2011

How does leadership affect information systems success? The role of transformational leadership

Jeewon Cho
Oregon State University

Insu Park
Dakota State University

John W. Michel
Towson University

How does leadership affect information systems success? The role of transformational leadership

Jeewon Cho [a,*], Insu Park [b], John W. Michel [c]

[a] Oregon State University, College of Business, 340 Bexell Hall, Corvallis, OR 97331, United States
[b] University of Memphis, Department of Management Information Systems, The Fogelman College of Business and Economics, Fogelman Administration Building, Memphis, TN 38152, United States
[c] Towson University, Department of Management, College of Business & Economics, 8000 York Road, Towson, MD 21252, United States

ABSTRACT

We examined the positive impact of transformational leadership on IS success in organizations via two psychological mechanisms of system users'—perceived organizational support and systems self-efficacy. Our conceptual model was assessed using a sample of 251 employees from a multi-national bank in Korea. Overall, our results supported the hypothesized relationships: transformational leadership was positively related to system users' IS success, and both perceived organizational support and systems self-efficacy of the system users mediated the relationship between transformational leadership and IS success. The results call for manager's attention to the importance of transformational leadership development in organizations.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

Much attention has been paid to exploring the factors that enhance IS success [8,15]. It can be achieved in several ways but little attention has been given individual characteristics (e.g., motivation and attitudes), despite their potential for being effective. Another factor deserving more attention involves the impact of leadership on IS success. Research in the IS field has often focused on very specific managerial roles, such as allocating resources, monitoring outcomes, and controlling and coordinating people and work environments. While these managerial behaviors are undoubtedly important, they encompass only a small portion of a leader's role and thus primarily in obtaining efficient operations. While these are important, the role of a leader also includes motivating employees and adapting to changing conditions [24]. It therefore seemed necessary to investigate the relationship between leadership and IS success. The primary purpose of our study was to determine the influence of transformational leadership (focusing on inspiring and revitalizing people to perform better) on IS success.

Transformational leaders inspire the values and ideals of followers and ultimately motivate followers to perform beyond expectations [5]. However, little is known about the relationship between transformational leadership and IS-related outcomes. Therefore, we attempted to integrate two important domains by positing that *transformational leadership* would be positively related to *IS success*. Specifically, we believed that transformational leaders can enhance IS success through:

(1) *idealized influence,* transformational leaders instill pride, faith, and respect in IS users by acting well and leading-by-example; thereby, causing followers to identify with the leader.
(2) *inspirational motivation,* transformational leaders enhance system users' confidence in using the IS by articulating an appealing vision and expressing high levels of expectation and optimism about the users' ability to use IS.
(3) *individualized consideration,* transformational leaders can coach or mentor followers and provide individualized support while listening to the concerns and needs of IS users.
(4) *intellectual stimulation,* transformational leaders can stimulate system users' creative problem-solving skills by challenging them to address old problems using new perspectives, making them take risks, and soliciting system users' ideas for better use of the IS.

By performing such behaviors, we believe that transformational leaders can play a crucial role in IS users' success.

* Corresponding author. Fax: +1 541 737 4890.
  E-mail addresses: jeewon.cho@bus.oregonstate.edu (J. Cho),
insuparkster@gmail.com (I. Park), jmichel@towson.edu (J.W. Michel).

Thus we focused on two research questions:

(1) Is transformational leadership positively related to IS success? and
(2) What are the underlying psychological mechanisms by which this relationship is transmitted?

2. Theory and hypotheses

2.1. Transformational leadership and IS success

2.1.1. IS success

The concept of IS success has been widely accepted as an important criterion for assessing organizational performance due to IS use [8,15]. In general, IS success has been seen as the degree of organizational performance resulting from the use of IS. According to DeLone and McLean, *individual impact* refers to the positive effect of information on individual behavior and *organizational impact* indicates the organizational level effect of IS on organizational performance. Along with the concept 'impact', several constructs have been used to evaluate especially 'individual impact', such as perceived usefulness, net benefits, individual job performance, and individual productivity.

We conceptualized IS success as consisting of two factors: users' perceived usefulness (the degree to which the user believes that using a particular system has enhanced his or her job or group's performance), and IS satisfaction (end-users' overall affective and cognitive evaluation of their fulfillment when using IS [1]. The concept of perceived usefulness has been employed as an indicator of individual performance for using IS, with the logic that perceived usefulness and individual impact are related to each other. According to Rai et al., perceived usefulness derive from personal valuations of an IS, which DeLone and McLean include under the *individual impact* category [8]. In addition, it is associated with several constructs at the individual level, such as improved individual productivity, task performance, individual power or influence of individual impact, that make the concept relate specifically to users. Because our study focused on exploring individual perceptions and attitudes of IS success, these two factors were needed to explore the antecedents of success at the individual level.

2.1.2. Transformational leadership

Transformational leadership focuses on inspiring the values and ideals of followers and ultimately motivating them to perform beyond expectations. As a result of such leadership, followers feel trust, loyalty, and reverence toward the leader and often transcend self-interest for the sake of the group [2].

According to Bass and his colleagues, transformational leadership consists of four behavioral components: idealized influence (admirable behaviors intended to arouse follower emotions and identify with the leader), inspirational motivation (behavior focused on communicating an inspiring and appealing vision), individualized consideration (the degree to which a leader provides support and encouragement to followers, coaches and mentors them, etc.), and intellectual stimulation (the degree to which a leader increases awareness and helps followers challenge assumptions and take risks). These have been shown to relate to both individual- and organizational-level outcomes. Thus transformational leadership is positively related to organizational commitment, justice perception and organizational citizenship behaviors, follower motivation, organization performance, and leader effectiveness [6,12].

2.1.3. Transformational leadership and IS success

Despite evidence of the effectiveness of IS leadership, two issues deserve further investigation.

Identifying the effect of transformational leadership on IS outcomes to better understand effective IS leadership. Often management and leadership have been used interchangeably, but leaders do more than simply manage employees: they focus on change and motivation.

(1) Defining the processes which make transformational leadership effective in producing IS outcomes.
(2) In order to inspire collective efforts for IS success; transformational leaders can communicate high levels of confidence in using existing or newly introduced IS.

In the current business environment, for instance, banks have introduced electronic decision systems to aid in the approval of personal or business loans and mortgages. In such a situation, a transformational leader can provide support and coaching to followers. encouraging usage of the IS by reporting on their positive experience, and giving evidence of the system's importance (e.g., reduced rates for insolvent obligation). In addition, since transformational leaders recognize each user's different capabilities, needs, and developmental stage, they can provide a tailored support by ensuring that the individual uses IS to maximize individual performance. Thus we hypothesized:

Hypothesis 1a. Transformational leadership will be positively related to a system user's perceived usefulness.

Hypothesis 1b. Transformational leadership will be positively related to a system user's IS satisfaction.

2.2. The mediating effects on transformational leadership and IS success

2.2.1. Transformational leadership and perceived organizational support

Since transformational leaders emphasizes supportive, considerate, and guiding aspects for the development of followers, they should increase followers' perceived organizational support (POS)—their perceptions that the organization values their contribution and cares about their well-being [17]. According to organizational support theory, employees interpret whether their organization favors or disfavors them through the specific support given by the organizational management [18]. Therefore, we hypothesized:

Hypothesis 2a. Transformational leadership will be positively related to a system user's perceived organizational support.

2.2.2. Transformational leadership and self-efficacy on IS

Self-efficacy is an important organizational variable due to its positive impact on individual performance [3]. However, in our research, self-efficacy was measured as an individual's confidence in the comprehensive systematic usage of the overall IS and its related applications. Thus systems self-efficacy (SSE) was defined as an individual's belief in his or her capabilities to operate IS utilized to perform effectively.

The positive impact of self-efficacy has been recognized by the field of transformational leadership. Walumbwa et al. [22] suggested that transformational leaders develop employee self-efficacy through role modeling and verbal persuasion. In addition, there has been some positive evidence that organizational and management support, encouragement, and expectation are major behavioral predictors to SSE.

We argue that IS users' self-efficacy about IS would be enhanced by transformational leaders' encouragement and positive expectation of the IS users. In addition, such leadership positively affects

IS users' SSE by providing meaning and challenge to the current IS situation. Therefore:

Hypothesis 2b. Transformational leadership will be positively related to a system user's systems self-efficacy.

2.2.3. Perceived organizational support and IS success

POS refers to global beliefs of the extent to which the organization values an employee's contribution. It has been suggested that employees often attribute their perceptions of organizational support to the actions of their supervisor. Furthermore supportive supervision is related to POS since supervisors direct and evaluate employee performance [10].

Since POS focuses on the extent to which the organization values and cares about employees, we argue that employees will develop stronger relationships with their immediate supervisors. As a result, the employees are likely to derive perceptions about POS from their relationship with their supervisor. We therefore focused on leaders in work groups as the important figure and their support toward the users in IS implementation.

The argument, that POS is related to IS success, is grounded in social exchange theory. People in social exchange relationship often feel obligated to the benefactor—the norm of reciprocity [7]. Accordingly, we theorize that system users who perceive high levels of POS may accomplish better individual goal attainment as well as higher IS satisfaction, because they feel indebted to the transformational leaders. Since system users feel that they are supported by the leaders, this perception enhances their IS satisfaction. This leads to the following hypotheses:

Hypothesis 3a. A system user's perceived organizational support will mediate the relationship between transformational leadership and a system user's perceived usefulness.

Hypothesis 3b. A system user's perceived organizational support will mediate the relationship between transformational leadership and a system user's IS satisfaction.

2.2.4. Self-efficacy on IS and IS success

Self-efficacy is a strong predictor of subsequent work outcomes including higher performance, job satisfaction, and organizational commitment, as well as lower withdrawal behavior. Research on computer self-efficacy has suggested the positive effect of it on end-user's systems satisfaction and increased productivity.

We therefore argued that people working with transformational leaders have high levels of self-efficacy about IS, which will help them achieve better individual performance and higher satisfaction with IS. Thus we hypothesized:

Hypothesis 4a. A system user's systems self-efficacy will mediate the relationship between transformational leadership and a system user's perceived usefulness.

Hypothesis 4b. A system user's systems self-efficacy will mediate the relationship between transformational leadership and a system user's IS satisfaction.

3. Method

3.1. Sample and procedure

We conducted our surveys at the headquarters of a large, multi-national bank located in Korea. Since all participants were Korean, survey items were translated into Korean and then back-translated into English to ensure conceptual equivalence and comparability

Table 1
Descriptive statistics.

Demographics	Male (N=109)		Female (N=142)		Total (N=251)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	33.4	8.3	29.7	5.8	31.3	7.5
Total years of working	6.6	4.8	4.7	4.8	5.6	4.9

Demographics	Frequency		Frequency (%)
	Male (N=109)	Female (N=142)	Total (N=251)
Position			
Subordinate	44	107	151 (60.2)
Middle manager	49	28	77 (30.7)
Upper-level manager	16	7	23 (9.2)
Education			
High school	15	19	34 (13.5)
2 year college	8	41	49 (19.5)
University	79	72	151 (60.2)
Graduate school	7	10	17 (6.8)

with the original items. The bank serves both commercial and consumer markets and has a widespread network system of about 300 branches nationwide. Employees in the bank work interdependently to provide various financial services (retail banking, personal banking, loan and mortgage services, financial investment, etc.). In order to execute such tasks, the bank operates its own IS to provide customized services. Since IS are essential tools for employees' daily operations, all participants in our surveys were familiar with their IS.

All of the surveys were conducted in the bank after work and the completed questionnaires were returned directly to the author on-site. All participants were assured of the confidentiality of their response before beginning the survey. A detailed description of the items and measures used in our study and the reliability estimates for the scales are shown in Appendix A.

Table 1 presents the demographics the participants. Initially, 352 questionnaires were distributed to the employees, consisting of tellers, financial consultants, and administrative staffs; 268 completed questionnaires were returned. Of these, 251 were usable, for an effective response rate of 71%.

3.2. Measures

3.2.1. Transformational leadership

We used the 20-item Multifactor Leadership Questionnaire (MLQ)-Short Form 5X, the most commonly used measure of transformational leadership, to measure leaders' transformational leadership styles. However, since this test is copy-righted, its items could not be shown here.

Since our hypotheses made no distinction among the four behavioral components of transformational leadership, we combined them into a single indicator [23]. The items tap into transformational leaders' visionary, inspirational, and supportive attributes as well as their behavioral characteristics. Leaders' immediate subordinates completed the 20-item MLQ to evaluate their supervisors' transformational behavior since subordinates are the target of the leader's influence and are thus most likely to observe their behavior. Each item was rated on a five-point Likert scale ranging from 1 (not at all) to 5 (frequently, if not always).

3.2.2. Perceived organizational support

POS was assessed using a three-item scale, which demonstrated the three highest factor loadings. Sample items included: "The organization takes pride in my accomplishments," and "The organization cares about my well-being." These items helped assess the degree of POS. Each item was also rated on a five-point

Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

3.2.3. Systems self-efficacy

This was evaluated through 10 items modified from the computer self-efficacy scale. Due to the limited space of the questionnaire, we only used four items, with the highest factor loading scores of the original items. Since self-efficacy is a *task-specific* construct, it was modified to comply with the type of task and its domain; for example: "I believe that I really have the ability to handle the IS for doing my tasks." Each item was rated on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree").

3.2.4. IS success

Perceived usefulness was assessed using four items adapted from Rai et al., dealing with individual productivity, task performance, time saved, and individual effectiveness on the job. IS satisfaction was measured using five items, showing reliability and quality of output IS. Sample items included: "Our IS improves my job performance" and "I am satisfied with the reliability of output information." Each item was rated on a seven-point scale ranging from 1 ("strongly disagree") to 7 ("strongly agree").

3.2.5. Control variables

Team type and *position* were controlled in order to minimize their potential confounding effects on IS success. Since each team (operation vs. marketing) had different objectives and intra-organizational dependencies, their differences might affect their relationships. *IS experience* and *demographic* variables were also controlled.

3.3. Data analysis

This study used structural equation modeling procedures (SEM) with AMOS 4.0 to estimate both the measurement and models. We tested the mediation effects of two variables by comparing the full model (including a mediation path) with a nested one (excluding the mediation path) for *individual mediated effect* based on the difference between χ^2 of the two models. In addition, we calculated the magnitude and significance of *specific mediated effects*, based on values of standardized direct paths computed in the model. Lastly, we tested the mediation effects using Sobel's test to ensure the hypothesized relationships (e.g., [21]).

3.4. Common methods bias

In order to mitigate any concerns about the role of common method bias in our results, we employed two statistical and two procedural methodologies recommended by Podsakoff et al. [14].

As a statistical remedy, a Harman's single-factor test was conducted for these variables. Results from this showed that common method bias was not a serious issue. Specifically, more than one factor emerged from the unrotated solution and the first factor accounted for only 44.2% of the variance. Furthermore, the correlation matrix (see Table 2) did not indicate any highly correlated factors (the highest correlation was 0.70).

Two procedural remedies were used in the measurement of the variables: first, we provided respondents with verbal and written assurance of confidentiality and explained that there were no right or wrong answers; second, the response format used to assess the various constructs was different.

Finally, recent literature suggested that common method bias was not generally as perverse as once suspected [19].

4. Results

4.1. Descriptive statistics

We used a two-step approach to assess the quality of the measures using confirmatory factor analysis. Table 2 shows that the square root of average variance extracted (AVE) of the diagonal were higher than their correlations with other constructs. Thus adequate discriminant validity was achieved.

Most items exhibited high-factor loading (above 0.70) except four items in four constructs which were slightly below the normally accepted cutoff, indicating adequate reliability and statistically significant *t*-value, reflecting unidimensionality and convergent validity.

The confirmatory factor analysis model (see Table 3) revealed a reasonable model (Total Model: Normed χ^2 = 3.19; Comparative Fit Index [CFI] = 0.95, Normed Fit Index [NFI] = 0.93, and the RMSEA of 0.09); see Table 4.

4.2. Hypothesis tests

4.2.1. The effect of transformational leadership

To test Hypotheses 1a and 1b, we analyzed the relationship between transformational leadership and the two IS success variables. As shown in Fig. 1, transformational leadership was significantly related to both perceived usefulness (path = 0.28, $p < 0.001$) and IS satisfaction (path = 0.30, $p < 0.001$). Therefore, both hypotheses were supported.

The results for the effect of transformational leadership on POS and SSE showed that transformational leadership was significantly related to perceived organizational support (path = 0.52, $p < 0.001$) and systems self-efficacy (path = 0.34, $p < 0.001$). Therefore, Hypotheses 2a and 2b were supported.

Table 2
Means, SD, inter-construct correlations and average variance extracted (*N* = 251).

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	**(10)**
Transformational leader[#] (1)	3.36	0.79	**0.77**									
Perceived organizational support (2)	3.84	1.09	0.47	**0.88**								
Systems self-efficacy (3)	4.14	0.81	0.32	0.39	**0.83**							
Perceived usefulness (4)	4.25	1.21	0.24	0.43	0.35	**0.95**						
IS satisfaction (5)	4.3	1.23	0.28	0.38	0.38	0.70	**0.91**					
Gender (6)	–	–	−0.06	0.01	−0.05	0.04	−0.03	**1.00**				
IS experience (7)	5.6	4.95	0.11	0.03	0.11	−0.05	−0.03	−0.26	**1.00**			
Team type (8)	–	–	0.08	−0.15	−0.07	−0.07	−0.03	−0.10	0.09	**1.00**		
Education (9)	–	–	0.07	0.06	−0.02	0.06	0.03	0.12	0.38	−0.09	**1.00**	
Position (10)	–	–	−0.06	0.01	−0.10	0.10	0.08	0.34	−0.59	−0.12	−0.06	**1.00**
Age (12)	31.3	7.54	0.15	0.03	0.07	−0.02	−0.01	−0.25	0.28	0.12	0.26	−0.46

Notes: [#]Transformational leadership was measured on a 5-point scale. All other constructs were estimated 7-point scales. *C.R. represents composite reliability.
The bolded numbers on the diagonal are the square root of the variance shared between the constructs and their measures. Off diagonal elements are correlations among constructs.

Table 3
Confirmatory factor analysis statistics.

Latent variables	Item	Factor loadings[#]	T-value	R^2	Cronbach's α	AVE	C.R.
Transformational leadership	IJ1	0.69	11.31	0.47	0.89	0.71	0.93
	IJ2	0.75	10.40	0.56			
	IJ3	0.69	10.19	0.47			
	IJ4	0.67	12.38	0.45			
	FCH1	0.83	12.36	0.68			
	FCH2	0.83	11.00	0.68			
	FCH3	0.73	10.55	0.53			
	FCH4	0.70	11.60	0.49			
	FCH5	0.77	12.17	0.59			
	FCH6	0.81	11.71	0.66			
	FCH7	0.78	11.52	0.61			
	FCH8	0.77	12.31	0.59			
	FCH9	0.82	12.77	0.67			
	FCH10	0.86	11.62	0.73			
	FCH11	0.77	12.37	0.60			
	FCH12	0.83	11.94	0.68			
	FIC1	0.80	9.71	0.63			
	FIC2	0.64	10.37	0.41			
	FIC3	0.68	9.90	0.47			
	FIC4	0.65					
Perceived organizational support	POS1	0.74	13.05	0.54	0.89	0.64	0.92
	POS2	0.89	12.44	0.79			
	POS3	0.82		0.67			
Systems self-efficacy	ISE1	0.77	11.83	0.59	0.87	0.71	0.91
	ISE2	0.77	11.02	0.59			
	ISE3	0.72	12.42	0.52			
	ISE4	0.81		0.66			
Perceived usefulness	PU1	0.94	28.29	0.87	0.96	0.89	0.97
	PU2	0.94	28.86	0.88			
	PU3	0.94	22.64	0.89			
	PU4	0.87		0.76			
IS satisfaction	IN_PF1	0.67	13.03	0.45	0.95	0.83	0.96
	IN_PF2	0.92	13.22	0.85			
	IN_PF3	0.94	13.36	0.88			
	IN_PF4	0.95	12.94	0.91			
	IN_PF5	0.91		0.84			

Notes: Loadings are specified as fixed to make the model identified.
[#]Even thought those values were lower than the cut-off, these items were included in the analysis. Since it is important to retain as many items as possible from the original scale to preserve the integrity of the original research design, as well as the comparability of the results with other studies that used the same scales.

4.2.2. The mediating effects of POS and SSE

In order to examine the mediation effects of POS (H3a and H3b) and SSE (H4a and H4b), we first explored whether the mediators had direct effect on each IS success factor. Fig. 2 shows the results for the full model: POS had a significant relationship with perceived usefulness (path = 0.44, $p < 0.001$) and IS satisfaction (path = 0.35, $p < 0.001$). In addition, the direct path from SSE to perceived usefulness (path = 0.31, $p < 0.001$) and IS satisfaction (path = 0.33, $p < 0.001$) were statistically significant. Overall, both POS and SSE were significantly related to increasing perceived usefulness and IS satisfaction, respectively.

In order to identify the mediation effects of POS and SSE, we conducted a comparison between the full and nested models using the maximum-likelihood method in AMOS 4.0, and calculated the

Table 4
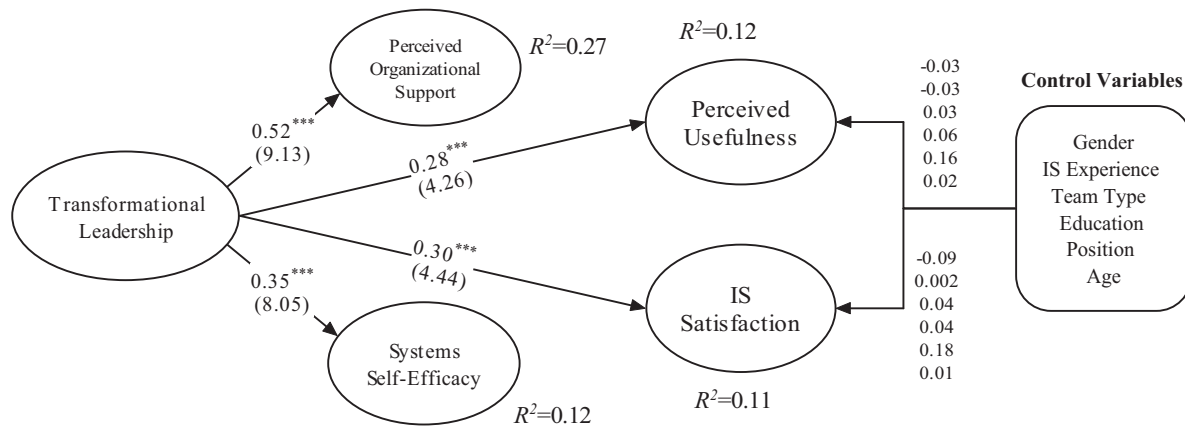Model fit comparisons among models.

Structure	Direct model	Two mediators model		Single mediator model			
				POS[a]		SSE[b]	
		Full model	Nested model	Full model	Nested mediation	Full model	Nested mediation
Normed χ^2	3.40	3.19	3.31	3.25	3.20	3.31	3.26
NFI (>.90)	0.92	0.93	0.93	0.93	0.93	0.93	0.93
CFI (>.90)	0.94	0.95	0.95	0.95	0.95	0.95	0.95
TLI (>.90)	0.94	0.94	0.94	0.94	0.94	0.94	0.94
RFI (>.90)	0.91	0.92	0.92	0.92	0.92	0.92	0.92
RMSEA[c]	0.10	0.09	0.09	0.10	0.10	0.10	0.10
RMSEA confidence level	0.094	0.09	0.09	0.091	0.091	0.092	0.092
	0.102	0.098	0.098	0.099	0.099	0.1	0.1
$\Delta\chi^2$	–		1.03		0.56		8.04
Sig.	–		0.60		0.76		0.02

Notes: Full model includes direct path, nested (partial) models exclude direct path.
[a] POS: perceived organizational support.
[b] SSE: systems self-efficacy.
[c] Even though root mean square of approximation (RMSEA) is a average fit at lower than 0.10 and at an excellent fit at lower than 0.05 (e.g., [20]), past research has used lower than 0.1 of RMSEA as acceptable fit criteria in various research fields.

Notes: T-values in Parenthesis.
***p<0.001, **p<0.01, *p<0.05.

Fig. 1. The effect of transformational leadership on IS success.

magnitude and significance of each mediation effect in the SEM. First, we calculated a nested model by excluding direct paths from transformational leadership to each IS success construct in the full model to allow for the presence of both direct and mediated effects for comparing χ^2 of two models. The results of nested-model comparison indicated that the effect of transformational leadership on IS success was completely mediated by both perceived organizational support and systems self-efficacy ($\Delta\chi^2 = 1.03$, $p > 0.1$). Further, single mediator models for calculating the effect of each mediator on the model show that for POS, the nested model (the model without direct paths) fit the data worse than the full model (the model with direct paths) including direct paths to perceived usefulness ($\Delta\chi^2 = 0.56$, $p > 0.1$), implying the presence of mediated effects. Thus, there was no significant difference of χ^2 between the two models. SSE, on the other hand, did not fully mediate the relationship between transformational leadership and IS success factors in the model ($\Delta\chi^2 = 8.04$, $p < 0.05$).
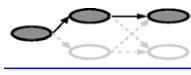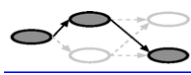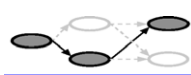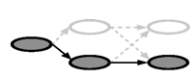
Further, Sobel's test had suggested that the indirect effects of the relationships through perceived organizational support were statistically significant. The magnitude and significance of each

mediation effect are shown in Table 5, demonstrating that POS and SSE were significantly related to perceived usefulness (path = 0.23, $z = 3.31$) and IS satisfaction (path = 0.18, $z = 3.23$). Additionally, each mediation effect of SSE demonstrated a statistically significant relationship with perceived usefulness (path = 0.11, $z = 2.39$) and IS satisfaction (path = 0.11, $z = 2.76$). Thus Hypothesis 4b was supported. Therefore, based on the two complementary methods we concluded that Hypotheses 3a and 3b (the mediation effects of POS) were supported, and that Hypothesis 4a was strongly supported, but that Hypothesis 4b was only partially supported.
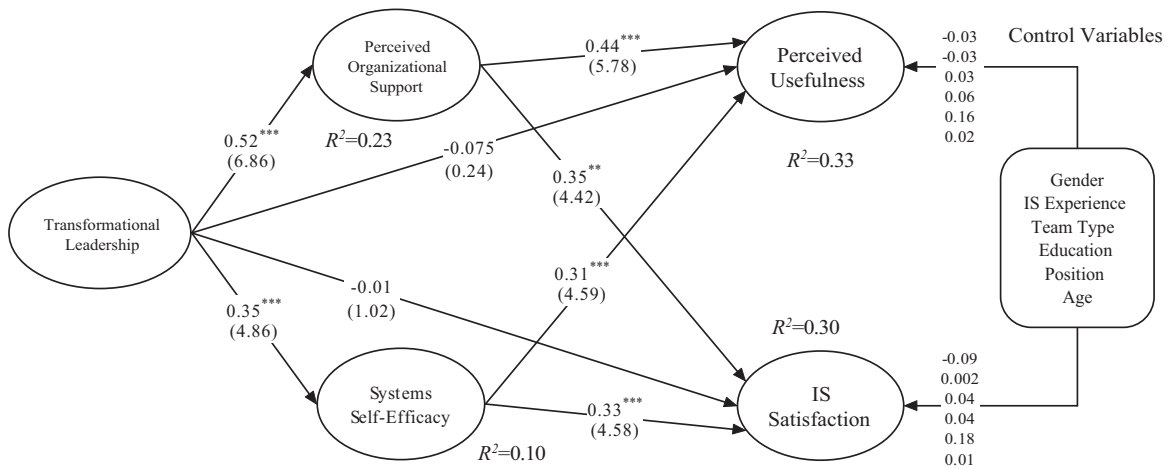
5. Discussion

We applied transformational leadership theory to an IS context and found that our test results were consistent with the finding in the transformational leadership literature. The major findings supported our hypotheses in that both a system user's POS and SSE act as mediators in the relationship between transformational leadership and IS success. Table 6 presents our results.

Table 5
Significance of mediated paths from transformational leadership to IS success.

Indirect effect		Row	Mediated paths	Significant mediated paths	Path	Z stat[a]
Specific mediation effect	TFL[b] → POS[c]	A	TFL → POS → perceived usefulness		0.23	3.31
		B	TFL → SSE → IS satisfaction		0.18	3.23
	TFL → SSE[d]	C	TFL → SSE → perceived usefulness		0.11	2.39
		D	TFL → SSE → IS satisfaction		0.11	2.76

[a] The standard errors are approximated as $\sqrt{\sigma_\alpha^2\beta^2 + \sigma_\beta^2\alpha^2 + \sigma_\alpha^2\sigma_\beta^2}$ for a single mediated path, where, σ_j^2 is variance with j denoting α_i and β_i path coefficients, α_i and β_i are path coefficients with i denoting first and second mediators, and $\sigma_{\beta_1\beta_2}$ is covariance between β_1 and β_2, as adapted from MacKinnon et al. [13].
[b] TFL: transformational leadership.
[c] POS: perceived organizational support.
[d] SSE: systems self-efficacy.

Note: *T*-values are in parenthesis.
R^2 values are in Full model.
***$P < 0.001$; **$P < 0.01$; *$P < 0.05$.

Fig. 2. The results of the structural model ($N = 251$).

Table 6
Summary of hypotheses testing.

Hypothesis	Descriptions	Support
H1a	Transformational leadership will be positively related to a system user's perceived usefulness	Yes
H1b	Transformational leadership will be positively related to a system user's IS satisfaction	Yes
H2a	Transformational leadership will be positively related to a system user's perceived organizational support	Yes
H2b	Transformational leadership will be positively related to a system user's system self-efficacy	Yes
H3a	A system user's perceived organizational support will mediate the relationship between transformational leadership and a system user's perceived usefulness	Yes
H3b	A system user's perceived organizational support will mediate the relationship between transformational leadership and a system user's IS satisfaction	Yes
H4a	A system user's systems self-efficacy will mediate the relationship between transformational leadership and a system user's perceived usefulness	Yes
H4b	A system user's systems self-efficacy will mediate the relationship between transformational leadership and a system user's IS satisfaction	Yes (partial)

5.1. Theoretical implications

Our study integrated two important managerial issues—transformational leadership and IS success. Although several studies previously examined the effect of leadership on IS success, less attention was devoted to understanding the role of transformational leadership in the IS context. Therefore, our study showed that transformational leadership played an important role in an IS context.

By focusing on system users' affective and cognitive reactions to transformational leadership, we identified the underlying individual mechanisms of the relationship between transformational leadership and IS success. Understanding individual mechanisms in certain relationships is crucial because it helps explain the phenomena that occur in organizations. Since IS in organizations are operated by people, considering system users is important in articulating IS success.

There has been much evidence on the effectiveness of transformational leadership in Western cultures including the U.S., but there has been a lack of research on transformational leadership in non-Western cultures. Korea has well-known cultural features—specifically, collectivism and high power distance. Our study showed that POS, as an operation for the social exchange perspective, was an important way for Korean employees, working with transformational leaders, to achieve IS effectiveness along with their self-efficacy to IS that they use in the workplace.

5.2. Practical implications

Our major findings showed that transformational leaders help employees feel that they are supported and help them become confident in operating IS in the workplace. Therefore, IS managers should note that IS success can be enhanced by leaders' transformational leadership style. Management should provide transformational leadership development programs for their IS managers, who should be encouraged to act in ways that create high levels of perceived organizational support of their employees as well as systems self-efficacy. Managers should also structure their organizational procedures in ways that helps to make IS users feel that they are valued and become confident in using IS to perform their tasks effectively.

Finally, our study can provide IS managers, working in similar cultures to Korea, a better understanding of how they can use transformational leadership behavior and skills in motivating employees to achieve IS success.

5.3. Limitations

There are four limitations to our study. First, we did not consider technical factors for IS success though they obviously do affect the results. Second, even though the results were consistent with our theoretical assumptions, the cross-sectional design could not completely rule out alternative explanations and we were not

able to test any causal inferences. Third, since the findings were drawn from a Korean sample, the results are not necessarily generalizable to other nations or continents. Transformational theory, as developed in Western cultures, may not apply to Korean and other Eastern cultures. Finally, all of the variables in our study were collected from one source and this could have been a source of common method bias, which could explain some observed relationships between variables.

Despite these limitations, our study showed a positive impact of transformational leadership on IS success in Korea. The results suggested that transformational leadership achieved both individual IS success as well as IS satisfaction by enhancing system users' perceived organizational support and system self-efficacy.

Appendix A. Measures

Items
Transformational leadership [4]
Multifactor Leadership Questionnaire (MLQ)-Short Form 5X (20 items)
Perceived organizational support (POS) [9]
The organization takes pride in my accomplishments
The organization cares about my well-being
The organization values my contributions to its well-being
Systems self-efficacy (SSE) [11]
I believe that I really have the ability to handle the information system for doing my tasks
I believe that I have the high system proficiency to complete my tasks on time
I believe that I am an expert for use of information systems at my job
I am very proud of my skills and abilities to handle information systems
Perceived usefulness [15]
Using our information system improves my job performance
Using our information system in my job increases my productivity
Using our information system enhances my effectiveness on the job.
Using our information system makes it easier to do my job
IS satisfaction [16]
I am satisfied with the reliability of output information
I am satisfied with the quality of available reports
I am satisfied with up-to-date information from information systems
I am satisfied with the relevancy of report
I am satisfied with the accuracy of the output information of report

References

[1] N. Au, E.W.T. Ngai, T.C.E. Cheng, A critical review of end-user information system satisfaction research and a new research framework, Omega 30 (6), 2002, p. 451.
[2] B.J. Avolio, W. Zhu, W. Koh, P. Bhatia, Transformational leadership and organizational commitment: mediating role of psychological empowerment and moderating role of structural distance, Journal of Organizational Behavior 25, 2004, pp. 951–968.
[3] A. Bandura, E.A. Locke, Negative self-efficacy and goal effects revisited, Journal of Applied Psychology 88 (1), 2003, pp. 87–99.
[4] B.M. Bass, B.J. Avolio, Full Range of Leadership Development: Manual for the Multifactor Leadership Questionnaire, Mind Garden, California, 1997.
[5] B.M. Bass, B.J. Avolio, D.I. Jung, Y. Berson, Predicting unit performance by assessing transformational and transactional leadership, Journal of Applied Psychology 88 (2), 2003, pp. 207–218.
[6] J. Cho, F. Dansereau, Are transformational leaders fair? A multi-level study of transformational leadership Justice Perceptions, and Organizational Citizenship Behaviors Leadership Quarterly 21 (3), 2010, pp. 409–421.
[7] R. Cropanzano, M.S. Mitchell, Social exchange theory: an interdisciplinary review, Journal of Management 31 (6), 2005, pp. 874–900.
[8] W.H. Delone, E.R. Mclean, The DeLone and McLean model of information systems success: a ten-year update, Journal of Management Information Systems 19 (4), 2003, pp. 9–30.
[9] R. Eisenberger, R. Huntington, S. Hutchison, D. Sowa, Perceived organizational support, Journal of Applied Psychology 71, 1986, pp. 500–507.
[10] R. Eisenberger, F. Stinglhamber, C. Vandenberghe, I.L. Sucharski, L. Rhoades, Perceived supervisor support: contributions to perceived organizational support and employee retention, Journal of Applied Psychology 87 (3), 2002, p. 565.
[11] R.D. Johnson, G.M. Marakas, Research report: the role of behavioral modeling in computer skills acquisition—toward refinement of the model, Information Systems Research 11, 2000, p. 403.
[12] T.A. Judge, R.F. Piccolo, Transformational and transactional leadership: a meta-analytic test of their relative validity, Journal of Applied Psychology 89 (5), 2004, pp. 755–768.
[13] D.P. MacKinnon, C.M. Lockwood, J.M. Hoffman, S.G. West, V. Sheets, A comparison of methods to test mediation and other intervening variable effects, Psychological Methods 7, 2002, pp. 83–104.
[14] P. Podsakoff, S. MacKenzie, N. Podsakoff, Common method biases in behavioral research: a critical review of the literature and recommended remedies, Journal of Applied Psychology 88 (5), 2003, pp. 879–903.
[15] A. Rai, S.S. Lang, R.B. Welker, Assessing the validity of IS success models: an empirical test and theoretical analysis, Information Systems Research 13 (1), 2002, p. 50.
[16] L. Raymond, Organizational characteristics and MIS success in the context of small business, MIS Quarterly 9, 1985, p. 37.
[17] L. Rhoades, R. Eisenberger, Perceived organizational support: a review of the literature, Journal of Applied Psychology 87 (4), 2002, pp. 698–714.
[18] L. Shanock, R. Eisenberger, When supervisors feel supported: relationships with subordinates' perceived supervisor support, perceived organizational support, and performance, Journal of Applied Psychology 91 (3), 2006, pp. 689–695.
[19] P.E. Spector, Method variance in organizational research: truth or urban legend? Organizational Research Methods 9 (2), 2006, p. 221.
[20] G.L. Stewart, S.L. Dustin, M.R. Barrick, T.C. Darnold, Exploring the handshake in employment interviews, Journal of Applied Psychology 93 (5), 2008, pp. 1139–1146.
[21] S. Utz, U. Matzat, C. Snijders, On-line reputation systems: the effects of feedback comments and reactions on building and rebuilding trust in on-line auctions, International Journal of Electronic Commerce 13 (3), 2009, pp. 95–118.
[22] F.O. Walumbwa, B.J. Avolio, W. Zhu, How transformational leadership weaves its influence on individual job performance: the role of identification and efficacy beliefs, Personnel Psychology 61 (4), 2008, pp. 793–825.
[23] H. Wang, K.S. Law, R.D. Hackett, D. Wang, Z.X. Chen, Leader-member exchanges as a mediator of the relationship between transformational leadership and followers' performance and organizational citizenship behavior, Academy of Management Journal 48 (3), 2005, pp. 420–432.
[24] G. Yukl, How leaders influence organizational effectiveness, The Leadership Quarterly 19 (6), 2008, pp. 708–722.

Jeewon Cho is an assistant professor of the College of Business at Oregon State University. She received her Ph.D. in Organizational Behavior from the State University of New York (SUNY) at Buffalo. Her current research interests include leadership processes at multiple levels of analysis, organizational justice, social identity and identification in organizations, multiple levels of analysis issues, and interdisciplinary works. Her research has been published in leading journals such as the Leadership Quarterly, Journal of Management, Group and Organization Management, Decision Support Systems, European Journal of Work and Organizational Psychology, and Journal of Leadership and Organizational Studies. In addition, her research works have been presented in major conferences such as the Academy of Management (AOM), the Society for Industrial and Organizational Psychology (SIOP), the International Conference on Information Systems (ICIS), etc.

Insu Park is an instructor in the Department of Management Information Systems of the Fogelman College of Business at University of Memphis. He received his Ph.D. in management information systems from the State University of New York (SUNY) at Buffalo. His current research interests include IT impacts, E-commerce, information assurance, and trust issues. His research has been published in leading journals such as International Journal of Electronic Commerce, Decision Support Systems, and IEEE Transaction on System, Man and Cybernetics. Also, his research works have been appeared in several conference proceedings and presentations in major conferences such as the International Conference on Information Systems (ICIS), the Americas Conference on Information Systems (AMCIS), and the Academy of Management (AOM), etc.

John W. Michel is an assistant professor in the Department of Management at Towson University. He received his Ph.D. in organizational behavior/human resource management from the University at Albany. His research interests include supportive and fun workplace practices, social exchange relationships, leadership and influence processes, and employee selection and retention issues. His research has been published in journals such as the Journal of Vocational Behavior, Human Performance, the Journal of Leadership & Organizational Studies, the Journal of Service Management, and the Journal of Applied Social Psychology.