Information & Management 51 (2014) 865–879

Contents lists available at ScienceDirect

Information & Management

journal homepage: www.elsevier.com/locate/im

Investigating the effects of IS strategic leadership on organizational benefits from the perspective of CIO strategic roles

Fang Ding [a], Dong Li [a], Joey F. George [b,*]

[a] Guanghua School of Management, Peking University, No. 5 Yiheyuan Road, Haidian District, Beijing 100871, PR China
[b] SCIS Department, College of Business, Iowa State University, 2340 Gerdin Business Building, Ames, IA 50011, USA

ARTICLE INFO

Article history:
Received 13 November 2012
Received in revised form 29 July 2014
Accepted 7 August 2014
Available online 19 August 2014

Keywords:
IS strategic leadership
IS quality
Organizational benefits of IS
IS vision

ABSTRACT

In this study, the effects of IS strategic leadership on organizational outcomes are examined from the perspective of CIO strategic roles. A field survey is conducted that collects data from 110 matched pairs of CIOs and business executives within organizations. Our findings suggest that strategic leadership significantly affects both organizational benefits and information system quality. Further, we found that IS quality significantly mediates the relationship between IS strategic leadership and organizational benefits. We also note that IS vision significantly moderates the relationship between IS strategic leadership and IS quality, although it does not moderate the relationship between IS strategic leadership and organizational benefits or the relationship between IS quality and organizational benefits.

1. Introduction

> *Half of CIOs are still stuck in the old school and not really business focused. That's surprising. I've always been a business-first, IT second executive. . .. There is a perception problem that CIOs and IT as a whole have to get past, the whole "If you need to know how to silence your iPhone, call your IT person" thing. . .. When you think about it, though, the CIO is the one executive who really understands the enterprise business process end-to-end.*
> – Brian Beams, CIO, Pharmavite, 2/20/14, enterprisersproject.com

Over the past two decades, information systems have continued to grow in importance as a means of enhancing the strategic growth of many organizations [70]. Meanwhile, the effects of IS strategic leadership [40,41] on organizational benefits continue to be a major concern of CIOs and other executives [4,12,40,41,51,62].

In today's organizations, the strategic focus of the CIO is to align IS strategy with business strategy to achieve organizational goals [13,60,62]. We suggest that IS strategic leadership is also likely to have implications for organizational benefits, which is consistent with Hambrick and Mason's [33] "upper echelon" theory whereby top executives in an organization affect organizational performance. Prior research has generally assumed that IS leadership influences organizational outcomes through the IS function [1,13,21,65]. Many past CIO studies have been merely anecdotal and descriptive in nature and focused less upon the special attributes of IS leadership compared with general leadership. As Karahanna and Watson [40] indicate, the idiosyncratic aspects of IS leadership stem from the nature of IS and the role of the CIO in the organization. IS leadership is more than general leadership because it requires the extra dimension of IS intelligence. However, there is a lack of research that employs a systematic approach to empirically investigate whether IS strategic leadership affects organizational benefits and IS quality from the perspective of the strategic roles of the CIO. It is also unclear whether IS strategic leadership differentially affects organizational outcomes when organizations have different IS natures, such as different IS visions (i.e., the inform and transform visions) [3,24,57,74]. Further, prior studies have failed to open the black box of how IS strategic leadership influences organizational benefits through the mediating effects of IS quality. This gap in the current body of knowledge must be addressed through theory-driven empirical studies that enrich the IS strategic leadership literature. Hence, our study focuses on the mediating effects of IS quality and the moderating effects of IS vision on the relationship between IS strategic leadership and organizational benefits from the perspective of CIO strategic roles (i.e., IS strategist and business strategist) within organizations that espouse different IS visions.

By introducing a new theoretical model, we present the useful lens of CIO strategic roles through which researchers can examine

* Corresponding author. Tel.: +1 515 294 7162.
E-mail addresses: dingfang@gsm.pku.edu.cn (F. Ding), lidong@gsm.pku.edu.cn (D. Li), jfgeorge@iastate.edu, joey.george@stanfordalumni.org (J.F. George).

http://dx.doi.org/10.1016/j.im.2014.08.004
0378-7206/

the special nature of IS strategic leadership and how such leadership can influence organizational outcomes. Additionally, because the nature of IS is related to the special attributes of IS leadership, we examine the relationship between IS strategic leadership and the nature of IS, which is described in this paper as IS quality and IS vision, respectively. Our empirical results show that IS strategic leadership has significant direct effects on organizational benefits and on IS quality. Additionally, IS quality mediates the relationship between IS strategic leadership and organizational benefits. Specifically, IS strategic leadership, as moderated by IS vision, has different levels of influence on IS quality.

The remainder of this paper is organized as follows. The second section proposes four hypotheses that predict the direct and indirect effects of IS strategic leadership on organizational benefits. The research method and data analysis are described in the third section. Section four presents the contributions and limitations of this study.

2. Theory and hypotheses

Some researchers propose that the CIO is an important asset who can add business value to information systems [19] and potentially enhance organizational performance (e.g., [3,10,39]). The conceptual model underlying our research draws upon the combination of upper echelon theory [33] and prior literature regarding IT management and CIOs. Upper echelon theory posits that upper echelon characteristics determine strategic choices and thereby affect organizational performance. The specific strategy dimensions listed in the IT management and CIO literature include IS strategy choice, IS quality, and IS innovation [31,41]. The previous IT management and CIO literature suggests that the attitudes of CIOs and other top executives significantly influence the strategic possibilities of the organization [31,32,63]. According to the organization's strategic development needs, the IS strategic leader can use the "IS resource" not only to support business strategy but also to drive business strategy and maintain a dynamic balance between these two efforts [18,51]. Hence, we propose that IS quality mediates the relationship between IS strategic leadership and organizational benefits.

Upper echelon theory [33] suggests that the combination of certain situational conditions and a leader's characteristics will lead to certain strategic choices. The situation, the leader's characteristics, and the strategic choices then interact to determine organizational benefits. The leader faces complex situations and brings a cognitive base and values to decisions, which creates different visions for the organization [33]. The leader's eventual perception of the situation is combined with his/her values to establish the basis for strategic choices. IS vision is treated here as a feature that can reflect a leader's perceptions but that can also directly affect a strategic choice because an IS leader can theoretically improve IS quality and organizational benefits based on a particular IS vision for the organization. With this in mind, we propose that IS vision moderates the relationship between IS strategic leadership and IS quality and organizational benefits.

Strategic CIOs are members of the firm's C-level executive team and assume many influential roles [19], such as participating in strategic decision-making activities [56], offering the IS vision for the firm, promoting IS as an agent of business change [7], redesigning firm strategy, and ultimately creating value for the organization [4]. IS strategic leadership is typically strongly tied to organizational strategic decision-making [46], which means that the degree to which IS contributes to the organization is closely related to IS strategic leadership [10]. The strategic leadership literature also suggests that leadership can have important but varied influences on organizational performance [24]. The research model is shown in Fig. 1.

2.1. Literature review

2.1.1. IS strategic leadership

Management researchers believe that a leader is someone who can influence others and has managerial authority [56]. Vroom et al. [68] define leadership as the "process of motivating people to work together collaboratively to accomplish great things." In their paper, these authors propose that leadership is a process in which a leader influences a group to successfully achieve a goal rather than to attain personal property and that the consequence of this influence is that all group members cooperate closely to pursue great things. Finkelstein & Hambrick [24] noted: "In terms of the concept of (strategic) leadership, some mainstream methods focus on examining an individual's executive ability." Therefore, the leader implements certain tasks, and strategic leadership manifests through the leader by means of his ability to have a profound effect on organizational performance based on his choices and implementation of strategies. The roadmap of the definition of IS strategic leadership is shown in Fig. 2.

Despite the central importance of IS strategic leadership in practice and research, our review of the literature suggests that the concept of IS strategic leadership is a term that is readily used but not fully understood. We conducted a search of the literature relevant to IS strategic leadership by searching titles, abstracts and keywords in EBSCO/Business Source and ProQuest/ABI Inform using the string "Info* OR IT OR IS" through 2012, which resulted in 3271 articles. Consistent with the prior literature, the CIO is

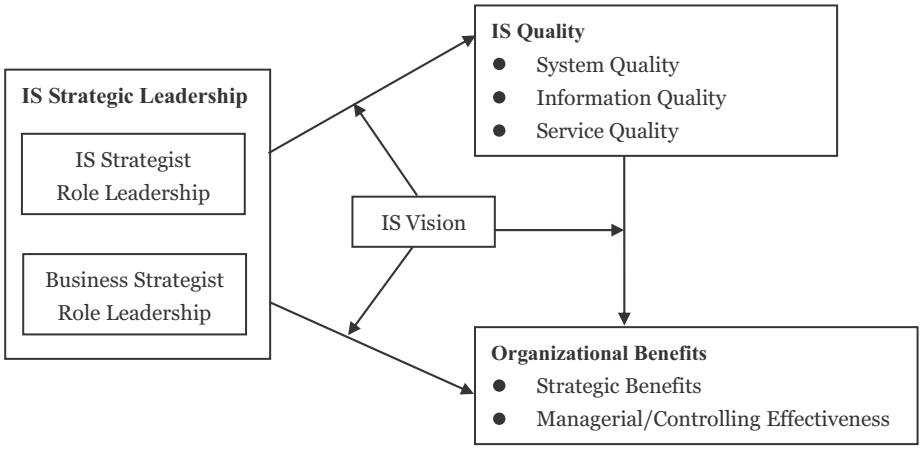

Fig. 1. Research model.

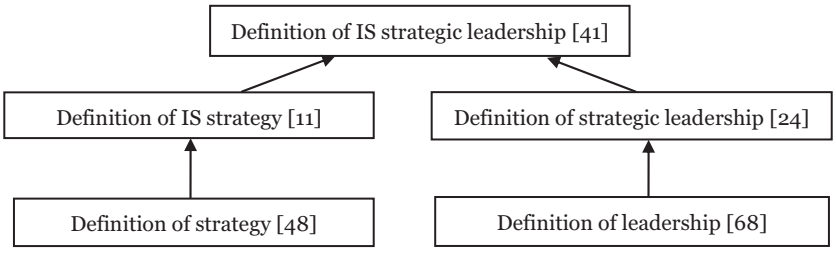

Fig. 2. Road map of the definition of IS strategic leadership.

defined as the highest-ranking IS leader at the top executive level within the organization [3,30,58]. We then identified the key words related to CIO research by a manual scan of the titles and abstracts of 500 articles out of these 3271, which resulted in the identification of five terms: "CIO," "Chief Information Officer," "IS/IT leadership," "IS/IT leader," and "IS executives." The 3271 articles were then manually scanned to find all articles with one or more of these five terms in the title or as core topics, which resulted in 521 articles, of which 26 actually studied the core construct of IS leadership (see Appendix A for a list of these papers). We were surprised so few papers dealt specifically with conceptualizing IS leadership.

An analysis of these articles revealed four different conceptions of IS strategic leadership: leadership through persuasion and management, which focuses on CIO job responsibilities and does not explain the effects of fulfilling these tasks successfully [8]; leadership through exploration, which focuses on "technology" and "business" and lacks the organizational viewpoint to integrate these two terms as a whole [12]; leadership through effectiveness, which neglects the existence of organization-centered IS strategic leadership [62]; and leadership through influence on organizational performance at the top executive level [40]. Of these four conceptualizations, only the fourth adequately addresses both the organizational and technological aspects of IS leadership.

This latter conceptualization of IS strategic leadership, as proposed by Karahanna and Watson [40], is explained as follows. First, the concept of IS strategic leadership is defined as the "process of performance influencing the organization to improve IS profits [7,40,41]," which is consistent with the general definition of leadership [68]. Second, this concept features "organizational performance" as a key word, which is consistent with the general definition of IS strategy [11]. Third, IS strategic leadership is evaluated from the perspective of CIO strategic roles, with a similar conclusion as found in the IS-related research field (e.g., [13,60,62]). Karahanna et al. [39] suggest that an effective CIO should demonstrate good performance in various key roles, be able to find the best balance between the internal and external environments of the organization, and eventually continue on to become an effective IS strategic leader.

IS strategic leadership includes three unique features. First, IS strategic CIOs effectively play the roles of both IS strategist and business strategist. Conventional leadership focuses primarily on the business area, whereas IS leadership integrates both IS-oriented and business-oriented roles. Some researchers have empirically examined CIO strategic roles to find that they include an IT orientation, referred to as a strategic orientation, and a business orientation, referred to as a business strategic orientation [1,13,58,60,62]. These findings are consistent with the study of "IS/IT strategy" and "SISP." For example, based on the "strategic 5P model" proposed by Mintzberg [48], Chen et al. [12] note that IS strategy is an organization-centric concept that combines the two extremes of "business-strategy-driven logic" and "IT-strategy-driven logic" into "IS-enabled organizational strategy." As such, IS strategic leadership is distinct from general leadership because the CIO is expected to combine IS technical skills with an in-depth understanding of business strategy [40,41]. The unique nature of IS strategic leadership derives from the technology/business interface [40,41], which leads us to suggest that CIO strategic roles include IS strategist and business strategist. Second, IS strategic leadership improves organizational benefits in two ways, i.e., directly and indirectly via IS quality. Karahanna and Watson [40] believe that IS strategic leadership can promote the implementation and execution of IS strategy and business strategy; thus, CIOs who play their strategic roles effectively increase the business value of the information system and further promote organizational performance. Third, the condition of the effects of IS strategic leadership on organizational outcomes can differ. When the organization espouses a transform IS vision, the CIO may be more successful in improving organizational outcomes. Further, as a strategic leader, the CIO should be involved in both business activities and IS activities to ultimately create an elaborate IS vision.

The responsibilities of the IS strategist role are described, in general, as the development and realization of IS strategy through the innovative usage of new emerging IT, data, information, and IT outsourcing services to form enterprise applications [1,13,58,60,62]. CIOs are increasingly called upon to engage in organizational strategy planning and decision-making functions, and they help shape both organizational mission and IS vision. Therefore, the CIO typically is responsible for integrating enterprise applications (particularly the technology-based business process), directing efforts to build an integrated delivery system, and developing a full understanding of the delivery process.

The responsibilities of business strategists are described as "be[ing] intimately involved in business strategic planning and decisions," "provid[ing] expertise on multi-disciplinary business process improvement teams," "direct[ing] IT-enabled business process reengineering," and "develop[ing] metrics that reflect the value of IT to the enterprise" [1,13,58,60,62]. As such, CIOs are increasingly called upon to engage in organization-level strategic planning and decisions and to help shape the organization's mission and vision.

Based on this classification of CIO strategic roles, we suggest that IS strategic leadership includes two dimensions: IS strategist role leadership and business strategist role leadership. IS strategist role leadership considers the CIO to be responsible for developing and implementing technology-centric IS strategies via the innovative usage of new emerging technology, data, information, and outsourcing services aimed at improving organizational benefits [13,22,62]. Business strategist role leadership posits that the CIO is responsible for developing and implementing business-centric IS strategies through the CIO's involvement in the business aspects of the organization that aim at improving organizational benefits [13,22,62].

2.1.2. Organizational benefits

Based on Delone and McLean [15,16] and Gable et al. [26], we define the organizational benefits of IS as the contribution of IS to the overall organization benefits based on either the subjective

evaluation of the members of the TMT or the objective performance derived from financial data. In particular, this study focuses on managerial/controlling effectiveness and strategic benefits derived from information systems. The IS strategic benefits can be subdivided into competitive advantage benefits, alliance benefits, and customer relationship benefits [49], which are regarded as the strategic contribution of IS to organizational growth [4,12].

2.1.3. IS quality

IS quality includes system quality, information quality and service quality [15,16]. System quality mainly refers to the system's reliability, ease of use, usefulness, and flexibility [15,16]. Information quality is evaluated by whether it meets the needs of both decision-making executives and employees of the enterprise [15,16]. Service quality refers to the reliability, responsiveness, and security of the IS service provided by the IS organization in the construction, utilization, and improvement of information systems [15,16].

2.1.4. IS vision

IS vision is defined as the shared, aspired-to state of the role that IS should play in the organization [57,74]. The three visions proposed by Feeny et al. [22] include the automate, inform, and transform visions. When the firm espouses an automate IS vision, the role of IS is to use information technology to replace expensive and undependable human resources [3,22]. In firms with an inform vision, IS provides the TMT with information resources and effectively helps them utilize the controlling and coordinating functions of IS to the full. IS is used to release key information to employees at the bottom of the organizational chart to allow information to be utilized by first-line employees or to provide them with relevant knowledge and information [22]. In firms with a transform IS vision, IS is one of the most important methods for improving the firm's competitive advantage and the industry structure [3,22]. Hence, IS vision is a key factor that predicts the strengths of the effects of IS strategic leadership on organizational benefits.

2.1.5. Control variables

To test the hypotheses that IS strategic leadership may be systematically associated with organizational outcomes, we must control for certain organizational variables that have previously been found to exert an influence on IS strategic leadership [3,12,45,46]. Prior studies suggest that the extent of firm size and firm age may affect the allocation of resources needed to derive organizational benefits from IS [3]. The IS budget is frequently found to significantly affect innovative IS performance [46]. Firm type, industry type, and geographical regions are also found to significantly affect IS value in China [45]. Hence, we believe that firm size, firm age, IS budget, firm type, industry type, and geographical region may affect the organizational benefits of IS.

2.2. Strategic leadership and organizational benefits

The implied hypothesis under the concept of IS strategic leadership is that CIO strategic roles (i.e., IS strategist and business strategist) are related to improving organizational benefits rather than to ensuring the success of the IT function alone [6,12,17,34,41]. The most commonly used criteria for the outcomes of IS strategic leadership include the extent to which the leader's organizational unit performs its tasks successfully and attains its goals [4,12,73]. The influence of IS strategic leadership on organizational benefits is reflected in driving/supporting product and process innovation, reconstructing relationships with business partners, opening up new business markets, and optimizing the original business areas using IS [4,12,73]. As an IS strategist, the CIO is responsible for developing and implementing IS strategy and ensuring the dynamic alignment between IS strategy and business strategy [67] to make available to the organization the strategic contributions of IS [12,22]. As a business strategist, the main responsibility of a CIO is to collect the individual strategic plans of each business unit and develop business-enabled IS goals [7,19] to yield the best business value [19]. IS strategic leadership is the leading factor predicting organizational performance because it supports each business unit in creating an individual business goal and in integrating these goals with other units to form an organizational strategy [12,23].

IS strategist role leadership implies that strategic leaders are frequently involved in strategic IS planning, developing future objectives, and promoting the alignment between IS strategy and firm strategy [7,19]. Effective IS strategic leaders can utilize and integrate IS resources and non-IS resources to formulate and implement a unique competitive strategy [59]. This competitive strategy, deeply rooted in the integration of IS resources and business resources, is not easily imitated by competitors and is therefore capable of creating competitive advantage and generating strategic growth [12,23]. In particular, to fulfill strategic requirements, the CIO must be a creative thinker within the organization who is in charge of developing the vision of how IS can empower and revolutionize the organization based on his knowledge of the enterprise [7,10,12]. The CIO also must be recognized as an organizational strategic leader who can shape and inform expectations regarding IS-enabled business opportunities and market growth possibilities [7,12].

Business strategist role leadership is concerned with assessing and predicting unanticipated business needs (in the form of product and process innovations) and with forming partnerships with business functions to identify areas for business improvements using IT [4,12]. Researchers also note that strategic IS leaders always grasp the "key benefits" and "nodes of risks" in the operational process of the entire organization. As explained by Reich and Benbasat [55], the CIO should be involved with business planning and should create a clear IT governance structure that fits into the organizational structure to execute a shared IT vision. The TMT sets the control indices concerning the key points of interest and nodes of risk, which should be controlled with IT in the course of process-designing [7]. The CIO must set both reasonable and ambitious expectations by helping business colleagues "see what is actually possible today as well as what is unimaginable today, but will be possible tomorrow" [7]. Of course, business executives generally prefer that other top executives not interfere with the operation of their business units, so a CIO must be able to persuade other business executives to improve their existing business processes [12,22]. Accordingly, IS-enabled organizational activities reflect the managerial and controlling intention of the TMT, which is the significant influence of strategic leadership on the organization [7].

By effectively fulfilling both the IS strategist and business strategist roles, the CIO will be able to bring everyone on board to develop and implement unique competitive strategies by combining IT competencies with complementary non-IT strategic resources and changes [7,12]. This argument is consistent with upper echelon theory and the prior IT management and CIO literature that describes a strategic leader as responsible for both efficiently improving the strategic growth of his organization and effectively dealing with managerial effectiveness in operational activities [12,22,73]. Thus, we propose the following hypothesis:

Hypothesis 1. IS strategic leadership has positive effects on organizational benefits.

2.3. Strategic leadership and IS quality

The relationships between IS strategic leadership and IS quality are evident in the strategic management literature. For example, to make ERP initiatives successful, CIOs must acquire extensive knowledge of the relevant customers, markets, suppliers, and competitors to consider strategy, processes, systems, and change management [42]. IS strategic leadership combines the social and knowledge dimensions of the strategy alignment with the social dimension that reflects the shared understanding of the TMT members for the role of IS [55] and the knowledge dimension that embodies the information-sharing mechanism and knowledge-transferring strategy of IS [7,22]. Specifically, IS strategic leadership embodies the strategic roles of a CIO, who implements IS strategy to improve the enterprise information system and achieve the maximum benefits for the organization [7]. IS strategic leadership predicts IS quality (i.e., information quality, system quality, and service quality) [1,37,54]. The TMT members regard IS as a means of facilitating their access to information related to customers and suppliers, and they understand that timely information services will enable them to make decisions rapidly [61]. Some researchers propose that the CIO strategic role is to ensure IS quality because a reliable information system is the operating platform of all the business units [7,19].

The influence of IS strategic leadership on IS quality is a form of strategic innovation that derive primarily from combining the top-down and bottom-up principles in the strategy-making process [11,18]. The top-down strategy enables the IS strategy to adapt to dramatic changes in the external environment and in organizational strategy [11,18]. By contrast, the bottom-up strategy helps IS strategy integrate the wisdom of all levels of IS users and is thus not easily imitated by competitors [11,18].

As an IS strategist, the CIO is responsible for IS strategy formulation and implementation [1,11]. A CIO must integrate not only internal and external competitive strategy and high-level managerial experience but also the business experience of the employees at lower levels [7], which is thus not easily imitated by competitors [5]. Therefore, IS strategic leadership is considered to improve system quality in terms of reliability, ease of use, usefulness, and inimitability [7].

As a business strategist, the CIO should become familiar with the organizational strategy to provide more accurate, timely, and highly business-related IS services to business units [7]. The external turbulence of competitive markets forces the TMT members to increasingly rely on information resources when making strategic decisions [1,11]. Strategic IS leaders accurately forecast external market competition and clearly understand the business strategy of each unit such that the information resources derived from IS can meet the information needs of top executives and business units [52].

In the process of IS planning, designing, use, and outsourcing, IS strategic leadership is helps improve IS quality by building a set of integrated operational platforms that can be adapted to both present and future business activities [4,7]. Specifically, strategic CIOs are responsible for establishing a highly efficient and effective IS team [12]. Strategic CIOs allocate reasonable power to the IS team, which is an effective guarantee of human resources by which the organization can manage IS risk while maintaining the security of the operation of the information system [7]. Effective strategic leaders are more likely to lead the IS team to provide effective IS service for the organization [22]. Therefore, we propose the following hypothesis:

Hypothesis 2. IS strategic leadership has positive effects on IS quality.

2.4. Mediating effects of IS quality

The essence of IS strategic leadership is to use advanced information systems to improve the overall organizational benefits [41], and its effects on organizational benefits are progressive [12]. To identify and successfully implement organizational changes that can be enabled by IT, CIOs must explore new opportunities to develop unique competitive strategies by combining IT capabilities with other complementary non-IT strategic resources and capabilities of the firm. Some researchers argue that IS strategic leadership distinguishes organizational benefits derived from information systems of different qualities [12,42,46,53]. As the strategic leader, the CIO considers the overall benefits of the organization, continuously improves information systems, and develops and utilizes information resources to maximize long-term profits driven by the IS strategy (i.e., realizing the managerial and controlling intention of the top management team (TMT)) [19]. The CIO and business executives give top priority to IS quality [4,7]. If the information system fails to implement the TMT's intention for management and control, they will not commit to the CIO's IS initiatives. A CIO must first be able to successfully implement the IS project, build stable information systems in which the management rules of executives are embedded, make use of the information systems to monitor business risk, and set up an IS services team that can continuously provide effective and efficient information services. Only by improving IS quality can a CIO improve the strategic benefits of IS [7,22]. Therefore, consistent with our strategic IS leadership model, IS strategic leadership will not affect the IT contribution to organizational benefits significantly unless the CIO has improved IS quality.

Smaltz et al. [62] propose that CIO strategic roles (i.e., IS strategist and business strategist) focus on the strategic needs of the organization to promote cost reduction, increase productivity, and thereby increase organizational benefits. As an IS strategist and business strategist, the CIO should take full account of business needs to track critical operations, such as orders, inventory, production, design, and sales, in addition to accurately predicting the business behaviors of competitors, suppliers, and customers [7]. Therefore, accurate, timely, and highly business-related information can effectively act as a mediator between strategic leadership and strategic benefits [4,7]. Specifically, a strategic IS leader belongs to the organizational decision-making level, which is responsible for IS strategy development and business unit strategic planning [7,62]. CIOs must build an excellent IS unit that can fully comprehend and implement IS strategy [7]. A high-quality IS team can fully perform its commitment to each business sector and provide reliable, timely, and high-level IS service, which is critical and effective for transferring IS strategy into actual productivity [7]. The indirect effects of IS strategic leadership on organizational benefits can also be supported by the concept of IS strategic leadership, as proposed in the extant literature. CIOs are important players because they develop and manage the IS infrastructure, which links businesses, employees, and customers together to transact business [40,41]. Furthermore, high-quality IS is a critical resource for the day-to-day operation of the organization and can thus be an important catalyst for strategic differentiation and competitive advantage [50]. The role of the business strategist for the CIO is a critical factor for business units to gain and maintain their competitive advantages with the supportive driving force derived from IS strategy [6,17,34]. Karimi et al. [36] report that CIOs in organizations with an IT-enabled market growth focus have a higher-level role in the organization's hierarchy than those in firms with an IT-enabled operations focus. Hence, IS strategic leadership is a necessary precondition for the CIO to have the opportunity to improve IS quality and its contribution to organizational benefits [4,12]. As such, IS quality

is a mediator in terms of the IS strategic leadership's influence on strategic benefits [4], and the CIO's influence is realized progressively as IS quality improves [12]. Therefore, we propose the following hypothesis:

Hypothesis 3. IS quality has mediating effects on the relationship between strategic leadership and organizational benefits.

2.5. Moderating effects of IS vision

The IS literature stresses the importance of the IS vision that is created by CIOs. Some researchers believe that strategic IS vision could be a significant factor moderating some of the relationships discussed in the previous sections [3,22]. The previous literature also posits that IS success is influenced by certain characteristics of the TMT, particularly in terms of the strategic IS vision that reflects the importance of IS for organizational strategies [43]. Armstrong and Sambamurthy [3] argue that IS vision moderates the relationship between CIO capabilities and IT assimilation. In organizations that espouse different IS visions, the intensity of the relationships between strategic leadership and IS quality and organizational benefits will vary because IS vision describes the true role of IS and is a predictor in firms of a good relationship between the CIO and CEO [7].

IS vision is an important situational factor that influences the strategic leadership level [3,7]. When the firm creates an inform IS vision, the firm expects to provide timely and accurate information support to managers and business staff. In these firms, IS provides information to the TMT easily and efficiently to strengthen their power, organizational control, and coordination roles. Additionally, IS is used to distribute key information to lower levels of the organization to enhance the information reach of "front-line" organizational members and empower them with relevant knowledge and information [61]. The CIOs in firms with an inform vision are often not members of the top management team and are perceived as impeding the impact of strategic leadership on organizational benefits and IS quality [38] because they lack the opportunity to have both formal and informal interactions and to develop a shared vision with all members of the TMT [52].

When a firm has a transform IS vision, IS is regarded as the core driving force or an indispensable key factor for the organization to attain strategic benefits. Therefore, it is much easier for strategic IS leaders to drive IS quality improvement and enhance organizational benefits. In these firms, the TMT regards IS as a means of changing the company's relationships with suppliers and customers and to change products, markets, organization structure, organization boundaries, the relationships between organizations, and even the management process itself. The CIOs in these firms with transform vision are accepted into the top management team and are considered to be contributing beyond their functional responsibilities. Successful relationships between the CIO and CEO seem to be linked to a shared vision of the role of IT as an agent of transformation. Although the CIO can have formal and informal interactions and develop a shared vision with all TMT members [52], a direct reporting relationship facilitates easier access and stronger lines of communication with the focal C-level executive. The direct reporting relationship enables the CIO to promote a vision for IT, exchange ideas about IT initiatives, and ensure that proposals are heard by the appropriate executive(s), which facilitates the relationship between IS strategic leadership and IS quality and organizational benefits.

With the growth of IS related business risks, uncertainty, and opportunities, the CIO is more likely to be considered a key executive in the organization, and IS strategic leadership will also be treated as essential for organizations to achieve success. Conversely, in organizations with an inform IS vision, IS-related uncertainties are subordinate and lag behind business uncertainty; thus, IS strategic leadership will not be treated as a foundation that can influence the success of these companies with an inform vision. Therefore, we propose the following hypotheses:

Hypothesis 4a. The relationship between IS strategic leadership and IS quality will significantly vary across IS visions.

Hypothesis 4b. The relationship between IS strategic leadership and organizational benefits will significantly vary across IS visions.

Hypothesis 4c. The relationship between IS quality and organizational benefits will significantly vary across IS visions.

2.6. Control variables

The control variables in this study include firm type, industry type, firm size, firm age, IS budget, and geographical region [3,12,45,46]. Firm type includes state-owned firms, private firms, and foreign-funded firms. Industry type includes manufacturing; finance; wholesale and retail trade; mining; transportation and storage; computers, electronics and telecommunications; agriculture, forestry, animal husbandry and fishery industry; electricity, gas and water production and supply; culture, sports and entertainment; construction; accommodation and catering, and government. IS budget refers to the average annual investment into IS over the most recent three years. However, to eliminate the effect of firm sales, this study uses the IS investment firms' accounting for the proportion of sales as the measuring index.

3. Research method and results

3.1. Measurement development

3.1.1. IS strategic leadership

Welbourne et al. [71] proposed that employee performance should be examined within the salient role expectations at the studied firm. Smaltz et al. [62] examined CIO effectiveness from the perspective of CIO executive roles viewed as important at a firm. As IS strategic leadership is defined as CIO job performance related to salient strategic roles, we develop the instrument from the perspective of CIO strategic role expectations, which was cross-validated across both chief information officers and senior business executives. Thus, our operationalization of IS strategic leadership elicits a variety of roles and adopts a role-based performance perspective.

We have suggested that IS strategic leadership includes two dimensions based on the classification of CIO strategic roles in the prior literature [1,13,58,60,62]. We conducted a three-stage test to identify the strategic roles of the CIO to find the new roles in today's organizations. First, we used the 521 articles identified in the previous search to conduct a manual scan of the titles and abstracts using the keyword "role." Seventy-six articles were found related to CIO roles in the manual scan. We assembled a list of 32 items representing different CIO role expectations from the extant literature (Appendix B).

Second, we invited 36 business and IS executives or managers from various industries, including manufacturing, transportation, and healthcare, among others, to discuss CIO roles. These respondents answered a questionnaire that included an open-ended question: "In which aspects do you evaluate the job performance of CIO strategic roles in your company?" This process resulted in 207 responses.

Third, we provided definitions for CIO strategic roles, including IS strategist and business strategist, based on the previous

literature, and listed three typical items for each definition. Three PhD students concentrating in MIS compared the 32 items summarized from the literature and the 207 statements provided by the respondents [20,21]. Identical or similar items in the two resources were deleted, leaving 62 items. Next, the three PhD students classified the remaining 62 items separately and added a new CIO role if they found that some items could not be included in the extant roles, which resulted in 10 roles at the end of the first round of encoding: "IS strategist," "business strategist," "integrator," "informationist," "business partner," "relationship builder," "contract insight," and "Chief Innovation Officer." In addition, the roles of "data manager," and "politician" were also included and represented new findings for CIO roles obtained in our study.

Finally, the students discussed the classification framework, which was proposed in the first round of encoding, with two professors in the IS field. We re-invited the 30 business and IS executives who participated in the first-round questionnaire (the other six senior managers were unavailable due to work obligations) and asked them to distinguish the strategic roles from the 10 roles identified by the PhD students. The roles of IS strategist and business strategist received the highest scores. Furthermore, the role of IS strategist most closely aligns with Rockart's [58] and Applegate and Elam's [1] role of "IT strategist," Ross and Feeny's [60] role of "business partner," and the higher-function roles of "integrator" and "IT contract insight" proposed by Smaltz et al. [62]. The role of business strategist most closely aligns with McLean and Smit's role of "strategist," Rockart's [58] and Applegate and Elam's [1] role of "business strategist," Ross and Feeny's [60] role of "business visionary," and the higher-function roles of "business strategist" proposed by Smaltz et al. [62]. Hence, in the 10 roles identified, the roles of "integrator," "informationist," "business partner," "contract insight," and "data manager" are more similar to the role of "IS strategist," whereas the roles of "relationship builder," "Chief Innovation Officer," and "politician" are more similar to the role of "business strategist."

Next, the three PhD students reclassified the items according to the definition of IS strategist and business strategist. This round of encoding resulted in eight items for the two key roles, i.e., "IS strategist" and "business strategist." We calculated the degree of the consistency of the three PhD students who were responsible for classification in the two rounds of encoding. The three kappa values were .712 (the first and second students), .813 (second and third students), and .776 (first and third students), indicating that the classification was stable and reliable.

The initial measurement items of IS strategic leadership are shown in Appendix C.

We conducted a field survey to test the validity and reliability of the proposed measurement items of IS strategic leadership. The sampling frame was developed by cross-listing items from the Chinese Entrepreneurs Database and several professional industry associations. In the first stage, 2000 surveys were sent to a list of CIOs from organizations headquartered in China with branches covering over 30 provinces, including Hong Kong and Macao. The firms' enterprise systems consisted of CRM and SCM, which were quite mature and had been in use for at least two years. A total of 376 CIO surveys were returned, for a total response rate of 18.8% for the first-stage survey. In the second stage, a second instrument was sent to the selected top business executives of each organization from which we had received a completed CIO questionnaire. Business executives were contacted within six months of collecting the CIO data. All the CIOs who had responded to the questionnaire were individually contacted to obtain the names and contact information for their business partners, which was labor-intensive work that took many weeks to complete. The scale used for these questions ranged from 'critically important (7)' to 'not important at all (1).' The respondents were asked to judge the importance of every item used to describe IS strategic leadership in their organizations.

A total of 110 of the 376 organizations returned at least one business executive survey. In total, we derived responses from 110 matched pairs of CIOs and the corresponding top business executives within the organization, yielding an organizational response rate of 29.2% for the second-stage survey. As we had no detailed information on the non-respondents, we conducted a response bias test by comparing early respondents against late ones (determined by the median value) [2]. Our assessment revealed no issues regarding response bias.

We conducted an exploratory factor analysis on the scales for IS strategic leadership using the responses from both the CIO and business executives from the 110 organizations. All the multiple-item constructs demonstrated strong discriminant validity and convergent validity for the two dimensions of IS strategic leadership, IS strategist and business strategist. Finally, we assessed the reliability of the constructs with the Cronbach's alpha coefficient. The composite reliability and the Cronbach's alpha of the constructs present reliabilities greater than .70, which suggests that they explained more than 50% of the variance in the constructs and that the constructs have adequate reliability (see Appendix D).

3.1.2. Organizational benefits of IS

We adopted the variable "organizational benefits of IS" primarily from Delone & McLean [15,16]. Based on the definition of this construct, we measured this variable using 11 items from the perspective of two dimensions: managerial/controlling effectiveness and strategic benefits. All the items used a Likert scale of 1 (strongly disagree) to 7 (strongly agree).

3.1.3. IS quality

We adopted the variable "IS quality" primarily from Delone & McLean [15,16]. Based on the definition of this construct, we measured this variable with 20 items from the perspective of three dimensions, including system quality, information quality, and service quality. All the items used a Likert scale of 1 (strongly disagree) to 7 (strongly agree).

3.1.4. IS vision

We adopted the variable "IS vision" primarily from Armstrong and Sambamurthy [3] and Ross and Feeny [60]. Based on the definition of this construct, we measured this variable using three items from the perspective of three dimensions: automate, inform and transform.

3.1.5. Control variables

We adopted the control variables primarily from Li et al. [45], Li et al. [46], and Chen et al. [12]. The control variables included firm type, industry type, firm size, firm age, IS budget, and geographical regions.

3.2. Assessing the measurement model

To ensure the accuracy of the translation of the questionnaire items from English to Chinese, this study followed a translation/back-translation procedure. First, two of the authors (one MIS professor and one MIS doctoral student), one English professor, and one CIO translated all the items from English into Chinese with modifications. Next, another English professor was asked to translate the Chinese items back into English. The back-translated English versions were then compared with the original English versions. If the translated Chinese items had significant semantic differences, the two authors, two English

professors, and CIO then discussed and modified the items. Based on this iterative process, the Chinese versions were again revised by the authors.

The measurement model was assessed in three steps. First, semi-structured interviews were held with five CIOs and business executives to assess content validity and to gain richer insights into the phenomenon. Second, we conducted an item-sorting exercise to qualitatively evaluate the discriminant validity of each of the measured constructs [67]. Finally, the psychometric properties of the scales were statistically assessed using the survey data.

The questionnaires were validated using a three-step process. Before implementing the field survey, a pretest was conducted to improve the validity and reliability of our measurements. The pretest contains three parts: an open-ended general discussion, a semi-structured discussion, and a highly structured item-by-item examination of the draft instrument [67]. During the interview with 10 CIOs and 12 EMBA students, we provided respondents with the option of providing open-ended comments on the questions. Based on their suggestions, we made some modifications to the wording and framing of the questions. Other suggestions were also incorporated to improve consistency in the phrasing of the sentences.

In the second semi-structured segment, questions from the interviewers called attention to key matters regarding the dependent variable scales. To further improve validity, participants in the third segment of the interview ware asked to evaluate a version of the questionnaire item-by-item. Content validity was strengthened by encouraging participants to note obscure questions. Furthermore, we asked two statistics teachers to evaluate the layout and presentation of the highly structured format of the questionnaire. We incorporated their suggestions to shorten some pages to avoid information overload.

To validate the scale further, a pilot test was performed using 210 EMBA students. The revised questionnaire was sent to them, and we collected 210 valid responses with a 100% response rate. Next, we analyzed the data collected from the survey using exploratory factor analysis in combination with qualitative data from the interview. Because exploratory factor analysis can result in dimensions that are not interpretable, the data were screened prior to the factor analysis. Eliminating undesirable items is a recommended approach [14,35,66]. The results indicated that two items regarding IS quality should be deleted to attain high convergent and discriminant validity. The modified scale was then assessed by CIOs and statisticians to form the final version of the questionnaire.

3.3. Sample and data collection

The sampling frame was developed by cross-listing items from the Chinese Entrepreneurs Database and several professional industry associations. This policy resulted in a sampling frame of 2136 small-to-large Chinese firms. Data were gathered through a large sample field survey that tapped responses from CIOs and business executives, such as the CEO or other formal members of the top management team. Because the definition of role effectiveness suggests that it is assessed by the CEO or other members of the TMT, separate questionnaires were developed for the CIO and the TMT members.

Data were collected in a manner similar to that used for validating the CIO role scales. In the first stage, a total of 2136 surveys were sent to a list of CIOs from organizations headquartered in China with branches covering over 30 provinces, including Hong Kong and Macao. The firm's enterprise system included CRM and SCM, which were quite mature and have been in use for over two years. A total of 412 CIO surveys were returned for a total response rate of 19.3% for the first-stage survey. In the second stage, a second instrument was sent to the selected top business executives of each organization for which we had received a completed CIO questionnaire. Business executives were contacted within three months of collecting the CIO data. All the CIOs who had responded to the questionnaire were individually contacted to obtain names and contact information for their business partners, which was labor-intensive work that took many weeks to complete. A total of 110 of the 412 organizations returned at least one business executive survey, which resulted in an organizational response rate of 26.7% for the second-stage survey. Demographic information about the respondents is included in Table 1.

In total, we received and analyzed responses from 110 matched pairs of CIOs and corresponding top business executives within the organization. IS strategic leadership was assessed using the CIO's immediate superior or another member of the TMT according to the definition of IS strategic leadership. Data on IS strategic leadership were also gathered from CIOs using the same scales.

IS quality and organizational benefits were evaluated by CIOs and TMT members. For IS quality and organizational benefits, the

Table 1
Demographic information for survey respondents.

Industry	Frequency	Percentage
Manufacturing	31	28.20%
Finance/insurance/property	29	26.40%
Wholesale/retail	19	17.30%
Mining	1	0.90%
Transportation/storage/post	4	3.60%
Computer/electronics/telecommunication	2	1.80%
Agriculture/forestry/animal husbandry/fishery	2	1.80%
Electricity/gas/water production and supply	2	1.80%
Culture/sports/entertainment	5	4.60%
Building	5	4.60%
Accommodation/catering	6	5.50%
Government	4	3.60%
Firm size (number of employees)		
Less than or equal to 10	2	1.82%
More than 10 and less than or equal to 50	2	1.82%
More than 50 and less than or equal to 100	10	9.09%
More than 100 and less than or equal to 500	12	10.91%
More than 500 and less than or equal to 1000	26	23.64%
More than 1000 and less than or equal to 5000	30	27.27%
More than 5000	28	25.45%
Number of IT professionals		
Less than or equal to 10	12	10.91%
More than 10 and less than or equal to 50	50	45.45%
More than 50 and less than or equal to 100	28	25.45%
More than 100 and less than or equal to 500	15	13.64%
More than 500	5	4.55%
CIO age		
35 and below	20	18.18%
36–40	25	22.73%
41–45	27	24.55%
46–50	24	21.82%
51–55	11	10.00%
Above 55	3	2.73%
CIO tenure		
3 years and below	20	18.18%
3–5 years	41	37.27%
5–10 years	39	35.45%
Over 10 years	10	9.09%
CIO Educational Level		
Secondary School Diploma and below	4	3.64%
Bachelor's Degree	45	40.91%
Graduate Degree	61	55.45%

means of the CIO response and TMT response were used in the analysis to alleviate concern that the firm's IS quality and organizational benefits derived from IS might be overestimated by CIOs [3] and underestimated by TMT members [45]. We assessed the interrater agreement between multiple responses by calculating the rWG coefficient [36] for these two constructs. Prior research suggests that rWG values that are greater than or equal to .60 warrant the aggregation of individual responses [27]. We found that none of the firms with two responses had an rWG value below .60 for both constructs. We note that the high level of agreement among the CIO and the business executive within the same organization supports combining these two assessments to produce averaged, aggregated scores for the respective firms [12,49,69]. Therefore, we judged the means of the CIO response and TMT response to be more "neutral" regarding IS quality and the organizational benefits derived from IS. For each of the firms with

Table 2
Convergent and discriminant validity results.

Item	Cronbach's α	F1	F2	F3	F4	F5	F6	F7
IS strategist role leadership								
	.747							
ISS1 (Performance of participating in organizational strategic planning and decision-making process)		**.736**	.005	.431	.098	.211	.430	.274
ISS2 (Performance of participating in creating IS vision and mission)		**.901**	.327	.226	.503	.202	.004	.009
ISS3 (Performance of participating in formulating and implementing IS strategy aligned with the organizational strategy)		**.812**	.003	.008	.034	.506	.052	.252
Business strategist role leadership								
	.713							
BS1 (Performance of participating in the strategic planning and decision-making activities of the business units)		.504	**.765**	.051	.461	.076	.177	.511
BS2 (Performance of dividing IS strategy into the IS-enabled business, managerial, and controlling goals)		.072	**.701**	.444	.011	.322	.316	.307
BS3 (Performance of guiding IS-enabled business and managerial process reconstruction)		.003	**.742**	.048	.652	.018	.054	−.097
BS4 (Performance of guiding the IS-enabled business goals and managerial/controlling objectives)		.420	**.831**	.032	.221	.001	.005	−.061
BS5 (Performance of making the evaluation standard for IS value)		.212	**.868**	.567	.555	.322	.320	.372
System quality								
	.775							
SQ1 (Reliability, such as an information system's stable operation)		.012	.114	**.843**	.001	.229	.066	−.004
SQ2 (Ease of use, such as an information system is easy to be used)		.445	.280	**.721**	.445	.075	.328	−.025
SQ3 (Usefulness, such as an information system is very practical in daily work)		.006	.428	**.807**	.399	.244	.301	.173
SQ4 (Non- imitability, such as the design of an information system cannot be imitated)		.011	.009	**.703**	.021	.039	.177	.335
SQ5 (Overall condition of information system quality)		.503	.117	**.755**	.334	−.071	.109	.029
Information quality								
	.799							
IQ1 (Correctness, i.e., the degree of exactness of information supplied by an information system)		.080	.308	.232	**.770**	.116	.075	.065
IQ2 (Timeliness, i.e., whether an information system can supply required information in time)		.272	.482	.377	**.809**	.001	.339	.377
IQ3 (Relatedness to business, i.e., the extent to which information is related to business)		.119	.006	.114	**.752**	.350	.201	.505
IQ4 (Overall condition of the quality of data and information)		.454	.519	.040	**.701**	.499	.277	.066
Service quality								
	.796							
SQ1 (IT staff is able to provide promised IS service)		.037	.511	.367	.423	**.811**	.433	.011
SQ2 (Users are very satisfied with IT staff's attitude and speed when they query with IT staff)		.443	.320	.455	.571	**.749**	.199	.065
SQ3 (IT staff is completely capable of providing high quality service)		.021	.007	.020	.002	**.906**	.336	.432
SQ4 (Overall condition of the quality of IS service provided by IT staff)		.501	.309	.307	.076	**.771**	.378	.299
Strategic benefits								
	.912							
SB1 (Increases firm's return of investment (ROI))		.049	.330	.032	.001	.310	**.768**	.457
SB2 (Increases firm's sales revenue)		.337	.219	.409	.344	.208	**.721**	.365
SB3 (Increases firm's market share)		.076	.001	.354	.102	.073	**.717**	.156
SB4 (Increases top executives' ability to make decisions)		.287	.177	.056	.277	.379	**.821**	.287
SB5 (Create or improve firm's products and service)		.005	.498	.502	.499	.205	**.700**	.156
SB6 (Improve relationship with up-stream and down-stream partners on supply chain and business partners)		.523	.377	.399	.307	.137	**.705**	.388
Managerial/controlling effectiveness								
	.909							
MCE1 (Implemented information systems have realized the management mode established by top managers)		.331	.113	.218	.029	.076	.102	**.901**
MCE2 (Implemented information systems help top managers effectively control with firm's daily operation)		.490	.217	−.196	.361	.200	.317	**.842**
MCE3 (Implemented information systems help top managers effectively monitor firm's daily operation)		.560	.001	.044	.265	.477	.399	**.707**
MCE4 (Overall, information systems assist in realizing top managers' attempt to manage and control firm's operation)		.112	.032	.531	.303	.387	.570	**.792**

Values in bold are the largest loadings of each item on each construct.

Table 3
Correlations between dependent and independent variables.

Variable	1	2	3	4	5	6	7
1. IS strategist role leadership	.807						
2. Business strategist role leadership	.102	.712					
3. System quality	.431	.393	.851				
4. Information quality	.377	.285	.104	.697			
5. Service quality	.401	.366	.007	.098	.773		
6. Strategic benefits	.117	.542	.292	.461	.246	.893	
7. M/C effectiveness	.201	.374	.263	.342	.389	.005	.902

two responses, we then computed an aggregated average score for the two constructs (i.e., IS quality and organizational benefits).

TMT members were presented with a brief description of the inform IS vision and transform IS vision developed by Feeny et al. [22]. They were asked to identify the vision that best described the role of IT in their firm.

The Cronbach's alphas and indicator loadings are shown in Table 2. The Cronbach's alphas of all the constructs exceeded the recommended score of .7, which indicates adequate reliability [67]. For item reliability, all indicators had loadings greater than .700, which suggests that more than 50% of the variance in the construct was explained. All the constructs demonstrated strong convergent validity, as indicated by the inter-factor loadings being higher than the intra-factor loadings.

The correlation matrix of three dependent variables and the independent variable are shown in Table 3 with the average variances extracted along the diagonals included. The square root of the average variance extracted for a construct was larger than its correlations with other constructs, which suggests adequate discriminant validity [25]. Comparing the diagonals and non-diagonals in Table 3, all the constructs in our model fulfilled this criterion. Furthermore, the results of the factor analyses showed that the loadings of items on their corresponding factors were much higher than cross-loadings on other factors (see Table 3). Consequently, all the constructs demonstrated adequate discriminant validity.

3.4. Assessing the structural model

Structural equation modeling (SEM) was used to test our hypotheses, and we conducted all statistical tests at a 5% level of significance, as implemented in Amos Graph 20.0. When testing the structural model, we ran the model with organizational control variables (type, industry, firm age, size, IS budget). We noted that the only significant effect observed from the inclusion of the control variables was IS budget related to organizational benefits. Fig. 3 shows the evaluated path coefficients for the structural model. As hypothesized, we found that IS strategic leadership significantly influenced organizational benefits and that IS strategic leadership was significantly related to IS quality in the theoretical model. Hence, H1 and H2 were supported.

We analyzed the mediating effects of IS quality utilizing the four-step process recommended by Baron and Kenny [5]. In the first step, the IS quality variable was removed from the original model. We tested the direct influence of the strategic leadership variables on organizational benefits, and the path coefficients from strategic leadership to organizational benefits were found to be significant ($p > .001$). In the second step, IS quality was used as the criterion variable in the regression equation, and strategic leadership was used as a predictor. A test was performed to determine whether the strategic leadership variable correlated with the IS quality variable. We observed that the path coefficients from strategic leadership to IS quality were significant ($p > .001$).

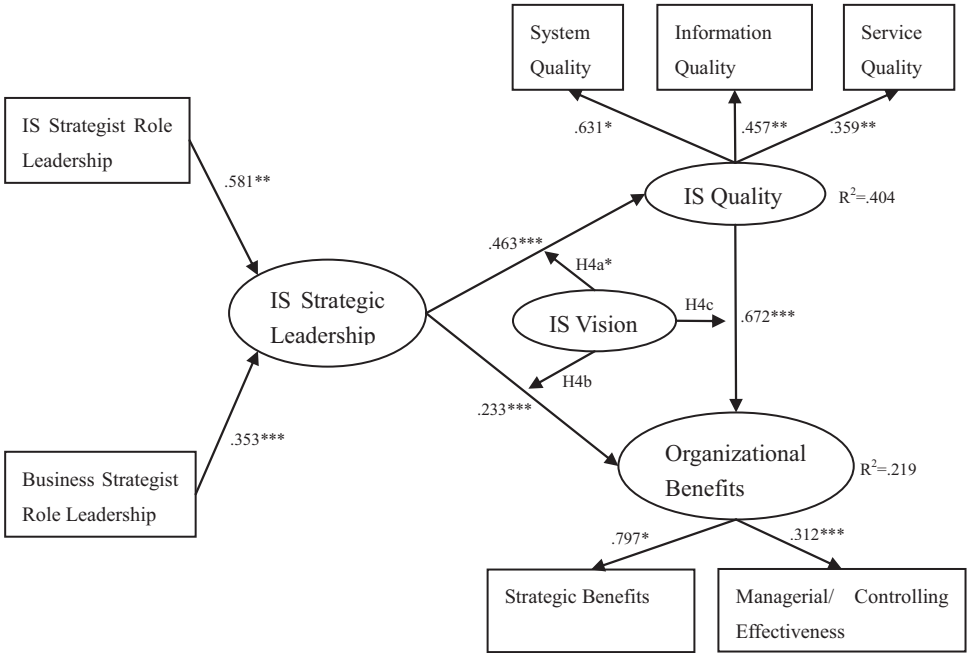

Fig. 3. Structural model note: $^{*}p < .05$, $^{**}p < .01$, and $^{***}p < .001$.

Table 4
Mediating effects of IS quality.

Model	Path	Path coefficient	R^2
Step 1	IS strategic leadership → organizational benefits	.371 (.11)***	.512
Step 2	IS strategic leadership → IS quality	.463 (.06)***	.601
Step 3	IS quality → organizational benefits	.672 (.11)***	.623
	IS strategic leadership → organizational benefits	.233 (.06)***	

Note. Figures in parentheses represent standard errors.
*** $p < .001$.

In the third step, organizational benefits were used as the criterion variable in the regression equation, and strategic leadership and IS quality were used as predictors. We found that the path coefficients from IS quality to organizational benefits were significant ($p > .001$). In the fourth step, we sought to establish whether IS quality completely or partially mediates the strategic leadership-organizational benefits relationship. We found that the effect of the strategic leadership variable on organizational benefits controlling for IS quality did not equal zero. Therefore, these results indicate that the effects of strategic leadership on organizational benefits were partly mediated by IS quality.

We also conducted mediation analyses according to Sobel [64]. First, we tested the direct influence of strategic leadership on organizational benefits. Next, we tested the path coefficients from strategic leadership to organizational benefits in the original model. Finally, we tested the reduction in the explained variance by the independent variable after accounting for the mediation. We found that the reduction in variance explained by the independent variable was significant (Z-test, $p < .05$). Accordingly, we can conclude that IS quality mediated the relationship between strategic leadership and organizational benefits, and Hypothesis 3 was supported (see Table 4). Table 4 shows the results of the mediator variable model based on Baron and Kenny's four-step process [5].

The moderating effect of IS vision was tested based on Baron and Kenny [5]. Testing the moderating effect of IS quality involves comparing a main effect model with a moderating effect model [51]. First, we tested H4a. A direct path was included between IS vision and IS quality to create the main effect model. An interaction term was then added to the structural model – which was also directly linked to IS quality – to create the moderating effect model. Following Goodhue et al. [28], we computed the interaction (or moderating) variable between strategic leadership and IS vision. The interaction effect between strategic leadership and IS vision was also significant ($p < .001$); therefore, the findings show that including an interaction term significantly increases the model R^2 relative to its exclusion. Thus, the findings validate the moderating role of IS vision on the link between strategic leadership and IS quality (H4a). To further examine the moderating effect of IS vision, we tested whether the variance explained that was caused by the moderated effect was significant beyond the main effects using the F statistic [9]. The F statistic was found to be significant ($p < .01$), which provided support for the significant role played by the moderating effect of the IS vision on the relationship between strategic leadership and IS quality.

Next, we tested H4b. A direct path was included between IS vision and organizational benefits to create the main effect model. An interaction term was then added to the structural model – which was also directly linked to organizational benefits – to create the moderating effect model. Following Goodhue et al. [28], we computed the interaction (or moderating) variable between strategic leadership and IS vision. The interaction effect between strategic leadership and IS vision was not significant; therefore, the findings show that including the interaction term does not significantly increase the model R^2 relative to its exclusion. To further examine the moderating effect of IS vision, we tested whether the variance explained that was caused by the moderated effect is significant beyond the main effects using the F statistic [9]. The F statistic was not found to be significant; thus, H4b was not supported.

Third, we tested H4c. A direct path was included between IS vision and organizational benefits to create the main effect model. An interaction term was then added to the structural model – which was also directly linked to organizational benefits – to create the moderating effect model. Following Goodhue et al. [28], we computed the interaction (or moderating) variable between IS quality and IS vision. The interaction effect between IS quality and IS vision was not significant; therefore, the findings show that including the interaction term does not significantly increase the model R^2 relative to its exclusion. To further examine the moderating effect of IS vision, we tested whether the variance explained that was caused by the moderated effect is significant beyond the main effects using the following F statistic [9]. The F statistic was not found to be significant; thus, H4c was not supported.

Finally, the control variable, IS budget, was significant in the model, which suggests that it was a contributing predictor of the relationship between IS strategic leadership and organizational benefits. Firm type, industry type, firm size, and firm age were not significant in the model.

4. Discussion

Although some researchers have stressed the importance of IS strategic leadership, little empirical research has examined its effects on organizational benefits based on the unique nature of IS leadership, such as the nature of the particular IS and the role of CIOs [40]. To help fill the gaps in the IS strategic leadership literature, we presented and tested a research model that described the relationship between IS strategic leadership and IS quality/organizational benefits, the mediating effects of IS quality, and the moderating effects of IS vision from the perspective of CIO strategic roles. First, we searched the IS management literature (i.e., [1,13,58,60,62]) to identify and categorize the strategic roles of CIOs, which include the role of IS strategist and business strategist. We then applied role-performance theory and upper echelon theory to determine whether the two roles of CIO leadership have significant effects on organizational benefits and IS quality. Furthermore, we examined the mediating effects of IS quality on the relationship between IS strategic leadership and organizational benefits. In addition, we utilized the extant IS management literature to examine the moderating effects of IS vision within organizations.

4.1. Findings

Our results revealed two key findings. First, IS quality significantly mediates the relationship between IS strategic leadership and organizational benefits. We found that organizational benefits are influenced by IS strategic leadership directly and indirectly via IS quality. The findings thus open the black box of whether and how IS strategic leadership influences organizational benefits through the mediating effects of IS quality. Second, IS vision significantly moderates the relationship between strategic leadership and IS quality. However, IS vision does not moderate the relationship between IS strategic leadership and organizational benefits or the relationship between IS quality and

organizational benefits. Furthermore, earlier research does not empirically examine the effects of IS strategic leadership on organizational benefits from the perspectives that distinguish IS leadership from general leadership. This study examines the complex relationships among IS strategic leadership, IS variables (i.e., IS quality and IS vision), and organizational outcomes from the perspective of CIO strategic roles. As an IS strategist, the CIO is involved in developing and implementing IS strategy and fostering alignment with the organizational strategy at the upper levels of the organization. He participates in organizational strategic planning and decision-making functions and in creating an IS vision and mission. As a business strategist, the CIO is involved in developing and implementing a business strategy aligned with the IS strategy. He participates in guiding IS-enabled business process and managerial process recreation; guiding the IS-enabled business goals and managerial/controlling objectives; dividing IS strategy into its IS-enabled business, managerial, and controlling goals; and creating evaluation standards for IS value.

4.2. Limitations

This paper also has limitations, which present directions for future research. First, there may be other variables that moderate the relationships between IS strategic leadership and organizational outcomes. Future research should examine how these two leadership roles influence other IT-enhanced organizational outcomes. Second, the sample size of our study is small. In particular, the data collection was cross-sectional, such that the data were collected at a specific time. In the future, we should conduct a longitudinal study to track IS strategic leadership and organizational benefits over time while controlling for environmental characteristics to explore other factors we may have failed to consider in this study. Third, when conducting the questionnaire survey, only two respondents, the CIO and another executive, were chosen from each firm. Their knowledge may be limited – and even biased – which may lead to a certain degree of deviation from reality. One possible extension of this study is to collect data from more executives in the same firm.

4.3. Implications for theory and practice

Despite the many factors that affect organizational benefits, the significant effects of IS strategic leadership on organizational benefits remains the subject of debate in the literature. Although the direct effects of IS strategic leadership on organizational benefits has been discussed in the extant literature, the mediating effects of IS quality and the moderating effects of IS vision are interesting and novel findings of this study. Our study offers several theoretical contributions. First, we challenge the consensus that a leader's characteristics predict only organizational benefits directly. Strategic CIOs support the firm's strategic positioning by leading valuable IT initiatives and improving IS quality. Furthermore, IS strategic leadership does not always affect organizational benefits and IS quality directly, and CIOs should perform their strategic roles effectively to improve system quality, information quality, and service quality; each of these qualities each, in turn, affects organizational benefits. This logic is consistent with upper echelon theory, whereby a leader's characteristics and a firm's situation, when used in combination, can lead to strategy choices that affect a firm's performance. The IT management and CIO literature should focus on how both types of CIOs perform their strategic roles effectively to improve their firm's performance.

Second, we examine the moderating effects of IS vision, which provides different organizational contexts related to IS strategic leadership. In this paper, the results provide important levers for the TMT members and for the CIO to cultivate an IS vision in the organization. IS success and organizational success are likely to occur when there is strategic alignment between IS strategy and business strategy, which requires a shared understanding between the CIO and the TMT regarding the role of IS. The organization must realize that an appropriate IS vision confirmed by the CIO and the TMT has pervasive effects on the behavior of IS leaders, which can consequently have implications for IS quality. Compared with the inform vision, there is a more significant relationship between strategic leadership and IS quality in organizations with a transform vision. This result shows that establishing a transform vision is beneficial for IS strategic leaders to inspire IS staff to generate innovative thinking in practical work and embody innovative thinking in the system design process, which would thereby improve IS quality. IS vision does not moderate the relationship between IS strategic leadership and organizational benefits. This finding shows that, even with different IS visions (e.g., inform vs. transform visions), a CIO is mainly responsible for developing and implementing IS strategy. The moderating effects of IS vision on the relationship between IS strategic leadership and organizational benefits were not significant. IS vision did not moderate the relationship between IS quality and organizational benefits.

Third, although prior descriptive studies have anecdotally implied that IS leadership can influence organizational outcomes, the special attributes of IS leadership, such as the role of the CIO, have been neglected. We provide insight into the effects of the two strategic roles of CIO leadership on organizational benefits. We demonstrate the usefulness of thinking of IS strategic leadership as encompassing two dimensions, IS strategist leadership and business strategist leadership. We also develop and test new measurement scales for these two dimensions of IS strategic leadership. As such, the current study uses the new lens of CIO strategic roles to examine the special nature of IS leadership. Therefore, the CIO, when treated as a strategic asset, may be required to play the strategist roles effectively to ensure that IS provides the required contributions to the organization. In addition, organizations must cultivate the strategic roles of the CIO to derive value from IS.

Finally, this study has important implications. First, our theoretical model indicates that firms must cultivate the position and strategic roles of the CIO to derive value from IS. Given that the dual technical and business orientations pose unique challenges for CIOs, CIOs should effectively perform the roles of IS strategist and business strategist to generate organizational benefits. Second, the mediating effects of IS quality in our study provide a new perspective, namely, that the dual technical and business orientation of CIO strategic roles provides two paths for IS. One path is the IS-oriented path, where IS strategic leadership has a significant effect on IS quality. Obviously, to improve IS quality, the organization must invest human, material, and financial resources; initially, the costs of development and implementation may exceed the benefits derived from the systems. As the information systems are implemented, high-quality information systems can improve IS benefits for the organization, such as improving customer relationships, increasing market share to achieve strategic benefits, and realizing management innovation and operational risk control. As the strategic leader, the CIO should consider the overall benefits of the organization, continuously improve IS quality, and develop and utilize information resources to enhance the business value of IS. The other path is business-oriented, whereby CIOs are involved in organizational strategic planning and decision-making processes, and IS leadership impacts organizational benefits directly.

Third, in the IS-oriented path, IS vision is the critical condition for IS strategic leadership to impact IS quality. The organization must realize that IS vision has pervasive effects on its executives' behavior, which can consequently affect IS quality. After establishing the CIO position, the TMT should pay close attention to and help the CIO create the IS vision. The CEO and TMT members must ensure that the IT department and IT initiatives are properly supported and have the necessary resources if the organization expects to generate strategic value from IT via the CIO. In addition, the CIO may need to perform his strategic roles effectively to ensure that the organization provides the required support for IT initiatives. In particular, if the organization espouses a transform vision, the organization should design the CIO position such that the CIO is involved with strategic decision-making functions and coordinating business units to obtain maximum returns from IS investments.

Appendix A. Papers focused on defining the core of IS leadership

Article ID	Prior studies	Article ID	Prior studies
1	Wu et al. (2008)	14	Armstrong and Sambamurthy (1999)
2	Preston et al. (2008)	15	Broadbent and Kitzis (2005)
3	Ke and Wei (2008)	16	Karahanna and Watson (2006)
4	Prybutok et al. (2008)	17	Preston et al. (2008)
5	Chen et al. (2010)	18	Faraj and Sambamurthy (2006)
6	Cho et al. (2011)	19	Li et al. (2006)
7	Chen and Wu (2011)	20	Smaltz et al. (2006)
8	Lin and McDonough (2011)	21	Feeny et al. (1992)
9	Chakrabarty and Whitten (2011)	22	Karahanna et al. (2009)
10	Banker et al. (2011)	23	Enns et al. (2003)
11	Müller et al. (2012)	24	Feeny and Willcocks (1999)
12	Roepke et al. (2000)	25	Earl and Feeny (1994)
13	Kaufeld et al. (2009)	26	Ross and Feeny (2000)

Appendix B. CIO role expectations in the literature

Items of CIO role expectations	Categorization of CIO role expectations	
	IS-oriented roles	Business-oriented roles
1. Participate in organizational strategic planning and decision-making process [8]		Business innovator
2. Provide expertise on cross-departmental business process improvement teams [46,68,69]		Business partner
3. Shape and inform expectations for an IT-enabled enterprise [8]		Innovator
4. Direct IT-enabled business process restructuring/reengineering [68,69]		Business strategist
5. Ensure confidentiality & security of organizational information systems [28,33]	IT expert	
6. Provide oversight for quality assurance of organizational data [21,28,33,80]	Informaticist	
7. Be intimately involved in business strategic planning and decisions [12,13,46,68,69]		Business strategist
8. Be intimately involved in creating a vision for how IT will build your organization's success [8,12,13,46,68,69]		Business visionary
9. Develop and implement an effective IS strategy [8,40,41]	IS strategist	
10. Weave business and IS strategy together [8]	IS innovator	
11. Create clear and appropriate IT governance [8]	IS strategist	
12. Develop/maintain metrics that reflect the value of IT to the organization [8,13,46,69]	IS innovator	
13. Develop and implement a strategic IT plan that aligns with the organization's strategic business plan [14,64,68,69]	IS strategist	
14. Negotiate with vendor IT organizations on new external contract proposals [8,13,19,23,44,46]		Innovator
15. Provide executive oversight for all IT contracts with external vendors [8,13,19,23,25,44,46]		IT contact oversight
16. Build good relationship with the members of the top management team [8]		Business innovator
17. Build a new IS organization-one that is leaner and more focused than its more traditional predecessor [8]	IT manager	
18. Migrate organization from legacy, departmental applications to cross-departmental, integrated applications [23,25,29,34]	Integrator	
19. Build and nurture a high-performing team in your IS organization [8]	IT manager	
20. Provide insight to the top management team/executive staff (TMT) on new emerging technologies [3,8,13,23,25,46,68,69]	IT educator	
21. Champion computer literacy throughout the organization [34,65,68,72,73]	IT educator	
22. Build and maintain an IT staff with skill sets [5,65,68,72,73]	IT educator	
23. Manage the new enterprise and IT risks [8]		Business strategist
24. Establish informational linkages to external entities [12,23,25,68]		
25. Ensure the organization's users have adequate workstations (PCs) to accomplish their jobs [72]	IT manager	
26. Establish informational linkages throughout the organization [12,21,23,25,68]	Integrator	
27. Establish and maintain an IT department that is responsive to user requests/problems [8,13,23,25,26,65,68,72,73]	IT manager	
28. Keep enterprise information systems operational [21,23,25,27,38,65,72,73]	IT manager	
29. Lead IS team to deliver to provide cost-effective services [8]	IT manager	
30. Lead with business colleagues to set expectations and identify what is valued by enterprise leaders [8]		Business strategist
31. Understand the fundamentals of organizational environment [8]		Innovator
32. Communicate IS performance in business-relevant language [8,40,41]		Business strategist

Appendix C. Measurement of IS strategic leadership

Dimension	Item	Item content
IS strategist	ISS1	Performance of participating in organizational strategic planning and decision-making process
	ISS2	Performance of participating in creating IS vision and mission
	ISS3	Performance of participating in formulating and implementing IS strategy aligned with the organizational strategy
Business strategist	BS1	Performance of participating in the strategic planning and decision-making activities of the business units
	BS2	Performance of dividing IS strategy into the IS-enabled business, managerial, and controlling goals
	BS3	Performance of guiding IS-enabled business and managerial process reconstruction
	BS4	Performance of guiding the IS-enabled business goals and managerial/controlling objectives
	BS5	Performance of making the evaluation standard for IS value

Appendix D. Convergent and discriminant validity results.

Item	Cronbach's α	CIO factor analysis		Business executive factor analysis	
		F1	F2	F1	F2
IS strategist					
	.742				
ISS1		.704	.103	.812	.151
ISS2		.902	.020	.743	.194
ISS3		.715	.007	.781	.034
Business strategist					
	.703				
BS1		.162	.836	.178	.807
BS2		.177	.729	.230	.692
BS3		.305	.893	.361	.733
BS4		.065	.758	.072	.871
BS5		.271	.697	.221	.775

References

[1] L.M. Applegate, J.J. Elam, New information systems leaders: a changing role in a changing world, MIS Q. 16 (4), 1992, pp. 469–490.
[2] J.S. Armstrong, T.S. Overton, Estimating nonresponse bias in mail surveys, J. Market. Res. 14 (3), 1977, pp. 396–402.
[3] C.P. Armstrong, V. Sambamurthy, Information technology assimilation in firms: the influence of senior leadership and IT infrastructures, Inf. Syst. Res. 10 (4), 1999, pp. 304–328.
[4] R.D. Banker, N. Hu, P.A. Pavlou, J. Luftman, CIO reporting structure, strategic positioning, and firm performance, MIS Q. 35 (2), 2011, pp. 487–504.
[5] R.M. Baron, D.A. Kenny, The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations, J. Pers. Soc. Psychol. 51 (6), 1986, pp. 1173–1182.
[6] T. Brady, D. Targett, Strategic information systems in the banking sector: holy grail or poison chalice, Technol. Anal. Strateg. Manage. 7 (4), 1995, pp. 387–406.
[7] M. Broadbent, E.S. Kitzis, Interweaving business-driven IT strategy and execution: four foundation factors, Ivey Bus. J. 69 (3), 2005, pp. 1–6.
[8] M. Broadbent, E.S. Kitzis, The New CIO Leader, Harvard Business School Press, Boston, 2005.
[9] T.A. Carte, C.J. Russell, In pursuit of moderation: nine common errors and their solutions, MIS Q. 27 (3), 2003, pp. 479–501.
[10] D. Chatterjee, V.J. Richardson, R.W. Zmud, Examining the shareholder wealth effects of announcements of newly created CIO positions, MIS Q. 25 (1), 2001, pp. 43–70.
[11] D.Q. Chen, M. Mocker, D.S. Preston, A. Teubner, Information systems strategy: reconceptualization, measurement, and implications, MIS Q. 34 (2), 2010, pp. 233–259.
[12] D.Q. Chen, D.S. Preston, W.D. Xia, Antecedents and effects of CIO supply-side and demand-side leadership: a staged maturity model, J. Manage. Inf. Syst. 27 (1), 2010, pp. 231–271.
[13] M. Chun, J. Mooney, CIO roles and responsibilities: twenty-five years of evolution and change, Inf. Manage. 46 (6), 2009, pp. 232–334.
[14] G.A. Churchill Jr., A paradigm for developing better measures of marketing constructs, J. Market. Res. 16 (1), 1979, pp. 64–73.
[15] W.H. DeLone, E.R. McLean, Information systems success: the quest for the dependent variable, Inf. Syst. Res. 3 (1), 1992, pp. 60–95.
[16] W.H. DeLone, E.R. McLean, The DeLone and McLean model of information system success: a ten-year update, J. Manage. Inf. Syst. 19 (4), 2003, pp. 9–30.
[17] S. Duhan, M. Levy, P. Powell, Information systems strategies in knowledge-based SME's: the role of core competencies, Eur. J. Inf. Syst. 10 (1), 2001, pp. 25–40.
[18] M.J. Earl, Management Strategies for Information Technology, Prentice Hall, London, 1989.
[19] M.J. Earl, D.F. Feeny, Is your CIO adding value? Sloan Manage. Rev. 35 (3), 1994, pp. 11–20.
[20] K.M. Eisenhardt, Building theories from case study research, Acad. Manage. Rev. 14 (4), 1989, pp. 532–550.
[21] J.-L. Farh, P.C. Earley, S.-C. Lin, Impetus for action: a cultural analysis of justice and organizational citizenship behavior in Chinese society, Adm. Sci. Q. 42 (3), 1997, pp. 421–444.
[22] D.F. Feeny, B. Edwards, K.M. Simpson, Understanding the CEO/CIO relationship, MIS Q. 16 (4), 1992, pp. 435–448.
[23] D.F. Feeny, L.P. Willcocks, Core IS capabilities for exploiting information technology, Sloan Manage. Rev. (3), 1998, pp. 9–22.
[24] S. Finkelstein, D. Hambrick, Strategic Leadership: Top Executives and Their Effects on Organizations, West, Minneapolis, 1996.
[25] C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, J. Market. Res. 18 (1), 1981, pp. 39–50.
[26] G. Gable, J.-N. Lee, K.-Y. Kwahk, P. Green, Administrative placement of the information systems academic discipline: a comparative SWOT analysis, Commun. Assoc. Inf. Syst. 21 (8), 2007.
[27] W.H. Glick, Conceptualizing and measuring organizational and psychological climate: pitfalls in multilevel research, Acad. Manage. Rev. 10 (3), 1985, pp. 601–616.
[28] D. Goodhue, W. Lewis, R. Thompson, Statistical power in analyzing interaction effects: questioning the advantage of PLS with product indicators, Inf. Syst. Res. 18 (2), 2007, pp. 211–227.
[29] P. Gottschalk, Strategic management of IS/IT functions: the role of the CIO in Norwegian organizations, Int. J. Inf. Manage. 19 (5), 1999, p. 389.
[30] V. Grover, S.R. Jeong, W.J. Kettinger, C.C. Lee, Chief information officer: a study of managerial roles, J. Manage. Inf. Syst. 10 (2), 1993, pp. 107–130.
[31] D.C. Hambrick, M.J. Chen, The influence of top management team heterogeneity on firm's competitive moves, Adm. Sci. Q. 41, 1996, pp. 659–684.
[32] D.C. Hambrick, Taxonomic approaches to studying strategy: some conceptual and methodological issues, J. Manage. 10 (1), 1984, pp. 27–41.
[33] D.C. Hambrick, P. Mason, Upper echelons: the organization as a reflection of its top managers, Acad. Manage. Rev. 9 (1), 1984, pp. 193–206.
[34] G.J. Hidding, Sustaining strategic it advantage in the information age: how strategy paradigms differ by speed, J. Strateg. Inf. Syst. 10 (3), 2001, pp. 201–222.
[35] B. Ives, M.H. Olson, J.J. Baroudi, The measurement of user information satisfaction, Commun. ACM 26 (10), 1983, pp. 785–793.
[36] L.R. James, R.G. Demaree, G. Wolf, Estimating within-group interrater reliability with and without response bias, J. Appl. Psychol. 69 (1), 1984, pp. 85–98.
[37] S.L. Jarvenpaa, B. Ives, Executive involvement and participation in the management of information technology, MIS Q. 15 (2), 1991, pp. 204–227.
[38] M.L. Kaarst-Brown, S. Kelly, IT Governance and Sarbanes-Oxley: the latest sales pitch or real challenges for the IT function? in: Proceedings of the 38th Annual Hawaii International Conference on System Sciences, 2005.
[39] E. Karahanna, D.Q. Chen, Give your CIO time: an empirical analysis of CIO role effectiveness and firm performance, working paper, University of Georgia, Athens, GA, 2006.
[40] E. Karahanna, R.T. Watson, Information systems leadership, IEEE Trans. Eng. Manage. 53 (2), 2006, pp. 171–176.

[41] E. Karahanna, D.S. Preston, D.Q. Chen, Information systems leadership, in: W. Huang, K.L. Wang (Eds.), On Information Systems Research: Issues and Latest Development, Tsinghua University Press, Beijing, 2009 , pp. 609–641, (in Chinese).
[42] W. Ke, K.K. Wei, Organizational culture and leadership in ERP implementation, Decis. Support Syst. 45, 2008, pp. 208–218.
[43] P. Keen, Every Manager's Guide to Information Technology, Harvard Business School Press, Boston, 1991.
[44] A.L. Lederer, V. Sethi, Critical dimensions of strategic information systems planning, Decis. Sci. 22 (1), 1991, pp. 104–119.
[45] D. Li, W.W. Huang, Position the CIO within and outside the organization, CIO Insight 23, 2009, pp. 29–36.
[46] Y. Li, C.-H. Tan, H.-H. Teo, B.C.Y. Tan, Innovative usage of information technology in Singapore organizations: do CIO characteristics make a difference? IEEE Trans. Eng. Manage. 53 (2), 2006, pp. 77–190.
[47] H.-E. Lin, E.F. McDonough, Investigating the role of leadership and organizational culture in fostering innovation ambidexterity, IEEE Trans. Eng. Manage. 58 (3), 2011, pp. 497–509.
[48] H. Mintzberg, The strategy concept I: five Ps for strategy, Calif. Manage. Rev. 30 (1), 1987, pp. 11–24.
[49] R. Mirani, A.L. Lederer, An instrument for assessing the organizational benefits of IS projects, Decis. Sci. 29 (4), 1998, pp. 803–838.
[50] M.E. Porter, V.E. Miller, How information gives you competitive advantage, Harv. Bus. Rev. 63 (4), 1995, pp. 149–160.
[51] D. Preston, D.Q. Chen, D.E. Leidner, Examining the antecedents and consequences of CIO strategic decision-making authority: an empirical study, Decis. Sci. J. 39 (4), 2008, pp. 605–642.
[52] D. Preston, E. Karahanna, The antecedents of IS strategic alignment: a nomological network, Inf. Syst. Res. 20 (2), 2009, pp. 159–179.
[53] V.R. Prybutok, X.N. Zhang, S.D. Ryan, Evaluating leadership, IT quality, and net benefits in an e-government environment, Inf. Manage. 45, 2008, pp. 143–152.
[54] B. Raghunathan, T. Raghunathan, Relationship of the rank of information systems executive to the organizational role and planning dimensions of information systems, J. Manage. Inf. Syst. 6 (Summer (1)), 1989, pp. 111–126.
[55] B.H. Reich, I. Benbasat, Factors that influence the social dimension of alignment between business and information technology objectives, MIS Q. 24 (1), 2000, pp. 81–113.
[56] P.S. Robbins, M. Coulter, Management, 9th ed., Prentice Hall, Upper Saddle River, NJ, 2007.
[57] S.R. Robbins, R.B. Duncan, The role of the CEO and top management in the creation and implementation of strategic vision, in: D.C. Hambrick (Ed.), The Executive Effect: Concepts and Methods for Studying Top Managers, JAI Press, Greenwich, 1988.
[58] J.F. Rockart, The changing role of the information systems executive: a critical success factors perspective, Sloan Manage. Rev. 24 (1), 1982, pp. 3–13.
[59] R. Roepke, R. Agarwal, W.F. Thomas, Aligning the IT human resource with business vision: the leadership initiative at 3M, MIS Q. 24 (2), 2000, pp. 327–353.
[60] J.W. Ross, D.F. Feeny, The evolving role of the CIO, in: R.W. Zmud (Ed.), Framing the Domains of IT Management: Projecting the Future Through the Past, Pinn Flex, Cincinnati, OH, 2000, pp. 385–402.
[61] E.H. Schein, The role of the CEO in the management of change: the case of information technology, in: T.A. Kochan, M. Useem (Eds.), Transforming Organizations, Oxford University Press, Oxford and New York, 1992 , pp. 80–95.
[62] D.H. Smaltz, V. Sambamurthy, R. Agarwal, The antecedents of CIO role effectiveness in organizations: an empirical study in the healthcare sector, IEEE Trans. Eng. Manage. 53 (2), 2006, pp. 207–222.
[63] W.K. Smith, M.L. Tushman, Managing strategic contradictions: a top management model for managing innovation streams, Organ. Sci. 16 (5), 2005, pp. 522–536.
[64] M.E. Sobel, Asymptotic confidence intervals for indirect effects in structural equation models, in: S. Leinhart (Ed.), Sociological Methodology, Jossey-Bass, Francisco, CA, 1982, pp. 290–312.
[65] C.S. Stephens, W.N. Ledbetter, A. Mitra, F.N. Ford, Executive or functional manager? The nature of the CIO's job MIS Q. 16 (4), 1992, pp. 449–467.
[66] D.W. Straub, Validating instruments in MIS research, MIS Q. 13 (2), 1989, pp. 146–169.
[67] L.A. Tai, R. Phelps, CEO and CIO perceptions of information systems strategy: evidence from Hong Kong, Eur. J. Inf. Syst. 9 (3), 2000, pp. 163–172.
[68] V.H. Vroom, A.G. Jago, The role of the situation in leadership, Am. Psychol. 62 (1), 2007, pp. 17–24.
[69] D.A. Waldman, G.G. Ramirez, R.J. House, Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty Acad. Manage. J. 44 (1), 2001, pp. 134–214.
[70] R.D. Watson, G.G. Kelly, R.D. Galliers, J.C. Brancheau, Key issues in information systems management: an international perspective, J. Manage. Inf. Syst. 13 (4), 1997, pp. 91–115.
[71] T. Welbourne, D. Johnson, A. Erez, The role-based performance scale: validity analysis of a theory-based measure, Acad. Manage. J. 41 (5), 1998, pp. 540–555.
[72] J.H. Wu, Y.C. Chen, V. Sambamurthy, The impacts of BTM capability and CIO role effectiveness on firms' information technology assimilation: an empirical study, in: Proceedings of International Conference on Information Systems, Paris, 2008.
[73] G.A. Yukl, Leadership in Organizations, 5th ed., Prentice-Hall, Upper Saddle River, NJ, 2002 p. 508.
[74] R.W. Zmud, Building relationship throughout the corporate entity, in: J. Elam, M.J. Ginzberg, R.W. Zmud (Eds.), Transforming the IS Organization: The Mission, the Framework, the Transition, ICIT Press, Washington, DC, 1988.

Fang Ding is an Associate Research Fellow of e-government in State Information Centre of China. Her research interests include Information System (IS) leadership, e-government, and the value of IS investments. Her work has been published in information system conference such as Pacific Asia Conference on Information Systems (PACIS) and INFORMS Annual Meeting.

Dong Li is a professor of Management Science and Information Systems department, Guanghua School of Management, Peking University. His Current research focuses on IT leadership, IT strategy planning, and IT business performance. His work has appeared in academic journals and International Conferences, including Communications of Association Information Systems, Computers in Human Behavior, Frontiers of Business, Research in China, etc. Professor Dong Li was serving as vice Chair of China Association of Information Systems, and member of Editorial Board of China Journal of Information Systems.

Joey F. George is Professor of Information Systems and the John D. DeVries Endowed Chair in Business in the College of Business at Iowa State University. His research interests focus on the use of information systems in the workplace, including deceptive computer-mediated communication, computer-based monitoring, and group support systems. He is a past president of the Association for Information Systems (AIS), and in 2008, he was selected as a Fellow of AIS.