of TMS have resulted in inconsistent measures of the concept (see column 3, Table 1 for a summary of measures used). In addition, there is an incongruity between the behavioral support measures and their respective support definitions. For example, Guimaraes and Igbaria (1997) defined management support to include 'top management encouragement and allocation of resources' (p. 859), reflecting a behavioral interpretation of TMS, yet their five-item scale also included attitudinal items (e.g., 'management's understanding' and 'management's interest'). As a result, while studies on TMS have generated a wealth of useful findings they have not yet offered a clear or compelling understanding of TMS, and the divisive and inconsistent definitions and measures have resulted in conflicting empirical findings. For example, Leonard-Barton and Deschamps (1988) failed to discover a direct relationship between perceived management behaviors and use of the LAYOUT system; Thong *et al*. (1996) found an insignificant relationship between TMS and user satisfaction; and Compeau and Higgins (1995) found that support was negatively related to self-efficacy.

Theoretical underpinnings

Many different theories have been proposed and used to test the concept of TMS (see Table 1, column 5, for an overview). These include the technology acceptance model, the theory of reasoned action, the theory of planned behavior (Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997; Venkatesh *et al*., 2003), Roger's theory of IT innovation adoption and diffusion (Rogers, 1995), and social cognitive theory (Bandura, 1977; Compeau and Higgins, 1995).

To guide our research we looked at the work of Orlikowski *et al*. (Orlikowski, 1992; Orlikowski *et al*., 1995). On the basis of structuration theory (Giddens, 1984), Orlikowski *et al*. (1995) proposed that influential individuals involved in technology assimilation (e.g., 'champions, trainers, and local experts,' p. 437) engage in 'metastructuring' actions in order to reshape their institutional context. These metastructuring actions or behaviors are designed to influence individual users' structuring activities, which themselves represent the choices individuals make about what aspects of the technology to use or not use. We expect that top managers – individuals who influence and shape the behaviors of others in the organization – are in a perfect position to take metastructuring actions related to large-scale IS implementations, and in so doing substantially influence project outcomes. As Sharma and Yetton (2003: 536) noted, top managers are 'critical in undertaking these actions' in a successful system implementation. Relevant actions could include 'both direct actions to make the technology more valuable to users and indirect actions to manipulate prevailing institutional structures and influence individual structuring actions' (Purvis *et al*., 2001: 121). Implicitly, the theory suggests that these metastructuration actions should be visible to users and organizational members who participate in an implementation.

Based on Orlikowski's work, researchers have made a few suggestions regarding effective metastructuring actions (e.g., Purvis *et al*., 2001; Sharma and Yetton, 2003). For example, top managers may institute new structures (e.g., offering resources and training) to promote learning and help users overcome knowledge barriers (Sharma and Yetton, 2003), introduce new performance control systems

(e.g., offering rewards/incentives) to increase users' motivation (Sharma and Yetton, 2003), develop new coordination mechanisms to help overcome resistance to the change through existing power structures, and make changes to performance goals (e.g., offering support especially during 'an extended period of performance decline') (Sharma and Yetton, 2003: 537).

Viewing TMS through the theoretical lens of metastructuring directs us to focus on top management behaviors rather than attitudes – yet we quickly observe that only limited varieties of behaviors have been empirically examined to date. Resource provision (i.e., of IT resources such as hardware, software, training) is the single most commonly examined behavior (Sanders and Courtney, 1985; Bardi *et al*., 1994; Ramamurthy and Premkumar, 1995; Thong *et al*., 1996; Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997; Sultan and Chan, 2000; Bruque-Cámara *et al*., 2004). The extent to which managers actively encourage and help users to adopt a system, particularly in terms of instituting changes to performance goals, has also been examined (Compeau and Higgins, 1995; Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997; Wixom and Watson, 2001). Other actions such as attending meetings and decision-making participation have been described as mechanisms for signaling the importance of a new system to the organization (Jarvenpaa and Ives, 1991; Thong *et al*., 1996). Empirical studies, however, have not distinguished the impact of these actions on implementation outcomes (e.g., Ramamurthy and Premkumar, 1995; Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997).

Using metastructuring as our theoretical lens, we undertook two in-depth case studies examining large-scale IS implementations in order to enrich our understanding of the supportive actions of top managers, and to explore their impact on implementation outcomes.

Case study methodology

Case studies allow the researcher to engage in exploratory theory-building, first by identifying and untangling critical managerial actions, and then deciphering how these actions might affect users' attitudes and behaviors (Eisenhardt, 1989; Dubé and Paré, 2003). Case studies also allow perspectives from multiple different players in the implementation process to be incorporated. This allows the researcher to distinguish one type of behavior from another, to examine the respective impacts of each type of behavior on implementation outcomes, and to explore how different managerial actions might interact. This approach allowed us to examine contextual elements that played a role in top management influence (Yin, 1994, 2002) – an especially relevant consideration given that the IS implementation process involves 'a complex, intertwined set of social and political interactions' (Myers, 1994: 188).

Site selection

We began the study by looking for relatively homogeneous case sites that had implemented a large-scale ES. Homogeneous case sites are advantageous as they enable 'theoretical replication' (Eisenhardt, 1989: 537) (i.e., to enable examination of cross-case similarities and differences (Guha *et al*., 1997)). Our search led us to two large, conveniently located Canadian universities that operated under similar internal and external environments and both had implemented an ES. We targeted ES implementations because the impact of TMS has been found to be highly influential in this context (Sharma and Yetton, 2003).

Our general research objectives were to identify salient TMS actions, and explore the unexamined links between each type of action and implementation outcomes. However, because the metastructuration perspective indicates that any influential individual in an organization can directly and indirectly affect individual structuration of technology (Purvis *et al*., 2001; Sharma and Yetton, 2003), we collected data from users, managers, project members and non-project members, as well as senior managers, to develop a better understanding of metastructuration actions that occurred.

There are no predefined rules regarding the minimum number of cases for a case study. Just as single-case studies can significantly extend and deepen existing knowledge about a phenomenon (e.g., Keil, 1995a, b; Webster, 1998), comparative studies offer unique insights (e.g., Robey and Sahay, 1996; Volkoff *et al*., 2004). As McKewon (2004: 153) put it, 'cases are often more important for their value in clarifying previously obscure theoretical relationships than for providing an additional observation to be added to a sample.'

Data sources

The two universities that we studied were both striving to reengineer their business processes through the use of a packaged ES, which in both cases was to replace outdated (30-plus years old) legacy systems. The two sites had purchased their systems from different vendors, but both were attempting to implement similar core modules with few modifications to the base code. Our study focused primarily on the payroll system, a major module for which the implementation outcomes in the two cases were very different.

Multiple data sources were used, including semi-structured interviews, observation (e.g., of system menus, terminologies, screens, reporting tools), internal documents (e.g., project status reports), and published sources (e.g., publications from ES vendors, newspaper reports, consultants' reports, university newsletters, and university conference presentations). In the interviews we gathered detailed information about the implementation process. We also asked 'why' questions to probe for salient TMS actions, and 'so what' questions to explore the link between TMS actions and implementation outcomes. By relying on multiple data sources, our intention was to improve validity, gain multiple perspectives on issues, obtain insights into emerging issues, and provide stronger substantiation of emergent constructs and hypotheses (Eisenhardt, 1989; Yin, 1994). The information gathered covered a wide range of issues including the strategic vision for the new system, processes and technologies used to develop and implement the system, user and manager attitudes and behaviors, changes in attitudes and behaviors over time, project team experiences, espoused critical success factors, and manager and peer influences.

We conducted in-depth interviews with 19 subjects (10 in university A and 9 in university B), as well as several rounds of follow-up interviews with these subjects to clarify and extend our understanding (see Appendices I and II for a summary of interview questions and responses, respectively). Our informants held positions ranging from front-line employee to university provost, and had work experience ranging from 5 to 20 years. Data collection ended when the case studies incorporated a wide range of roles and perspectives, and when informants could no longer offer unique information regarding the implementation process, outcomes, or related factors (Eisenhardt, 1989; Orlikowski, 1993). Note that we did not limit case study subjects to express only their individual perspectives, but also encouraged them to comment on their sense of how the implementation process and outcome had gone as a whole (e.g., in terms of user satisfaction, skill development, overall organizational impact). By keeping their focus on the 'big picture,' we hoped to gain a better understanding of top management influence at the organizational/project outcome level (Yetton *et al*., 1999; Sharma and Yetton, 2003).

Interview responses from four senior managers (i.e., one project champion and one top manager from each of the universities) were used to enrich our knowledge of the implementation context and process, including key challenges, actions taken, and lessons learned.

We took a phenomenological approach to the case studies, since they were focused on unearthing the 'the implicit structure and meaning of human experiences' (Sanders, 1982), and describing the world from the perspectives of persons with 'lived experiences' (p. 357). Compared to other qualitative approaches (e.g., ethnography), phenomenology makes clear that 'more subjects do not yield more information' (p. 356), and puts a strong emphasis on in-depth investigations of carefully selected subjects (usually three to six). By studying phenomena 'as they are known directly as they are presented to consciousness' (p. 358), phenomenology offers insights that complement findings from quantitative research (Sanders, 1982). Our phenomenological study, through intensive information probing of carefully selected group of individuals, sheds light on the effect of top managers' actions perceived by employees.

Various tactics were used to ensure validity (Yin, 1994). For example, we verified data by triangulating various data sources (i.e., interview, internal organizational documents, published media). We also created a chain of evidence 'to understand the derivation of the conclusion' (Yin, 1994: 98). Identical case procedures were applied to the two case studies in order to 'minimize errors and biases' (Yin, 1994: 36).

Data analysis

We conducted within-case and across-case comparisons to search for similarities and detect differences, in an iterative process of data collection, coding, and analysis. As Eisenhardt (1989: 539) pointed out, 'Overlapping data analysis with data collection not only gives researchers a head start in analysis, but, more importantly, allows researchers to take advantage of flexible data collection. Indeed, a key feature of theory-building case research is the freedom to make adjustments during the data collection process.' Our study utilized an iterative four-step procedure as summarized in Table 2.

The first step involved coding transcripts and field notes from university A. These data were captured from interviews and observations as well as public and private documents. The purpose of this step was to identify relevant concepts, and to understand how these concepts were related. Vague concepts were clarified through follow-up interviews, and by triangulation using information collected from different sources. The coded transcripts were first validated by the subjects, and then independently analyzed by two qualitative researchers experienced in IS implementations to confirm: (1) that the concepts accurately reflected underlying comments and notions contained in the transcripts; and (2) that coding rules were applied consistently throughout.

In naming, defining, and refining categories we tried to integrate our findings with existing theories and literature containing similar concepts. When we observed that multiple interview subjects made consistent comments regarding resources (e.g., 'Top managers made sure that we had budget and enough human resources [for] the implementation'), we adopted the code 'TMS – Resource provision' (TMSR) – a term that had been used and studied

Table 2 Summary of data analysis methods

	Nature	*Methods*	*Results*
Step 1: Code university A	Within-case analysis	Coding, interviewing, triangulating	Identified two categories of top management support: TMS – resource provision and TMS – change management. Explored relationships among these categories
Step 2: Apply codes to university B	Within-case analysis	Coding, interviewing, triangulating	Refined TMS – resource provision and TMS – change management categories. Examined category relationships in university B
Step 3: Conduct between-case comparison	Between-case analysis	Pattern analysis	Identified new TMS category, TMS – vision sharing
Step 4: Compare findings with previous studies	Between-case inductive analysis	Pattern analysis	Explained discrepancies

in previous work (e.g., Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997). TMSR describes managerial actions regarding the supply of key resources such as funds, IT, staff, and user training programs. Similarly, comments such as 'Top managers failed to anticipate the depth of change' led us to apply the code 'TMS – Change management' (TMSC) – consistent with earlier research (Ramamurthy and Premkumar, 1995; Thong *et al*., 1996; Guimaraes and Igbaria, 1997; Igbaria *et al*., 1997). TMSC describes managerial actions that fostered organizational receptivity of the new ISs throughout the implementation process (e.g., encouraging open communication, addressing concerns and complaints, and engaging users directly to understand their needs). When defining implementation outcomes we considered multiple dimensions suggested by DeLone and McLean (1992) (e.g., user satisfaction, individual impact, and organizational impact), and by Markus *et al*. (2000) (e.g., technical success, adoption success, user satisfaction, and user skill development).

The second step applied the same procedure and coding scheme used in step 1 to university B, in order to identify similarities in core concepts between universities A and B, and expand the coding scheme with unique insights from university B. The code-application process iterated several times, until we were confident that we had developed a thorough understanding of all relevant elements in both cases.

In the third data analysis step we examined patterns across the two case studies, and prepared a listing of obvious and subtle similarities and differences between them. As Eisenhardt (1989) predicted, during this process we generated additional concepts, and developed a more sophisticated understanding of our case studies. For example, one pattern we observed was that middle managers in university A frequently felt ignored by their senior managers, subsequently powerless and frustrated, and so they disregarded their subordinates' training needs as a result. Middle managers in university B, on the other hand, were invited into the implementation process at an early stage, felt strongly supported by top managers in achieving implementation success, and thus were inspired to follow and pass on their leaders' vision and dedication to the new system. Further examination of these differences led us to develop a third core concept, TMS – vision sharing (TMSV), which describes the actions that top managers used to encourage lower-level managers to develop a common understanding of the core objectives and ideals for the new system. The 'vision sharing' code was selected because of its consistency with prior research – that is, the leadership literature dealing with visioning (e.g., Bass, 1985; Akkermans *et al*., 1999; Roepke *et al*., 2000). Through this new lens we observed that in addition to direct influence, top managers also exerted indirect influence by managing through other people (Mintzberg, 1994). With the creation of this category in university B, we iterated back to university A and identified instances of vision sharing in that setting.

The fourth and final data analysis step involved a comparison of patterns revealed in this study against those proposed in previous studies to 'sharpen the insights yielded by the inductive process' (Eisenhardt, 1989: 548). The following section first describes the IS implementation in each university, and then 'enfolds the literature' by analyzing the potential influence of each type of top management action on implementation outcomes.

University A

Implementation context

The legacy system in university A was originally developed in-house, and was neither functionally integrated nor Y2K compatible. Processes were highly centralized; the 350 business officers located in 13 faculties across the university regularly completed paper-based forms (e.g., for payroll processing) and sent them to the university's human resources (HR) department where a dedicated staff of 20 HR experts would enter and process the data (e.g., calculate gross and net pay, generate payroll cheques, print tax receipts, run management reports). University A decided to decentralize these responsibilities to the business officers, primarily in response to complaints by deans in the larger faculties who wanted greater autonomy and flexibility to deal with HR-related matters. By transferring the responsibilities to the localized business officers, the university hoped to free their HR personnel to focus on higher order processing functions (e.g., recording legislative changes, maintaining employment records, issuing letters of confirmation, and receiving and interpreting confidential government documents). Table 3 contains a summary of these two case study sites.

After evaluating a variety of large-scale ESs, university A selected SAP. Three groups were established to coordinate the implementation effort: (1) a steering committee composed of 16 senior, department and IT managers (led by the vice-provost of HR who served as champion, the vice-provost of planning and budget, and the provost); (2) a 22-member user-liaison team made up of business officers from the university's three campuses; and (3) a six-member project team led by the director of the IS department, and composed of external consultants and internal IT personnel. The project manager worked with the user-liaison and project teams, and reported back to the steering committee.

A modular phase-in approach was used to allow the implementation teams to concentrate primarily on one module at a time. Because the university wanted to introduce fundamentally new business processes that were consistent with the 'best practices' embedded in the ESs software, few modifications were made to the SAP base code. The implementation of the payroll component started in 1997, and the system went live in 1998 (see Table 4). The vendor and external consultants worked closely with the project team throughout the system development and implementation processes, particularly on technical challenges. The 350 affected users were formally notified about the new SAP payroll system 2 months prior to the implementation. Each employee attended a 2-h information session where they viewed a demonstration of the new system, learned about its structure and benefits, were told about required changes to current business processes, and received information about documentation, training, and technical support. The direct cost of the package, including software, hardware, training, and consulting was approximately $17 million.

Table 3 Implementation context summary

	University A	*University B*
Organizational context		
• Size	10,000 staff, 68,000 students	3000 staff, 29,000 students
• Annual budget	$480 million	$206 million
• Age of institution (years)	200	130
• Ownership, language	Public, English	Public, English
• Ranking (2005 national survey)	#2 in Canada	#1 in Canada
• Current administration's tenure	3 years	2 years
Project context		
• Project budget	$17 million	$2 million
• Number of affected users	350	300
• Prior user experience with large-scale IS projects	None	None
• Project manager experience	16 years	10 years
• External support	Vendor (SAP) Third-party consultants	Vendor (PeopleSoft) Third-party consultants

Table 4 Project timeline

	University A	*University B*
Adoption		
1995–1996	Purchased SAP HR system including payroll, benefits, and administration modules	Purchased PeopleSoft HR system including payroll, benefits, and administration modules
Implementation		
1996	Formed business process management committee	Started training for team members, middle managers, and super users; formed steering committee
1997	Formed steering committee; set up project committee; configured modules; tested system	Launched training lab; configured system; tested HR modules; trained HR users
1998	Just-in-time training; go-live; training for secondary users; process training to department administrators	Go-live; *ad hoc* training based on individual needs

Top management support – Resources

Most project expenditures were associated with up-front technology procurement (e.g., hardware, software, configuration, coding), training, and technical support. One vice-provost clearly indicated that providing funding for hardware, software, training, and technical support was the senior managers' first priority. Managers and end users concurred that resource provision was thought to be generally sufficient. For example, the project manager declared, 'Top managers made sure that we had budget and enough human resources [for] the implementation.' Likewise, a department manager stated, 'We had enough resources,' and an end user confirmed, 'I do not believe that I had problems related to resources.'

Specific resource challenges did arise, however. For example, a 'just-in-time' 5-day standard training course was provided to primary users just prior to the cutover date. Many users felt that this did not give them enough time to grasp their new responsibilities or to master the new business processes and terminologies, and one department manager expressed frustration with the nature of the training program:

> Each department has its own structure, thus each department is different. Instead of instructing people 'this is how you key it [information] in and this is how you hire someone,' the training program needs to get people to think … 'if I enter this information here, how will it affect [things] ten steps down'?

When users found that they lacked the knowledge and skills to deal with their new tasks, they tended to ignore the formal technical support channels and instead turned directly to their supervisors for help. One user explained: '(The) IT people did not know what I was doing.' Thus, while financial, technical, and human resources were readily available, users often felt confused about their responsibilities and remained reluctant to use the system.

As one user put it, '[You must] show me that it works well before I will use it!'

Top management support – Change

For business officers who had worked with the legacy system for many years, the new ES appeared to be extraordinarily complex. They had become comfortable with the legacy environment, in which all they needed to do was to complete a form and 'send it to HR' for processing. But the new system and related decentralized processes now required that they perform duties that were previously executed exclusively by HR staff, including hiring and terminating employees, and reconciling employee accounts. The users had not been consulted about these changes in advance, and in fact the simple message from the university was that the new system would provide all of the same reports and functionalities that were available in the old system, in addition to desirable new capabilities. Some business officers were apparently so overwhelmed by the changes that they resigned from the university. One business officer expressed their frustration and anxiety in this way:

> When I was using the system, I was confused with all the buttons and terminologies. I also had this massive fear, as I understood that whatever I was doing was going to affect the employees' pay. I didn't want to be the one to press the button!

Top managers, however, had their own way of interpreting this frustration and confusion. According to one vice-provost, 'People are bound to complain and resist. This is human nature! Training will help them.' Therefore, top managers did not perform behaviors other than offering training to deal with users' frustration and confusion. Unfortunately, employee training did not appear to solve the problem. Users indicated that they were given 'step-by-step instructions' on how to key in data (e.g., how to enter sick leave data), but they were not taught about organizational policies, tax regulations, or the purposes of various reports produced by the system. To make matters worse, during the 5-day training program users frequently received emergency calls from their departments, and missed some of the training as a result. One user estimated that the 5-day training program was effectively reduced to 3 days for many users.

When asked how well the project was supported from the top, business officers commented that while top managers seemed to be working hard, it was not clear what they were contributing in practical terms:

> I knew that we had steering committees and management boards, but I didn't know the role that senior management played. I was really not happy with the implementation process because of the lack of communication, training, and support.

Department managers concurred: 'people sitting at the top raised expectations too high, but did little to settle [the ensuing] chaos.' Moreover, there was no identifiable champion to smooth the transition for the payroll module implementation. According to the project manager:

> The champion for the HR implementation should be the vice-provost of HR, but he did not take on that role – although if you talk to him, he would say, 'Yes, I am [the champion].' But he was not active … so when you came to the actual action, it was hard to find support.

Top management support – Vision sharing

Top managers in university A held a clear, shared vision for the new SAP system – it would replace the legacy system, and it would provide a platform for reengineering existing inefficient business processes and improve departmental autonomy and flexibility. They expressed this vision through newsletters, town hall meetings, and formal meetings with faculty and departmental representatives.

Unfortunately, key managers and users considered this vision to be 'unrealistic' and 'too much to bite off' at once. In particular, middle managers felt uncertain and doubtful about decentralizing HR responsibilities and processes at the same time as the system was being implemented, since the system on its own was already extremely complex technically. Early problems with the new system only reinforced these concerns. For example, when business officers were granted system access to view and edit employee records, they quickly discovered that they could access confidential data for all employees in the university, not just for those employees in their department. Security and privacy measures had to be developed very quickly, 'in flight,' to restrict access. No sooner was this hole plugged than new authorization challenges appeared (e.g., related to the presence of casual employees of the university, who worked across multiple departments). Concerns were also expressed on the HR staff side:

> Payroll involves legislative, records of employment, letters of confirmation, and certain things that come in from the government that are so confidential (that) we just couldn't release it to the departments. So there will be always a need for a central area. We also have to be heavily involved with the departments to close the pay, release the pay, and balance the pay. So although I could see the benefits of the new system, I don't see the reasons for delegation.

However, top managers asserted that decentralization was a necessary part of the project, and therefore ignored these concerns. Two months before the go-live date, when the formal review sessions on the SAP HR module were being held, department managers were shocked when the university administration informed them of their new responsibilities. Managers expressed their dissatisfaction: 'Why should we use a system that was chosen without a real understanding of our needs?' At least one manager decided to ignore the implementation and focus his employees' attention on getting daily tasks done first: 'I am not going to get someone in to support you during this period while you are off training. So when you come back, you are expected to do what you need to do here.' Users were confused about

what types of actions the organization expected: 'How could they expect us to use the system without letting us learn it first?'

Thus, while top managers held a consistent shared vision, it was not understood or shared by middle managers or employees, and it appeared to be essentially disconnected from the reality of their day-to-day work.

Implementation outcomes

Six weeks before the go-live date, a dean requested that the university halt the implementation because the business officers were still unfamiliar with the new procedures, uncomfortable using the system, and unable to do their jobs. Although administrators were aware of the users' confusion and reluctance, they decided to stick to the schedule and push the implementation forward. The project manager commented, 'They [top managers] believed that as long as we kept pushing, people would eventually use the system.'

The system went live on schedule. However, according to one subject, users made mistakes '90% of the time.' From an organizational standpoint, these mistakes were expensive because they often would not be identified until it was too late (e.g., payroll underpayments and overpayments would not be recognized until after a payroll processing cycle had been completed, resulting in a great deal of duplicated effort). According to the project manager, business officers expressed overwhelming dissatisfaction with the new system:

> After the system went live, we – two senior people and I – held a first town hall meeting. So we went out to meet the business officers. The first time we met with forty business officers. We met all at once in a big room. The first meeting at the Actuarial Science building was very interesting. They were yelling, all kinds of that stuff.

To equip users with the necessary knowledge and skills, a major clean-up period was required post-implementation. Users had to be retrained, and numerous additional departmental town hall meetings were required. The project team was forced to cancel a proposed software upgrade in order to give users more time to catch up with the older version of the software. At the end-point of our study, the organization was seriously considering re-centralizing payroll processing activities.

University B

Implementation context

The legacy system in university B, nicknamed 'Manpower,' was housed on a terminal-based IBM mainframe computer that relied on an archaic punched card system for data entry. Because the core applications were not integrated, staff members frequently had to work overtime to manually re-key data from one application to another in order to generate management reports.

Senior managers in university B decided to implement a PeopleSoft client/server ES. Two vice-provosts, of academic administration and external relationships, were appointed as co-champions for the implementation. Two years before the implementation, three groups were established: (1) a seven-person steering committee (composed of the two co-champion vice-provosts, two additional vice-provosts, two faculty chairs, and the Director of IT); (2) a vendor working group (composed of IT people and key users from different faculties); and (3) a project team (composed of managers and users from all functions, technical staff, and external consultants).

The actual implementation occurred in two sequential phases. The first phase lasted 24 months and saw the introduction of a new GUI-based e-mail system, improved security procedures (including backup and disaster recovery), and a training program. The second phase lasted 48 months and involved moving applications from the mainframe to the new client/server platform, testing, and user training. The system implementation directly affected 300 primary users including central HR people as well as dispersed departmental administration officers. The vendor participated heavily in system design, development, and user education and training. Key managers were brought in at an early stage of the implementation and participated in the system selection process. Several small modifications to the PeopleSoft base code were required (e.g., to make the system compatible with Canadian reporting requirements), but no major changes were required. The direct cost of the project including software, development, and training was approximately $2 million.

Top management support – Resources

Senior managers in university B publicly ensured constant availability of financial and technological resources, regardless of budget implications. A 2-month training period was provided after the initial information sessions to help users learn the fundamentals of the new system as well as its special capabilities. Additional specialized courses were offered as required. As the project manager confirmed, 'Whenever I needed more technological or financial support, they [top managers] made sure I got what I wanted – even when our budget increased two years after we started the project.'

End users recognized that strong resource support was being provided from the top. If users were not confident about their own knowledge and skills upon completing the training sessions, they were encouraged to take additional lessons, and they were given time away from their regular duties to do so. A training lab was set up for employees to experiment with the system without worrying about making mistakes. As one user put it, 'I learned the system by playing with it at the training center.' A help desk was also available for users to call in and ask questions. Another employee commented about these support resources: 'We really felt that the project was a priority in the university.'

Despite resource support, users felt overwhelmed by the extent of change in their daily tasks and uncertain about their computer knowledge and skills. One user told her department manager, 'I hate computers. I hate the system!' Another user who had been serving the university for over 20 years commented, 'It was a hazardous project. I sometimes thought, "Will it survive?" '

Top management support – Change

Unlike university A, the top management team in university B decided not to decentralize its payroll functions. They believed that the changes introduced by the new system, on its own, were going to be complex and challenging enough. They hoped that retaining centralized processing would minimize organizational disruption.

HR staff members were attracted to the efficiency and advanced functionalities of the new system, but also experienced significant challenges. Because most staff lacked basic computer literacy knowledge and skills, they did not understand technological terminology and were unable to quickly develop an intuitive grasp of the system's interfaces or outputs. Furthermore, the HR staff had become very comfortable with the legacy system procedures – for example, entering data to the system involved preparing a punch card and submitting it for processing with the next batch run. Given the level of real-time integration and information sharing desired for the new system, this batch processing approach was no longer sufficient – it was crucial that users now catch and eliminate errors before they entered the system, since the information would be immediately accessible (with appropriate security clearance) throughout the entire university and could have immediate ripple effects on other departments. Therefore, even though basic processing was to remain largely centralized, the new system required that users fundamentally changed their old ways of doing things. The degree of change created fear and uncertainty among many users.

To make matters worse, the system was initially unstable due in part to key 'Canadianization' software modifications. It crashed repeatedly, sometimes during user training sessions. Recognizing that they had overestimated the native capabilities of the new system and underestimated the extent of change required by users, the vice-provosts ordered a major change in the delivery of training sessions. The new training program no longer focused solely on the mechanics of the new system, but now also explained limitations in the old legacy system, highlighted benefits of the new PeopleSoft system, and offered users a more holistic understanding of the entire system's inputs and outputs. Furthermore, it was tailored to the specific needs of users (e.g., new computer users were given introductory skill-building courses such as Windows Basic Fundamentals and Introduction to PeopleSoft). Specific applications were taught based on users' individual processing responsibilities. A special training laboratory was constructed to allow employees to experiment with the interface (e.g., users could add, edit, and delete 'dummy data' to the test system without having to worry about the consequences).

As the implementation continued to unfold, top managers sought to keep informal communication channels open. They regularly visited departments to understand what problems managers faced, and regularly offered specific support. When departmental managers pointed out that the implementation was causing employees to work overtime without pay, the top managers introduced an open overtime policy. When managers explained that some users were afraid of losing their jobs, the vice-provosts made a public announcement guaranteeing that no job losses would occur. Top managers also set up a communication plan whereby an HR person was dedicated to regularly communicating with administrative officers to understand their training needs. The project manager remarked that he got 'real support,' not just 'support on paper.' Referring to the level of apparent engagement by top management, one team member offered the following:

> We got the support. The vice-provost occasionally stopped by our offices and asked how we were doing. The president had a party for us at Christmas-time because we worked over Christmas. Several VPs were at the party, and they were just very supportive. They came down to take good care of us. Occasionally we all got chocolates from them. Chocolates made us work!

A project leader reported a similar experience:

> We had great support from senior managers, such as small things like going to the [university bar] and putting it into the expense report. What they really did was to inspire us … It was sort of rewarding to see things get better, little by little. We were not rewarded in terms of the big fat cheque or bonus. But you were appreciated, and it was acknowledged that you had done a lot of work that was tough.

One of the vice-provosts noted, 'I really believe in the use of internal resources, which means you have to train them. You can't just say, ''Go do this.'' You have to keep supporting them.' These change management actions helped to ease users' anxiety and come to terms with the incoming system.

Top management support – Vision sharing

Senior managers in university B understood that the new ES could be used to drive substantial process reengineering and improve efficiency. They conveyed a clear vision – PeopleSoft was a critical project that would benefit the entire university in the long run. The following comment by one vice-provost reflected the vision:

> It is the most important thing that is running at the university. We can't have our systems fail. The two vice-provosts Administration and University Planning and the senior vice-president are fully in support of the system.

Top managers believed that middle managers were the key to the implementation. Therefore, they ensured that middle managers were brought in at an early stage of the implementation, and participated in the system selection process. Middle managers were also among the first to be trained. Once they touched and felt the system, they began to see the system as an opportunity to leverage performance in their department or division. As one departmental manager stressed:

> The old system was like twenty years of baggage that all got mixed up. It created an opportunity for people to clean up the baggage and to work more efficiently.

However, middle managers also understood the complexity of the system, and felt cautious. One manager expressed the following:

> Implementing PeopleSoft was a major challenge – even the change in the look and feel of the existing system [alone] was a major challenge, without any of the business changes!

As a result, top managers sought to stay in continual contact with middle managers to address the obstacles they faced in realizing the vision. For example, when the HR manager indicated that she was short-staffed because some HR employees were working heavily on the project, the top management team approved hiring of temporary employees for the HR department.

Managers throughout university B not only accepted the vision, they became deeply committed to it as they saw it being fully supported, in word and action, by the top management team. In turn, middle managers tried to express the vision to their subordinates. An HR staff supervisor was so involved in this process that she kept a pen and paper beside her bed in case she awoke in the middle of the night with an idea. The bedside notepad idea inspired other employees to follow her example. As a result, the commitment from middle managers and users became very strong. As one user put it, 'We did it [the system implementation] for us!'

Implementation outcomes

Despite their initial fear and anxiety, users gradually came to understand the benefits of the new system, and then to embrace it. According to one departmental manager, 'I would say that a comfort level has been established.' Seven months after the implementation of the HR module, university B successfully completed an upgrade to a new version in approximately half the time most customers normally took. University B thus earned a reputation in the eyes of the vendor as one of its premier educational client organizations.

Above we have reported on the cases of two universities that implemented enterprise-class payroll systems at around the same time. A summary of implementation context, TMS behaviors, and implementation outcomes is presented in Table 5, and analyzed in the following section.

Analysis of TMS

Top management support – Resources

Resource support was strong in both cases. Subjects expressed their beliefs that financial, technical, and human resources were critical to the project, and that their top management team had provided these resources in sufficient measure. In explaining why they provided these resources, senior managers in both universities cited the overall importance of the project. This supports the argument that securing resources for system implementations, especially large system implementations, is a key responsibility of senior managers (Thong *et al*., 1996; Sharma and Yetton, 2003).

Strong resource provision in both universities was apparently necessary for project completion, but did not appear to positively influence user satisfaction or skillfulness, or other positive organizational impacts. Our study does not confirm the assertion that resource provision will necessarily 'promote learning and overcome [knowledge] barriers' (Sharma and Yetton, 2003: 536). Users in university A resisted the new system mainly due to the extensive changes to their daily tasks, and confusion about the direction the university went with the system. Likewise, users in university B initially resisted the new system because of their fears about organizational changes and their inability to handle the new system. These concerns were not addressed by simply offering more resources or training.

Top management support – Change

In university A, subjects' perceptions of TMS are rated as 'weak.' Top managers decided to implement the SAP system, and at the same time to decentralize hiring responsibilities to local business officers. The scope and complexity of this change effort was underestimated. Business officers were thrust into a situation in which they had to learn new terminologies and technical interfaces, and at the same time come to terms with complex and unfamiliar new HR policies and regulations. Prior to the implementation, top managers failed to actively involve the affected business officers in the system design and development process, or substantially encourage these users to make an effort to learn and master the new system. As a result, users failed to develop the key knowledge and skills required to use the new system effectively, and some were so dissatisfied with the outcome that they quit their job.

In contrast, we considered the TMS for change in university B to be 'strong.' This team understood the degree of change that the new system introduced, and in response purposefully chose to pursue a 'vanilla implementation' (i.e., limited recoding of standard software modules). They actively engaged users in the change process and directly demonstrated their commitment to users in many ways (e.g., by redesigning training programs mid-stream, removing specific barriers as they appeared, rewarding users for hard work, engaging with users at a social level, actively soliciting user feedback throughout). Middle managers and users were invited to join in the design and development process early on. They experienced a sense of ownership of the system, and were ultimately satisfied with the results of their own hard work.

The two cases suggest that top managers can show strong leadership by engaging in specific, direct actions (e.g., providing chocolates as a token of appreciation) to encourage and motivate users. In addition, the leadership behaviors of top management could also be seen in offering additional training as-needed that can help users realize the value of the new system and increase their self-efficacy. Enacting reward policies also encouraged users to master the new system. All these actions seemed to be effective in university B.

Furthermore, the two cases suggest that the success of an IS implementation also lies in top managers' ability to

Table 5 Case study categories, concepts and findings

Categories	*Concepts*	*University A*	*University B*
Implementation context	Characteristics of the new system	• Client/server system to replace legacy mainframe • Desired decentralized processing functionality	• Client/server system to replace legacy mainframe • Maintained centralized processing functionality
	Management structure	• One project champion (senior administrator) • Three groups (steering committee, user-liaison team, project team)	• Two project co-champions (both senior administrators) • Three groups (steering committee, vendor working group, project team)
	Individual impact	• Users had to learn new tax regulations and policies, and take on more responsibilities	• Users had to change 'mindset' to adjust to the new working procedures, and master new computer skills
Top management support	Resources	• Provided necessary capital funding for hardware, software, and ancillary services • Ensured availability of technical support (training programs and help desk)	• Provided necessary capital funding for hardware, software, and ancillary services • Ensured availability of technical support (training programs, training centers, help desk) • Approved purchase of specialized programs 'in flight'
	Change	• 'Designated champion' rarely made key decisions • New project announced only 2 months in advance • Tended to treat the new system as a 'black box' • Unresponsive when users expressed discomfort • Did not follow through on promises	• Co-champions were highly engaged and visible • New project announced 2 years in advance • Invited early user participation • Guaranteed user job security • Openly acknowledged difficulties faced by individuals • Set up special training lab • Set up a communication plan to listen to user needs • Refocused training to highlight benefits, mid-implementation • Occasionally 'dropped in' on users to track front-line status and offer encouragement
	Vision sharing	• Shared among top managers, but not universally understood • Vision of decentralization was disconnected from users' reality	• Reiterated the strategic vision and benefits of adoption • Publicized determination to succeed • Communicated formally and informally with middle managers to understand and address their challenges
Implementation outcomes	User satisfaction	• Users did not understand the intended benefits • Users unhappy with their new process responsibilities	• Users understood intended benefits • Users eventually satisfied with the new system's features • Users expressed ownership of the new system
	User skills	• Users uncertain about how to use the new system, unfamiliar with new policies and rationale • Users had narrow understanding of system usage (they understood only their own 'steps', not how their work fit into the bigger picture)	• Users given time to become familiar with new processes and their purpose • Users developed holistic understanding of the purpose and usage of the system
	Project completion	• On time (technically), but major subsequent 'clean-up' was required	• On time

Table 5 Continued

Categories	*Concepts*	*University A*	*University B*
	Organizational impact	• User mistakes reportedly occurred '90% of the time' • Cancelled routine upgrade • Many patches required • Contemplated cancellation	• Successfully completed a software upgrade shortly after implementation • Publicly recognized by the ES vendor as a 'success story'
Summary – Top management support	• Resources • Change • Vision sharing	Strong Weak Moderate	Strong Strong Strong
Summary – Implementation outcomes	• User satisfaction • User skills • Project completion • Organizational impact	Low Low Completed Negative	High Moderate to High Completed Positive

adjust the level and content of support provided throughout the implementation process, a notion that has been suggested in prior research (Leonard-Barton and Deschamps, 1988; Keil, 1995a, b; Keil and Robey, 1999), but has not yet been closely examined (Boyatzis *et al*., 2003). Despite the fact that the two IS implementations started with user resistance, top managers in university A failed to adjust their behaviors to fit users' needs and relied solely on training to overcome the user resistance. In contrast, top managers in university B exhibited strong leadership by actively soliciting feedback and adjusting their actions accordingly. The differences in the implementation outcomes between the two universities highlight the importance of this kind of flexibility.

Top management support – Vision sharing

Subjects' assessments of TMS – vision sharing in university A was summarized as 'moderate.' Through formal written communications, top managers delivered a strong and consistent message about the importance of replacing the legacy system, and there was broad buy-in to this message. However, whereas top managers viewed decentralization of business processes as a core component of the project, middle managers and users did not understand why this was necessary. Top managers downplayed this confusion about the core purpose of the project, allowed the reengineering to continue, and hoped that middle managers would eventually see the benefits once they started using the system. Unfortunately, the confusion and uncertainty blossomed. Middle managers became unable and unwilling to offer guidance or assistance to users, and users became increasingly fearful, critical, and unsupportive of the new system.

In contrast, TMSV was judged to be 'strong' in university B. Top managers provided a clear and consistent vision of what they wanted to achieve: an implementation of an IS that was going to benefit the university in the long run. To develop a common understanding and buy-in of this vision, top managers invited departmental managers to join the project during the early stages, engaged in regular communication with these managers, and helped them overcome obstacles in realizing the vision. In turn, these mid-level managers engaged and inspired their key users, who developed a strong sense of ownership of the system.

We observed that top managers needed not only to advocate a clear vision, but also to effectively share the vision with their subordinates. In other words, they had to take actions beyond formal communications by proactively clarifying confusion, engaging key stakeholders in the early stage of system developing, and inspiring a strong sense of ownership and commitment. Having a vision without sharing it caused a rippling effect where users became confused and eventually unhappy with the system.

Other factors

ES implementation outcomes are affected by a variety of factors (Markus and Tanis, 2000). Below we describe a number of factors other than TMS that may have played a significant role in the outcomes.

As shown in Table 3, there were many similarities between the two universities. Both were highly ranked, public, English-speaking institutions with a lengthy history.

Users were similarly inexperienced with large-scale IS implementation projects. Both universities had assembled a thoughtful governance structure for the project, put experienced project managers in place, and ensured that training and other support resources were available for the implementation.

However, university A was significantly larger than university B (e.g., in terms of the number of staff and students, annual budget, project budget, and number of affected users). Thus, we considered the degree to which the negative outcome in university A might have been associated with the size of the organization and project, since this would naturally result in increased complexity (Adam and O'Doherty, 2000). In our opinion, at least a portion of the added complexity in university A was exacerbated by the initial vision to decentralize the HR processes to the business units. Furthermore, while size may have made 'a bad situation worse' in university A, it was top management's weak leadership behaviors that created a chaotic situation in the first place. Had the leaders in university A engaged in more responsive and thoughtful change management and vision sharing behaviors, as we saw in university B, we believe that the likelihood of implementation success would have improved dramatically – regardless of organization or project size.

It was difficult to further identify or attribute outcomes to one system *vs* the other. Such differences may have existed, though again we would point out that the impact very much depends on interactions between users and technology, as opposed to the technology itself (Orlikowski, 1992). We also note that the ESs software packages implemented by the two universities were both very popular, and numerous examples of successes and failures by other organizations using either of these systems have been publicized. Therefore, we do not believe that underlying differences in the technology was a major factor associated with different implementation outcomes.

External support from vendors and consultants, and knowledge transfer between consultants and clients, have been found to affect important implementation outcomes such as users' perceived ease of use (Igbaria *et al*., 1997; Venkatesh, 2000; Ko *et al*., 2005). In university A, SAP appeared committed to making the system work. SAP consultants and independent third-party consultants worked closely with the university to stabilize and 'Canadianize' the payroll system, as well as to implement new business processes. In university B, PeopleSoft and external consultants also participated heavily throughout the implementation. However, in this case some degree of specialization occurred whereby the vendor took responsibility for generally configuring the base system, and consultants focused on reconfiguring the system according to their specific requirements (e.g., using programs in their shared solution library to reduce development time). It is possible that this methodological difference had some influence on the final outcomes, but again we do not believe this to have had a major impact.

Discussion

Successful IS implementations are difficult to achieve. High implementation failure rates are constantly reported, and organizations have suffered massive losses due to these failures. Despite a general consensus on the importance of TMS in IS implementations, existing research has not provided a clear or compelling understanding of the concept. Disparate conceptual definitions and inconsistent measures have led to conflicting findings regarding the impact of TMS. Looking at TMS through the theoretical lens of metastructuration, this study offers a clear behavior-based definition of TMS and the impacts of different types of TMS actions. Our study's implications for theory, practitioners, and future research are discussed below.

Implications for theory

We identified three types of TMS actions: TMSR (e.g., providing funds, technologies, staff, and user training programs), TMSC (e.g., promoting organizational receptivity of the new ISs), and TMSV. While some of these behaviors have been mentioned in previous studies (e.g., Igbaria *et al*., 1997; Purvis *et al*., 2001; Sharma and Yetton, 2003), others are novel (e.g., using emotional appeals and individualized training).

The existing TMS research tends to treat TMS as a single-dimension construct (Purvis *et al*., 2001; Wixom and Watson, 2001). Our case study suggests the existence of the three distinct types of TMS actions, based on which we reveal a complex impact of each of these top management supportive actions on implementation outcomes.

First, our case study uncovers how each action influences implementation outcomes. For example, we found that strong resource provision in both universities was apparently necessary for project completion, but did not appear to positively influence user satisfaction or skillfulness, or other positive organizational impacts. Strong TMSC seemed to positively affect user satisfaction and skillfulness while TMSV impacted implementation outcomes by top managers' indirect influence on others. The relationship between each of these types of TMS actions and the implementation outcomes suggested by our case studies challenges the prevailing assumptions held by the extant TMS literature (Table 6).

Second, our case studies not only suggest that each type of TMS action affects implementation outcomes differently, but also reveals the potential intertwining relationships. For example, our analysis suggests that TMSC and TMSV cannot function alone – without strong TMSR, top managers' efforts to mitigate resistance and motivate users to learn and use complex, interdependent new systems, and to establish a shared understanding of the vision with middle managers, will be in vain. As shown in the case of university A, the fact that a moderate TMSV did not lead to positive user attitudes and enhanced user skills suggests the necessity of strong TMSC, in addition to TMSV. Prior studies have not yet paid attention to the potential relationship between multiple top managers' supportive actions. The question 'How are TMS actions intertwined?' deserves further investigation.

Furthermore, our analysis highlights that top management supportive actions are not static, and that it is important for top managers to adjust their behaviors throughout an IS implementation process. IS implementations, especially related to large-scale projects like these, are

Table 6 Summary of theoretical assumptions and data

Initial theoretical assumptions	*Data – University A*		*Data – University B*	
	TMS actions	*Implementation outcomes*	*TMS actions*	*Implementation outcomes*
• Metastructuration actions may affect implementation outcomes differently (Sharma and Yetton, 2003) • Various TMS actions (e.g., resource provision, encouragement, assistance) exercise a similar impact on implementation outcomes (e.g., Ramamurthy and Premkumar, 1995; Guimaraes and Igbaria, 1997; Igbaria *et al.*, 1997)	*Resource provision* • 'Top managers made sure that we had budget and enough human resources [for] the implementation' (project manager) • 'We ensured that funding and training was in place for the project' (project champion) *Change management* • 'People are bound to complain and resist. This is human nature! Training will help them' (project champion) • 'People sitting at the top raised expectations too high, but did little to settle [the ensuing] chaos' (department manager) • 'The champion for the HR implementation should be the vice-provost of HR, but he did not take on that role' (project manager) *Vision sharing* • 'The decentralization was inherent in SAP. Therefore it was necessary to decentralize while implementing the system' (project champion)	*Project completion* • On time • Within budget *User satisfaction* • 'The first time we met with forty business officers. We met all at once in a big room. The first meeting at the Actuarial Science building was very interesting. They were yelling, all kinds of that stuff' (project manager) • 'Some people tried to sabotage the system' (department manager) *User skills* • Users made mistakes '90% of the time' (project manager) • 'I was confused with all the buttons and terminologies' (user#1 and #2) *Organizational impact* • 'Users had to be trained, and proposed upgrade had to be postponed' (project manager) • 'We were thinking to centralize some HR functions' (senior manager)	*Resource provision* • 'Whenever I needed more technological or financial support, they [top managers] made sure I got what I wanted' (project manager) • 'Never said no to the project' (project champion) *Change management* • 'You needed to listen to them all the time, what their needs were. The goal was to meet their needs without being unreasonable' (project champion) • 'What they really did was to inspire us … It was sort of rewarding to see things get better, little by little' (project leader) • 'I really believe in the use of internal resources, which means you have to train them. You can't just say, "Go do this." You have to keep supporting them' (top manager) • 'I felt fear, but I actually had nothing to fear. The training center made the learning fun' (user) *Vision sharing* • 'It [PeopleSoft] is the most important thing that is running at the university' (project champion) • 'Middle managers were key. We ensure that they were among the first to be trained' (top manager) • 'Locked away, working away, nobody knows anything. That's not the case at all. They knew it	*Project completion* • On time • Within budget *User satisfaction* • 'We did it [the system implementation] for us' (user#1) • 'The system was quite useful. I could see a lot of information, and it allowed you to do calculations and reports that the old system couldn't do' (user#2) *User skills* • 'I would say that a comfort level has been established' (department manager) • 'We developed an internal expertise on PeopleSoft' (top manager) • 'Using the system becomes easy now' (user) *Organizational impact* • Earned an award from the vendor • Finished system upgrades shortly after the implementation

Table 6 Continued

Initial theoretical assumptions	*Data – University A*		*Data – University B*	
	TMS actions	*Implementation outcomes*	*TMS actions*	*Implementation outcomes*
	• 'It [implementing the system and decentralizing HR at the same time] was too much to bite off' (middle manager) • 'It was wholly unrealistic about how much change would be required in decentralizing [HR] in a complex organization as ours' (department manager)		was important to the University. They knew that the Vice-Presidents were there for them' (project champion) • 'Manpower was very archaic, and should be replaced' (department manager) • 'The old systems was like 20 years of baggage that all got mixed up' (department manager)	

rarely predictable; issues and challenges related to the quality of system, training, resources, users, middle managers, and consultants frequently emerge. Our cases suggest that positive implementation outcomes tend to follow if support behaviors are adjusted to the dynamics of the system implementation process.

Our results also underscore the importance of TMSR, TMSC, and TMSV behaviors, rather than attitudes. In particular, TMSR secures necessary resources to support the completion of the implementation; TMSC lessens resistance while encouraging, rewarding, and assisting users to overcome knowledge barriers; TMSV attracts middle manager buy-in. As indicated in both cases, top managers in both universities were favorable toward their adopted system, and also attended formal and informal project meetings. The attitudes and meeting attendance, however, did not seem to be as important and influential as top manager actions. This discovery is contrary to the results of Jarvenpaa and Ives (1991) and Thong *et al*. (1996), who found that CEO's attitudes (instead of participative behaviors) exerted a significant influence on company's progressive use of IT. Our findings support the assertion that it is actual supportive behaviors, rather than expressed support, that ultimately determines implementation outcomes (Shrednick *et al*., 1992; Sauer, 1993a, b).

Implications for practice

This study offers several relevant findings for practitioners. First, it is clear from these case studies that the behaviors (or non-behaviors) of top managers had a direct influence on IS implementation outcomes – that actions spoke louder than words! Documents such as organizational newsletters may be useful for communicating facts, but real change and vision sharing were positively impacted by practical, active relational behaviors by managers. This implies that top managers need to actively exhibit supportive actions (e.g., seek feedback, address user concerns and questions) to ensure that strategic visions are internalized. Second, our findings indicate that implementation success was more likely to occur when top managers actively sought out and listened to feedback from users and middle managers, and then adjusted their supportive behaviors accordingly. Since large-scale system implementations tend to introduce foreseeable and unforeseeable organizational changes (Davenport, 1998; Markus and Tanis, 2000), top managers need to adapt their level and content of support to fit what is needed, rather than relying solely on standardized training and technical assistance programs. Third, our findings demonstrate the importance of ensuring top manager's visibility throughout the entire IS implementation process. Top managers should not assume that employees are aware of their support, but must publicly demonstrate their determination, vision, and appreciation via a steady execution of concrete action and communication (e.g., portraying a sense of humor, enthusiasm, and interpersonal sensitivity) (Fox and Amichai-Hamburger, 2001).

Our study suggests that management could apply techniques to deal with users who are at different stages of 'readiness' (Roberts *et al*., 2003). For example, users who are already positive about an implementation primarily

need top management to provide necessary resources (e.g., IT support, training), so that they can effectively master the new technology and apply it to their jobs. On the other hand, reluctant users may need more than resource support from top managers. They must also see their leaders as highly supportive to the implementation and effectively spreading their vision for the purposes and benefits of the system.

For project managers, results demonstrate different consequences resulting from different executive actions. This may be particularly relevant to those whose senior supervisors hold the assumption that resource provision alone is sufficient for an IS implementation. Although the project managers in both case studies passively relied on their top managers to support their implementations, other, more active support practices are possible. For example, Sauer (1993b) lists three strategies that can be used to gain support: (1) the targeted strategy (i.e., winning support from a small number of powerful supporters); (2) the spray-shot approach (i.e., getting support from multiple sources); and (3) the capture-a-champion strategy (i.e., obtaining support from the project champion). Alternatively, the step-by-step strategy suggested by Kiesler (1971) advises project managers to seek top management commitment one small step at a time. Although these ideas look promising, the effectiveness of the various strategies has not been tested, and so project managers should be mindful about what types of top management influence are the most in need when seeking support.

Limitations and future directions

In this study we chose to examine how top management behaviors influence implementation outcomes using two in-depth case studies. While this approach has provided useful, detailed insights into these particular projects, it is important to note that actions are bound to the context within which a case study is conducted, and therefore may not be applicable to a broader context (Eisenhardt, 1989). More case studies therefore are needed to validate the findings. Our objective in using case studies was to examine this phenomenon in depth, rather than to establish external validity, and so generalizing these results to other implementation contexts should be undertaken very carefully.

Despite our efforts to rule out confounding factors, we recognize that there are other static and/or dynamic factors that may have influenced implementation outcomes (Markus and Keil, 1994). Nonetheless, we selected these case study sites specifically because we anticipated that the size, scope, and level of disruption of an ES's implementation would heighten the need for top management interventions, and that we might see important behavioral differences across the sites.

As an early study examining different managerial actions on implementation outcomes, this research has several important implications for future research on top management supportive actions. First, future research should attempt to confirm and further investigate the dynamics of TMS behaviors, and their impacts on implementation outcomes. Are there additional top management behaviors that are relevant in different contexts? Are certain behaviors more or less important in different situations? What other contextual factors (e.g., technologies, scale of implementations, roles of project managers and consultants) contribute to the dynamics of TMS, and consequently implementation outcomes?

Second, while in our studies direct leadership was required from the most senior managers in both organizations (due to the relatively large scope of these projects), a 'hands-off' leadership approach can also occur under certain circumstances (Jarvenpaa and Ives, 1991). We need to understand under what condition(s) active *vs* passive leadership approaches are most effective.

Conclusion

Extraordinarily high IS implementation failure rates have left many business leaders skeptical, if not downright contemptuous, about IT projects. This paper has identified numerous top management behaviors related to resource provision, change management, and vision sharing, which the leaders in these case studies engaged in with dramatically different results. While these findings must be replicated and extended with additional research, the tentative good news is that organizational executives have a tremendous capacity to positively influence implementation success, by directly and individually engaging in supportive behaviors.

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Appendix I

See Table A1

Table A1 Summary of interview questions

Questions
1. Users: What role did your direct manager (or project champion) play in your adoption of the information system? Project champion or managers: What did you perceive your role in the implementation?
2. Users/managers: Do you know why your organization adopted the information system? Project champion: Why did you decide to adopt the system?
3. Users/managers: What types of support were provided? Project champion/senior managers: How did you support the implementation?
4. Users/managers: What types of training were provided?
5. Users/managers: Did you feel that the implementation of the system was supported by the organization? Why?
6. Users/managers: What changes has the system brought to your tasks? Project champion/senior managers: How did the system change the existing business processes? How did you prepare the users for the change?
7. All subjects: What are the differences between the old system and the new system?
8. Users: What do you think about your use of the system? Managers: What do you think the users' use of the system?
9. Users: Do you find the system difficult to use?
10. Users: What were the challenges you have faced in your use of the system? Managers: What were the challenges users faced in their use of the system? Project champion/senior managers: What were the challenges you faced in implementing the system? How did you overcome the challenges?
11. Users: What are the reasons that you use the system? or Managers: What are the reasons that users adopted the system?
12. Users: What were your reactions towards using the system? or Project champion/managers: What were the users' reactions towards using the system? How did you deal with these reactions?
13. All subjects: What do you think about the adoption of the system by your organization?
14. Users/managers: What do you use the system for?
15. All subjects: Do you feel the implementation was successful? Why?

Appendix II

See Table B1

Table B1 Summary of interview responses

	Subjects	*University A*	*University B*
TMS – Resources	Project manager	• Resources were provided • Training was provided (post-implementation)	• Resources were provided (including in-flight budget increases)
	Top manager (project champion)	• Ensured necessary resources was available	• Provided necessary resources
	Top manager	• Offered hardware, software, and training	• Offered hardware, software, technical support, and training
	Department managers	• Resources were offered • Training was not well prepared	• Resources (hardware, software) were available • A training center was available
	HR employees	• Resources in need were available • Help desk was available	• Resources, training, and help desk available • Did not hear about any problems with resources
	User trainer	• Resources and training were in place	• N/A
	Users	• Unsure whether resources were provided • Help desk was available	• Hardware and software were in place • Training center was offered
TMS – Change	Project manager	• Top managers were afraid to make decisions • They ignored user resistance, and failed to address user concerns • They focused mainly on project completion	• Top managers remained visible throughout the system implementation • They took measures to address user resistance (e.g., setting up training stations, offering extra training,)
	Top manager (project champion)	• Offered training • Communicated the project progress through formal and informal meetings and newsletters	• Drew up a communication plan to understand users' needs, and fit their needs accordingly • Bonus reward policy for people working overtime • Sent chocolates to users • Paid informal visits to departments; talked to users
	Top manager	• Top managers offered training	• Offered additional training • Announced no-layoff policy • Minimize the scope of change
	Department manager #1	• No departmental support was provided when staff were on training • Top managers did not develop policies or measures to address the staff shortage	• Top managers were dedicated to the project • 'No layoff' policy eased concerns and worries • Top managers visited the department from time to time and inquired about user concerns
	Department manager #2	• Insufficient support provided for business officers to get their work done • No reward/incentive programs were offered to encourage use • Top managers did little to mitigate the user resistance	• Top managers underestimated the challenges initially, but took measures to correct • 'No layoff' policy was encouraging • Extra training was helpful • Little gifts (e.g., chocolates) really showed top managers' appreciation of hard work
	HR employee #1	• Difficult to get timely decisions from top managers • Top managers underestimated the depth of changes to users	• Strong determination of management to finish the implementation quelled user resistance • Rewards program for staff who worked overtime encouraged people to use the system
	HR employee #2	• Top managers were overly optimistic about the implementation and its impact on users	• System difficult to use initially (not designed for educational institutions or Canadian context), but training center and

Table B1 Continued

	Subjects	*University A*	*University B*
		• Top managers failed to clearly divide responsibilities between HR and business officers	temporary staff encouraged use • Top managers showed appreciation for individual effort in using the system by dropping off some chocolates and hosting parties
	User trainer	• Training was transaction-focused, and failed to prepare users to do their jobs • Insufficient managerial effort was made to deal with users' negative attitudes toward the system	• N/A
	User #1	• Top managers broke their promises • Difficult to balance the work with the training	• The system was complex, the implementation was on a tight schedule • Top managers did not anticipate the strong user resistance, but they showed appreciation and offered small incentives for hard work, which really motivated users to apply the system
	User #2	• Training was short and ineffective • Subjects were uninvolved in implementation until asked to use the system	• Subjects initially did not like the system because it was complex and unstable; gradually learned to use the system because of the strong organizational pressure and repeated training
TMS – Vision sharing	Project manager	• Top managers failed to convey a clear vision • Little effort spent to gain middle managers' buy-ins	• Top managers stood firmly by their decisions • Constantly reinforced the value of the system
	Top manager (project champion)	• Discussed the system benefits with department managers during formal meetings • Discussed the decentralization with department managers during formal meetings	• Talked to department managers informally to address their concerns • Trained middle managers in the early stage of the implementation
	Top manager	• Formally communicated the necessity of implementing the system • Stressed the importance of decentralization to local departments	• Emphasized the importance of the system implementation • Communicated informally with department managers to understand their needs
	Department manager #1	• Felt it was a mistake to delegate HR responsibilities to business officers	• Top managers always emphasized the vision behind the system adoption
	Department manager #2	• Felt that the HR system was a disaster	• Agreed with top managers about the importance of the system to the university
	HR employee #1	• Top managers were vague about next steps • We lacked a clear vision from our managers	• Top managers constantly stated the benefits of the system • Subject realized the importance and benefits of the system
	HR employee #2	• We understood the reasons for the system, but we did not understand the reasons for delegating	• Recognized the value of the system to the organization
	User trainer	• Top managers endorsed the new integrated system	• N/A
	User #1	• Subject did not understand the reasons for delegation of responsibilities	• Top managers stressed the benefits of the system • Adopting the system was the right decision
	User #2	• Understood the reason for adoption, but failed to see the value of the system to their work	• Top managers put pressure to use the system • Subject gradually felt the benefits of the system