Discriminative effect of user influence and user responsibility on information system development processes and project management

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ABSTRACT

Context: User participation in information system (IS) development has received much research attention. However, prior empirical research regarding the effect of user participation on IS success is inconclusive. This might be because previous studies overlook the effect of the particular components of user participation and other possible mediating factors.

Objective: The objective of this study is to empirically examine how user influence and user responsibility affect IS project performance. We inspect whether user influence and user responsibility improve the quality of the IS development process and in turn leads to project success, or if they have a direct positive influence on project success.

Method: We conducted a survey of 151 IS project managers in order to understand the impact of user influence and user responsibility on IS project performance. Regression analysis was conducted to assess the relationship among user influence, user responsibility, organizational technology learning, project control, user–developer interaction, and IS project management performance.

Results: This study shows that user responsibility and user influence have a positive effect on project performance through the promotion of IS development processes as mediators, including organizational technology learning, project control, and user–IS interaction.

Conclusion: Our results suggest that user responsibility and user influence respectively play an important role in indirectly and directly impacting project management performance. Results of the analysis imply that organizations and project managers should use both user participation and user influence to improve project success, and in turn, increase project success.

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mains elusive [21]. Possible reasons may be which components of user participation are employed and the use of models that are not sufficiently explanatory in system development [34].

An examination of the relationship between user responsibility (or user influence) and project performance might help explain the inconclusive results of the literature on user participation/involve-
ment. User responsibility and user influence are important mea-
sures of user participation and user involvement, respectively [22]. User responsibility refers to the assignment and activities reflecting a user's overall accountability to the success or failure of a project [22]. User influence grants users decision-making authority in system design [37]. Involving users in a project with- out granting them power and accountability can eventually lead to poor project performance. On the other hand, empowered users can influence the direction of the project for which they are responsible. Users feel psychologically empowered and engaged in the system when they are able to reconfigure it [48]. This study selects user responsibility and user influence because these two components are commonly adopted, explaining why the re-
sults are comparable with previous studies [17,22,31,37]. For ease of exposition, this study adopts the term “user participation” to re-
fer to the general activities or behaviors of users during system development. This study empirically examines how user influence and user responsibility affect the performance of ISD projects. We pose the following research questions: Does the practice of user responsibil-
ity (or user influence) prompt (or enervate) the quality of ISD pro-
cesses, and which in turn influences project performance? Does the practice of user responsibility (or user influence) affect project per-
formance only in the presence of established processes? The an-
swers to these questions may allow project managers to plan interventions on involving users in projects to improve project performance.

2. Theoretical background and hypotheses

Due to the rapid changes in today's business environment, user requirements fluctuate constantly to meet business goals, and have become increasingly hard to predict and control [18]. User partic-
ipation refers to the assignment, activities and behaviors that users or their representatives perform during ISD process [22]. Advo-
cates of user participation claim that the effort of users on the project can reduce the uncertainty of user requirements [27]. Many re-
searchers have suggested user participation as an effective way to ensure beneficial results in IS projects, including risk control [29], user satisfaction [37], management quality [45] and system quality [34]. However, previous research also found that user participation can pose more threats to the implementation of IS due to its un-
known complexity [56]. IS project teams only benefit from the selection of appropriate user participants [31]. Users lacking knowledge or a clear sense of requirement, or users differed amongst themselves in their requirements might lead to require-
ment uncertainty [31,41]. Fluctuating requirements could impair the climate of the project and the trust between the users and IS personnel. This in turn could lead to conflicts between users and IS personnel that require significant effort and time to resolve, therefore decreasing process performance [17].

To mitigate the potential negative effects of user participation in the ISD process, and encourage active user participation, several methods and managerial intervention are proposed, including proto-
typing [11], user partnering [27] and user empowerment [48]. For instance, prototyping helps users understand the specification of system design as their requirements are transformed into sys-
tem specification [11]. User partnering activities provide an oppor-
tunity for users to recognize potential problems, clarify roles and responsibilities, allocate resources, and develop procedures for cooperation [27]. In addition, empowered users who know their roles and responsibilities can better control their own progress [48]. Users might have their own opinion regarding system fea-
tures that do not meet their needs. Users need power to influence the direction of a project goal if a conflict surfaces. User influence empowers users to exercise their right to work with others and to ensure their needs are deliver in the system [17]. Responsibility of users enhances the motivation of users to collaborate with IS personnel, which in turn promotes communication and strengthens the organizational learning process required to acquire technology. Thus, empowerment and responsibility are regarded as facilitating conditions that increase the odds of IS success [48]. Although user influence and user responsibility are apparently pertinent to project performance, the IS literature related to user par-
ticipation often overlook these topics.

This study proposes that IT project managers must also be aware of user responsibility and user influence. The exploration of a potential mediation may help explain exactly how user influ-
ence (or user responsibility) affects the ability of an ISD project team to achieve successful project management. Since user partic-
ipation reshapes the process of product development [15], this study adopts three ISD processes as mediating factors to reveal the effects of user influence and user responsibility on project suc-
cess. The adopted ISD processes include organizational technology learning, project control, and user–IS interaction [41]. Fig. 1 shows the relationships of the proposed model.

This study applies coordination theory, trust theory, and organi-
zational learning theory to clarify the relationships in the proposed model. Coordination theory requires that tasks be allocated across organizational members, and communication and control mecha-
nisms must facilitate the necessary information exchanges and 
decision autonomy required for effective collaboration and deci-
ision-making [54]. Users with responsibility have greater motiva-
tion to communicate with IS personnel and to monitor the progress toward project success. Trust theory indicates that envi-
ronmental or task uncertainty requires a greater degree of trust among individuals or groups [35]. User responsibility reflects the common goal of project success among users and IS personnel. A common goal is one of the attributes that create a propensity to trust [35] in dealing with uncertainty. Adopting the outcome per-
spective, Anderson and Narus [2] defined trust as a party's belief that another party will perform actions that will create positive outcomes for the party as well. Trust-based interaction helps dif-
ferent parties achieve the same project goal. Finally, organizational learning theory has considerable relevance to the practice of IS development [3]. Organizational learning occurs constantly through different phases of the software development life cycle. For example, requirement analysis is a typical organizational learning activity that occurs in the initial planning and analysis phases. The following sections use coordination theory, trust theory, and organizational learning to present the hypotheses of this study.

2.1. Effect of user influence and user responsibility on project performance

Requirement specification is a chaotic and iterative process among stakeholders. IS project team members must continuously solicit feedback from other team members to refine system requirements and features until an agreement is reached [33]. The various perceptions of stakeholders involved in an IS project often hinder the development of mutual understanding, and ulti-
mately, the ability to achieve project success [43]. IS developers have difficulty reconciling requirements and specifications with user needs due to the perception gap. Granting users the authority
244 knowledge or skill acquired by the interaction or activities of a firm
243 Organizational technology learning refers to the technology
242
241
2.2. Effect of user influence and user responsibility on organizational
239 the trust theory and limited IS literature, this study proposes:
238 search on user responsibility in the IS field is limited. According to
237 positive effects of user participation on ISD projects. Empirical re-
236 associated with user participation dispute the assumption of the
235 project outcomes [45]. However, early findings of negative effects
234 process reduces requirement uncertainty and improves system
233 and common goals are two factors that not only contribute to a
232 viduals or parties that trust each other are likely to subjugate their
231 deal with task uncertainty, and reduce the uncertainty [35]. Indi-
229 own needs and egos in pursuit of a common goal [28]. The positive
228 attitudes characteristics of trust promote knowledge sharing,
227 way of sharing. Most ISD projects involve interdependent parties, including
226 most IS developers view system development in a technical way, but users view it in a func-
225 tional or organizational way. Both IS developers and users can pro-
224 system development in a technical way, but users view it in a functional way. Intensive user–IS communication is a necessary activity for improving the effectiveness of analysis and design in high technology development projects [7]. This process treats IS professionals as knowledge disseminators, spreading both technology and functional knowledge in an organization [43]. Many IS developers view system development in a technical way, but users view it in a functional or organizational way. Both IS developers and users can provide valuable insights on how to implement and use systems. These distinct perspectives provide opportunities for learning in a user-influenced environment [50]. Therefore, this study proposes:
223 accountable for specific elements of project success. Responsibility
222 willingness to communicate and common goals are two factors that not only contribute to a
general experience of trust, but also create a propensity to trust
221 individuals or parties that trust each other are likely to subjugate their
220 Project control is the manager-initiated continuous improve-
219 uncertainty reduces requirement uncertainty and improves system
218 that lead to uncertainty [27]. Vested with responsibility, users
217 A lack of user participation in the ISD process is one of the factors
216 project outcomes [29]. Therefore, project managers should ensure that users are actively involved in the
215 H1a. User influence is positively related to project performance.
214 Uncertainty is one of the primary risks of IS project success [29],
213 on this background, this study proposes:
212 managers should ensure that users are actively involved in the
211 improves the success rate of ISD outcomes [30]. Therefore, project
210 of participation by project stakeholders, specifically user influence,
209 project can be improved. Previous research shows that a high degree
208 participation of project stakeholders, specifically user influence,
207 resulting product addresses user needs [7]. Through decision-making,
206 to implement their opinions on IS projects can ensure that the
205 organizational technology learning. Research shows that increasing user responsibility results in a user-influenced environment [50]. Therefore, this study proposes:
204 system development in a technical way, but users view it in a functional way. Intensive user–IS communication is a necessary activity for improving the effectiveness of analysis and design in high technology development projects [7]. This process treats IS professionals as knowledge disseminators, spreading both technology and functional knowledge in an organization [43]. Many IS developers view system development in a technical way, but users view it in a functional or organizational way. Both IS developers and users can provide valuable insights on how to implement and use systems. These distinct perspectives provide opportunities for learning in a user-influenced environment [50]. Therefore, this study proposes:
203 learning. The extent of user responsibility is a good indicator of the
degree of organizational technology learning. For instance, a user is more likely to examine work in progress and incorporate their comments into the design of a system if that user feels responsible for the quality of the adopted system. A clear user role and responsibility help users perform their assigned roles and get involved with design activities during system development. The execution and discussion of design activities lead to organizational technology learning. Research shows that increasing user responsibility can help an organization successfully develop cross-functional integration [16]. Cross-functional integration provides the opportunity for technology learning in an organization. Based upon the organizational learning theory [3] and characteristics of user influence and user responsibility, this study proposes the following hypotheses:
202 share with design activities during system development. The execution
201 role and responsibility help users perform their assigned roles and get involved with
design activities during system development. The execution and discussion of design activities lead to organizational technology learning. Research shows that increasing user responsibility can help an organization successfully develop cross-functional integration [16]. Cross-functional integration provides the opportunity for technology learning in an organization. Based upon the organizational learning theory [3] and characteristics of user influence and user responsibility, this study proposes the following hypotheses:
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different parties or stakeholders perceive software projects in different ways [46], and have different perceptions of project risk [27]. Project managers might consciously ignore certain risks due to conflicts of interest. Compared to project insiders (IS personnel), project outsiders can identify more risks and make better decisions to continue, stop, or radically restructure the project [29]. Given the authority of decision-making, users have opportunities to continuously provide their opinions and feedback to IS developers and managers to refine the course of implementation or system features until consensus is reached. Iterative inspections allow users and managers alike to develop realistic expectations of the technologies, schedule, budget, and performance, fostering effective project control. Based on this background, we expect:

H3a. User influence is positively related to project control.
   Effective management of project control must adequately consider user needs and opinions [40]. In addition to considering IS personnel, who make decisions in private to fulfill their interests, the project control management requires active collaboration among stakeholders to reach project goal consensus. Encouraging user participation by assigning them responsibilities for system development results might create a sense of ownership of the IS project. The sense of project ownership energizes users to communicate with IS personnel and be involved in design activities during system development. Specifically, users are more likely to actively participate in controlling the project by critiquing, reviewing, and checking development progress to ensure consistency between practical execution and original planning in terms of project goals, quality, budget, and schedule. The implementation of project control relies on assigning the appropriate users to control the schedule and budget, and encouraging them to take responsibility for the project [38]. Therefore, we expect:

H3b. User responsibility is positively related to project control.

2.4. Effect of user influence and user responsibility on user–IS interaction

In most IS projects, stakeholders must work together as effectively as possible to maximize the attainment of shared organizational goals. However, the user–IS chasm exists in most IS projects because of inherent knowledge and skill gaps between users and developers [17]. As a result, most users are unmotivated to engage in discussions with IS personnel, and vice versa. IS developers often play a dominant role, while users play a dependent role, resulting in poor user–IS interaction. To improve the quality of user–IS interaction, IS management must shift the dominance/dependence roles among users and analysts [7]. User influence stresses adopting user opinions and user decisions, and is one way to switch dominance/dependence roles between users and IS personnel. In this case, IS personnel would actively discuss with users to better understand their decision points and achieve common goals. Similarly, to make decisions, users need to understand problems and solve them with IS developers. Solving problems together forces active interaction as a part of a formal or informal process, and facilitates knowledge exchange and integration in IS development teams. Knowledge exchange and integration enhances technology learning and user–IS interaction quality [14].

Based on this background, this study proposes:

H4a. User influence is positively related to user–IS interactions.
   As mentioned above, sharing responsibility with users is a process approach for systems development. This approach creates a propensity to trust that overpasses inherent relationships [28] between users and IS personnel. Trust theory asserts that trust can lead to behavioral expectations among individuals and groups, improving their communication and encouraging them to manage uncertainty or risk through their interactions [28]. Thus, sharing the responsibilities of project success with users and IS personnel encourages cooperative behavior and quality communication, which enables them to work together to achieve consensus for project success. Based upon trust theory and the limited IS literature, this study proposes:

H4b. User responsibility is positively related to user–IS interactions.

2.5. Effect of organizational technology learning, project control, and user–IS interaction on project performance

Technical knowledge is essential in any IS development project. A lack of required knowledge among project personnel poses a significant risk to project success [29]. Users that lack the required knowledge for a project hardly contribute useful ideas during ISD processes [31]. As project stakeholders gain familiarity with required knowledge, they become aware of relevant technical support and problem-solving needed for a project [36]. Effective technology learning enriches user knowledge, helping them transform their needs into formal system requirements and communicate their needs to the development team. Jiang et al. [26] showed that organizational technology learning plays a mediating role in minimizing the risk of lack of skill on project performance. Vandenbosch and Higgins [52] showed that IS success depends upon IS members’ learning effectiveness, and encouraged future research to examine the direct relationship between learning and product success. In fact, many IS researchers and practitioners conclude that organizational technology learning has a positive effect on IS outcomes and organizational outcomes [8,33,51]. Based on the literature, this study expects:

H5. Organizational technology learning is positively related to project performance.
   Control theory is extensively adopted in the literature, and specific controls are essential to IS development [25,55]. Here, project control refers to management attempts to influence IS project team members to make progress in accordance with project goals. Software projects that are well planned and controlled are likely to be within budget and schedule. Many firms deploy information systems to support their business strategies in today’s competitive environment. In order to deliver a system to meet business goals despite rapidly changing business strategies, proper controls for IS projects are essential [55]. An effective control system must address the multi-dimensional criteria of project performance [47] such as cost, schedule, regulatory compliance and user requirements. Control mechanisms can help project managers assess project progress vis-à-vis overall project goals, as well as quality, budgetary, and scheduling targets. Henderson and Lee [23] suggest that project performance is significantly related to project goals and outcome standards established by managers. Proper control mechanisms are important to IS project implementation [55]. Thus, this study hypothesized that project control is an antecedent of project performance and a possible mediator between user influence (or user responsibility) and project performance:

H6. Project control is positively related to project performance.
   The quality of user–IS interaction is critical for improving software project management performance [4]. System development depends heavily on users to actively contribute their opinions and domain knowledge to the IS developers [26]. However, users and IS personnel in most IS projects often have different knowl-
edge and interests [27]. The uncertainty resulting from differences in understanding between users and IS personnel is one of the major risks in an IS project [29]. IS project managers must strive to reduce this gap to achieve a consonant view among stakeholders. 

User–IS interaction enables the exchange of perceptions, interests and objectives among users and IS personnel and also reduces gaps in mutual understanding during communication. Such interaction is regarded as horizontal coordination [41]. Boehm suggested that effective interaction between users and IS personnel is important for defining project scope and controlling project changes [9]. Therefore, effective user–IS interaction is needed for a common understanding of system requirements and project goals, and considered a prerequisite of project success. Based on the literature and the horizontal coordination theory [41], we propose the following hypothesis:

**H7. User–IS interaction is positively related to project performance.**

### 3. Research design

This section presents the specifics of our research design, including sample population and survey measurements.

#### 3.1. Sample

Questionnaires were mailed to 500 IT managers in the US, who were randomly selected from the membership records of the Project Management Institute (PMI) Information Systems Special Interest Group (http://www.pmi-issig.org/). Members of the group were expected to be familiar with software project activities and outcomes. Postage-paid envelopes for each questionnaire were enclosed. All respondents were requested to respond the survey based on their recent experience in an IS project, and all were assured that their responses were confidential. Of the initial surveys mailed, 85 valid responses were received. In order to increase the response rate, two follow-up mailings were conducted. The total number of responses obtained from the three rounds of surveys was 151.

Non-response bias occurs when the survey respondents do not represent the overall target sample. One test for potential non-response bias is to compare demographic data between early and late respondents [49]. The f-test scores were calculated for the means of key demographics (work experience, project duration, team size) obtained in the first and third mailings to test for significant differences. Since no significant differences were found, all respondents were combined in subsequent analyses. Table 1 presents the demographic features of the sample. Project duration and team size, which are widely believed to affect project performance, were included as control factors in the analysis.

#### 3.2. Measures

**User influence** refers to the extent to which members of an organization affect decisions related to the final design of an information system [37,46]. Three items adopted from Barki and Hartwick [22] were used to measure this construct: (a) the influence of users in decision-making, (b) the user opinions considered, and (c) the overall user influence on a system. The questionnaire asked the respondents to indicate the extent of the influence that users generate during the system development. Each item was presented such that the greater the score, the higher the extent of the particular item, from “not at all” (1) to “a complete extent” (5). Table 2 shows the items used to measure this and other constructs.

**User responsibility** refers to the assignment and activities reflecting a user’s overall accountability or leadership for the ISD project [22]. Many items of user responsibility have been suggested in the literature, including having responsibility for system success, being a project team leader, selecting hardware or software, estimating costs, or requesting additional funds [22]. A subset of these items was used to measure user responsibility, listed in Table 2. Each item was presented such that the greater the score, the higher the extent of the particular item, from “not at all” (1) to “a complete extent” (5).

**Organizational technology learning** indicates the ability of an organization to adapt technology and acquire knowledge to changing business needs [13]. The original instrument was developed by Cooprider and Henderson [13] and further examined by Nidumolu [41]. Four questions measured acquired knowledge in using key technologies, using development techniques, supporting user businesses, and overall knowledge obtained through the project. Respondents were asked to indicate the extent the items typically occurred when developing information systems in their organizations. Each item was presented such that the greater the score, the higher the extent of the particular item, from “never” (1) to “always” (5).

**Project control** describes the extent of control over project outcomes and processes. Measurement items, which were adapted from Nidumolu [41], included effective control over project costs, effective control over project schedule, adherence to audit and control standards, and overall control exercised over the project. The control is achieved using methods, tools and procedures of well structure and formalism to deal with the complex and uncertain task of IS development. Respondents were asked to indicate the extent of the items typically occurring when developing information systems in their organizations. Each item was presented such that the greater the score, the higher the extent of the particular item, from “never” (1) to “always” (5).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Number</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>97</td>
<td>64</td>
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<td></td>
<td>Female</td>
<td>54</td>
<td>36</td>
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<tr>
<td>Job position</td>
<td>IS Manager</td>
<td>61</td>
<td>40</td>
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<td>Project Leader</td>
<td>79</td>
<td>52</td>
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<td>Industry type</td>
<td>Service</td>
<td>117</td>
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<td>Manufacturing</td>
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<td>&lt;11</td>
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<td>Avg. team size</td>
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<td>Avg. project duration</td>
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<td>&gt;3 years</td>
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Total sample size: 151.
Project **Performance** contains at least three dimensions: staying within budget, adherence to the schedule, and satisfying user requirements [36]. Others suggest additional dimensions such as the amount and quality of the work produced and the ability to meet project goals [23]. The measurement items employed in this study were adapted from Henderson and Lee [23]. Similar items were also used by Beck et al. [8]. Respondents were asked to indicate their satisfaction towards the project performance for the information systems considered. Each item was scored on a five-point scale ranging from “total disagreement” (1) to “total agreement” (5).

### 4. Data analysis and results

We applied the method of Partial Least Squares (PLS) to examine constructs and hypothesis, by using PLS-Graph Version 3.01 [10]. The PLS method was chosen because it has minimal demands on sample size and residual distribution and is widely used in IS research [57]. The PLS assesses the measurement model within the context of the structural model by estimating the loadings of indicators on constructs and then by iteratively estimating causal relationships among constructs [12].

The reliability, convergent validity and discriminant validity of the model were tested. Individual item reliability was examined by observing the factor loading of each item. A high loading implies that the shared variance between constructs and its measurement is higher than error variance [24]. Factor loadings should exceed 0.70 and should be statistically significant (t-statistics in Table 2) to confirm reliability [12]. Item-total correlation (ITC) refers to the correlation between an individual item and the total score of all other items in the same construct. The ITC reveals the internal consistency of a construct. Items with extremely low ITC (e.g., <0.3) should be eliminated before further analysis. Thus, the measures for User Responsibility with extremely low loading factor (<0.4) and low ITC (<0.3) were eliminated for the user responsibility construct.

Convergent validity of a construct must be confirmed when the construct is measured by multiple indicators. Convergent validity can be examined by construct reliability, composite reliability (CR), and average variance extracted (AVE) by constructs [5]. Construct reliability can be verified by Cronbach alpha (>0.7 recommended) [5]. To obtain the composite reliability of constructs (>0.70 recommended), the sum of loadings is squared and then divided by the combination of the sum of squared loading and the sum of the error terms. The AVE reflects the variance captured by indicators, and a value greater than 0.5 is recommended [5]. Table 2 shows the statistical results, which confirmed that the constructs adopted in this study had acceptable convergent validity.

Discriminant validity indicates whether the measures of constructs differ from each other. It is assessed by testing whether the square root of the AVE exceeds the correlation coefficients [11]. For each construct in this study, the square root of AVE exceeds the correlation between each pair of constructs (see Table 3). The skewness and kurtosis of each construct were small, which indicated a normal distribution in the constructs [19]. Discriminant validity can also be examined by testing whether each indicator has a higher loading on the construct of interest than on any other constructs [10]. This study includes exploratory factor analysis to evaluate the discriminant validity of the considered variables. EFA was performed on the indicators of the variables using SPSS 18.0. All cross loadings in the analysis results are equal or lower than 0.5. The loading analysis results confirmed the discriminant validity and convergent validity of observed indicators.

Multicollinearity is indicated by very strong correlations (>0.80) among independent variables [1], by VIF exceeding 4.0, or by toler-
5. Discussion

This survey of 151 IT project managers confirms the positive relationship among user influence and user responsibility on project performance. The analysis results show that user influence and responsibility can produce better quality ISD processes for IS project teams. Specifically, the practice of user influence and responsibility significantly improves the quality of user–IS interaction. Interestingly, the processes that they improve are substantially different in degree. User responsibility prompts interaction quality but not learning or project control. Interaction quality can be improved even more by user responsibility together with user influence. A possible explanation is that the responsibility to users induces users’ intention to communicate with IS personnel, but not the vice versa. On the other hand, user influence significantly affected all processes considered, especially project control, which had the largest effect on project performance.

Accordingly, project managers should note that requesting user responsibility may not enable IS personnel to provide users with sufficient knowledge and information for improving learning and project control. On the other hand, user influence prompts IS personnel to communicate with users in order to obtain a consensus when making a decision for system requirements and project goals. The communication intention of IS personnel thus significantly improves learning and project control significantly.

In addition to confirming the effect process quality on project success, the analysis results show that ISD processes (i.e., organizational technology learning, project control, and user–IS interactions) have a fully mediating effect between user responsibility and project performance and a partially mediating effect between user influence and project performance. This indicates that user influence and user responsibility significantly improve process performance and therefore benefit project management. These findings clarify the inclusive result about the impact of user participation on project performance reported in the literature and have important implications for both practice and research.

5.1. Managerial implications

This study presents two major implications for IT project managers. For IT project managers, a major implication of this study is that user influence should be more emphasized than user responsibility. Inviting users and requesting them to take responsibility for the results of the system development is not sufficient to reach
Table 5
Summary of hypothesis tests.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a: User influence is positively related to project performance</td>
<td>Supported</td>
</tr>
<tr>
<td>H1b: User responsibility is positively related to project performance</td>
<td>Not supported</td>
</tr>
<tr>
<td>H2a: User influence is positively related to organizational technology learning</td>
<td>Not supported</td>
</tr>
<tr>
<td>H2b: User responsibility is positively related to organizational technology learning</td>
<td>Not supported</td>
</tr>
<tr>
<td>H3a: User influence is positively related to project control</td>
<td>Supported</td>
</tr>
<tr>
<td>H3b: User responsibility is positively related to project control</td>
<td>Supported</td>
</tr>
<tr>
<td>H4a: User influence is positively related to user–IS interactions</td>
<td>Supported</td>
</tr>
<tr>
<td>H4b: User responsibility is positively related to user–IS interactions</td>
<td>Supported</td>
</tr>
<tr>
<td>H5: Organizational technology learning is positively related to project performance</td>
<td>Not supported</td>
</tr>
<tr>
<td>H6: Project control is positively related to project performance</td>
<td>Supported</td>
</tr>
<tr>
<td>H7: Effective user–IS interactions is positively related to project performance</td>
<td>Supported</td>
</tr>
</tbody>
</table>

6. Conclusion and outlook

The contribution of this study is threefold. First, it provides researchers with a new avenue of examining the effects of user participation – for example, user influence and user responsibility. Second, it provides researchers with a larger picture of how users influence the final project outcomes, in addition to user participation. Third, this study explores the effects of user influence and user responsibility on the system development process. Results of the analysis show that the management practice of user influence and responsibility can encourage quality processes, which in turn improves project management performance. This study makes a case for not treating user participation as a single activity to manage. More general user participation does not necessarily contribute to the improvement of project performance. Although user participation is a specific construct of ISD theory, the findings in this study stress the importance of further decomposing this construct into user influence and user responsibility due to their different effects on mediating factors and project performance.

An effective IT project manager needs to delicately manage user participation by balancing user influence and user responsibility across the system development life cycle. This study highlights the importance of increasing user influence in an attempt to increase organizational technology learning, project control, and user–IS interaction. Improving these three areas can lead to improved project performance. User influence has a direct effect on increased project performance. However, overemphasizing user responsibility cannot produce the same coordination or close ties with project performance as user influence. This might be because user responsibility cannot significantly improve project control and organizational technology learning. Thus, the exercise of user responsibility alone cannot directly increase project performance.

an effective IS development. User influence can be exerted through formal procedures or informal practices. Development methods that heavily empower users are more likely to promote user–IS interactions. For example, a large scale e-bank reportedly used unsolicited feedback to promote user influence and user–IS interactions [39]. Project managers can also employ internal auditors to conduct project health checks (PHCs) periodically to assess whether inherent risks are under control [42]. The employment of internal auditors is a form of user influence for improving project control and effective user–IS interactions.

Second, project control is more significant to project management among the system development processes. Continuously monitoring and controlling the system implementation process is essential for improving project performance. Project control techniques, such as control charts and process sigma, can help in fine-tuning the system development life cycle [20]. Vendor-based sponsors also play control roles in project performance by protecting project quality and resourcing the project [32]. Efficient management controls, including management review and change control, can enhance software flexibility and maintainability as well as project performance [54]. An IT project manager needs to employ effective control techniques to increase the success of system development.

5.2. Research implications

One implication of this study is that evaluating the overall practice of user participation cannot clarify how users affect IS project performance. The significant components of user participation must be evaluated separately to explore their effects on ISD project performance. User influence and user responsibility can provide further insight into user participation. Second, user influence associated with user responsibility can effectively improve IS project quality. User responsibility improves project control and promotes user–IS interactions. Compared to user responsibility, user influence has a greater effect on overall processes, especially on learning and project control. This implies the significance of user influence on the research of IS projects for improving process performance.

Finally, the system development process has significant mediating effects on the impact of user participation to project performance, particularly project control and user–IS interactions. User influence directly impacts project performance whereas user responsibility indirectly impacts project performance through quality ISD process. These findings clarify the relationships among user influence, user responsibility, and IT project performance.

5.3. Limitations

The first limitation of the study is that project managers, rather than users, were asked about user influence and responsibility based on their perception. This survey is an indirect measure, and is widely adopted in the literature, e.g., [27,55]. However, single IT managers were the only source of the survey instrument for each project considered, which raises the possibility of single respondent bias. Second, self-perception of project performance may be a possible bias. However, self-appraisal is regarded as a valid predictor of performance because individuals often judge their own performance in a complete aspect for the dimensions of performance [27]. Third, this study considered only a set of dimensions for the measure of project performance. Several dimensions of system success are not included, such as system usage, user satisfaction, impact to individuals, and to organization. The fourth potential limitation is that the questionnaire asked IT managers to recall their recent experiences. Because the measures required perceptual evaluations after project completion, memories may have faded or may have become confused with memories of other projects and processes. However, recall is the only viable way to conduct data collection in a survey.
The merit of considering user influence in terms of influencing project performance can be examined in the virtual project context where users have less influence on project outcomes than they do in face-to-face projects. Global IT projects often transcend country boundaries and involve users and developers with varying cultural backgrounds. For instance, the directive control of top management on the system development process may fail to earn trust from Korean system developers [44]. User influence in JAD meetings plays a more important role for Korean developers in enhancing user-IS communication and project performance. In contrast, unmet project goals rather than user participation play a more important role for US and Japanese developers. How will cultural factors influence the effect of user influence on user-IS interactions, organizational technology learning, and project control? What kinds of influence can a user exert to effectively manage a project? The isomorphism between user influence and project performance may be weaker in virtual, global IT projects. Future research should replicate this study in virtual, global IT projects and examine if the effect of mediating factors between user influence and project performance still exist. If not, what other factors are more relevant in the virtual, global context? This study provides an impetus for continued discussion on the importance of assessing user participation as a multi-factor, consisting of user influence and user responsibility, in different IT project management contexts.

7. Uncited reference

Appendix A

See Table 6.

References


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