Exploring the impact of empowering leadership on knowledge sharing, absorptive capacity and team performance in IT service

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Abstract

Purpose – The purpose of this paper is to empirically investigate the mechanism through which empowering leadership of a team leader might influence the team performance in IT service.

Design/methodology/approach – The data of 315 individuals collected from 85 different IT projects through online survey is used to empirically test the hypotheses.

Findings – The results confirm that team leader’s empowering leadership raises the level of knowledge sharing among team members and increase the absorptive capacity of the team, and lead to better team performance.

Research limitations/implications – This research theoretically presented and demonstrated the middle- and long-term impacts of empowering leadership resulting from the development of absorptive capacity as the effects of knowledge sharing in an IT project team are produced through absorptive capacity.

Practical implications – The findings indicate that more effective in increasing the performance of IT project teams can be to strengthen empowering leadership than to promote traditional charisma or directive leadership. Knowledge sharing at a team level has the direct effect of improving project performance by providing information and knowledge regarding the related project, but on the other hand it contributes to making stronger the path of associating absorptive capacity with project performance.

Originality/value – The impact of empowering leaderships on team performance of IT project has received less research attention. Little prior research has carried out such an integrated analysis in IT service context. This study contributes to knowledge management research by identifying a key antecedent of knowledge sharing.

Keywords Leadership, Absorptive capacity, IT project management, Knowledge worker performance

Paper type Research paper

1. Introduction

Research on effective team management has been highlighting the importance of team leaders’ behaviors as one of factors critical for successful team performance (Judge et al., 2004). Among the team leaders’ behaviors studied, empowering leadership is
drawing attentions, recently, reflecting current trend toward increased autonomy of
actuating employees (Bennis and Townsend, 1995). Though empowerment is not a new
concept traceable back to the early work of Lewin (1947), recent literature on empowering
leadership focuses on leaders’ empowering actions, such as enhancing meaningfulness
of work, expressing confidence in performance, shared decision making, providing
autonomy (Zhang and Bartol, 2010), leading by example (Kirkman and Rosen, 1997).

Although empowering leadership has been known to be important for team
performance (Srivastava et al., 2006), few studies have examined mechanisms linking
empowering leadership and team performance, particularly in IT project teams. It is
still not clear how empowering leadership may lead to effective performance in teams.
While some studies focus on employees’ responses to empowering leadership (Conger
and Kanungo, 1988; Spreitzer, 1995; Thomas and Velthouse, 1990), this study focuses
on investigating mechanisms through which empowering leadership might influence
the performance of IT project teams.

It is argued here that the relationship between project team leader’s empowering
behaviors leading to team performance especially in IT service environment is a bit
more complex than just a simple trigger. As critical mediators linking empowering
leadership to team performance in IT services, two are included through extant
literature review: knowledge sharing and absorptive capacity. Knowledge sharing is a
team process defined as team members’ sharing of task-relevant ideas, information and
suggestions with each other (Tiwana and McLean, 2005), while absorptive capacity is
the ability to recognize the value of new information and knowledge, thus assimilate
and apply it (Nemanich et al., 2010).

In earlier studies examining the relationship between leadership behavior and team
outcomes in IT service projects, knowledge sharing and absorptive capacity have been
rarely considered simultaneously in a single model, though both concepts are
considered critical in different contexts (Liao et al., 2007). In this study, knowledge
sharing and absorptive capacity of a team are conceptualized as nomological
mediators leading empowering leadership toward the team performance.

In this regard, the goal of this study is to examine the roles of knowledge sharing
and absorptive capacity leading empowering leadership to team performance. Findings of this study may increase understanding of how empowering leadership
actuates team members to produce better team outcome through higher level of
knowledge sharing and increased level of absorptive capacity. It would not only help
academics explicate theoretical relationship between empowering leadership and team
performance, but also aid practitioners in managing IT service teams in which
knowledge sharing and absorptive capacity are critical for effective team performance.

This study fills the research gap in IT service by bringing in empowering
leadership research. IT service projects demand tight collaboration between business
and technology, and this collaboration occurs in team environment. Despite the
importance of IT service teams for effective development of systems (Montoya et al.,
2010), details of team processes related to empowering leadership, knowledge sharing
and absorptive capacity of these teams have not been examined in as much detail in IT
service project teams as in other types of teams. Yet such investigations are critical
because, unlike teams in other domains, in which the focus is on a series of predefined
tasks, IT project teams are effective only insofar as they are able to effectuate high level
knowledge sharing with increased level of absorptive capacity.

In this context, a research model was set up in this study, nomologically linking
empowering leadership, knowledge sharing, absorptive capacity and team

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performance based on reviews of research results in related area, and collected empirical data from 315 subjects across 82 different IT service projects.

In the following section, we discuss in detail how we conceptualize empowering leadership of team leaders, knowledge sharing, absorptive capacity of a team. Next, we develop hypotheses that delineate the mediating effects of knowledge sharing and team absorptive capacity on team performance. Details of data collection and analyses are presented at the end followed by findings and discussions.

2. Background and research model
IT service is one of those services that require high level of professional credence as the outcome quality of service is mostly invisible and knowledge intensive (Park et al., 2012; Carr, 2006). Also, as technical experts need to work closely with domain specialists from the beginning of requirements elicitation till the final implementation, team activities are critical for the success of project (Chen and McQueen, 2010). We define the empowering leadership as a critical variable that lead to higher level of knowledge sharing among team members, in turn increase the level of absorptive capacity of the team, so that the team can perform effectively and efficiently.

2.1 Empowering leadership in IT services
Leadership style has been highlighted as a strategic and critical factor for successful organizational performance, especially in knowledge management area (Nonaka and Takeuchi, 1995). Among a variety of leadership behaviors, empowerment is being emphasized, recently, in effective knowledge management (Oliver et al., 2006; Singh, 2008), as empowerment is considered consistent with the transition into knowledge economy in which individuals’ autonomy is emphasized. Moreover, employee empowerment is found to critical in promoting employee’s creativity (Zhang and Bartol, 2010). Empowered employees with a certain degree of autonomy in task achievement can provide a useful agility to the organization’s knowledge culture, which then enables and motivates the employees to achieve what they intend to achieve with higher level of knowledge sharing among organizational members (Oliver et al., 2006).

Empowerment stimulates knowledge sharing among employees and, in turn, is known to help raising the organizational performance level (Srivastava et al., 2006). Leaders need to commit themselves to this style of leadership, consciously reflecting on their way of management behavior (Bass, 1999). Managers’ self-awareness of and reflection on their leadership style helps them to trigger the empowerment (Fowler and O’Gorman, 2005).

IT service project teams may benefit from an empowering leader. An empowering leader consults with and makes joint decisions with team members. An implication of empowering leadership is that much of the decisions and control processes that traditionally had been the prerogative of the team leader are now shared among team members, increasing the sense of participation and responsibility. An empowered team will actually share control, formally or informally. This kind of shared leadership via empowerment is known to be best applied to knowledge teams engaged in complex work where tasks are highly interdependent, require high levels of creativity (Pearce, 2004). As systems development is this type of knowledge work, empowered leadership might provide the balanced levels of autonomy and shared control necessary for effective team performance, collaborating members with different background. Actually, it is found that, in creating, organizing, applying and using knowledge effectively in systems development teams, teams with empowering leader exhibit better team performance (Singh, 2008). Employees given sufficient authority and
responsibility in terms of managing their own work at the workplace seems to feel free to experiment and innovate on their own with personal attention to and analysis of facts and figures around, and performs better than the ones being constantly directed and supervised closely by their leader.

Empowering leaders get their subordinates involved in making decisions, thus remove the sense of powerlessness, and allow them to be as flexible as circumstances warrant (Arnold et al., 2000). Such a leadership style helps employees learn and elicit behaviors that are consistent with the culture of experimentation and innovation. Such empowerment is known to produce a positive impact on sharing knowledge by challenging people to be more exploratory and creative.

2.2 Absorptive capacity as ability and motivation

Organizations maintain the ability to recognize the value of new information and knowledge. Valued information and knowledge are to be assimilated, and applied for their organizational advantages, leading to innovative actions (Lane et al., 2006). Cohen and Levinthal (1990) first defined this as the absorptive capacity. Mowery and Oxley (1995) further refined the concept of absorptive capacity as a broad set of skills necessary for dealing with tacit components of knowledge transfer. In this regard, absorptive capacity allows a firm to adapt to environmental changes and improve organizational performance with knowledge intensive strategic maneuver. Absorptive capacity is known to depend mainly on prior knowledge, i.e. the knowledge available in the organization (Szulanski, 1996). Organizations assimilate new knowledge more easily if the new knowledge resembles and closely relates to their prior knowledge (Nonaka and Takeuchi, 1995), leading to increased capacity for absorption.

Cohen and Levinthal (1990) explicates that the absorptive capacity tends to develop cumulatively and path-dependently, building on existing knowledge. “Absorptive capacity is more likely to be developed and maintained as a by-product of routine activity when the new knowledge domain that the firm wishes to exploit is closely related to its current knowledge base” (Cohen and Levinthal, 1990, p. 150).

In this line of argument, Zahra and George (2002) suggested to differentiate realized absorptive capacity from potential absorptive capacity. Realized absorptive capacity is geared toward transformation and exploitation, while potential capability toward acquisition and assimilation of new information. A leader who is conscious of all organizational routines and strategic processes through which the firm absorbs knowledge to create value strengthens efforts to foster potentials and achieve higher level of realized absorptive capacity directly utilized for organizational performance (Zahra and George, 2002). Despite the use of word ‘capacity’ that may imply fixed level in general sense, the absorptive capacity has been conceptualized and used as a capability subject to be developed, nurtured and grown, not as a trait unchangeable and fixed.

Increasing absorptive capacity via knowledge sharing. A basic premise of absorptive capacity is that ability (acquired prior knowledge) and motivation (to learn) of an individual facilitate the identification, selection, and implementation of new and innovative practices by that individual (Volberda et al., 2010). While examining a firm's capability to utilize and exploit previously acquired knowledge, employees’ ability and motivation are identified as key aspects of firm’s absorptive capacity (Minbaeva et al., 2003).

It was also found that managers can develop organizational absorptive capacity by providing information to people in the organization who might potentially adopt a new practice (Lenox and King, 2004). In other words, through the interaction with other
members, team members can acquire new knowledge that increases their absorptive capacity which leads to successful team performance. Knowledge sharing among team members and members outside the team may increase the level of absorptive capacity of the team as it increases the members’ ability and motivation. Liao et al. (2007) show that the absorptive capacity is the intervening factor between knowledge sharing and innovation capability, in which knowledge sharing maintains positive influence on absorptive capacity.

Empowering leadership for increased knowledge sharing and higher absorptive capacity. One of the ways organizations could improve efficiency and performance is to empower their employees and let them share what they have, so that other employees may learn from others. In this regard, knowledge sharing is a critical aspect of empowered teams (Argote et al., 2003). Empowering leader can set an example for subordinates by sharing his or her own knowledge first, which signifies his or her support for team-wide knowledge sharing (Xue et al., 2011). And the coaching behavior of an empowering leader includes teaching team members how to effectively communicate with one another and encouraging them to collaboratively solve problems, thereby providing opportunities for them to share their knowledge in practice (Nemanich et al., 2010; Robertson et al., 2012).

Also, in this regard, empowering leadership can also heighten the level of absorptive capacity of the team as the leader enables and promotes individual absorption behavior (ability and motivation) by sharing his/her knowledge and coaching team members (Bosch et al., 1999). Empowered team members are more motivated to learn and assimilate new knowledge as they have more responsibility concerning their own performance than when they are directly micro-supervised with detail instructions in which case responsibility is more on the supervisor. In a theoretical sense, absorptive capacity of the team may be influenced directly by the leader's empowerment and/or indirectly through the increased level of knowledge sharing among team members, as knowledge sharing may increase the ability and motivation to absorb new ways of practice.

2.3 Research model

Empowering leadership can be contrasted with autocratic leadership, and one of the central differences is that autocratic leadership inhibits knowledge sharing among team members but follow charismatic one-way instruction from the leader (Yukl, 2002). Thus, knowledge sharing is a potentially important benefit of empowering leadership (Srivastava et al., 2006). Empowering leaders are the key for integrating processes to construct a learning organization, and subsequently raising the level of absorptive capacity (Srivastava et al., 2006; Amitay et al., 2005). In this regard, these three constructs are strategic in creating a climate that stimulates the disciplines of organizational learning and their interaction. Research model in Figure 1 graphically depicts this line of argument leading to team performance in IT service project teams.

Knowledge processes such as knowledge sharing and knowledge transfer are an important component of knowledge management, as they help in codifying the repository of available knowledge in the team and expanding this repository over time (Fang et al., 2012). When team members are empowered to make job-related decisions on their own, they need to possess adequate information to ensure that the decisions are reasonable and justifiable given the decision contexts. They are more likely to share knowledge with one another before and during the decision process. Therefore, empowering leadership is the enzyme that stimulates and nurtures knowledge sharing
An empowering leader who possesses these attributes will be seen as a supportive leader who provides guidance to followers, treats them fairly and recognizes the value of their input. Team members are likely to receive fair recognition by an empowering leader for their contribution of ideas and information, which motivates them to share their knowledge with each other. Similarly, participative decision-making and coaching behaviors of an empowering leader will also encourage knowledge sharing in teams (Srivastava et al., 2006).

The empowering leadership skills of current team leaders can be strengthened by improving each of the five components identified by Arnold et al. (2000): leading by example, coaching, participating decision making, informing and showing concern. Appropriate training programs can be provided to help team leaders identify their weaknesses and develop the specific skills that they lack. Such training is likely to transform the organization’s current managerial practice. Though difficult to achieve, empowering practice has great potential to stimulate employees’ knowledge sharing behavior and subsequently increase the performance level, especially in knowledge-based tasks (Xue et al., 2011). Jobs and tasks in IT service projects are knowledge intensive, characterized by varying levels of task uncertainty and collaboration challenges. The empowering leader encourages team members to solve problems together and participate in decision making, thereby providing them with opportunities to share their knowledge. Thus:

**H1.** Empowering leadership will be positively associated with the level of knowledge sharing in IT service project teams.

Leaders play crucial role creating and modifying cultures, systems and structures that may foster the absorption, assimilation and application of information and knowledge (Kavanagh and Ashkanasy, 2006). Leaders encourage workers to share their ideas by creating a climate that is receptive to new ideas and by growing absorptive capacity (Bryant, 2003; Garca-Morales et al., 2008) Empowering leaders can make organizations more effective by stimulating active participation and self-management for performance (Faraj and Sambamurthy, 2006).

Empowering leaders foster the absorptive capacity of the team as they encourage autonomous and responsible action from the employee side. They only provide information with appropriate responsibilities while employees use their skill and other
competencies to acquire and implement new information and knowledge, thus transform their practice into innovative ones with creative ideas (Melkas et al., 2010). In this process, they improve internal communication by reducing barriers to sharing knowledge, thereby increasing the efficiency of the absorption process (e.g. Cohen and Levinthal, 1990; Bosch et al., 1999). In this regard, absorptive capacity has recently been recognized as a specific type of organizational learning (Sun and Anderson, 2010). Most of these discussions are related to the role of leadership in creating an atmosphere of openness and psychological safety, which is regarded as a crucial factor for effective organizational learning to occur (Edmondson, 1999). Empowering leaders may make better use of the same contextual factors and enhance the members’ learning by increasing the level of absorptive capacity (Amitay et al., 2005). Thus:

**H2.** Empowering leadership will be positively associated with absorptive capacity in IT service project teams.

Minbaeva et al. (2003) defines absorptive capacity with two elements: prior knowledge (members’ ability) and intensity of effort (members’ motivation). Members’ ability is acquired job-related skills including their educational background and training that may represent the level of acquired prior knowledge: their potential and current ability. Motivation refers to the members’ energy intended for how rigorously contribute to task and job effectiveness by using this ability against newly acquired information and knowledge. Despite the high potential for learning abilities, a members’ absorptive capacity is low if the motivation to do so is low or absent (Nazri et al., 2011; Todorova and Durisin, 2007).

Building a knowledge-sharing culture and activity in a team has an impact on the performance and satisfaction of team members (Huang et al., 2013). Liao et al. (2007) emphasized that, when members share more of their knowledge with one another, they are more likely to experience improvement in their ability and more motivated to participate in knowledge sharing. In an IT service project team, knowledge sharing is very important because of the differences between team members in their expertise and background. Only when the technical knowledge and prior experience with other systems for other corporations or other domains shared with business professionals of the target organization, the business professionals can increase their knowledge of and experience with applications, and contribute to the collaborative efforts to develop systems that may suitable for what they are doing (Wang et al., 2007; Srivardhana and Pawlowski, 2007), and vice versa. Consequently, knowledge sharing in IT service projects helps enhancing the teams’ absorptive capacity (ability and motivation). Therefore, we propose the following hypothesis:

**H3.** Knowledge sharing will be positively associated with absorptive capacity in IT service project teams.

Knowledge sharing has a positive influence on team performance. Knowledge sharing enhances decision-making effectiveness. Stasser and Titus (2004) argued that frequent knowledge sharing enables members to consider a variety of possibilities for solving problems faced by effectively using the knowledge held within their team and to make decisions appropriate for the context. In addition, knowledge sharing contributes to improving team performance by having a positive impact on
the effective cooperation and collaboration among team members. Okhuysen and Eisenhardt (2000) suggested that if team members continue to share information for a certain period of time, members would develop the ability to perceive the information processes occurring within the team as a single pattern or block rather than seeing them as individual fragments need to be integrated. Processing information as a pattern is faster than as a collection of fragments to be cognitively integrated. Therefore, continuous sharing information is useful in developing a collective mental model for information and knowledge processing (Srivastava et al., 2006). Furthermore, team members may increase the level of appreciation of other members' unrevealed skills or capabilities, and use these skills and capabilities to make up for their own weaknesses (Isenberg, 1984). As a result, knowledge sharing is helpful in increasing the team spirit among the team members who try to perform their tasks and accomplish higher performance (Marks et al., 2000; Mathieu et al., 2000).

In this regard, knowledge sharing has been identified as a strong predictor of performance in IT service projects (Pee et al., 2010). It improves performance by bridging different perspectives, producing what Kotlarsky and Oshri (2005) called “collective knowledge and transactive memory” and leads to innovative solutions to problems that they faced, as sharing of accurate and complete requirements is fundamental for meeting users’ needs (Chou et al., 2009):

**H4.** Knowledge sharing will be positively associated with team performance in IT service project teams.

Drucker (1999) argued that productivity is a key indicator of performance in knowledge work. Cohen and Levinthal (1990) suggested that absorptive capacity should be taken into account to maximize the use of knowledge for business interests. Many studies have examined the relationship between an absorptive capacity and performance (Zahra and George, 2002). Griffith et al. (2003) reported a relationship between absorptive capacity and productivity in the economic development and supply chain contexts. Tsai (2002) demonstrated that an organization's absorptive capacity in inter-organization knowledge delivery influences system-wide innovation and business performance. Liao et al. (2007) emphasized that it is important to enhance members’ absorptive capacity and that system-wide innovations can only be made possible through the enhancement of such absorptive capacity. Thus, the following hypothesis is proposed:

**H5.** Absorptive capacity will be positively associated with team performance in IT service project teams.

In addition to the constructs discussed above, some factors may influence project team performance in the proposed model as control variables. Project member (size) and project duration may influence project team performance (Pee et al., 2010). It may be more challenging for a large team and long-term project to perform well given the potential for an increase in conflict among members as team size grows or project term increases. Project type may also influence team performance. Some studies have suggested that the team performance decreases as project difficulty (Rai et al., 2009) as project types dependent on business complexity have more challenges to overcome. Thus, we control for the effect of project number, project duration and project type.
3. Research method

3.1 Measures

Measures of all four constructs were mostly adopted from prior research. Adopting from Arnold et al. (2000), empowering leadership is modeled as a second order construct comprising five first order reflective constructs: lead by example, participative decision making, coaching, informing and showing concern. Knowledge sharing is measured by Faraj and Sproull's (2000) four-items, developed in a field study of IT service project teams. Absorptive capacity is modeled as a second order reflective construct consisting of members’ ability and motivation, adopting from Liao et al. (2007) study. The scale for project team performance was adapted from Henderson and Lee (1992). All of the items were evaluated by a five-point Likert scale where 1 represents “strongly disagree” and 5 represents “strongly agree.”

Absorptive capacity measures are still evolving in the field. For example, some measure the shape and scope of knowledge assimilation as “[…] groups of factors as follows: (1) communication with the external environment, (2) level of know-how and experience within the organization, (3) diversity and overlaps in the knowledge structure, and (4) strategic positioning (Liao et al., 2007),” while others measure “[…] the component capabilities of knowledge process: recognition, acquisition, assimilation or transformation, and exploitation” (Todorova and Durisin, 2007). As team absorptive capacity is the focus of our study, we have borrowed and employed individual level measures of absorptive capacity, consisting of member’s ability and motivation from Liao et al. (2007). Their operationalization of absorptive capacity construct is based on cognitive aspects of the capacity, coming from the theory of learning. This cognitive definition is also well accepted in a community as “conceptualization of absorptive capacity by emphasizing employees’ motivation as well as employees’ ability as the important aspects of absorptive capacity” (Minbaeva et al., 2003) and “[…] identify employees’ ability and motivation as the key aspects of the firm’s absorptive capacity that in turn facilitates internal knowledge transfer” (Minbaeva et al., 2003). “Both aspects of absorptive capacity (ability and motivation) must be present to optimally facilitate the absorption of knowledge” (Volberda et al., 2010).

Minbaeva et al. (2003) defined, as the basis for the measurement of absorptive capacity, prior knowledge (employees’ ability) and intensity of effort (employees’ motivation). This study used their proposal and adopted a version produced and validated by Liao et al. (2007). Motivation (intensity of effort) refers to the amount of energy expended by members to solve problems. Intensity of effort is well studied in cognitive process theories such as the expectancy valence theory of work motivation. Even though the team may consist of individuals with high abilities, its ability to utilize the absorbed knowledge will be low if their motivation is low or absent. Therefore, the second construct of absorptive capacity is the employees’ motivation, and this motivation includes not only the individually originated motivation but external motivation such as rewards. Lane et al. (2006) also noted that “[…] absorptive capacity […] depends on the organization's ability to share knowledge and communicate internally.” In other words, it is theorized and empirically tested here that the ability and motivation to absorb external and internal knowledge (absorptive capacity) may grow stronger when members share knowledge, probably because knowledge sharing may help members to synchronize their mental models and trigger motivation to learn and absorb together as a team.

Measurement items are presented in the Appendix. A qualitative pretest was conducted with five client personnel selected from the primary data sampling frame.
A few modifications were made in terms of word sequence and syntactical errors, but no major changes were suggested in the pretest.

A note of caution is in due order concerning the unit of analysis. Out of four constructs of interests in this study, empowering leadership seems to be an individual level trait of the team leader while other constructs seem to be appropriate to be measured at the team level – team performance, team absorptive capacity and knowledge sharing level in the team. That is, all data in this study were collected from were collected at the individual level and multiple respondents for each team. We were aggregated for each team after assessing within-team agreement. Before aggregating individual responses to a team level, it was necessary to statistically test the conformity of the level of measurement to the level of the theoretical analysis. To assess such within team agreement, the interclass correlation coefficient (ICC) was used to test whether members in a team also led to similar patterns of responses. The ICC values showed in Table II range from 0.544 to 0.681, which indicates sufficient within-team agreement to justify aggregation (Klein and Kozlowski, 2000). Aggregated values confirmed the average of individual members’ perceptions of their team.

3.2 Sample and procedure
A survey was conducted online. In a large electronic parts manufacturing firm, 400 employees with IT service project experiences across 85 different IT service project teams. A total of 330 questionnaires were returned. As 15 returned questionnaire contains inappropriate or missing responses, a total of 315 data points across 82 different IT service projects were used for analysis.

Table I shows the demographics of respondents. Male respondents outweighed female respondents: males and females accounted for 83.5 percent (263) and 16.5 percent (52), respectively, of the respondents. This indicates that there are a far greater number of male participants in IT service projects than women. University graduates were found to constitute 98 percent (309) of the surveyed IT project team members; this indicates that the projects in the IT sector require a high level of education. The majority (56.9 percent, 173) of the surveyed IT project participants (or project team members) was found to have less than three years of work experience in the field, and a considerable number of respondents (12.1 percent) were manager-level team members whose length of service was more than 11 years. Most project teams (95.1 percent) were small groups of < 30 members, and the proportion of project teams with less than ten members was 74.4 percent. The project periods were mostly between six months and one year (39.02 percent), and the largest portion of IT projects (81.7 percent) was represented by projects of between three months to two years’ duration. Most IT projects were found to have a budget of < 1.0 billion Korean won, the majority (52.4 percent) of which was small-scale projects with a budget of 100 million Korean.

4. Analysis
A partial least squares (PLS) analysis was performed to test the research model presented. PLS analysis is a component-based approach and thus does not have strict requirements for sample size and residual distribution (Lohmoller, 1989). Another advantage of the PLS analysis is that it can evaluate a theoretical structural model and a measurement model simultaneously (Chin et al., 2003). SmartPLS software was used in two stage approach. In the first stage, all measurement models were examined for proper psychometric properties, while the second stage was focussed on testing the research model and hypotheses – structural model.
4.1 Measurement model

Assessment of the measurement model involves evaluations of reliability, convergent validity and discriminant validity of the construct measures. Reliability was examined using Cronbach’s \( \alpha \) and composite reliability. As indicated Tables II and III, Cronbach’s \( \alpha \) exceeded 0.8 for each construct. The average variance extracted (AVE) indicates the amount of variance in the measurement items accounted for by the latent construct. It is generally more conservative than Chronbach’s \( \alpha \) and should be 0.5 or above to establish composite reliability of measures (Fornell and Larcker, 1981). As shown in the last column of Table II, all the AVE are \( > 0.50 \). Therefore, it can be concluded that the individual measurement items reliably measures related constructs.

According to Hair et al. (1995), measurement indicators can be evaluated for convergent validity and discriminant validity. Generally, if the factor loadings of each measurement item onto its construct is more than 0.7, the measurement item is considered valid (Chin et al., 2003). Factor loadings of more than 0.7 for each measurement indicate the convergent validity as can be seen in Table II.

To evaluate discriminant validity, AVE can be used. The square root of AVE for each construct should be greater than the correlations among constructs in order for measures to be discriminantly valid. Table III shows the correlations among the constructs and the values in the diagonal are the square roots of the AVE. Square-rooted AVEs were greater than all the other correlational coefficients. Thus, it can be concluded that the measurement model demonstrated adequate discriminant validity.

An empirical analysis of the measurement model verified the appropriate level of factor loadings of five reflective sub-constructs for the “empowering leader”: leading by example, participative decision-making, coaching, informing and showing concern. Also, the loadings of absorptive capacity by its reflective components (members’

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### Table I.
Profile of characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Sample</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
<td>20-29</td>
<td>163</td>
<td>51.7</td>
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<td></td>
<td>30-39</td>
<td>130</td>
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<td></td>
<td>40-49</td>
<td>22</td>
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<td>Education</td>
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<td></td>
<td>Diploma</td>
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<td></td>
<td>University</td>
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<td>Postgraduate</td>
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<td>Experience (years)</td>
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<td>1-3</td>
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<td>4-5</td>
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<td>6-10</td>
<td>58</td>
<td>18.4</td>
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<td></td>
<td>More than 10</td>
<td>38</td>
<td>12.1</td>
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<tr>
<td></td>
<td>Sum of respondents</td>
<td>315</td>
<td>100</td>
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<tr>
<td>Project size (persons)</td>
<td>Less than 10</td>
<td>61</td>
<td>74.4</td>
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<td></td>
<td>10-30</td>
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<td>31-50</td>
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<td>More than 51</td>
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<td>Project period (months)</td>
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ability and motivation) were found to be statistically significant. Measurement model analyses verified the reliability and validity of the measurement items for this study, and revealed no problem in proceeding to further analysis of structural model in focus. For the formative constructs, absolute item weights were examined to determine the relative contribution of items constituting each construct (Chin, 1998). We found that all factor loading weights were accepted by standard of loading value (see Table II).

### 4.2 Structural model

Proposed hypotheses were tested using a bootstrap significance test for inter-variable paths using PLS. Results of PLS analysis is presented in Figure 2. Path coefficients are the standardized $\beta$ coefficients from the PLS analysis.

As expected, empowering leadership displayed a significant and positive relation to knowledge sharing ($\beta = 0.453$, $p < 0.001$). Thus, $H1$ was supported. Empowering leadership was found to have significant positive relationship with project team's

<table>
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<th>Construct</th>
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<th>CR</th>
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**Table II.**

Factor loadings and Cronbach’s $\alpha$
absorptive capacity ($\beta = 0.384, p < 0.001$); as such, $H2$ was supported. Likewise, knowledge sharing had a significant positive relationship with project team’s absorptive capacity ($\beta = 0.384, p < 0.001$). So, $H3$ was supported as well. Regarding $H4$, which deals with the relation between knowledge sharing and project team performance, the resulting coefficient provides support ($\beta = 0.117, p < 0.05$). Project team’s absorptive capacity maintains a positive impact on project team performance ($\beta = 0.574, p < 0.001$), supporting $H5$.

There are two paths, in the research model, from empowering leadership to absorptive capacity: one direct and the other via knowledge sharing. A simple path analysis points that total effect of empowerment on absorptive capacity is (0.558): direct effect (0.397) plus indirect effect (0.149 = 0.453 × 0.329). The direct effect of empowering leadership on absorptive capacity is much higher than the indirect effect via knowledge sharing. Meanwhile, in the impact of knowledge sharing on team performance, the indirect effect via absorptive capacity (0.227 = 0.397 × 0.574) is found to be stronger than the direct effect of knowledge sharing alone (0.117). It can be

![Table III. Composite reliability, average variance extracted and discriminant validity](image)

**Notes:** LE, lead by example; PD, participative decision-making; CO, coaching; IN, informing; SC, showing concern; KS, knowledge sharing; AB, member’s ability; MO, member’s motivation; TP, team performance; SZ, project size (number); DU, project duration; TY, project type. *AVE is not calculated for single-item

![Figure 2. Results of testing model](image)

**Notes:** * = $t > 1.96$; ** = $t > 2.58$; *** = $t > 3.29$ ns = insignificant at the 1.96 level
inferred that the mediating effect of the absorptive capacity seems greater than initially anticipated. In IT service project teams, both knowledge sharing and empowering leadership works through the absorptive capacity.

Squared multiple correlation ($R^2$) for endogenous constructs are presented in Figure 2. $R^2$ measures the percent of variance explained by independent constructs in the model. Independent constructs were found to explain substantial portion of variance in dependent constructs: project team performance ($R^2 = 43.0$). It is also found that empowering leadership explains 19.6 percent of variance in knowledge sharing and 40.9 percent of variance in absorptive capacity with knowledge sharing. The changes in variance explained in the model with control variables were statistically insignificant.

5. Discussions and conclusions
This study proposed an empirical research model explicating the impact of empowering leadership on the team performance via knowledge sharing and absorptive capacity in IT service environment. These constructs are adopted from prior research results in related areas and relations among these constructs are theorized also based on prior research on knowledge and team management. A survey instrument was constructed from the items in this research, and empirical data collected from 315 subjects across 82 different IT service projects.

Empowerment has been discussed as important in fostering creativity and autonomy of individuals, leading to effective performance as a team. Empowering leadership has been emphasized in many fields including business administration, public administration and politics. However, not many studies have been conducted concerning the mechanisms of empowerment, dealing with its consequences. As we progress into knowledge based society in which autonomy and creativity of individual becomes more important, it seems appropriate for empowerment to take a leading role in increasing performance of teams conducting knowledge-based tasks. IT service project is one of those knowledge intensive environments in which the sharing of knowledge among team members with different expertise are critical and higher level of absorptive capacity of the team will make a difference in terms of performance (Faraj and Sambamurthy, 2006).

This study attempted to demonstrate the impact of a team leader’s empowering leadership on knowledge sharing among team members in team-based activities leading to the heightened level of absorptive capacity to effective team performance, especially in IT service project environment. In other words, we advanced and verified a theory that empowering leadership facilitates knowledge sharing and boosts the team’s absorptive capacity, and consequently the sharing of knowledge and the development of absorptive capacity may raise the level of project team performance. Analysis results of the proposed research model empirically supports the argument that knowledge sharing does not always lead to team performance, but a team’s absorptive capacity is actually plays an important mediating role along with knowledge sharing in improving team performance. Empowering leadership of the team leader can also be effective only via raising the level of absorptive capacity of team members to reach out for the actual performance.

These findings have implications primarily for IT service project management. For academics, this study fills the research gap, dealing with knowledge sharing and absorptive capacity of a team, simultaneously. Previous studies of IT service team have dealt with knowledge sharing and absorptive capacity, but separately, not together as
mediators for empowering leadership. Also, not many studies have dealt with empowering leadership in IT services, especially at the project team level.

Liao et al. (2007) proposed and empirically tested that absorptive capacity actually plays a key role between knowledge sharing and innovation capability at the firm level. However, this study pushes the research envelope by adding empowering leadership as a leading antecedent in modeling for team performance. Hypothesized theoretical relation from empowering leadership via knowledge sharing and absorptive capacity toward the team performance, in IT service project teams, are once empirically tested here.

For practitioners, the findings of this study implies the importance of empowering leadership in IT service environment. Empowering leadership explains more that 40 percent of the variance in the absorptive capacity of the team. In all practical sense, it seems important for IT project managers to exhibit and use empowering leadership for the project to be successful. It seems that, in the knowledge intensive tasks such as IT services in which people with different expertise collaborate, empowering works better than any other method of project leadership. It should be noted here for practitioners that primary components of empowerments consists of five sub components: leading by example, participative decision making, coaching, informing and showing concern. Leadership training programs for IT service project team leaders need to provide them with education and training in empowering techniques in real-life situations.

Other implication is related to the direct and indirect relation among the constructs of interests. Though knowledge sharing at a team level maintains direct effect on improved team performance, but the indirect path via absorptive capacity toward the team performance is found to be stronger. This indicates that knowledge sharing produces greater effects through absorptive capacity, suggesting that in the actual practice of team management, emphasis should be placed on raising the absorptive capacity rather than forcing to share knowledge.

Limitations and further studies
First of all, this study employed a cross-sectional survey as a primary research method, although it is a study of leadership development processes. In embodying the leadership, as a matter of fact, the sharing of knowledge and the development of absorptive capacity are the processes of transformation that take place in a longitudinal manner with a team. Nevertheless, project participants (or survey respondents) were asked to recall such processes and their results and give responses to the questionnaire. This indicates that the collected data is retrospective and may not be accurate. In order to confirm and expand the findings of this study, future studies need to measure and monitor the process of empowering leadership and the fluctuations in knowledge sharing and absorptive capacity together throughout IT projects.

Another limitation is that this study didn’t take the task characteristics into consideration. Faraj and Sambamurthy (2006) demonstrated the importance of task uncertainty as a variable mediating the impact of empowering leadership. Empowering leadership may play a critical role in complex tasks but not in simple and routine tasks. IT service projects are rather complex and knowledge intensive in general compared to other project, but project can be differentiated based on complexity and knowledge intensity involved. For example, developing innovative process management systems would be more complex than data porting projects from
one version to another. However, this study analyzed a number of different projects sampled without taking into account the different characteristics of projects. Data points collected from 82 different projects are insufficient for split sample analysis for different complexity. Further studies need to address and include the different complexity of projects that may lead to different level of knowledge intensity in term of jobs and tasks.

References


Chen, J. and McQueen, R.J. (2010), “Knowledge transfer processes for different experience levels of knowledge recipients at an offshore technical support center”, Information Technology & People, Vol. 23 No. 1, pp. 54-79.


**Appendix. Measurement items**

**Empowering leadership**

**Leading by example**

(1) My team leader […] sets high standards for performance by his/her own behavior

(2) Works as hard as he/she can

(3) Works as hard as anyone in my project team

(4) Sets a good example by the way he/she behaves
Participative decision-making
My team leader…
(1) Encourages project team members to express ideas/suggestions
(2) Listens to my project team’s ideas and suggestions
(3) Uses my project team’s suggestions to make decisions that affect us
(4) Gives all project team members a chance to voice their opinions

Coaching
My team leader…
(1) Suggests ways to improve my project team’s performance
(2) Encourages project team members to solve problems together
(3) Provides help to project team members

Informing
My team leader…
(1) Explains sponsor (such as top management) decisions/comments
(2) Explains project team goals
(3) Explains rules and expectations to my project team
(4) Explains his/her decisions and actions to my project team

Showing concern/interacting with the project team
My team leader…
(1) Takes the time to discuss project team members’ concerns patiently
(2) Shows concern for project team members’ success
(3) Gets along with my project team members
(4) Knows what work is being done in my project team

Knowledge sharing
(1) Members in our team share their special knowledge and expertise with one another
(2) If someone in our team has some special knowledge about how to perform the team task, he or she is not likely to tell the other member about it (R)
(3) There is virtually no exchange of information, knowledge, or sharing of skills among members (R)
(4) More knowledgeable team members freely provide other members with hard-to-find knowledge or specialized skills

Absorptive capacity
Ability of project members
(1) Project members are equipped with excellent professional knowledge.
(2) Project members can acquire quickly and thoroughly new knowledge required.
(3) Project members have better working skills than members of other projects.
(4) Project members have the ability to use and organize acquired knowledge.
Motivation of project members

(1) Project members strive to acquire working skills and knowledge for their own career movement.

(2) Knowledge acquisition behavior of project members positively helps increasing working efficiency.

(3) Project rewards are designed to encourage members’ to acquire working skills.

(4) Project members obtain fair rewards for their progress in learning compared to members of other projects.

Project team performance

(1) This team was efficient in project operations.

(2) This team maintained good adherence to project schedule.

(3) This team maintained good adherence to project budget.

(4) This team produced good quality work.

About the authors

Jungwoo Lee is currently a Professor of Information Systems and the Director of the Center for Work Science at the Yonsei University, Republic of Korea. He received his PhD in Computer Information Systems from the Georgia State University in 1998. His research interests are focussed primarily around social and organizational changes incurred by information and communication technologies.

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