



The effects of organizational citizenship behaviors on ERP system success

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ABSTRACT

Although the research on organizational citizenship behaviors (OCBs) has increased dramatically in diverse fields during the past decade, little is known about the OCBs in the information systems area. The purpose of this study was to explore the effect of OCBs on enterprise resource planning (ERP) system success. In order to perform empirical analyses, measurements on the OCBs constructs based on the five dimensions of [Organ, D.W. (1988). *Organizational citizenship behavior: The "Good Soldier" syndrome*. MA: Lexington Books]: altruism, conscientiousness, courtesy, civic virtue, and sportsmanship were developed, and the research model including the relationships between the OCBs constructs and ERP system success variables of information quality, work efficiency, and intention of IT innovation was proposed and empirically analyzed using structural equation modeling.

The contribution of this study is to provide strategic insights for successfully managing ERP systems by identifying the effects of organizational citizenship behaviors in ERP context.

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1. Introduction

Organizational citizenship behaviors (OCBs) are discretionary, extra-role behaviors of employees, which go beyond the prescribed formal roles, and are known to be contributing factors of organization performance (Organ, 1988). The topic of OCBs initially did not even have a substantial impact on the field of organization behavior study. But interest in it and related concepts, such as extra-role behavior (Van Dyne, Cummings, & Parks, 1995), prosocial organizational behavior (Brief & Motowidlo, 1986), civic organizational behavior (Graham, 1991), organizational spontaneity (George & Brief, 1992), and contextual performance (Borman & Motowidlo, 1997), have increased dramatically during the past decade (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Moreover, interest in OCBs has not been confined to the field of organization behavior but has extended to such diverse fields as human resources management (Borman & Motowidlo, 1997), marketing (Kelley & Hoffman, 1997; Yoon & Suh, 2003), hospital and health administration (Bolon, 1997), and education (Somech & Drach-Zahavy, 2000).

Although the rapid growth in theory and research obviously has been gratifying to those interested in OCBs (Podsakoff et al., 2000), much still remains unexplored about possible consequences of OCBs (Yoon & Suh, 2003). Most of the research on OCBs initially has focused on the effects of employee-level variables such as attitude, perceptions, and personal dispositions (Organ & Ryan, 1995), but recently there have been several attempts to explore various other consequences of OCBs such as sales performance (Podsakoff & MacKenzie, 1994), productivity and product quality (Podsakoff,

Ahearne, & MacKenzie, 1997), and service quality in marketing (Bell & Menguc, 2002; Yoon & Suh, 2003). However, little is known about the effects of OCBs on information systems.

An enterprise resource planning (ERP) system is a packaged software system that provides a totally integrated solution to information-processing needs, enabling executives to manage resources efficiently and effectively (Shih, 2006). These days, many companies have implemented an ERP system not only to survive but also to achieve strategic advantages in an increasingly competitive business environment (Glover, Prawitt, & Romney, 1999). The ERP system has subsequently become the backbone of the information system of the company (Kalakota & Robinson, 2000). In fact, recently ERP systems have become the typical information system in most companies. Consequently, we choose the ERP system as information system representative, and we will attempt to explore the effects of OCBs on ERP system success in this study.

The next section will introduce the conceptual background of this study including the OCB and ERP system success variables. Our research model and hypotheses will be explained in the third section. The research design and survey results will be presented in the fourth and the fifth sections, respectively. In the sixth section, we will discuss our results and will explain the implications of this study and further research directions.

2. Conceptual background

2.1. Organizational citizenship behavior

Katz and Kahn (1978) divided behaviors in organizations into in-role behavior in accordance with formal role descriptions, and extra-role behavior beyond formal role requirements. According

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to their theory, extra-role behavior arises from feelings of “citizenship” with respect to the organization (Burns & Collins, 1995). These feelings have been perceived as the backbone of behaviors that were not required by an organization, but which have positive impact on organizational function (Organ, 1988).

Diverse terms to describe extra-role behavior have been suggested such as organizational citizenship behavior (Organ, 1988; Smith, Organ, & Near, 1983), prosocial organizational behavior (Brief & Motowidlo, 1986), civic organizational behavior (Graham, 1991), organizational spontaneity (George & Brief, 1992), and contextual performance (Borman & Motowidlo, 1997). The most recognizable term is organizational citizenship behavior (OCB) proposed by Smith et al. (1983). Organ defined OCB as “*individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization*” (1988, p. 4). Also, Organ more recently defined OCB as “*performance that supports the social and psychological environment in which task performance takes place*” (1997, p. 95).

Various dimensions have been proposed to define and operationalize this organizational citizenship behavior construct. Organ (1988) proposed ‘altruism’, ‘conscientiousness’, ‘courtesy’, ‘civic virtue’, and ‘sportsmanship’ as OCB dimensions. Smith et al. (1983) proposed ‘altruism’ and ‘generalized compliance’ as its components. Podsakoff and MacKenzie (1994) proposed ‘helping behaviors’, ‘sportsmanship’ and ‘civic virtue’, and Graham (1989) proposed ‘organizational obedience’, ‘interpersonal helping’, ‘organizational loyalty’, and ‘organizational participation’. The components of Organ’s (1988) study have become widely accepted as the dimensions of organizational citizenship behavior construct as they comprehensively represent the constructs on extra-role behavior or voluntary behavior proposed in previous studies.

Organ (1988) depicted the dimensions as follows. Altruism occurs when one employee aids another employee in completing his/her task under unusual circumstances (e.g., Organ’s (1988) example of one worker helping another catch up after sick leave). Conscientiousness refers to an employee performing his/her assigned tasks (in-role behavior) in a manner above what is expected. Courtesy includes behavior such as “*helping someone prevents a problem from occurring, or taking steps in advance to mitigate the problem*” (Organ, 1988, p. 12). Civic virtue involves support for the administrative functions of the organization. Sportsmanship refers to stressing the positive aspects of the organization instead of the negative.

These days, the reason that organizational citizenship behavior has been visibly noted in management is its positive impacts on organization. To support the conceptual plausibility that organizational citizenship behaviors contribute to organizational effectiveness, several studies have been conducted to empirically test the relationship between such behaviors and organizational effectiveness (Podsakoff et al., 2000). In these studies, Karambayya (1990) found that employees in a high performing work unit exhibited more citizenship behaviors than employees in a low performing work unit. Podsakoff and MacKenzie (1994) empirically demonstrated that citizenship behaviors had a positive impact on sales performance in an insurance agency unit. Also, Podsakoff et al. (1997) showed empirically that citizenship behaviors had a positive impact on productivity and product quality in paper mill work crews. In marketing literature, Bell and Menguc (2002) explored the direct positive relationship between organizational citizenship behaviors and customers’ perceptions of service quality.

2.2. ERP system success variables

ERP systems not only transform an information system environment but also affect business process and employee behaviors at a

firm-wide level (Lee & Lee, 2004a). Therefore, it is desirable for ERP system success variables to include the measurements reflecting information system quality, effectiveness of business process, and employee behaviors. Markus and Tanis (2000) stress that the outcome of ERP implementation is a dynamic concept, consisting of multiple dimensions: (1) business index (ROI, better decision making, etc.); (2) operational metrics (labor costs, orders shipped without errors, cycle times, inventory levels, etc.); (3) information capability (information quality, effective use of information, user satisfaction with information, etc.). Gable, Sedera, and Chan (2003) proposed an Enterprise System success model composed of system quality, information quality, system use, user satisfaction, individual impact, and organization impact based on DeLone and McLean’s (1992) IS success model. Taking the Markus and Tanis (2000) assertion and the Gable et al.’s (2003) Enterprise system success model into consideration, information system quality, effectiveness of operational process and financial performance are regarded as the factors of ERP system success.

When an ERP system is implemented in an organization, organizational knowledge such as best practices and process design techniques based on information technologies are also transferred (Lee & Lee, 2004b), thus increasing the innovative capacity of employees. Therefore, innovative behaviors of employees may be an important measurement of ERP system success. Accordingly, information quality, work efficiency, intention of IT innovation representing information system quality, effectiveness of operational process, and innovative behaviors of employees respectively were proposed as ERP System success variables in this study. (System quality and information quality are quite different constructs, but because this study doesn’t deal with implementation success for ERP system, we excluded system quality as an ERP system success value.) Although measuring financial performance must be an important variable to measure ERP system success, in information system literature, it has been argued that financial performance cannot be used as a measurement since it is difficult to measure financial performance affected only by information systems. Therefore, we excluded the variable in this study.

3. Research model and hypotheses

As Organ’s (1988) study on citizenship behavior is well known and the construct of his study comprehensively represents the constructs on extra-role behavior proposed by previous studies, the model for this research is based on the construct of OCBs proposed by Organ (1988). OCBs, which consist of the five dimensions of altruism, conscientiousness, courtesy, civic virtue, and sportsmanship, affect information quality, work efficiency and intention of IT innovation thereby affecting ERP system success positively. In addition, information quality of the ERP system affects work efficiency, and work efficiency by ERP system also affects employees’ intention of IT innovation. Fig. 1 represents the research model.

Podsakoff and MacKenzie (1997) argued that helping behaviors (altruism) had a positive impact on productivity and product quality due to helping coworkers “learn the ropes” to become more productive employees faster. ERP system data created by employees who are new or who are inexperienced in using an ERP system can be inaccurate and incomplete. Helping behaviors toward them may make the data of an ERP system more accurate and complete through teaching ERP system operations, and help to spread “best practices” in using an ERP system (Podsakoff & MacKenzie, 1997), thus enhancing the information quality of the ERP system.

Today, ERP systems play an important role in accomplishing the business of a company. Consequently, difficulties that arise from using an ERP system may cause business transaction delays. Any act that helps the colleagues who are having difficulty using an

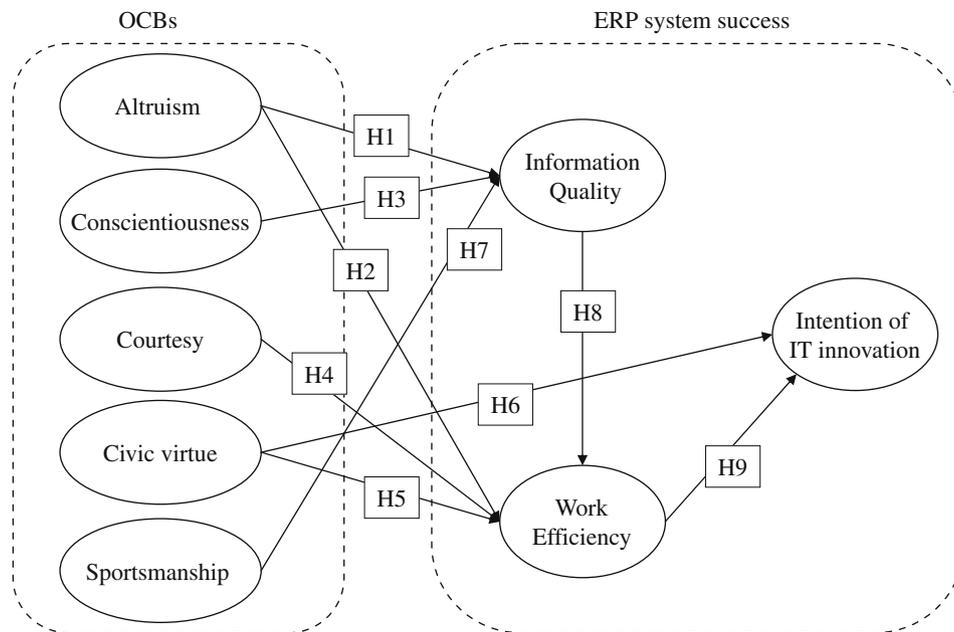


Fig. 1. Research model.

ERP system (altruism), will improve the efficiency of business transactions. Therefore, we establish the following hypotheses.

Hypothesis 1. Altruism has a positive impact on the information quality of an ERP system.

Hypothesis 2. Altruism has a positive impact on the work efficiency by an ERP system.

Conscientiousness refers to discretionary behaviors by an employee that go well beyond the minimum role requirements of the organization in the areas of attendance, obeying rules and regulations, taking breaks, working hard, and so forth (Farh, Earley, & Lin, 1997). Conscientious behaviors such as observing company regulations and procedures in using an ERP system, and performing ERP system transactions in time or even after working time will create timely information in using the ERP system. Therefore, conscientious behaviors are expected to have a positive influence on the information quality of an ERP system.

Hypothesis 3. Conscientiousness has a positive impact on the information quality of an ERP system.

Courtesy may serve as an effective means of coordinating activities between team members and across work groups. Courtesy by “touching base” with other team members, or members of other functional groups in the organization, reduces the likelihood of the occurrence of problems that would otherwise take time and effort to resolve (Podsakoff & MacKenzie, 1997). Therefore, it is expected that courtesy behaviors preventing a problem from occurring in using an ERP system, or taking steps in advance to mitigate the problem will enhance work efficiency through promoting the cooperation of business units.

Hypothesis 4. Courtesy has a positive impact on work efficiency in an ERP system.

Civic virtue by voluntarily attending and actively participating in work unit meetings help the coordination of effort among team members, thus potentially increasing the group’s effectiveness and efficiency (Podsakoff & MacKenzie, 1997). Also, civic virtue behaviors involving support for the administrative functions of the organization (Organ, 1988) will also enhance work efficiency through promoting the cooperation of business units. Therefore, citizenship behaviors are expected to have a positive influence on work efficiency by ERP system.

Employees who attend and actively participate in meetings aid the dissemination of information in an organization, thus enhancing its responsiveness (Podsakoff & MacKenzie, 1997). In addition, civic virtue behaviors such as following company policies or business strategies, and participating to meet process improvement goals (Organ, 1988) will also have a strong positive effect on the innovation of an organization. Therefore it may also be deduced that these positive behaviors impact on intention of IT innovation. Consequently, the following hypotheses can be established.

Hypothesis 5. Civic virtue has a positive impact on the work efficiency of an ERP system.

Hypothesis 6. Civic virtue has a positive impact on intention of IT innovation.

Podsakoff and MacKenzie (1997) also argued that employees, who exhibit sportsmanship, by demonstrating a willingness to take on new responsibilities or learn new skills, enhance the organization’s ability to adapt to changes in its environment. Sportsmanship behaviors such as being willing to accept new information technologies will contribute to an ERP system being successfully adapted into the organization, and thus will ultimately have a positive effect on the information quality of an ERP system. Therefore, the following hypothesis can be established.

Hypothesis 7. Sportsmanship has a positive impact on the information quality of an ERP system.

In information system literature, the fact that the quality of information has a positive impact on work efficiency is grounded on theoretical rationale and empirical cases (DeLone & McLean, 1992). Thus, it is noted that the quality of information generated by an ERP system affects work efficiency positively.

Hypothesis 8. Information quality of an ERP system has a positive impact on work efficiency.

Generally, innovation is defined as the development and successful implementation of new and creative ideas (Amabile, 1988; Draft, 1978). The propensity toward adopting the innovation lies in the perceived benefits (Ching & Niehoff, 2003). Therefore the benefits of an ERP system such as work efficiency by ERP system may favorably affect intention of IT innovation.

Hypothesis 9. Work efficiency by ERP system has a positive impact on intention of IT innovation.

4. Research methodology

4.1. Data collection

The target of this study is the organization that has implemented an ERP system. In order to gather data from these organizations, the following procedure was performed: first, the firms were identified from the lists provided by ERP vendors; second, we visited the firms and asked executives or senior managers of the firms to participate in this study; third, e-mails that included the electronic survey method and links to the web-based questionnaire were sent to them that agreed to our proposal; last, they forwarded the e-mails to his or her staffs.

Data for analysis was collected in Korea. In total, 152 usable questionnaires from 35 firms were used for analysis. Of the respondents, 21 manufacturing firms, eight distribution or service firms, five bank or telecommunication firms, and one university were involved in the study. The ERP systems implemented in the respondents' firms consisted of 14 SAP ERP systems, 15 Oracle ERP systems, one uni-ERP system, and five small size ERP systems. With respect to the individual respondents, 30 respondents belonged to marketing/sales departments, 59 to HR/finance departments and 40 to operation/R&D departments. Detailed descriptive statistics relating to the respondents' characteristics are shown in Table 1.

Descriptive data are shown in Table 2. All items ranged from 1 (strongly disagree) to 7 (strongly agree), and showed a reasonable dispersion in their distributions across the ranges, as seen in the standard deviations.

4.2. Measurements

The questionnaire used for data collection contained scales to measure the various constructs of the research model. The measurements for OCB were adapted from Bell and Menguc's (2002) study, and the measurements for information quality on ERP systems were adapted from the Sedera and Gable's (2004) study. The items for work efficiency and intention of IT innovation were newly developed in this study. The pilot test of the measures was conducted by graduate students majoring in MIS. Individuals indicated their agreement or disagreement with the survey items using a seven-point scale. The wording of items was modified on

Table 2

Descriptive statistics of data.

Construct	Mean (Std.) of construct
OCBs	
Altruism	5.06(1.28)
Conscientiousness	5.43(0.96)
Courtesy	5.74(0.88)
Civic virtue	5.85(0.92)
Sportsmanship	4.14(1.28)
Information quality	5.47(1.04)
Work efficiency	5.02(1.13)
Intention of IT innovation	5.73(0.99)

the basis of the results of the pilot test and the advice of IT experts. All items of the questionnaire are shown in Appendix A.

5. Results

The SEM (Structural Equation Modeling) approach was used to validate our research model. Partial Least Squares (PLS-Graph Version 3.0) was employed to perform the analysis. Although LISREL technique also is widely used for empirically-base studies, PLS is more appropriate in performing exploratory level studies such as this study (Chin, 2000).

Data analysis proceeded in two stages. First, a validity test on the research measurements was examined by confirmatory factor analysis. Second, an analysis of the structural equation model followed for testing the associations in the research model.

5.1. Reliability and validity of measurement items

Partial least squares (PLS) can test the convergent and discriminant validity of the scales. In a Confirmatory Factor Analysis (CFA) by PLS, convergent validity is shown when a measurement loads highly if its coefficient is above 0.60 and loads very significantly, with t -values well within the 0.01 level, on their assigned construct (Bagozzi & Yi, 1988). Table 3 shows the factor loadings of the measurement items and t -values.

The factor loadings of all items surpass the recommended level, 0.60 demonstrating convergent validity, and all t -values are also above 1.96 (Gefen & Straub, 2005).

Table 1

Descriptive statistics of respondents' characteristics.

Organizational characteristics			Individual characteristics		
Measure	Frequency	Percent	Measure	Frequency	Percent
<i>Type of firms</i>			<i>Dept.</i>		
Manufacturing	21	60	Marketing/sales	30	20
Distribution or service	8	23	HR/finance	59	39
Bank or telecommunication	5	14	Operation/R&D	40	26
University	1	3	Other	23	15
	35	100		152	100
<i>Installed ERP system</i>			<i>Job</i>		
SAP	14	40	Executive	5	3
Oracle	15	43	Senior manager	19	13
uni-ERP	1	3	Manager	66	43
Other.	5	14	Staff	62	41
	35	100		152	100
<i>Number of operating years</i>			<i>Number of years</i>		
Over 5	12	34	Below 5	44	29
3–5	8	23	5–10	36	24
1–3	7	20	10–15	38	25
Below 1	8	23	Over 15	34	22
	35	100		152	100

Discriminant validity is shown when two things happen: (1) measurement items load more strongly on their assigned construct than on the other constructs in a CFA, and when (2) the square root of the Average Variance Extracted (AVE) of each construct is larger than its correlations with the other constructs (Gefen & Straub, 2005).

As shown in Table 3, all the measurement items loaded considerably more strongly on their respective factor than on the other constructs. Table 4 shows the square root of AVE and the inter-construct correlations. Comparison of the correlation with the square root of AVE shows that all correlations between two constructs are less than the square root of AVE of both constructs.

In order to assess measurement items' reliability, we compute composite construct reliability coefficient, as shown in Table 4. Composite reliabilities range from 0.872 (for conscientiousness) to 0.942 (for intention of IT Innovation), which exceed the recommended level of 0.70 (Bagozzi & Yi, 1988). AVE range from 0.695 (for conscientiousness) to 0.891 (for intention of IT Innovation), which also exceed the recommended level of 0.50 (Fornell & Larcker, 1981). The results, therefore, demonstrate a reasonable reliability level for the measured items.

5.2. Hypothesis testing results

Having assessed the structural model, we examined the coefficients of the causal relationships between constructs, which would validate the hypothesized effects. Fig. 2 illustrates the paths and their significance on the structural model. The coefficients, and their *t*-value on the structural model, and the coefficients of determination (R^2) for each dependent construct are shown in Table 5.

Based on the structure model, we performed hypotheses testing. As indicated in Table 5, the results show that all hypothesized OCBs' constructs (altruism, conscientiousness, sportsmanship) on information quality have a significant impact with $\alpha = 0.05$. In the case of work efficiency however, none of OCBs' constructs (altruism, courtesy, civic virtue) has a significant impact on the construct. In addition, civic virtue construct has a significant impact on intention of IT innovation. In the hypotheses testing among the ERP system success variables, information quality effects on work efficiency, and work efficiency have a significant impact on intention of IT innovation with $\alpha = 0.01$, thus the hypotheses were supported.

Also about 33% of the variance of information quality is explained by OCBs ($R^2 = 0.332$), and about 52% of the variance of work efficiency by information quality, above 51% of the variance of intention of IT innovation by OCBs and work efficiency ($R^2 = 0.509$). Table 5 shows more detail of the results of the hypotheses testing.

6. Discussion and conclusions

Although the research on OCBs has increased dramatically during the past decade, still much remains unexplored about possible consequences of OCBs (Yoon & Suh, 2003). Notably, little is known of the effects of OCBs in the information system field. This study has begun to seek out the consequences of OCBs in the field of information systems. In order to achieve the purpose of this study, the research model, based on the OCBs constructs proposed by Organ (1988), consisting of the five dimensions of altruism, conscientiousness, courtesy, civic virtue, and sportsmanship, and including

Table 3
Results of confirmatory factor analysis.

Construct	Factor								<i>t</i> -value
	1	2	3	4	5	6	7	8	
<i>Altruism</i>									
ATZ1	0.884	0.566	0.379	0.313	0.173	0.360	0.189	0.349	20.61
ATZ2	0.934	0.520	0.421	0.331	0.120	0.387	0.274	0.378	62.64
ATZ3	0.857	0.445	0.326	0.348	0.133	0.279	0.191	0.366	24.72
ATZ4	0.772	0.400	0.328	0.267	0.219	0.285	0.260	0.264	15.26
<i>Conscientiousness</i>									
CTS1	0.490	0.868	0.611	0.534	0.131	0.502	0.296	0.594	46.94
CTS2	0.502	0.802	0.615	0.45	0.166	0.353	0.304	0.385	18.57
CST3	0.409	0.830	0.618	0.368	0.076	0.271	0.192	0.420	20.74
<i>Courtesy</i>									
CTS1	0.342	0.602	0.829	0.403	0.169	0.413	0.303	0.437	12.84
CTS2	0.242	0.518	0.847	0.500	0.129	0.293	0.214	0.495	15.73
CTS3	0.455	0.696	0.835	0.604	0.003	0.376	0.281	0.527	17.81
<i>Civic Virtue</i>									
CVT1	0.337	0.534	0.604	0.935	0.168	0.435	0.306	0.641	69.97
CVT2	0.309	0.503	0.580	0.947	0.232	0.459	0.354	0.602	77.52
CVT3	0.351	0.479	0.455	0.861	0.231	0.457	0.333	0.586	28.55
<i>Sportsmanship</i>									
SPM1	0.131	0.109	0.104	0.159	0.889	0.319	0.257	0.087	36.97
SPM2	0.247	0.203	0.154	0.266	0.925	0.428	0.265	0.175	72.59
SPM3	0.103	0.08	0.057	0.183	0.896	0.354	0.315	0.127	37.79
<i>Information quality</i>									
IFQ1	0.325	0.491	0.499	0.562	0.314	0.931	0.588	0.577	61.28
IFQ2	0.341	0.48	0.448	0.48	0.304	0.952	0.653	0.514	123.17
IFQ3	0.375	0.283	0.219	0.266	0.506	0.803	0.679	0.326	15.96
<i>Work efficiency</i>									
JEF1	0.209	0.262	0.279	0.317	0.229	0.605	0.887	0.372	35.86
JEF2	0.193	0.299	0.264	0.355	0.308	0.641	0.930	0.466	66.32
JEF3	0.319	0.309	0.338	0.311	0.295	0.679	0.900	0.456	32.64
<i>Intention of IT innovation</i>									
ITI1	0.335	0.53	0.515	0.627	0.128	0.471	0.449	0.942	76.88
ITI2	0.406	0.562	0.577	0.632	0.151	0.533	0.455	0.945	92.50

Table 4
Average variance extracted and correlation matrix.

Construct	AVE ^a	CCR ^b	1)	2)	3)	4)	5)	6)	7)	8)
Altruism	0.746	0.921	(0.864)							
Conscientiousness	0.695	0.872	0.562	(0.834)						
Courtesy	0.701	0.875	0.425	0.733	(0.837)					
Civic virtue	0.837	0.939	0.363	0.553	0.598	(0.915)				
Sportsmanship	0.817	0.930	0.185	0.150	0.119	0.230	(0.904)			
Information quality	0.806	0.925	0.385	0.471	0.440	0.492	0.411	(0.898)		
Work efficiency	0.820	0.932	0.267	0.321	0.325	0.362	0.308	0.710	(0.906)	
Intention of IT innovation	0.891	0.942	0.393	0.579	0.579	0.667	0.148	0.532	0.479	(0.944)

(), SQRT(AVE).

^a AVE, average variance Extracted.

^b CCR, composite construct reliability.

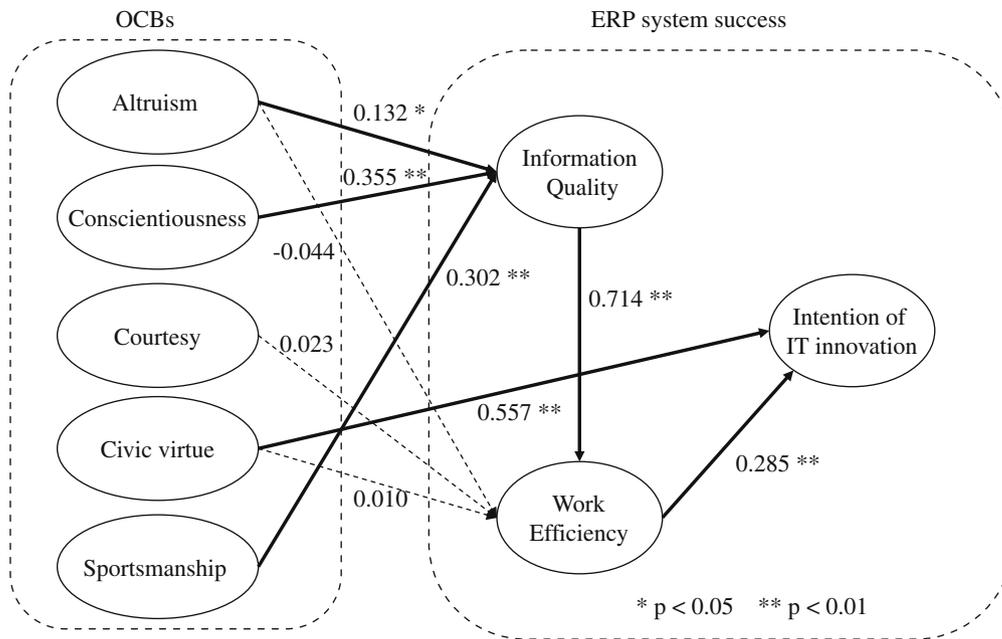


Fig. 2. Path diagram for research model.

Table 5
Hypothesis testing results.

Hypothesis	Path	Path coefficient	t-value	Result
H1	Altruism -> Information Quality	0.132	2.191	*
H2	Altruism -> Work Efficiency	-0.044	0.499	-
H3	Conscientiousness -> Information Quality	0.355	4.160	**
H4	Courtesy -> Work Efficiency	0.023	0.299	-
H5	Civic Virtue -> Work Efficiency	0.010	0.011	-
H6	Civic Virtue -> Intention of IT Innovation	0.557	6.275	**
H7	Sportsmanship -> Information Quality	0.302	4.171	**
H8	Information Quality -> Work Efficiency	0.714	11.580	**
H9	Work Efficiency -> Intention of IT Innovation	0.285	3.320	**

Information quality R^2 : 0.332.

Work efficiency R^2 : 0.519.

Intention of IT innovation R^2 : 0.509.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

the hypotheses that OCBs constructs have an impact on information quality, work efficiency, and intention of IT innovation as ERP system variables was established and empirically tested.

The findings of the hypotheses testing of our model were as follows.

First, we revealed that information quality of an ERP system is a consequence of OCBs, and conscientious behaviors (0.355) and sportsmanship behaviors (0.302) have much greater impact on information quality of ERP system than helping behaviors

(0.132). Most ERP systems should be timely processed by employees who each have their own role and responsibility in using an ERP system. Therefore, it is deduced that conscientious behaviors such as observing company regulations and procedures in using an ERP system, and performing ERP system transactions in time contribute more to enhance information quality of an ERP system than general helping behaviors toward employees who are new or who are inexperienced in using an ERP system. In addition, we can note the fact that positive thinking (sportsmanship) in using

an ERP system is important to enhance information quality of an ERP system.

Second, analysis showed that work efficiency by an ERP system is not a consequence of OCBs, namely, none of helping behaviors, courtesy behaviors, and civic virtue behaviors has a direct impact on work efficiency by ERP system. But, information quality has a strong impact on work efficiency by ERP system (0.714). Helping behaviors were found to enhance performance in prior studies (Karambayya, 1990; Podsakoff et al., 1997). But this study showed that helping behaviors have insignificant impact on work efficiency by an ERP system. One possible explanation for the insignificant finding may lie in a characteristic of ERP systems. ERP systems should be performed according to roles and responsibilities. Therefore, any acts that help the colleagues who are having difficulty using an ERP system may not contribute to increasing the efficiency of business transactions. Also, although courtesy and civic virtue behaviors may prevent problems from occurring in using an ERP system and promote the cooperation of business units, these behaviors do not seem to enhance work efficiency in an ERP system.

Third, civic virtue behaviors have a strong impact on intention of IT innovation (0.557), and work efficiency by ERP system also has a significant impact on that construct (0.285). Therefore, we can note the fact that an OCB such as civic virtue is no less important to enhance IT innovation intention of employees than the benefits of an ERP system such as work efficiency.

6.1. Managerial implications

The results show that ERP system success variables are significantly influenced by employees' OCBs in ERP context. This finding suggests that the OCBs would be important factors for the successful operation of ERP systems. Managers should pay attention to increasing employees' OCBs, especially conscientious behaviors and sportsmanship for enhancing information quality of an ERP system, and civic virtue behaviors for employees' motivation to IT innovation.

6.2. Limitations and further research issues

Although our findings provide meaningful implications for the successful operation of ERP systems, our study has some limitations. First, our research model does not have a strong theoretical background. Although our research model and hypotheses were established through logical reasoning on employees' behaviors associated with ERP system and empirical research such as organization behavior, human resources management, and marketing, we did not provide certain theoretical background for our model in this study. Therefore, we need further research regarding the framework of our model. Second, we focus on a limited number of factors for ERP system success. For example, user satisfaction could be added to improve the understanding of effects of OCBs in ERP context. Third, even though we were careful to avoid selection bias in the data collection process, there still exists the possibility of response biases occurring, including social desirability, acquiescence, and leniency effects.

Appendix A

Altruism: Likert scale of strongly disagree to strongly agree

ATZ1. I support employees who are unfamiliar with an ERP system

ATZ2. I give my time to help employees with ERP system-related problems.

ATZ3. I take time out of my day to help train new employees
ATZ4. I perform ERP system-related work of absent employees if I can.

Conscientiousness: Likert scale of strongly disagree to strongly agree

CST1. I obey company rules, regulations and procedures in using an ERP system.

CST2. I carry out ERP system-related work in a timely manner.

CST3. I complete ERP system-related work even though after business hours.

Courtesy: Likert scale of strongly disagree to strongly agree

CTS1. I am cautious to avoid problems with coworkers in using an ERP system

CTS2. I do not abuse rights of others in using an ERP system

CTS3. I do not interfere with coworkers with regard to using an ERP system

Civic Virtue: Likert scale of strongly disagree to strongly agree

CVT1. I am willing to follow organizational change.

CVT2. I keep up with the policy and business strategy of the organization.

CVT3. I positively participate in efforts for process improvement.

Sportsmanship: Likert scale of strongly disagree to strongly agree

SPM1. I keep trivial complaints about using an ERP system to myself

SPM2. I do not complain about my ERP system-related work even if the work seems excessive

SPM3. I do not complain about business processes that seem unfair to me.

Information Quality: Likert scale of strongly disagree to strongly agree

IFQ1. The ERP system of our company provides us important information.

IFQ2. The ERP system of our company gives us usable information.

IFQ3. The ERP system of our company provides us relevant information.

Work Efficiency: Likert scale of strongly disagree to strongly agree

JEF1. Thanks to the ERP system, business transactions are performed efficiently.

JEF2. Thanks to the ERP system, executive decisions are made quickly.

JEF3. Thanks to the ERP system, cooperation between departments is facilitated.

Intention of IT Innovation: Likert scale of strongly disagree to strongly agree

ITI1. I will actively improve business process using information technologies.

IT12. I will vigorously use information technologies to achieve business innovation.

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