



Research article

Accounting executives and IT outsourcing recommendations: an experimental study of the effect of CIO skills and institutional isomorphism

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Abstract

Although substantial effort has been devoted to understanding how cost issues drive Information Technology outsourcing (ITO), several researchers have proposed that this narrow focus ignores the role of more subtle factors. This paper addresses this concern by investigating internal and external influences on accounting executives' recommendations to outsource the IT infrastructure. Using resource-based and institutional theories, we hypothesize that when the chief information officer's (CIO's) skills are strong, accounting executives will more likely advise against outsourcing. But when the skills are weak, accountants are more likely to mimic the outsourcing actions of industry peers. Our findings support this expectation. These results should interest IS, accounting, and general management scholars. Strategic IT choices are a collegial decision which include contributions from multiple members of the top management team. Senior accounting executives are routinely involved in such evaluations, providing initial projections and monitoring the consequent progress. In addition, recent US regulations have made accounting executives personally responsible for the effectiveness of internal controls, including those over the IT infrastructure. The accounting executives' recommendations on ITO in this context often becomes decisive, and factors behind this recommendation should be fully explored.

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Introduction

Although information technology outsourcing (ITO) has become a common practice, it remains a critical IS initiative (Grover *et al.*, 1994; Teng *et al.*, 1995; Loebbecke and Huyskens, 2006) that leads to irreversible structural changes (Fowler and Jeffs, 1998; Smith *et al.*, 2005). As such, the contribution of key organizational executives to the initial ITO decision becomes critical for ITO success (e.g., Lacity and Willcocks, 1998; Karahanna and Preston, 2009). Yet, empirical evidence on the factors affecting such contribution is scarce. The purpose of this study is to provide evidence on two of these factors – the skills of the organization's chief information officer (CIO)

and the outsourcing actions of the organization's peers – in the context of the ITO recommendation offered by the senior accounting executive.

We focus on the impact of the CIO's skills because insights from descriptive interview-based ITO studies indicate that the skills of the executive responsible for the organization's IT function, the CIO, is often a catalyst in ITO decisions (Hirschheim and Lacity, 2000; Willcocks and Sykes, 2000). In addition, prior research points to IT managerial skills as the only likely source of technology-related sustained competitive advantage (Mata *et al.*, 1995) and reports that firms with high quality internal IT personnel have less incentive to outsource (Roy and

Aubert, 2002). Drawing on prior research, we explore the impact of the CIO's skills on ITO recommendations through a resource-based lens (e.g., Grover *et al.*, 1994; Cheon *et al.*, 1995; Cronk and Sharp, 1995; McLellan *et al.*, 1995; Roy and Aubert, 2002; Jayatilaka *et al.*, 2003; Tanriverdi *et al.*, 2007). We hypothesize that when the CIO's skills are strong and he/she advises against ITO, the accounting executives are more likely to concur with his/her advice.

We then draw upon institutional theory to examine the ITO recommendation when the skills of the CIO are weak. The theory predicts that when faced with uncertainty, organizations will mimic the decisions of other organizations (DiMaggio and Powell, 1983). The ITO decision is risky and the outcome is uncertain, especially when there is a doubt about the ability of the CIO to fulfill promises. Therefore, we expect that the CIO's skills would moderate the impact of peer actions, and hypothesize that accounting executives are more likely to follow peers when an organization has a weak-skilled CIO than a strong-skilled CIO.

Five hundred and fifteen members of the Institute of Management Accountants (IMA) completed the study.¹ Results indicate that when the CIO objects to ITO, accounting executives are indeed more likely to agree with a strong-skilled CIO than a weak-skilled CIO. Further, when CIO skills are weak, accountants whose organizational peers have outsourced are more likely to recommend outsourcing than those whose peers have not outsourced. Peer actions have no impact on the ITO recommendations of accounting executives who faced strong-skilled CIOs.

Our findings are important for several reasons. First, our study contributes to the emerging interdisciplinary literature that explores the impact of business executives on strategic IT decisions. Although prior research has emphasized executives' collegiality as an essential condition of value-creation in ITO (e.g., Lacity and Willcocks, 1998; Karahanna and Preston, 2009), we are not aware of any empirical evidence related to ITO recommendations by senior accounting executives. Given that the IT-infrastructure determines the configuration and reliability of the accounting information system (Beasley *et al.*, 2004; Smith *et al.*, 2005; Beasley *et al.*, 2007), accounting executives' recommendations on ITO often become decisive (De Looff 1995; Renner and Tebbe 1998). Thus, the determinants of such recommendation should be of interest for both academics and practitioners, and our data provides us with valuable insights into this issue.

Second, the distinctive feature of our study is that we are assessing the impact of CIO skills and peer actions on ITO recommendations in an experimental setting. Prior research has examined the ITO phenomenon mainly through surveys (e.g., Grover *et al.*, 1994; Sobol and Apte, 1995; Apte *et al.*, 1997; Aubert *et al.*, 2004; Miranda and Kim, 2006), case studies and interviews (e.g., Clark *et al.*, 1995; De Looff, 1995; Willcocks and Lacity, 1999; Hancox and Hackney, 2000) or by analyzing archival data (e.g., Loh and Venkatraman 1992a, b). These studies concluded that the skills of the CIO determine business executives' reactions to ITO proposals (Hirschheim and Lacity, 2000; Willcocks and Sykes, 2000); that business executives play

an important role in the initial ITO choice (De Looff, 1995); that ITO is subject to the bandwagon effect (Loh and Venkatraman, 1992b), and that institutional forces moderate the impact of other factors on the ITO decision (Miranda and Kim, 2006). We test the validity of these conclusions in a controlled environment where we directly manipulate CIO skills and peer actions while holding other variables constant. Thus, we complement prior results with experimental evidence.

Third, we examine the role of CIO skills and peer actions in their interaction. In contrast, prior studies have examined the impact of those factors on ITO and other strategic IT actions in isolation (e.g., Feeny *et al.*, 1992; Stephens *et al.*, 1992; Loh and Venkatraman, 1992b; Armstrong and Sambamurthy, 1999; Enns *et al.*, 2003; Teo *et al.*, 2003). As a result, we provide novel evidence on the moderating effect of CIO skills and on the boundaries of mimetic isomorphism: peer actions to outsource did not affect the recommendations of accounting executives who knew that their strong-skilled CIO objects to ITO. Thus, we contribute to the literature on both mimetic isomorphism and CIO skills.

In the following sections of this paper, we provide a review of the prior literature and the theoretical foundation for our research hypotheses. We then describe our experiment, present results, and conclude with a discussion of our findings.

Literature review and theoretical foundation

Information technology outsourcing

Since the emergence of ITO practices in the 1980s, the question of why firms outsource has received substantial attention in the information systems (IS) literature. The extant research has identified three primary categories of drivers: (1) financial and economic, (2) strategic, and (3) sociologic.

Researchers who focused on the first category have embraced the postulates of economic frameworks (e.g., transaction cost economics, agency theory), and examined financial motives including cost reduction, cash generation, and improved liquidity as the primary drivers of ITO (Loh and Venkatraman, 1992a; Jurison, 1995; Teng *et al.*, 1995; Grover *et al.*, 1996; Ang and Straub, 1998; Aubert *et al.*, 2004). Although these researchers have generally concluded that financial drivers are important considerations in ITO initiatives, most agree that economics explains only part of the ITO decision.

The second category of ITO drivers includes strategic motivations such as a commitment to align strategic goals and IT capabilities, intent to focus on core competencies, and a desire to gain access to new technology or unique expertise (e.g., Grover *et al.*, 1994; Cheon *et al.*, 1995; Teng *et al.*, 1995). This perspective relies heavily on the resource-based view of the firm, which characterizes the sourcing decision as a strategy to develop or acquire necessary IT resources to build sustainable competitive advantage (e.g., Cronk and Sharp, 1995; McLellan *et al.*, 1995; Jayatilaka *et al.*, 2003; Tiwana and Bush, 2007).

Only a handful of studies have explored the ITO decision through a sociologic lens (Loh and Venkatraman, 1992b; Ang and Cummings, 1997; Teo *et al.*, 2003; Son and



Benbasat, 2007). This perspective generally concentrates on the complex relationships among actors both within and between organizations. Although interest in this view is increasing, most research in this tradition has examined outsourcing implementation and outcomes (e.g., Klepper, 1995; Willcocks and Kern, 1998; Lee and Kim, 1999; Ang and Slaughter, 2001), rather than drivers of the outsourcing decision. This lack of sociological perspective in research on ITO determinants leaves gaps in our understanding of the phenomenon. Dibbern *et al.* (2004), in their comprehensive review of ITO literature, call for more sociology-based research to explore the role of organizational actors in the ITO choice.

Answering this call, our purpose in this paper is to reexamine the ITO decision from a strategic and sociologic perspective.² First, we draw on the resource-based view of the firm to predict that the CIO's skills, a component in the strategic positioning of IT in the organization, will affect the ITO choice. Resource-based theory (RBT) is the dominant strategic theory through which the ITO decision has been examined and provides an opportunity to explore the crucial role of the CIO in the creation of an organizational IT capability. Second, we use institutional theory to examine the sociologic pressure of industry peer actions on the accounting executives' recommendations. This theory, widely used in other disciplines, has received less attention in the IS literature (Son and Benbasat, 2007). However, it offers a valuable path for understanding the susceptibility of individual decision makers to mimetic pressure when evaluating strategic IT initiatives.

Resource-based theory

RBT of an organization defines a firm as a collection of productive resources and capabilities which enable a sustainable competitive advantage (Grant, 1991; Cheon *et al.*, 1995; Wade and Hulland, 2004). These resources and capabilities can be broadly defined as 'bundles of tangible and intangible assets, including a firm's management skills, its organizational processes and routines, and the information and knowledge it controls' (Barney *et al.*, 2001: 625). This perspective stresses the importance of analyzing not only the existing resources and capabilities, but also the gaps in resources and capabilities (Grant, 1991; Teng *et al.*, 1995). Resource gaps are differences between desired capabilities and actual capabilities (Stevenson, 1976; Grant, 1991). Organizations fill gaps through either the development and maintenance of internal firm resources or the external acquisition of complementary resources (Grant, 1991). Generally, RBT suggests that organizations should keep in-house all activities for which they possess strategic resources and capabilities, while outsourcing activities for which they lack the resources and capabilities necessary to obtain expected performance (Grant, 1991; Teng *et al.*, 1995; Barney, 1999; Alvarez-Suescun, 2007).

RBT has been applied in an IS context on a number of occasions (see reviews in Wade and Hulland, 2004; Espino-Rodriguez and Padron-Robaina, 2006). Most of these studies focused on the firm as the unit of analysis, and examined the relationship between idiosyncratic corporate resources and the resulting outcome (e.g., Zaheer

and Zaheer, 1997; Barua *et al.*, 2004; Melville *et al.*, 2004; Ray *et al.*, 2005). Consistent with RBT, this research has documented the significant, resource-contingent variance in performance not only between firms in the same industry but also between firms in more narrow groups of close competitors (Wade and Hulland, 2004). Although these researchers differed in how they classified IT resources and how specific they were in their definitions (Wade and Hulland, 2004), most included IT managerial skills (e.g., Mata *et al.*, 1995; Bharadwaj, 2000), the management of technology (e.g., Marchand *et al.*, 2000), IT leadership (e.g., Feeny and Willcocks, 1998) and IT implementation capability (Alvarez-Suescun, 2007) among key organizational factors. The common conclusion from these studies is that IT managerial skills as well as IT personnel skills, in general, are the most critical IT capabilities, and are often prerequisites for complementary effects of other IT resources (e.g., Mata *et al.*, 1995; Powell and Dent-Micallef, 1997; Broadbent *et al.*, 1999; Byrd and Turner, 2001; Byrd *et al.*, 2004; Alvarez-Suescun, 2007).

Although the majority of IS studies within RBT focused on determinants of firm performance, RBT-based ITO studies examined instead the factors leading to internal IT development *vs* IT acquisition choices (e.g., Cheon *et al.*, 1995; McLellan *et al.*, 1995; Teng *et al.*, 1995; Roy and Aubert, 2002; Jayatilaka *et al.*, 2003; Alvarez-Suescun, 2007). Such research has provided empirical support to Grant's (1991) conceptual argument that to the extent internal IT resources fall short of expectations or needs, organizations will look towards outsourcing to fill the gaps. In particular, these researchers reported that although financial considerations played a role in ITO, unresponsive IT departments significantly accelerated the ITO pace (McLellan *et al.*, 1995), and that a discrepancy between the desired and the delivered quality of information and IT support was a much stronger determinant of ITO (Teng *et al.*, 1995).

Most of the above cited empirical work relies on objective benchmarks such as IT department budgets and the number of employees in IT as the measurement of IT capabilities (e.g., Teng *et al.*, 1995). Absent from these benchmarks is a measure of the functional or process-based nature of capabilities (e.g., Carmeli and Tishler, 2004a, b). The IT capabilities reflect organizational success in the deployment of resources and link available resources with organizational actions (Alvarez-Suescun, 2007). Given their multidimensional nature, researchers have suggested that operationalization of capabilities 'requires approaches rooted in the behavioral sciences' (Robins and Wiersema, 1995: 292–293). According to this reasoning, the unexplored potential of RBT lies in its application to senior executives' beliefs about existing capabilities and their resulting strategic actions. In other words, constructs may be measured through the perceptions of managers or individual-level perceptions, which inform executives' choices (Carmeli and Tishler, 2004b). Such an approach allows for the capture of a more complex reality than previously applied measurements (Carmeli and Tishler, 2004a, b).

Responding to the call for further research in this tradition (e.g., Carmeli and Tishler, 2004a, b) and contributing to IS research on ITO determinants, we examine the impact of

accounting executives' perception of CIO's skills on accounting executives' ITO recommendation. We examine CIO skills because the strength of IT personnel capabilities depends on the organizational IT culture under CIO leadership and overall CIO skills (e.g., Hambrick and Mason, 1984; Barney, 1986; Armstrong and Sambamurthy, 1999; Roepke *et al.*, 2000; Alvarez-Suescun, 2007).³ Such interpretation is consistent with evidence from prior interview and case-based research that emphasized the role of the CIO as the catalyst in the ITO process (e.g., Lacity and Hirschheim, 1993; Hirschheim and Lacity, 2000; Willcocks and Sykes, 2000). Specifically, the prior track record and the CIO's reputation among executives, which are reflections of CIO skills, are found to be important ITO determinants in those studies.

Hirschheim and Lacity (2000) define the impact of the CIO's skills on the CEO's preference toward IT-sourcing. Through a series of case studies, they identify insourcing archetypes where the CIO exploits outsourcing bids to enhance his/her credibility with the CEO; and where the CEO dismisses the outsourcing option at the very beginning of the evaluation process due to strong CIO skills. Willcocks and Sykes (2000) provide similar insights on the role of CIO skills in outsourcing decisions from the context of an enterprise resource planning (ERP) investment. Their study describes an ERP project in which the CEO decides to invest in ERP without looking for meaningful CIO input. This usually happens in the situation when the 'IT function has a poor track record' (p. 34) and investment in ERP is believed to be a method for replacing the 'IT headache.'

Combining these insights from ITO research with evidence from other IS studies on the critical role of IT managerial and technological skills for the success of IT strategic initiatives, and achievement of IT-related sustainable competitive advantage (e.g., Mata *et al.*, 1995; Byrd and Turner, 2001; Byrd *et al.*, 2004), we hypothesize that accounting executives will more likely concur with the CIO's choice when they perceive him/her to have strong skills than to have weak skills.

Stated formally:

Hypothesis 1: When the CIO objects to ITO, accounting executives are less likely to recommend ITO in conditions of a CIO with strong skills than a CIO with weak skills.

Institutional theory

When considered in isolation, RBT provides a strategic, capability-driven perspective of the ITO decision. However, although we draw upon this to explain some motivation behind ITO, we do not assume it offers a full explanation. We propose that the outsourcing actions of industry peers may impact an organizational actor's recommendations on outsourcing. Organizations do not act in social vacuum, and peer actions affect other's decisions in variety of domains (e.g., Bikhchandani *et al.*, 1992, 1998; Walden and Browne, 2008, 2009). By complementing RBT with institutional theory, we address Dibbern *et al.*'s (2004) call for research on the role of sociological determinants in the ITO decision.

In their classical article on institutional development, DiMaggio and Powell (1983) pioneered the notion of institutional isomorphism: a process by which different organizations become similar to each other in terms of organizational culture, structure, technology, and other comparable aspects; and explained why this isomorphic tendency increases with the life of the organization. Contrary to competitive isomorphism (Hannan and Freeman, 1977), which justified this similarity through the natural selection process of organizations better suited to a changing environment, institutional isomorphism addresses homogenization as a response to socially prescribed dictates, standards, or expectations about what an organization *should* do. DiMaggio and Powell emphasize that institutional isomorphism enhances an organization's legitimacy within its environment, but not necessarily its efficiency (achievement of the goal with the least possible resources). They contend that although some organizational practices or strategies may not be optimal for many individual organizations, the mere fact that those practices are sanctioned by a social structure, environment, or industry increases the likelihood of their adoption. Indeed, organizations may suffer negative associations with regard to performance, but positive associations within sociological structures (Powell, 1995; Montes and Jover, 2004).

DiMaggio and Powell (1983) identify three conceptually different mechanisms that contribute to organizational similarity – coercive, normative, and mimetic. Dependent on the situation, environment, or actors involved, any one, two, or all three of the isomorphic pressures may be present in combination or conflict (DiMaggio and Powell, 1983). Coercive isomorphism encourages homogenization through the power held by an organization's constituents (e.g., customer, supplier, or regulator). These external pressures force firms to alter established practices in order to comply with the demands of the powerful constituent (Tuttle and Dillard, 2007). Normative isomorphism results from professionalization. Organizations become similar because, for example, management is comprised of individuals who have become 'virtually indistinguishable' (DiMaggio and Powell, 1983: 153), through the standardization of educational systems, trade associations, and professional certifications.

Mimetic isomorphism, the focus of this study, occurs when organizations respond to uncertainty by mimicking the actions of other organizations. Actions taken by other organizations increase the legitimacy of that strategy, often in the absence of any evidence that the strategy improves efficiency (DiMaggio and Powell, 1983; Powell, 1995; Lu, 2002). Prior research has found mimetic isomorphic tendencies in various types of managerial decisions, including market entry (Haveman, 1993; Lu, 2002), corporate performance and CEO pay structures (Staw and Epstein, 2000), and ERP assimilation (Liang *et al.*, 2007).

Mimetic isomorphism is particularly applicable for managerial decisions involving the adoption of technology as these decisions are plagued with the uncertainty 'related to network effects and reciprocal interdependence' (Teo *et al.*, 2003: 20). Research indicates that when technology is new, the goal is ambiguous, and the solution is unclear, mimicking industry peers' actions becomes the safe choice

(Caldas and Wood, 2001; Benders *et al.*, 2005; Liang *et al.*, 2007). In a case study of ERP implementations, Caldas and Wood (2001) found that 77% of the 28 studied organizations cited 'following the trend' as a primary reason for adopting ERP. In the ITO context, researchers reported mimetic behavior in the IT-sourcing decisions of banks (Ang and Cummings, 1997), the adoption of financial EDI technology (Teo *et al.*, 2003), and the adoption of B2B electronic marketplaces (Son and Benbasat, 2007). Consistent with the conjectures of institutional isomorphism and evidence from prior research, we hypothesize that when faced with a decision to outsource IT, an accounting executive is more likely to recommend a strategy consistent with peer actions.

Stated formally:

Hypothesis 2: Accounting executives are more likely to recommend outsourcing when industry peers have outsourced than when industry peers have not outsourced.

In this paper, we have drawn on prior research to hypothesize the role of both mimetic isomorphism and CIO skills in ITO decisions. The impact of both factors in concert, however, remains unclear. We propose that CIO skills moderate the impact of mimetic isomorphism such that accounting executives' recommendations on ITO proposals will be less affected by industry peer actions in the presence of strong-skilled CIO. We consider a setting in which the organization must address an outdated IT infrastructure – a resource gap. The accounting executive is expected to provide a recommendation on upgrading the in-house system or outsourcing to a Software-as-a-Service (SaaS) provider. As stated previously, research indicates that firms with strong IT capabilities have the incentive of retaining IT in-house (Roy and Aubert, 2002). Thus, when the internal IT capabilities proxied by the CIO skills appear sufficient to ensure successful upgrading in-house, the executive is less likely to look to outsource. On the other hand, weak CIO skills signal lower IT capability and generate greater uncertainty about the successful completion of the in-house upgrade project. Consequently, the accounting executive will be more likely to respond to this uncertainty by following the actions of industry peers. This discussion leads to our expectation of an ordinal interaction, stated as follows:

Hypothesis 3: CIO skills moderate the impact of peer actions on accounting executives' ITO recommendations, such that the stronger (weaker) the skills, the lower (higher) the impact of peer actions.

This relationship is presented graphically in Figure 1.

Participants, experimental materials, and procedures

Participants

Experimental materials were provided online to members of the IMA. The IMA distributed an invitation to participate with a link to the experimental materials to its regular US members, excluding academics, students, and consultants.

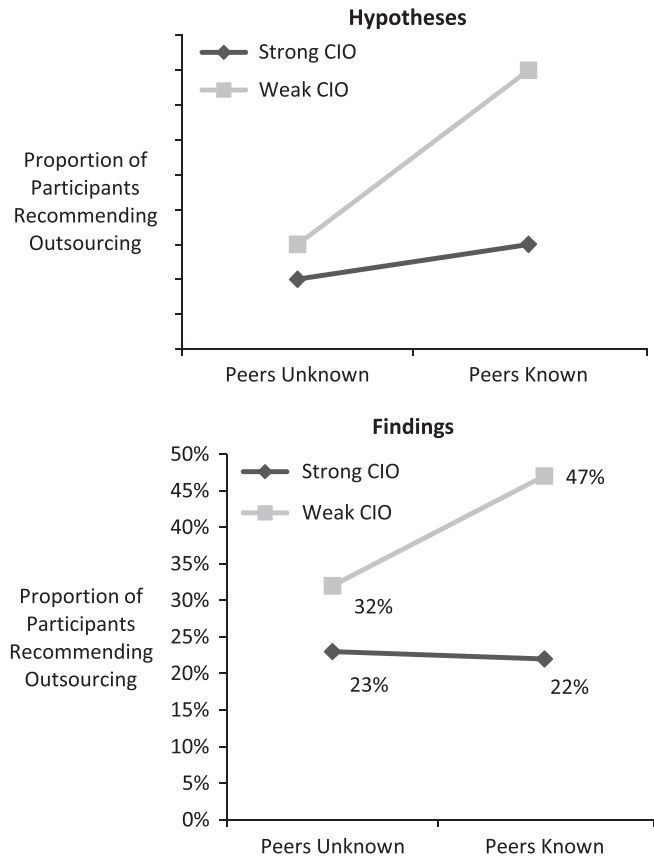


Figure 1 Graphs of hypothesized relationships and findings.

Participants were randomly assigned to one of the four available experimental treatments by IMA administrators. Five hundred and fifteen participants fully completed the experimental materials.⁴ More than half (64%) of the participants are male, 78% of the participants have more than 10 years of business work experience, and 43% (26%) of the participants hold CMA (CPA) licenses. Table 1 provides detailed data about the industry and organization size in which our participants are employed and self-reported extent of outsourcing in their organizations.

Experimental task

The experimental materials consist of two parts. Part one discusses the outsourcing dilemma including manipulated information regarding the two factors of interest: CIO skills and peer outsourcing actions. Part two contains manipulation checks and gathers demographic data. Appendix presents an example of the experimental materials.

The outsourcing dilemma requested the participants to assume the role of chief financial officer (CFO) the primary accounting executive and make a recommendation regarding the outsourcing of the IT infrastructure supporting the accounting applications for a hypothetical company. The case highlights a corporate necessity to deal with an outdated IT infrastructure and suggests two potential alternatives: (1) upgrade the current in-house structure, or (2) migrate to a web-based, SaaS infrastructure. The case reports that

Table 1 Descriptive statistics – participants

Industry	Frequency	Percent (%)
<i>Panel A: Industry frequencies</i>		
Manufacturing	225	43.69
Retail and wholesale	27	5.24
Banking or financial services	39	7.57
Government or not-for-profit	55	10.68
Services (tourism, consulting, real estate)	87	16.89
Utilities, energy, transportation, and construction	38	7.38
Telecommunications, medical equipment, pharmaceutical, and biotechnology	23	4.47
Other	21	4.08
Organization size	Frequency	Percent (%)
<i>Panel B: Organization size frequencies</i>		
0–1000 employees	257	49.90
1000–5000 employees	96	18.64
5000–10,000 employees	34	6.60
More than 10,000 employees	128	24.85
Outsourcing extent	Frequency	Percent (%)
<i>Panel C: Self-reported extent of organizational outsourcing</i>		
None	40	7.77
Low	221	42.91
Moderate	203	39.42
Extensive	51	9.90

the CIO prepared the estimates for the in-house upgrade that are roughly equal to the projected costs submitted by SaaS consultants for the web-based option. The case also emphasizes that the CIO objects to outsourcing and would prefer to keep all of the IT architecture in-house.

We use SaaS outsourcing as the context of our experiment. This type of service assumes the substitution of traditional accounting applications housed on an organization’s in-house IT infrastructure with web-based access to accounting software for a fee. We have chosen SaaS as the context of our experiment for several reasons. First, this type of outsourcing service and related technology was relatively novel when data was collected. Therefore, this context allowed us to introduce the strong element of uncertainty, which is critical for our tests. Second, because this type of outsourcing extends across organizations of different sizes, not just large organizations, all our participants should find the context relevant and familiar for them. Third, the business press suggests that this type of outsourcing is often initiated by managers rather than by IT executives. Thus, the context is realistic for managerial accountants. Finally, the business press indicates that SaaS is on the rise and thus, is a relevant and timely topic that will potentially affect many organizations.

Independent and dependent variables

We use a 2 × 2 between-participants design with CIO skills (strong or weak) and peer outsourcing actions (no known peer outsourcing or known peer outsourcing) as independent variables. Building on insights from the domain of leadership and strategy studies, Carmeli and Tishler (2006) define skills as the ‘ability to do something in an effective manner’ (p. 13). Consistent with this approach we operationalize the CIO skills as the ability to execute IT leadership and successfully deliver strategic IT projects within identified parameters (time, budget, etc.). We focus on the perceptual assessment of those skills by senior accounting executives. This is in keeping with proponents of ‘upper echelon theory’ who have argued for some time that ‘complex decisions are largely the outcome of behavioral factors rather than a mechanical quest for economic optimization’ (Hambrick and Mason, 1984: 194). We manipulate CIO skills at two levels. In the strong-skilled CIO condition, participants learned that management has been satisfied with the CIO’s leadership in the past, and two recent internal projects under the CIO’s command were completed on time and on budget. In the weak-skilled CIO condition, materials pointed out the CIO’s recent failures on two important internal projects when the products were delivered late and significantly over budget.

The variable representing peer actions was also manipulated at two levels. In the no known peer ITO condition, the background information contained the following statement: ‘Based on your readings of trade publications and discussions with fellow accountants, you are unaware of any competitors or peers who have chosen to migrate to the web-based structure.’ In the known peer ITO condition, participants were informed that the majority of competitors and peers have chosen to migrate to the web-based structure. However, the case also stressed that the evidence on the benefits of the web-based structure is mixed: some managers in the industry are quite satisfied with their decision whereas others are disappointed. We added the last sentence to ensure that the manipulation reflected the peers’ choices *per se* rather than peers’ choices as a proxy for outsourcing effectiveness.⁵

Participants’ recommendations – (1) update current structure *vs.* (2) outsource – serve as the dependent variable. We express this variable as dichotomous rather than as continuous to better reflect the reality of this context. We also asked participants about their level of confidence in their recommendation, using a 5-point scale from 1 (not at all confident) to 5 (extremely confident).

Results

Tests of the hypotheses

Given the scenario that the CIO objects to ITO, we predicted a higher likelihood of an ITO recommendation in the presence of a CIO with weak skills than with strong skills (Hypothesis 1). We also expected that a higher proportion of accountants would recommend ITO when industry peers have outsourced than when industry peers have not (Hypothesis 2). Finally, we hypothesized that the impact of peer actions on ITO recommendations of accounting executives will be stronger in the weak CIO

Table 2 Binary logistic regression using recommendation to outsource as dependent variable

	<i>B</i>	<i>S.E.</i>	<i>Wald statistic</i>	<i>Df</i>	<i>P-value (two-tailed)</i>
<i>Panel A: Parameter estimates and tests of their significance</i>					
CIO skills	1.141	0.283	16.202	1	<0.001
Peer actions	0.052	0.285	0.033	1	0.855
Skills*Peer actions	-0.683	0.395	2.986	1	0.084
Constant	-1.267	0.210	36.351	1	<0.001
<i>Panel B: Odds ratios and simple effects comparison</i>					
<i>Fixed factor</i>	<i>Comparison</i>		<i>T-statistic</i>	<i>P-value (two-tailed)</i>	<i>Odds ratio</i>
Weak CIO skills	No known peer actions vs Known peer actions		-2.3	0.0216	0.532
Strong CIO skills	No known peer actions vs Known peer actions		0.18	0.855	1.053

Panel A provides parameter estimates and tests of their significance for the binary logistic regression that models probability of outsourcing (DV) using CIO skills (weak vs strong) and peer actions (no known actions vs actions to outsource) as the factors. Panel B provides odds ratios and statistics on simple effect comparisons.

skills conditions than in the strong CIO skills conditions (Hypothesis 3). We begin our testing of Hypotheses 1 and 2 with a binary logistic regression⁶ using the recommendation to outsource as the dependent variable.⁷ CIO skills and peer outsourcing are the independent variables.⁸

As reported in Panel A of Table 2, the disordinal interaction term is not significant at $\alpha=0.05$ (Wald statistic = 2.986, $P=0.084$),⁹ thus, it is appropriate to examine the main effects of CIO skills and peer actions. We find a significant main effect of CIO skills (Wald statistic = 16.202, $P<0.001$), suggesting support for hypothesis 1. Contrary to our hypothesis 2, we do not find evidence of a main effect of peer actions (Wald statistic = 0.033 $P=0.855$).

Following suggestions in DeMaris (1991), we explore further the hypothesized effect of CIO skills by calculating and examining odds ratios (OR), which play a meaningful and important role in the interpretation of logistic regression results (Pedhazur, 1997). The odds ratio for participants recommending outsourcing when facing a weak-skilled CIO vs a strong-skilled CIO is 2.2. In other words, odds are more than two times greater that participants will recommend outsourcing in conditions of a weak-skilled CIO than in conditions of a strong-skilled CIO. This finding is consistent with the Wald statistic and provides additional evidence in support of hypothesis 1: generally, accounting executives are more likely to recommend outsourcing when the CIO skills are weak than when the CIO skills are strong.

Hypothesis 3 predicts the stronger effect of peer actions in conditions of weak CIO skills than in conditions of strong CIO skills. Because our hypothesized interaction is of an *ordinal* nature, inferences from standard regression techniques may be insufficient (Bobko, 1986). An ordinal interaction occurs when the rank order of treatment effects is constant, but the differences between the treatments are not constant. These differences vary based on the specific pairings of the treatments (Pedhazur, 1997). Specific to our study, we expected the recommendation to outsource as consistently more likely when the CIO's skills are weak than when the skills are strong. However, just *how much* more likely varies, depending on the actions of peers. As reported

Table 3 Proportion of participants recommending outsourcing

	<i>No known peer actions (%)</i>	<i>Known peer actions (%)</i>	<i>Overall (%)</i>
Weak CIO skills	38/119 32	52/111 47	90/230 39
Strong CIO skills	35/153 23	29/132 22	64/285 23
Overall	73/272 27	81/243 33	154/515 30

in Table 3, the proportion of participants recommending outsourcing in each condition supports this expectation. Under weak CIO skills, the proportion of participants recommending outsourcing is 32% when no peers have outsourced and 47% when peers have outsourced. Compare this with strong CIO skills, where the proportions of participants recommending outsourcing is 23% and 22%, no peer ITO and peer ITO, respectively. Therefore, we directly test this ordinal interaction using the pairwise comparison technique suggested in Strube and Bobko (1989) and discussed in detail in Elias (2004). This technique calls for a pooling of cells with equal proportions for comparison to the cell of interest. Accordingly, we apply a non-parametric chi-square test between the following cells: (1) weak skills/no peer ITO and strong skills/ no peer ITO; (2) weak skills/no peer ITO and strong skills/peer ITO; and (3) strong skills/no peer ITO and weak skills/peer ITO. All results were insignificant at $P=0.05$. Following Strube and Bobko (1989), we then pool the observations from these three groups. We find the proportion of accountants recommending outsourcing for this new group is 25%. We compare this proportion to the 47% of accountants who recommended outsourcing in the weak skills/peer ITO condition. The difference between these proportions is significant (chi-square = 4.129, $P=0.042$).

This confirms the presence of an ordinal interaction: in our study peer actions to outsource the IT infrastructure did not have an influence on accountants' recommendations to outsource in the presence of a strong-skilled CIO. However, in the presence of a weak-skilled CIO, accounting executives were more likely to recommend ITO when peers have outsourced.

Additional analysis of this result, reported in Panel B of Table 2, reveals that odds are roughly 1:2 that participants facing a weak-skilled CIO will recommend outsourcing when industry peers have not outsourced vs when peers have outsourced (OR = 0.53). In other words, in conditions of a CIO with weak skills, the odds of participants recommending outsourcing rather than internal development are about two times greater when their industry peers have outsourced. However, when the CIO's skills are strong, those odds are 1:1, and knowledge of peer actions does not influence participants' recommendations (OR = 1.05). These findings are consistent with hypothesis 3: peer actions to outsource influenced accountants who faced a weak-skilled CIO to a greater degree than those in the presence of a strong-skilled CIO. Overall, both the pairwise comparisons and odds ratio analysis support hypothesis 3 – an ordinal interaction between CIO skills and peer actions. Figure 1 graphically illustrates our initial hypotheses and our reported results.

Insights from self-reported confidence

After participants provided their ITO recommendations, we asked them to assess how confident they are in this recommendation using a 5-point scale from 1 (not at all confident) to 5 (extremely confident). In Table 4 we report the means of those assessments across our four experimental cells as well as tests of significance.

Evidence in Table 4 suggests that participants in the strong skills condition were more confident in their recommendation (mean = 3.80) than the participants in the weak skills condition (mean = 3.64). At the same time, the knowledge of peer actions did not alter participants' confidence in their recommendation. Such evidence is consistent with our expectations in hypothesis 3 that weak CIO skills increase the uncertainty of the decision environment and motivate participants to concur with peer actions. Alternatively, such evidence might be due to the fact that participants perceived the decision to outsource as riskier than internal development. There was a significant difference ($F = 8.095; P = 0.005$) in the self-reported confidence between those who recommended outsourcing and those who suggested internal development (non-tabulated). Accounting executives who recommended outsourcing (group mean = 3.58) were less confident in their choice than those who advocated internal development (group mean = 3.80). Also, the difference in self-reported confidence between weak and strong CIO skills disappears when 'outsourcing recommendation' is included as a covariate in the earlier discussed model.

Participants' confidence in their recommendations was not the focus of our investigation. Therefore, we did not formulate hypotheses and did not attempt to disentangle the impact of various factors on this confidence. We report these findings simply as supplementary insights. Future research is warranted to explore in more depth the factors of association between the ITO decision and related confidence in this strategic choice.

Discussion

We examined the effect of a CIO's skills and the actions of industry peers on accounting executives' recommendations

Table 4 Self-reported confidence with outsourcing recommendation

	No known peer actions	Known peer actions	Overall
<i>Panel A: Mean [Standard Deviation] of participants' self-reported confidence measured on a 5-point scale from 'not at all confident' (1) to 'extremely confident' (5).</i>			
Weak CIO skills	3.62 [0.82] n = 119	3.67 [0.78] n = 111	3.64 [0.80] n = 230
Strong CIO skills	3.86 [0.74] n = 153	3.73 [0.85] n = 132	3.80 [0.79] n = 285
Overall	3.75 [0.78] n = 272	3.70 [0.82] n = 243	3.73 [0.80] n = 515
<i>Source</i>	<i>Df</i>	<i>Mean sq.</i>	<i>F-value</i>
<i>Panel B: ANOVA (n = 515)</i>			
CIO skills	1	2.904	4.591
Peer actions	1	0.186	0.294
Interaction	1	0.876	1.385
Error	511		
			<i>P-value (two-tailed)</i>
			0.033
			0.588
			0.240



to outsource to a SaaS IT infrastructure. As predicted by RBT, subjects in our study were more likely to recommend ITO when the weak-skilled CIO objects to outsourcing than when the strong-skilled CIO objects to outsourcing. Apparently, when a CIO's skills are questionable, accounting executives are more willing to search for options outside the organization, even at a risk of losing some control over the IT infrastructure. Further, consistent with institutional theory, we show that accountants in this situation are then more likely to mimic the actions of industry peers.

The findings of our study indicate that executives should be mindful of decision makers' tendency to mimic peers' actions in uncertain environments. This 'follow the herd' mentality is problematic because it implies that decisions are based on factors other than sound organizational strategy, and because it might preclude an organization from building its own competitive advantage. Our results suggest that executives may fall victim to this isomorphic tendency, at least in the strategic outsourcing context, when facing a CIO with a questionable track record.

That said, accounting executives appear to be generally averse to outsourcing, as less than one-third (30%) of all participants recommended this option. This relatively low number is somewhat surprising, in light of the emphasis on SaaS in practitioner journals. For example, *Accounting Today* has reported that 'users and providers alike are praising the platform (SaaS) because of its flexibility (and) strong security backing' (Gold, 2008: 1). Even more surprising is the result that only 39% of participants faced with a weak-skilled CIO chose to outsource. This implies that the majority of accounting executives are willing to go forward with an internal IT upgrade directed by a CIO whose past projects were completed late and over budget, rather than outsource to a SaaS provider. This is especially relevant in the post-Sarbanes-Oxley environment, where internal controls over IT became a critical compliance issue. CIOs often lack appreciation of audit trails and similar features of IT controls, which they perceive as redundant and time-consuming. Couple this with the questionable track record of the CIO, and the recommendation to develop the system in-house might lead to higher compliance costs and greater risk of internal control weaknesses.

One explanation for this result is that pro-outsourcing features in the business press reflect the views of the consulting industry rather than organizational executives who commonly associate outsourcing with offshoring and potential job loss. An alternative explanation might be that accounting executives have an overall tendency towards risk aversion and avoidance of direct confrontation with another member of the senior management team. At this stage, these are only speculations not yet supported by empirical data. Future research might provide further insights on those important issues.

Limitations and possible extensions

As in any research, certain features of our study limit generalization of our conclusions and present opportunities for future research. First, we use experimental methodology, which emphasizes internal validity over environmental

inclusiveness. The experimental materials, although designed to be as realistic as possible, cannot simulate the rich and complex environment of a contemporary organization. For obvious reasons, we could not include in our design all the factors potentially relevant for ITO recommendations. In order to isolate the effects of strategic (IT capabilities) and sociological (isomorphism) factors, we held the economic factors constant. We also focused on only one proxy for internal IT capabilities, CIO skills, and one dimension of institutional isomorphism, mimetic isomorphism. Clearly, future research is needed to improve and expand on our understanding of the impact of these and other organizational forces on executives' ITO recommendations.

Second, we used SaaS outsourcing as the specific context of our experiment. Although we carefully selected this context in accordance with the study objectives, the question remains whether our conclusions will hold in different contexts (e.g., ERP vs internal development). We also strived to avoid in our context any additional ITO challenges that arise in cases of global collaboration, such as offshoring. The decision process becomes even more uncertain when ITO involves global collaboration (e.g., cultural issues, language issues, regulation, etc.). Future research is warranted to explore whether our results are context-specific or whether contextual variables moderate the impact of the reported factors.

Third, we focused on only one member of the senior management team: accounting executives. As a result, caution should be exercised when our conclusions are extrapolated to recommendations of other members of senior management. On the one hand, accounting executives are similar to many other senior managers, often lacking the technical expertise of their CIO colleagues, and the ability to evaluate the technological merits of the proposed solutions. Therefore, it is likely that other executives will be also affected by CIO skills. On the other hand, the Sarbanes-Oxley Act significantly raised the stakes for the CFO, the highest accounting executive in the corporate hierarchy. The CFO and CEO are the only members of the senior management team who personally certify the corporate financial statements. A reliable IT infrastructure is an essential condition for reliable financial statements. Because of this, the weight of the CFO's recommendation on the ITO decision might be higher than the weight of the recommendations by other members. A CFO might be more conservative in his/her recommendation because of this increased responsibility, and thus focus on the factors that increase the legitimacy of the choice. For these reasons, the CFO might be more influenced by peer actions than the other members of the top management team. Future studies will provide evidence whether our results are limited to the population of senior accounting executives or describe more general decision heuristics of senior management.

Fourth, we acknowledge that competing explanations for the sources of such behavior by accounting executives do exist. We have built our hypotheses on the insights of institutional theory, which emphasize legitimacy seeking as the root of mimicry. The alternative perspective of informational cascades (Bikhchandani *et al.*, 1992, 1998; Walden and Browne, 2008) builds on observational learning

theory and models mimicry as a response to environmental uncertainty and poor information. Discrimination between these competing explanations is beyond the scope of our investigation, but offers an avenue for future studies.

Finally, we focused on the perceptions of our participants in a hypothetical ITO situation. We recognize that additional support for the hypothesized relationships would come from observing the decision process in actual organizations. In such an environment, individuals will have additional signals with which to form a perception regarding CIO skills. Unfortunately, such data is almost impossible to obtain on a large scale as researchers rarely have the chance to observe the actual process. We hope future academic researchers will have more opportunities to address this limitation and provide further evidence on whether our conclusions hold when actual behavior is observed.

Potential implications for research and practice

The current study extends academic research and provides insights for IS management practice on several fronts. First, we present experimental evidence on the effect of CIO skills on IT-related recommendations: to the best of our knowledge, all prior findings in this area were based exclusively on interview-based data or surveys. As such, we contribute to both IS research and accounting information systems literature by providing corroborating empirical data through an alternative research method.

Second, we complement the insights of RBT, which has a long tradition in the management, accounting, and IS research, with perspectives from institutional isomorphism. We demonstrate that in conditions of greater uncertainty, accounting executives often make recommendations consistent with peers even though there is no direct evidence that such choice is beneficial for the long-term organizational performance. Again, the prior studies upon which we developed our hypotheses were archival or survey studies in sociology, organizational behavior, or general management contexts. There are ample opportunities for future research to explore the extent of mimetic isomorphism in organizational settings.

Finally, for practice, we highlight the importance of additional factors such as executives' perceptions of CIO skills and industry peer actions that often determine ITO recommendations. Although the role of cost control, efficiency, and strategy in the ITO choice is well documented, our evidence contributes additional pieces to the outsourcing puzzle. Organizational executives should be aware of the subtle influence of such factors on their recommendations and those of their colleagues, and carefully consider these in light of the reported evidence.

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Notes

- 1 We are grateful to the Foundation for Applied Research at the Institute of Management Accountants for providing access to these participants.
- 2 We hold the primary economic variable and cost of sourcing constant in order to isolate the effect of CIO skills and peers' actions. Cost estimates are notoriously unreliable and subjective, and thus, although cost is used to justify the decision, it is not the primary determinant (Lacity and Hirschheim, 1993; Hirschheim and Lacity, 2000; Olson, 2007). Given that economic motivations will always play some role in business decisions, we recognize that cost considerations occupy an established place in ITO initiatives. By holding cost constant across both sourcing alternatives, we are able to provide evidence on two additional, more subtle factors.
- 3 In our study we focus on CIO's comprehensive skills without attempt to discriminate between technical, managerial, business or interpersonal skills. Prior studies differed in their classifications of such skills, but generally concluded that the successful IS professional should possess a combination of those (e.g., Leitheiser, 1992; Todd *et al.*, 1995; Roepke *et al.*, 2000; Byrd *et al.*, 2004). Also, we believe this approach better reflects the reality of ITO decision when executives evaluate CIO skills in their entirety (e.g., Feeny *et al.*, 1992; Enns *et al.*, 2003).
- 4 Six hundred and five participants attempted to complete experimental materials. Many participants completed just the first page of the experimental materials. Inclusion of incomplete responses in the main analysis does not change the reported statistical results.
- 5 Son and Benbasat (2007) specifically delineate two dimensions of mimetic isomorphism: adoption among competitors and perceived success among competitors. The authors stress that these distinct dimensions exert mimetic pressure in the decision to adopt business to business (B2B) e-market practices. In our study, we specifically chose to examine the influence of adoption by competitors on ITO without the confounding influence of perceived success. We believe this provides us the ability to draw clear conclusions on this dimension of isomorphism, and suggest future research to examine the influence of competitors' perceived success.
- 6 Model fit statistics (not-tabulated) confirm that our factors are appropriate and add to the explanatory power of the model: all diagnostic variables (Akaike information criterion, score statistic, and log-likelihood ratio) for the model that include covariates are lower than for the model with the intercept only. Also, additional diagnostic tests such as log-likelihood ratio statistic, Wald statistic and Score statistic (not-tabulated) indicate that the probability of the null hypothesis that all model coefficients are zero is below 0.0001.
- 7 Logistic regression is suggested as the most appropriate model for data with a dichotomous dependent variable (Pedhazur, 1997).
- 8 Manipulation checks in the post-experimental questionnaire indicate statistical significance in the expected direction.
- 9 All reported *P*-values of Wald statistic in this paragraph are based on a two-tailed test.

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Appendix

Experimental materials

Name _____

Background

You are the Chief Financial Officer of Components Inc., a mid-sized manufacturer of components for the automobile industry. Recently, the senior management of Components Inc. examined the status of information technology infrastructure and determined that the structure is somewhat outdated and unable to handle the growing demands of the business, and ensure compliance with the Sarbanes–Oxley Act. Accordingly, an investment in the IT infrastructure is required and senior management has identified two possible options: (1) upgrade the current client-server infrastructure, or (2) migrate to a web-based, software-as-a-service infrastructure for its major accounting applications. You are asked to express your professional opinion about the impact and desirability of such a change.

Under the current structure, Components Inc. owns, maintains, and operates all hardware, software, and other network equipment necessary for the execution of its day-to-day operations and the maintenance of relevant accounting records. If Components Inc. decides to maintain the current structure, it will need to conduct an overhaul of its IT infrastructure and hire additional technical personnel in the IT department responsible for operation, documentation, and SOX-compliance of this IT infrastructure.

Under the web-based structure, the firm will pay a monthly usage-based subscription fee to access all financial applications (GL, AP, AR, Payroll, etc.) on the Internet. The application suite is maintained by an accounting software-as-a-service provider, FinSource Inc. Client information is stored at data centers operated by a large computer services corporation. A change to this structure is not expected to impact the duties of the accounting department. FinSource Inc. assures the existence of SOX complied internal controls in its information system and guarantees to provide Components Inc. with SAS 70 Type II reports on a regular basis.

FinSource has submitted a proposal to Components Inc. detailing the estimated fees for migrating to the web-based service. The Chief Information Officer of Components Inc. has developed a cost-benefit analysis for continued maintenance, operation, and upgrading of your current client-server system. Analysis of the preliminary estimates submitted by both parties suggests that the cost of the in-house system and operation is roughly equal to the fee proposed by FinSource for outsourcing over the next 5 years. Therefore, when making your recommendation you must consider the reliability of those estimates and other relevant factors.

According to FinSource, outsourcing the IT infrastructure will allow Components Inc. to concentrate on its core activities without maintaining a dedicated tech-support staff. It also allows for freedom for expansion or shrinkage as Components Inc.'s business needs change, and provides access to state-of-the-art technology. However, your Chief Information Officer suggests that outsourcing is a mistake since FinSource's services are not flexible enough to meet all of Components Inc.'s needs. Additionally, the officer points out that FinSource professionals do not have industry-specific knowledge, and that outsourcing might compromise the security and the confidentiality of Components Inc.'s data.

CIO skills manipulation

1. Strong Skills Condition

In the past, you have generally relied on your Chief Information Officer's judgment on technology issues. *You have been satisfied with the officer's leadership in the past, and two recent internal projects under his command were completed on time and on budget.* You also recognize that the outsourcing proposal contains some estimates that could vary from expectations.

2. Weak Skills Condition

In the past, you have generally relied on your Chief Information Officer's judgment on technology issues. *However, you heard about the officer's recent failures on two important internal projects when the products were delivered late and significantly over budget.* You also recognize that the outsourcing proposal contains some estimates that could vary from expectations.



Knowledge about peer actions manipulation

1. No known Peer Outsourcing

Based on your readings of trade publications and discussions with fellow accountants, *you are unaware of any competitors or peers who have chosen to migrate to the web-based structure.*

2. Known Peer Outsourcing

Based on your readings of trade publications and discussions with fellow accountants, *the majority of Components Inc. competitors and peers have chosen to migrate to the web-based structure. However, the current evidence on the benefits of the web-based structure is mixed: some managers in the industry are quite satisfied with their decision while others are disappointed.*

1. Based on the information above state your recommendation to the senior management team: should Components Inc. update its client-server infrastructure or outsource its hardware and software support by switching to the web-based 'fee-for-service' infrastructure? Please, choose one of the following alternatives:

Recommend
update to internal
client-server infrastructure

Recommend
switch to web-based
infrastructure

2. How confident are you in your recommendation? 5-point scale from 1 (not at all confident) to 5 (extremely confident).

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