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Striking the Right Balance When Users are Good at IT Too!: Partnering for Enterprise System Success

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ABSTRACT
Enterprise-level information system (IS) implementations are risky endeavors that require the active engagement of diverse parties from within the organization to meet the technical and functional requirements of the implementation, and mitigate possible resistance to the implemented system. Past research on IS implementation has traditionally pointed to the IT department as the sole source of technical competence, and confined the potential contribution of the user base to functional expertise. Furthermore, this line of research consistently identifies the IT department as the leaders of such projects, further confining the user base to sideline consulting roles during these initiatives. However, today’s business professionals increasingly possess IT competence and capability of contributing to the technical side of IS implementations. This study focuses on the balance of IT competence within the multi-functional enterprise-level IS implementation team, brought on by a more technically competent user base, and examines its impact on project success.

Keywords
Enterprise-Level Information Systems, User Competence, Partnership, Project Success

INTRODUCTION
Enterprise level systems are fundamental to businesses; unfortunately, the implementation of these large-scale systems can go awry and result in failure to realize the potential of these investments (Kumar and van Hillegersberg, 2000). To mitigate the numerous risks associated with enterprise-level IS implementation these projects often call for the active engagement of multiple parties from different functional areas within the organization. Recognizing the value of business professionals in IS projects, a number of past studies argue that multi-functional IS project teams should be governed by some form of shared control between the IS and user departments (Kirsch, 1997; Lawrence and Low, 1993). These studies often identify the overall leadership role of IT, and the contributing role of users in identifying and communicating business needs and information requirements. Recently however, through constant exposure to technology and increasing experience with IS implementations, the IT-related competence of the user base has grown, presenting a new way that business professionals can contribute to IS implementation success (Brown, Chervany and Reinicke, 2007).

As business professionals increasingly develop valuable IT competence they are not only more capable of contributing to IS implementation success, they are also more willing to accept more technical responsibilities in implementation efforts and establish partnerships with the IT department during large-scale implementation efforts (Bassellier, Benbasat and Reich, 2003). Research suggests that when “the business” establishes partnerships with the IT department during enterprise-level IS implementations, project success is more likely because the relationship mitigates the residual political risks surrounding the
project (Jiang, Klein and Chen, 2006; Ranganathan, 2004). Also, as these enterprise-level IS become increasingly meshed with the operations and strategy of the business, several decisions emerge in the implementation process that can be more effectively addressed by IT-competent users, rather than the IT department (Ross and Weill, 2002). Partnership between business professionals and the IT department in these cases provides an effective governance structure for ensuring project success.

Extending these lines of research, the current study focuses on how the balance of IT competence in multi-functional enterprise-level IS implementation teams contributes to the overall success of the project, as well as how the balance affects the governance structure of IS implementation teams. We develop a new construct labeled joint IT competence that captures the balance of IT competence across the business and IT professionals actively involved in enterprise-level IS implementation teams. We then examine the impact of joint IT competence on the success of the implemented project, as well as the governance structure of the implementation team to develop a richer understanding of the impact of joint IT competence on enterprise-level IS implementations. In sum, our examination focuses primarily on answering the following research questions:

**RQ1**: What impact does joint IT competence have on project success?

**RQ2**: What role does project-level partnership play in the relationship between joint IT competence and project success?

**CONCEPTUAL BACKGROUND**

**Enterprise-Level Project Success**

Enterprise-level IS are generally IT initiatives that connect various distinct business processes across an enterprise, and are a means of integration and data sharing between various new and legacy systems (Mitchell, 2006). The large scale and tight integration of enterprise-level IS makes their success imperative to the organization. The IS success literature consistently identifies user satisfaction (US) has been identified as a key measure of success (DeLone and McLean, 1992; Ives and Olsen, 1984; Kwon and Zmud, 1987). Specifically, in the context of enterprise-wide IS implementations, user satisfaction encompasses multiple aspects of the implementation including satisfaction with the operation and use of the system, satisfaction with the degree of involvement during the implementation of the system, and satisfaction with the support and services provided for the system. Each of these aspects is a necessary condition of user satisfaction, and dissatisfaction with any of these aspects of the system can lead to resistance and/or ineffective use of the delivered enterprise-level IS. As a result, we define enterprise-level project success in terms of user satisfaction along each of these distinct dimensions.

**Joint IT Competence**

At the individual level, IT competence has been defined as the set of IT-related explicit and tacit knowledge possessed by an individual that allows him/her to exhibit IT leadership, regardless of the primary area of expertise (Bassellier, Reich and Benbasat, 2001). IT competence encompasses more than just technical knowledge; it includes the ability to exploit and put specific IT knowledge into practice (Bassellier et al., 2003). Specifically, in the context of enterprise-level implementations, IT competence encompasses expert knowledge of the technology, the ability to assess and evaluate the system, and the ability to actually plan for and implement the technology in the business. It is unlikely that any single individual possesses all the requisite competence for successful enterprise-wide IS implementations. However, when team members from different functional areas integrate and meld their individually-held competences, the team can establish a cumulative, group-level competence that is more comprehensive than what is possessed by any individual or sub-group within the team (Mitchell, 2006).

The ability to integrate the different competences residing across the team relies on a foundation of shared perspective and shared understanding of the problem (Nonaka, 1994). In the context of enterprise-level IS implementations, the balance of IT competence between business professionals and the IT department is key for establishing shared perspective and understanding of the problem and, thus, the ability to integrate individually-held competences. In the current study we focus on this necessary foundation and use the label joint IT competence to refer to the balance of IT competence residing between business and IT professionals in multi-functional IS implementation teams. Specifically, we define joint IT competence as the balance IT-related competencies possessed by the collective members of a multi-functional enterprise-level IS implementation team that enables the team to carry out various implementation tasks.

**Project-Level Partnership**
User involvement in enterprise-level IS implementation projects can take many structural forms, with different degrees of responsibility. When business and IT professionals come together for large-scale IS projects, it is often the case that the IT department and user stakeholders share leadership in the project to some degree. Lawrence and Low point out that various degrees of user involvement, “are distinguished largely by the degree of influence and control vested in the user” (1993, p.195). These notions have been referred to elsewhere in the literature as the degree of user involvement (Ives and Olson, 1984) and the intensity of user involvement (Mitchell, 2006). Governance structures that appoint equal levels of decision-making power and responsibilities over the project have been described as partnership arrangements in the literature (Jiang et al., 2006; Mitchell, 2006). Consistent with these past conceptualizations, we define a purely partnership-led project as an enterprise-level IS implementation in which the users and IT department stakeholders involved in the project share comparable levels of leadership responsibility over the implementation.

RESEARCH MODEL

Our research model (Figure 1) positions joint IT competence as a direct determinant of project success, as well as implementation-level partnership between IS and the user base. We expect that when there is a balance of IT competence between these groups they are more capable of establishing a comprehensive, group-level competence which will improve the team’s implementation success. We also expect that joint IT competence will play a role in the governance structure established in the implementation team. The following sub-sections describe the research model and develop the hypotheses in more detail.

![Figure 1: Research Model](image)

Joint IT Competence and Project Success

The IT competencies of an enterprise-level IS implementation team reside in the heads of the collective members of the team (Newell, Tansley and Huang, 2004). When these individually-held competences are combined and leveraged, the implementation team is more capable of carrying out various implementation tasks (Mitchell, 2006). Past researchers refer to this process as knowledge integration and describe it as a process of knowledge transfer in order to derive a common core of IT competence (Mitchell, 2006; Newell et al., 2004; Peppard, 2007). The literature on high-performance teams suggests that when team members have similar knowledge structures, especially in the domains of the tasks and technology involved in the project, they are able to more efficiently and effectively coordinate, especially when communication is limited (Mathieu, Heffner, Goodwin, Cannon-Bowers and Salas, 2004; Mathieu, Heffner, Goodwin, Salas and Cannon-Bowers, 2000). Enhanced coordination results from team members’ ability to integrate their specific knowledge and produce new insights and solutions, which requires a shared perspective of the problem (Mitchell, 2006). When a balance of IT competence exists among the members from the IT and user departments, a shared perspective of the problem is more likely to exist, which can lead to higher performance. Lessons learned from practice support this notion. For example, Continental Airlines found that having highly IT competent individuals from the IT department and the user base involved in the delivery of their large-scale
data warehouse project played a strong role in the success of that system (Anderson-Lehman, Watson, Wixom and Hoffer, 2004). Overall, the evidence implies that the joint IT competence of the project team is a key determinant of project success. As a result, we hypothesize:

**H1:** The joint IT competence of an IS development project team will positively affect project success.

**Partnership-Led Implementations and Project Success**

Past research suggests that the success of IS projects is positively impacted by structuring the project team as a partnership between IT and user departments (Jiang et al., 2006). Partnership at the project level can impact the success of the project deliverables in two key ways. First, certain users are now more capable of making important decisions regarding the informational and process requirements of the implemented system that traditionally were made by the IT department (Ross and Weill, 2002). Second, project-level partnership can mitigate users’ political resistance to the new system (Jiang et al., 2006). Because enterprise-level projects often require a relatively broader set of resources from the adopting organization in order to be successful, and are much more visible in the organization, partnership should positively impact enterprise level implementation success by establishing a more complete set of skills in the implementation team and encouraging a sense of ownership in both parties. An example of these benefits of partnership is found in the case of the Gemini project—a large-scale IS project implemented at the University of Illinois Medical center (Ranganathan, Watson-Manheim and Keeler, 2004). The success of the project, according to those involved, was largely due to the business-IS partnership with the project, which established a sense of shared accountability and shared ownership of the project. Overall, this evidence leads us to expect partnership to play positive role in the success of enterprise-level IS implementations; thus, we hypothesize:

**H2:** Partnership at the project level will positively affect project success.

**Joint IT Competence and Partnership-Led Implementations**

We expect that partnership between IS and users is more likely to form under certain contextual conditions. Specifically, partnership between the IT and user departments is more likely to form when a high degree of joint IT competence exists. The shared foundational knowledge created by a high degree of joint IT competence not only facilitates information exchange between the two groups, it fosters mutual appreciation of the various aspects of IT that affect the reciprocal performance of the different groups (Nelson and Cooprider, 1996). Also, according to Basellier et al. (2003) as business professionals develop IT competence, they become more proactively involved in IS implementation projects and are more willing to create and/or strengthen partnerships with the IT department. When the user base shares an appreciation for the role of technology in the business, is demonstrably capable of taking on leadership responsibilities in IT projects, and is motivated to establish/strengthen partnerships with IT, we expect that partnership will be a first choice for governing IS implementations. As a result, we hypothesize:

**H3:** A project team’s joint IT competence will influence the degree of partnership between the user base and the IT department throughout the implementation.

**RESEARCH METHODOLOGY**

**Scale development**

The conceptual model presented in Figure 1 above was empirically tested via a large-scale survey. Consistent with past project-level IS research (i.e., Subramani, Henderson and Cooprider, 1999), two versions of the survey instrument were developed – one for the IS department and another for the user group. The two versions of the questionnaires differed in that, where appropriate, the phrases “The IT department” and “Our unit” were substituted based on the target respondent (user base versus IT department). All constructs were measured in both instruments except for project success, which was assessed only by the user base. The survey instrument included 7-point Likert-style questions. Details of the measurement items used in the survey are presented in the Appendix.

**Survey procedure**

A set of the two versions of the questionnaire were mailed to the CEO or another senior manager of 1,799 companies randomly selected from the “Compact Disclosure” database, which contains information on U.S. service and manufacturing organizations with 500 to 10,000 employees. The initial contact person was asked to identify the most knowledgeable persons from the user and IS side on the implementation effort of an enterprise-level multi-user DBMS (MDBMS).
Enterprise-level IS projects are generally IS initiatives that connect various distinct business processes across an enterprise, and they are a means of integration and data sharing between various new and legacy systems (Mitchell, 2006). Enterprise-level database management systems (DBMS) often serve as the backbone for several critical upper-tier systems and the success of these upper-tier systems relies heavily upon the success of the underlying DBMS. Few other systems play such a foundational role in the corporate IS infrastructure. As a result, we expected the implementation of these systems to involve more intense participation from users and, given the relative importance of these systems, we expected the presence of these systems in the organizations sampled to be highly probable.

The senior manager distributed the questionnaires and subsequently solicited the completed questionnaires. After three months of telephone and mail follow-up efforts, completed questionnaires from both user and IS departments from 79 companies were received for an overall effective response rate of 4.4%. Responses from an additional 12 companies were also received but they were dropped as only the IS or user departments participated. While low, this response rate is in line with previously published research based on matched-pair surveys involving senior managers. For example, Ko, Kirsch and King (2005) were able to obtain matched pair data on 96 projects in their study, and Enns, Huff and Golden (2003) obtained 75 matched pair responses from the 1,087 surveys they mailed out. Testing for response bias (Armstrong and Overton, 1977) was conducted, and revealed no statistically significant differences in the firms ($\chi^2 = \ldots$, $p = 0.279$).

Respondents came from various levels within their organizations (table 2) with 83.75% of the IS personnel being middle or higher-level managers. Twenty percent of the respondents from the user departments were middle or higher-level managers and came from a variety of functional areas.

<table>
<thead>
<tr>
<th>IS department (80 respondents)</th>
<th>User department (110 respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Information Officer</td>
<td>Upper-Level Manager</td>
</tr>
<tr>
<td>12.5%</td>
<td>20%</td>
</tr>
<tr>
<td>Vice President – IS</td>
<td>Professional – Non Manager</td>
</tr>
<tr>
<td>51.25%</td>
<td>43.64%</td>
</tr>
<tr>
<td>IS director/manager</td>
<td>Other</td>
</tr>
<tr>
<td>20%</td>
<td>36.36%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>16.25%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Respondents’ Positions

Data Analysis

Prior to any analysis, data from multiple respondents were averaged to calculate a set of single responses for each type of department – IS or user. Following this consolidation, data corresponding to joint IT competence and partnership were transformed to more accurately capture their intended concepts. First, because joint IT competence captures the balance of IT competence between the business and IT professionals in enterprise-level IS implementation teams, we transformed the data items to more effectively tap into the congruence between the IT and user departments along each dimension of joint IT competence. We calculated the absolute disparity between the users and IT department along the various dimensions of IT competence, and subtracted it from 7 to transform each item. Formulically, each measure of joint IT competence was calculated as:

$$JITC_i = 7 - |(IT_{Dept\_IT\_Competence}) - (User_{Dept\_IT\_Competence})|$$

In order to measure the degree of partnership in the enterprise-level IS implementation team we transformed the responses to anchor on the mid-range value, which explicitly describes the relationship between IT and users as partnership-based. Any response that departs from the middle value (in the extreme case – answers 1 and 7) indicates an imbalance in leadership responsibilities between the groups, favoring either the IT or the user group. This transformation was accomplished by calculating the absolute distance of the response from the middle and subtracting it from 4. Specifically, partnership was measured using the following transformation formula:

$$Partnership\_Led_i = 4 - |4 - Response_i|$$

Measurement Model Assessment
All latent constructs were conceptualized as formative constructs, as the items measuring each construct are conceptually distinct from one another, and make up the constructs. Close examination of the survey instruments suggests that each question taps into a separate aspect of each respective construct, and only when taking all measurement items together are the constructs adequately represented. While determining the structures of these constructs, we followed the assessment approach proposed by Jarvis, MacKenzie and Podsakoff (2003). Analysis was conducted using the partial least squares (PLS) estimation technique (Chin, 1998; Gefen, Straub and Boudreau, 2000). In addition to being an appropriate technique for assessing models including formative constructs, PLS offers the benefit of lower sample size requirements (Chin, Marcolin and Newstead, 2003) and has been used extensively in IS research (Venkatesh and Morris, 2000).

Assessment of formative measures was conducted using item weights as opposed to item loadings, which are typically used in assessing reflective measures (Chin, 1998; Petter, Straub and Rai, 2007). The significance of the item weights was determined based on t-values from a bootstrapping procedure with 500 iterations (Chin, 1998; Yi and Davis, 2003). All item weights were statistically significant for the project success measure and all but one of the item weights for the joint IT competence and partnership measures were significant. Examination of the insignificant measurement items did not reveal any clear wording problems with the items. With regard to the joint IT competence measure, Bassellier et al. (2003) view explicit IT knowledge as a key dimension of IT competence and describe technology-specific IT knowledge as knowledge about “current and emergent technologies that are both generic to all industries and specific to the organization” (2003, p 321). Because the insignificant item for joint IT competence taps into technology-specific explicit knowledge, which is considered a key component of general IT competence, it was deemed appropriate to leave the item in the model. The IT department measure of partnership was also not statistically significant at p < .10; however the t-value was relatively high (1.406). Krisch and Beath (1996), and Jiang et al. (2006) agree that partnership must be developed by transforming contractual relationships in such a way that both parties are compliant with the partnership. Token partnership, on the other hand, arises when one or both of the parties fail to buy in to the notion of equal roles, which results in ineffective coordination (Kirsch et al., 1996). Because the item measuring the IT department’s view of project-level partnership captures a key component of full partnership (Jiang et al., 2006) which is the desired form of partnership, we decided to keep this item in the model as well.

**Structural Model Assessment**

The structural model was assessed based on the significance of the path coefficients between constructs and R² values obtained for the dependent variables, which is also obtained from a bootstrapping procedure with 500 iterations. All paths in the structural model were significant, and the R² values were .07 and .33 for partnership and project success respectively. Detailed results for both the structural and measurement model are presented in Figure 3 below:
DISCUSSION AND IMPLICATIONS

The results confirm all three hypotheses. Overall, we found support for our conceptual model identifying joint IT competence as an antecedent of project success and shared leadership over the project.

Thus, while intuition suggests that organizations’ IT departments are the richest sources of IT competence, this study supports the idea that managers should also look to the user base as a valuable resource of IT competence that can lead to successful projects. Past research has established the value of the user’ functional competences in IS-implementation efforts; however, the results of this study also demonstrate the value of IT competence residing in the user base, which plays an important role in the success of the project by establishing joint IT competence in the implementation team. Managers should identify the fragmented pockets of technological competence found outside the IT department in many organizations and leverage those resources in large-scale IS implementation initiatives.

Furthermore, the findings suggest that when a high degree of joint IT competence resides within the team, partnerships are an effective form of project governance, in line with past research (Jiang et al., 2006; Kirsch 1997). While user participation is a step in the right direction, managers should not limit the roles of business professionals to mere sideline consultants with little control. Rather, managers should recognize that project-level partnership can positively impact project success, especially when a high level of IT competence resides in the team.

LIMITATIONS AND FUTURE RESEARCH

There are limitations of this study that should be pointed out. First, the timing of the survey required that respondents answer based on some degree of recall of the project. However, to control for this limitation, the survey asked senior managers to identify the most appropriate individuals involved in the project. Furthermore, we focused on an enterprise-level system which requires significantly more involvement than smaller projects. Finally, this study examined only one type of enterprise-level system. While this is a commonly employed system, the focus on a single system limits the generalizability of the findings. A replication of this study using a different enterprise-level system will greatly benefit our understanding of this phenomenon.

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**APPENDIX: MEASUREMENT ITEMS**

**IT Competence (Measured Using Both the IT Department and User Base)**

At the time the technology was implemented, we believed that:

1. Our unit had individual(s) with “expert” knowledge of the technology.
2. Our unit had individual(s) who could carry out various parts of the assessment and evaluation procedures for the technology.
3. Our unit had individual(s) who could plan and implement the technology.
4. Our unit had individual(s) who were in a formal/informal position to provide special information, regarding either the technology itself, or regarding applications of the technology.

**Implementation-Level Partnership (Measured Using Both the IT Department and User Base)**

At the time the technology was implemented, we believed that:

1. IS department completely controlled the implementation of the technology.
2. IS department led the major decision-making; and user department(s)’s opinions were minimally accepted by the IS department.
3. IS department led the major decision-making; but user department(s)’s opinions were strongly reflected in the decisions made.
4. IS department and user department(s) had equal decision-making power; both parties equally shared the responsibilities and duties.
5. User department(s) led the major decision-making; but the IS department’s opinions were strongly reflected in the decisions made.
6. User department(s) led the major decision-making, but they occasionally requested minimal technical expertise or advice from the IS department.
7. User department(s) completely controlled the implementation of the technology.

**Project Success (Measured Using Only the User Base)**

Now that the following technology is implemented and in use, we believe that:

1. Our unit is satisfied with the operation and uses the following technology.
2. Our unit is satisfied with our involvement and participation in the operation and ongoing development of the following technology.
3. Our unit is satisfied with the support and services provided for the following technology.