

6-2012

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Jetu, Fanta Tesgera and Riedl, René (2012) "Determinants of Information Systems and Information Technology Project Team Success: A Literature Review and a Conceptual Model," *Communications of the Association for Information Systems*: Vol. 30 , Article 27. DOI: 10.17705/1CAIS.03027

Available at: <https://aisel.aisnet.org/cais/vol30/iss1/27>

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Communications of the Association for Information Systems

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Determinants of Information Systems and Information Technology Project Team Success: A Literature Review and a Conceptual Model

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Abstract:

During the past years, increasingly more project managers started to recognize that human factors, in particular those related to project team success, are critical for overall project success. Hence, the scientific investigation of this topic has gained momentum. However, a review of the Information Systems and Information Technology (IST) literature on the determinants of project team success reveals that there has been limited research on this topic. Bearing this research gap in mind, it is reasonable to argue that IST theorizing can substantially benefit from new insights from other scientific disciplines in which studies on team effectiveness and project team success are already available. Therefore, the present article reviews and integrates the literature published in other disciplines in order to develop a conceptual model, which provides insights into the determinants of IST project team success. Moreover, a first empirical assessment based on interview data collected from sixteen project experts shows the utility of the model. Consequently, the contribution of the present article is twofold: First, we present a conceptual model applicable to IST project teams. Second, the theoretical insights addressed are useful for project managers who are responsible for project success. Propositions that guide future research are provided, and implications of the model for both theory and practice are discussed.

Keywords: teamwork, team effectiveness models, projects, project success factors, critical success factors, project team success

Volume 30, Article 27, pp. 455-482, June 2012

I. INTRODUCTION

The topic of project success has always been a central concern in the Project Management (PM) literature (e.g., Cooke–Davies, 2002; Fortune and White, 2006) and Information Systems (IS) research (e.g., Akkermans and van Helden, 2002; Rai, Maruping, and Venkatesh, 2009). A significant amount of research has gone into the identification of the determinants of project success. Notwithstanding the contributions of research to date, there are only a limited number of studies that have a focus on the human factors influencing project success [Belout, 1998; Belout and Gauvreau, 2004; Henrie and Sousa–Poza, 2005; Leybourne, 2007]. This result is not surprising, because the idea of project success has historically been understood from the technical aspects of projects [Belout and Gauvreau, 2004; Soderlund, 2004a]. Consequently, hard factors (time, cost, and quality) have been considered as the major drivers of project success [Leybourne, 2007; Neal, 1995; Pollack, 2007; Soderlund 2004a].

During the past years, increasingly more project managers started to recognize that human factors, in particular *project team success* (PTS), are critical for overall project success. There is a general consensus that an unbalanced focus on hard factors may understate the human factors that can significantly affect the hard factors through which project success is typically established. As a consequence, in the literature there is now a notable call for more vigorous research into the soft factors of project success. In particular, a call for the investigation of the human factors has been made (e.g., Belout, 1998; Belout and Gauvreau, 2004; Cooke–Davies, 2002; Henrie and Sousa–Poza, 2005; Kendra and Taplin, 2004; Kliem and Ludin, 1992; Thamhain, 2004b).

People are considered core elements in the successful delivery of projects. “Managing people effectively influences many results of a project” [Belout, 1998, p. 23], “the/a common theme to project success or failure is the people involved with the project” [Henrie and Sousa–Poza, 2005, p. 5], or “it is fast becoming accepted wisdom that it is people who deliver projects, not processes or systems” [Cooke–Davies, 2002, p. 189] are three exemplary statements that express the importance of the human element in the PM literature. Altogether, there is strong agreement in both academia and practice today that especially the human factors are critical elements of project success. Hence, the scientific investigation of this topic has gained momentum.

Within the Information Systems and Information Technology (IST) literature, there has been limited research that is devoted to identifying and describing the impact of the human factor on project success. Only a few studies have indicated the significance of human factors. Markus [1983, p. 433], for example, explained that “factors internal to people and groups” (e.g., cognitive style, personality traits, and human nature) may be an important cause of resistance against the implementation and/or use of new technologies in organizations. This explanation, to the best of our knowledge, was one of the first explicit statements in the IS literature on the importance of the human element in IST projects. In the 2000s, a few studies on the determinants of enterprise resource planning (ERP) project success have made a renewed call for the importance of human factors (e.g., Nah and Delgado, 2006; Parr and Shanks, 2000; Sarker and Lee, 2003; Soja, 2006).

In addition to studies on enterprise-wide system implementations and ERP initiatives, software development projects have also been the focus of IS research. In particular, in the late 1990s and early 2000s, Keil and colleagues ran a research program on risks and escalation behavior in software development projects. Despite the significant contribution provided by this program to IS research, the studies in this program (e.g., Keil, Cule, and Lyytinen, 1998; Keil et al., 2000a; Keil, Mann, and Rai, 2000b; Montealegre and Keil, 2000) only touched on the human element. For example, in Keil et al. [1998] the word *human* is not mentioned at all, and also the word *team* is mentioned only one time; they write in this context that a relevant question for project managers is: “[D]o I have a team in place that can successfully execute this project?” (p. 81).

An international Delphi study (Hong Kong, Finland, United States) by Keil, Lyytinen, and colleagues had the goal of developing “an authoritative list of common risk factors” in software projects [Schmidt, Lyytinen, Keil, and Cule, 2001]. The list contains fourteen risk factor domains, each of which is split into several factors. The word *team*, however, is mentioned in only three domains (No. 3, 4, and 10), and a detailed look at the factors reveals that the human element in connection with team is discussed only once; Schmidt et al. write in this context that “poor team relationships,” that is, “strains existing in the team due to such things as burnout or conflicting egos and attitudes,” constitute a risk factor in software projects (p. 17). A few years after this Delphi study, a survey among more than 500 software project managers identified “team risk” as one of six risk dimensions [Wallace, Keil, and Rai, 2004]; team risk was defined as “issues associated with the project team members that can increase the uncertainty of a

project's outcome, such as team member turnover, staffing buildup, insufficient knowledge among team members, cooperation, motivation, and team communication issues" (p. 117).

Finally, in addition to ERP and software development projects, outsourcing projects are also an important project type in the IST domain. Similar to the results of our analyses of the ERP and software development literature, we identified only a few studies which deal with the human (team) element in outsourcing and offshoring projects (e.g., Bandyopadhyay and Pathak, 2007; Dibbern, Winkler, and Heinzl, 2008; Dibbern, Winkler, and Heinzl, 2004). Altogether, therefore, we conclude that within the IST literature, and in particular in mainstream outlets of the IS discipline, there has been limited research on the impact of the human factor on project success.

The present article, therefore, seeks to close this significant research gap. We argue that if human factors are well known, considered and managed, they can positively influence the success of project teams, but, if they are not addressed, will undermine PTS. Specifically, we address the following three research questions:

1. What are the factors that drive the effective functioning of teams?
2. What are the factors that determine the success of IST project teams?
3. What dimensions better constitute PTS, and how do they interrelate?

From a theoretical viewpoint, addressing these questions stimulates improved and better understanding of the broad range of determinants of PTS, and also of project success in general, in IST project environments. Apparently, PTS is a complex, multidimensional construct. It is a topical issue that tends to cut across different research disciplines. Hence, it is important to reference success measures from different areas and integrate them. In this regard, a review and synthesis of works published in team effectiveness and management, project teams, cross-functional teams, virtual teams, and ERP teams is likely to yield fruitful insights for IST theorizing. For example, Baskerville and Myers [2002] argue that considering findings from reference disciplines holds the promise to enhance the reference potential of the IS discipline, thereby facilitating a cumulative tradition across the boundaries of scientific disciplines. So, IST researchers can be "intelligent consumers" of the existing literature in these reference disciplines to maximize the possibility for PTS.

A number of IST-related topics are closely associated with projects in which humans and their interaction play a crucial role (e.g., software development, business process reengineering [BPR], ERP, outsourcing), and hence the importance of our theoretical discussion becomes evident [Larsen and Myers, 1999; Levesque, Wilson, and Wholey, 2001; Levina and Ross, 2003]. From a practical viewpoint, our theoretical insights are useful to managers who are responsible for the success of projects. If project managers know and consider the human factors which might have influence on PTS (which is an important antecedent of overall project success), and if they also have knowledge about the interrelationship among these factors, then this could contribute to a higher success rate of IST projects.

The remainder of this article is structured as follows: In the next section, we discuss team effectiveness models, which we then use as a conceptual basis for the review of the determinants of PTS. We begin by examining the definition of teams used in the literature and then feature selected works that have discussed the different factors that drive team effectiveness. We continue with a conceptualization of the determinants of PTS in order to consolidate previous research, organize them into three broad categories herein referred to as dimensions, and propose a conceptual model that outlines the interrelationships among these dimensions. Then, we present interview data which provides preliminary empirical evidence for the proposed model. Finally, we reflect upon the theoretical and practical implications of the proposed model and suggest areas of future research.

II. REVIEW METHODOLOGY

In order to provide a solid theoretical foundation on which to ground our work, we build on both theoretical and empirical works from the above-mentioned fields of inquiry. Our primary base is an in-depth review of the PM literature to provide insights on project teams and the determinants of their success. We consider studies that have appeared in the last decade in the two premier journals of PM: *International Journal of Project Management* and *Project Management Journal* (from 1995 to 2009). Here, both key word search and scanning operations were performed in order to identify and select all possible studies related to the human aspect of project success (project teams). We used key words such as "project success," "the human aspect of project success," and "project team success." Moreover, we examined each issue of each volume of both journals for the period under consideration to identify and include relevant articles that discuss project teams or PTS from different perspectives.

The search was expanded to include the literature on ERP implementation from Management Information Systems (MIS) journals, an area of study which is well-established in the body of IST literature [King and Burgess, 2006]. To identify sources, key words such as "success factors" or "critical success factors" of ERP implementation were used.

Due to the vastness of literature in this area, we limit ourselves to selected studies that discuss and focus on the human aspect (project teams) of ERP implementation. In order to provide background information on teams, we further considered studies from team effectiveness and management literature and leading books focusing on this topic. Moreover, we also refer to studies on cross-functional teams and virtual teams' literature to obtain more insights. Phrases such as "teamwork," "team effectiveness models," "virtual teams," and "cross-functional teams" were used to identify sources.

Those articles and books that largely emphasize team effectiveness models and the factors determining the success of project teams were considered for the review process. First, book reviews, editorial notes, and viewpoints were eliminated from the review. Second, through reviewing abstracts or book chapters, those that attempt to offer models or a general framework of thinking or identify and discuss factors toward team effectiveness or project success were considered as the focus of the review. A further insight was given to those studies that emphasize project teams and broaden our understanding of the factors determining their success in project work settings. The resulting ninety-five articles came from journals (forty-one project management, nineteen team effectiveness and management, twenty-six MIS, and nine from other journals). It also includes one dissertation and five books (refer to Appendix A for the distribution of studies across journals).

III. TEAM EFFECTIVENESS

The introduction of teamwork can be traced back to biblical times [Thamhain, 2004a]. The rapid expansion of teamwork in many organizations, however, took place in the 1990s, and since then it has grown to become one of the most strategic elements in the achievement of organizational objectives (e.g., Harvey, Millett, and Smith, 1998; Kirkman, Rosen, Gibson, Tesluk, and McPherson, 2002). Teams have come in different forms for different purposes, and hence there exist different team typologies in the literature. For instance, Pina and Martinez [2008] mention five types of teams: work teams, parallel teams, self-managing teams, project teams, and management teams, while Robbins [2003] notes four types of teams: problem solving teams, self-managing teams, cross-functional teams, and virtual teams. Moreover, Cohen and Bailey [1997] identify four types of teams: work teams, parallel teams, project teams, and management teams, while Cleland [1995] lists about ten types of teams within contemporary manufacturing organizations. Despite diversity of team typologies, there is yet an inherent similarity in their definition and attributes in the body of literature [Fleming and Koppelman, 1996].

The concept of team is captured in a variety of ways [Salas, Sims, and Burke, 2005]. For example, Katzenbach and Smith [1993, p. 112] provide the following definition: "a small number of people with complementary skills, who are committed to a common purpose, set of performance goals, and approach for which they held themselves mutually accountable." Similarly, Lussier [2002, p. 343] defines a team as "a small number of members with shared leadership who perform interdependent jobs with individual and group accountability, evaluation and rewards." A seemingly comprehensive definition of teams is provided by Hackman [1987, cited in Cohen and Bailey, 1997, p. 241]: "[T]he collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries."

Based on the above definitions, teams have some distinguishing attributes: the existence of manageable size, shared purpose and understanding, collective responsibility and accountability for actions and outcomes, and a system to evaluate and reward performance [Katzenbach and Smith, 1993].

The importance of teamwork has increased considerably during the past decades. A reason for this fact is that organizations are constantly challenged by the onset forces of competition, swift technological changes and innovations, and these factors typically result in an increased degree of division of labor and the need for specialized expertise, thereby elevating the relevance of teamwork [Cohen and Bailey, 1997; Singh and Muncherji, 2007; Thamhain, 2004b]. The growing reliance on teamwork stems mainly from the benefits of collective synergy that would be impossible to achieve through individual work [Katzenbach and Smith, 1993; Rousseau, Aube, and Savoie, 2006; Salas et al., 2005; Tarricone and Luca, 2002]. A team usually has more expertise, experience, and information than does an individual, and as a consequence "effective teamwork is seen as a key success factor in deriving competitive advantages" [Thamhain, 2004a, p. 534].

In helping organizations benefit from teamwork, researchers have sought to understand and develop the drivers of effective teams or criteria and approaches to measure team effectiveness. As a result, there is considerable conceptual and empirical literature extending across different disciplines [Cohen and Bailey, 1997; Martins, Gilson, and Maynard, 2004]. Much of early theorizing in team effectiveness is mainly grounded in an input-process-outcome (I-P-O) model [Martins et al., 2004; Mathieu, Maynard, Rapp, and Gilson, 2008], and is a more recent phenomenon in the PM (e.g., Thamhain, 2004a) and MIS (e.g., He, Butler, and King, 2007) literature. Inputs

represent the conditions necessary in achieving team goals, while processes represent the dynamic interactions and influence process involved among team members as they work together. Outcomes represent team performance, both task and non-task consequences resulting from the team task [Martins et al., 2004; Mathieu et al., 2008]. Cohen and Bailey [1997] measure team outcomes in terms of three criteria: (i) performance (efficiency, productivity, response times, quality, customer satisfaction, and innovation), (ii) attitudes (employee satisfaction, commitment, trust in management), and (iii) behavioral outcomes (absenteeism, turnover, safety, and intention to leave).

Our review of team effectiveness and management literature revealed that studies have given much attention to the input and process characteristics of teams. Salas et al. [2005, p. 557], for example, argue that “team effectiveness takes a more holistic perspective in considering not only whether the team performed ... but also how the team interacted ... to achieve the team outcome.” After conducting an extensive review on the drivers of team effectiveness, they identified the following factors: (i) leadership that provides the direction and motivation, (ii) mutual performance monitoring that creates a common understanding of teamwork, (iii) behavior that accommodates the various needs, (iv) adaptability to meet new demands, (v) team orientation to ensure maximum concern for collective rather than individual goals, (vi) prevalence of a common understanding that holds members together, and (vii) transparent mode of communication on needs and expectations.

Another study [Rousseau et al., 2006] developed a hierarchical framework that integrates multiple teamwork behaviors. At the top-level, the hierarchy consists of two meta-factors: (i) regulation of team performance and (ii) management of team maintenance. At the second level, meta-factor (i) is subdivided into four sub-factors (each of which is then again subdivided): preparation of work accomplishment (team mission analysis, goal specification, and planning), work assessment behaviors (performance monitoring and systems monitoring), task-related collaborative behaviors (coordination, cooperation, and information exchange), and team adjustment behaviors (backing up behaviors, intra-team coaching, collaborative problem solving, and team practice innovation). Meta-factor (ii) is, at the second level, subdivided into two sub-factors: psychological support and integrative conflict management system.

In another investigation, Anderson and West [1998] developed and psychometrically validated a multidimensional measure of facet-specific climate for innovation within groups at work, the so-called Team Climate Inventory (TCI). At first, a four-factor theory of facet-specific climate for innovation, which was derived from a literature review, was developed. Then, the paper systematically outlines the procedures necessary to operationalize the model. After extensive empirical validation, a five-factor model containing thirty-eight items demonstrated robust psychometric properties (i.e., acceptable levels of reliability and validity). The five factors are: (i) vision, (ii) participative safety, (iii) support for innovation, (iv) task orientation, and (v) interaction frequency.

Robbins [2003] also analyzes team effectiveness on the basis of work design that offers team members both the greatest autonomy and mentally challenging work. In essence, in this investigation team effectiveness is affected by (i) a balanced team composition with a balanced mix of individuals based on abilities and skills, among other attributes, (ii) top management support, and (iii) appropriate team interaction patterns which ensure commitment to common purpose and objectives.

Despite the ubiquity of leadership influences on organizational team performance and the large amount of literature on leadership and team dynamics, little is known about how leaders create and handle effective teams. Zaccaro, Rittman, and Marks [2001] addressed this research void and focused on leader–team dynamics. In essence, they propose a model of leader performance functions contributing to team effectiveness. The model includes four leadership processes (information search and structuring, information use in problem solving, managing personnel resources, and managing material resources) which are hypothesized to influence four team processes (cognition, motivation, affect, and coordination), and these team processes, in turn, are expected to affect team effectiveness.

In team effectiveness and management literature, a number of further team effectiveness models are discussed (e.g., Harvey et al., 1998; Singh and Muncherji, 2007). Hence, the studies which we present here are considered to be illustrative rather than exhaustive. Table 1 summarizes important studies on team effectiveness models. For the purpose of the present article, it is crucial to stress that the studies listed in Table 1 embody the existing theoretical diversity in team effectiveness research.

Generally, the diversity of views and the theoretical basis reflected in the models tend to converge and hence have commonalities. The differences in the models appear to be in the viewpoints and dimensions being emphasized and the different approaches being pursued along the continuum. For instance, unlike the model proposed by Rousseau et al. [2006], the Robbins [2003] model subsumes job design as one of its dimensions. Moreover, Anderson and West [1998] stress the importance of clarity of vision, while Robbins [2003] and Salas et al. [2005] focus on team orientation or team interaction process. Most common among them were team context [Robbins, 2003], team

maintenance [Rousseau et al., 2006], support for innovation [Anderson and West, 1998], healthy team climate [Singh and Muncherji, 2007], and organizational support [Harvey et al., 1998], which all recognize the need for favorable team environment, especially management support.

Table 1: Team Effectiveness Models (Examples)

| Sources | Drivers of team effectiveness |
|----------------------------|--|
| Salas et al. [2005] | <ul style="list-style-type: none"> • Leadership • Mutual performance monitoring • Behavior that accommodates the various needs • Adaptability to meet new demands • Team orientation • Common understanding • Transparent mode of communication |
| Rousseau et al. [2006] | <ul style="list-style-type: none"> • Regulation of team performance • Management of team maintenance |
| Anderson and West [1998] | <ul style="list-style-type: none"> • Vision • Participative safety • Support for innovation • Task orientation • Interaction frequency |
| Robbins [2003] | <ul style="list-style-type: none"> • Work design • Balanced team composition • Top management support • Team interaction patterns |
| Zaccaro et al. [2001] | <ul style="list-style-type: none"> • Information search and structuring • Information use in problem solving • Managing personnel resources • Managing material resources |
| Harvey et al. [1998] | <ul style="list-style-type: none"> • Clear goals • Decision making authority • Accountability and responsibility • Effective leadership • Training and development • Resources • Organizational support • Rewards for team success |
| Singh and Muncherji [2007] | <ul style="list-style-type: none"> • Team objectives and integration • Decision making • Meetings • Implementation • Team health |

From the perspective of our review, the versatility of such models, the underpinning theoretical thinking, is especially important to understand the factors that determine the success of IST project teams, which is the focus of this article. They help not only in better understanding of the different determinants leading to PTS, but also provide the theoretical basis to consolidate such determinants into dimensions.

IV. PROJECT SUCCESS

Although many studies on project success have been published during the past decades, a universally accepted definition has not yet been established [Cook–Davies, 2002; Jugdev and Müller, 2005]. Despite this lack, there is agreement in the literature that project success typically includes two components (e.g., Baccarini, 1999; Cooke–Davis 2002): project management success and product success. While the first component focuses on project performance (meeting time, cost, and quality objectives) and the manner in which a project was conducted, the second component deals with the effects of the project’s final product.

In MIS research, the investigation of ERP projects, for example, is a prominent topic. The goal of such projects is the implementation of large enterprise-wide information systems. But they are often complex involving huge investment, long duration, multipronged problems, and often exceeding estimates, or not yielding the desired benefits, or resulting in failures [King and Burgess, 2006; Parr and Shanks, 2000; Ragowsky and Gefen, 2008; Soja, 2006]. In large organizations, in particular, an ERP implementation typically takes several years and the cost may reach several million dollars [Ragowsky and Gefen, 2008]. However, considering that project success can be measured on

the basis of project management success and product success, ERP managers and top management could assess the success of their projects in two ways. First, a project could be considered as successful if the target values regarding time, cost, and quality are met. Second, a project could be considered successful if the effects of the ERP implementation meet expectations such as an increase of productivity in workers who use the system (e.g., Bharadwaj, Bharadwaj, and Konsynski, 1999; Gattiker and Goodhue, 2005; Gefen and Ragowsky, 2005; Karimi, Somers, and Bhattacharjee, 2007).

Today, organizations of different types and sizes are putting vast amounts of resources into a variety of projects involving IST to achieve their objectives. However, achieving project success is obviously a complex challenge. The complexity of projects in many domains, and in particular in the field of IST, has been continuously increasing [Lebourne, 2007]. Indeed, project success is typically the outcome of the interplay of many factors [Belassi and Tukel, 1996; Camprieu, Renaud, and Feixue, 2007; Crawford and Pollack, 2004; Gray, 2001; Leybourne, 2007; Soderlund, 2004a].

A number of studies (e.g., Camprieu et al., 2007; Gray, 2001) provide conceptual frameworks for analyzing the impact of exogenous and endogenous factors on project success. The framework by Camprieu et al. [2007], for example, includes cultural, individual, socio-economic, and situational factors. Because these and similar factors are usually different in their nature and interrelated, an understanding of how these factors influence project success is relevant to both academics and practitioners. It is important to note, however, that several factors are usually outside the control of project managers (e.g., socio-economic factors). Hence, project management has to focus on those factors that can be controlled or at least influenced [Belassi and Tukel, 1996; Hyväri, 2006; Shenhar and Levy, 1997]. PTS is an antecedent of project success, and it can be influenced by project managers. In the following, therefore, we discuss the determinants of PTS, thereby providing insights for both theory and practice.

V. DETERMINANTS OF PROJECT TEAM SUCCESS

Despite the large body of studies identifying and describing the determinants of PTS in the PM literature, there is no precise definition of what constitute project teams and PTS. For the purpose of our review, we adapt the definition of Cohen and Bailey [1997, p. 242]:

Project teams are better defined and understood as members with diverse sets of knowledge and expertise that work interdependently on IST projects with a clearly defined objective and structure for a defined period of time to make suggestions on system improvements (in terms of quality, cost, and productivity) or design and develop new products for their organizations.

The meaning of PTS is also often assumed rather than explained or defined. Based on the input–process–outcome framework, PTS is better understood as project team outcomes resulting from the execution of a project. Specifically, Cohen and Bailey [1997] discuss performance, attitudes, and behavioral outcomes.

With the objective to enhance these outcomes or the likelihood that project teams are successful, different researchers have examined the determinants of PTS. Examples are investigations on project teamwork quality [Hoegl and Gemuenden, 2001], project team learning [Bresnen, Edelman, Newell, Scarbrough, and Swan, 2003; Jackson and Klobas, 2008; Sense, 2007a], team leadership [Kaulio, 2008; Thamhain, 2004b; Weinkauff and Hoegl, 2002], team integration [Baiden, Price, and Dainty, 2006], team achievement [Taveira, 2008], among others. In essence, all these studies provide evidence that PTS influences overall project success—hence, the former is considered as an important antecedent of the latter. Analyzing the empirical and conceptual literature on the determinants of PTS, therefore, is important. Our review mainly focuses on the team (micro) level determinants that occur within the project team environment in delineating the dimensions of PTS. An understanding of the broad range of the determinants provides valuable insights into the interrelationships among the dimensions, which, in turn, is useful for IST research in many domains such as software development, BPR, ERP, outsourcing, among other topics, because all these topics are closely associated with project management.

Table 2 summarizes the results of our literature review on the thirty-five determinants of PTS. We discuss important studies after the presentation of Table 2.

Thamhain [2004a, 2004b], for example, examines the influence of team leadership climate and project environment on the success of project teams in technology-based project teams. Based on his field study, he concludes that increased involvement of all project stakeholders, enhanced work support, good communication, active participation, effective risk management, and favorable project environment encourage team commitment and performance.

Table 2: Determinants of Project Team Success

| Determinants | Sources | Citations |
|---|--|-----------|
| Communication | Bishop [1999], Clarke [1999], Cleland [1995], Hoegl and Gemuenden [2001], Hyväri [2006], Johns [1995], Kloppenborg and Petrick [1999], McDonough [2000], Muzio, Fisher, Thomas, and Peters [2007], Peterson [2007], Sarker and Lee [2003], Seriki [2007], Taveira [2008], Thamhain [2004b] | 14 |
| Support | Bishop [1999], Carson, Tesluk, and Marrone [2007], Cleland [1995], Fleming and Koppelman [1996], Gray [2001], McDonough [2000], Nah and Delgado [2006], Parr and Shanks, [2000], Sarker and Lee [2003]; Soja [2006], Taveira [2008], Thamhain [2004a], Wheelan [2005] | 13 |
| Empowerment/ Autonomy | Ayas [1996], Bishop [1999], Cleland [1995], Fleming and Koppelman [1996], McDonough [2000], Peterson [2007], Sarker and Lee [2003], Seriki [2007], Soja [2006], Tarricone and Luca [2002], Thamhain [2004b], Weinkauff and Hoegl [2002] | 12 |
| Mutual Trust/ Respect | Bishop [1999], Hoegl and Gemuenden [2001], Kloppenborg and Petrick [1999], Kirkman et al. [2002], McDonough [2000], McGreevy [2006], Peterson [2007], Seriki [2007], Taveira [2008], Thamhain [2004b], Webber [2002] | 11 |
| Participation | Bishop [1999], Carson et al. [2007], Gray [2001], McDonough [2000]; Nah and Delgado [2006], Peterson [2007], Seriki [2007], Soja [2006], Taveira [2008], Thamhain [2004a], Wheelan [2005] | 11 |
| Commitment | Fleming and Koppelman [1996], Hoegl and Gemuenden [2001], Hyväri [2006], Jha and Iyer [2007], Kloppenborg and Petrick [1999], McDonough [2000], Parr and Shanks [2000], Seriki [2007], Taveira [2008], Thamhain [2004a] | 10 |
| Motivation/ Reward | Bishop [1999], Clarke [1999], Cleland [1995], McDonough [2000], McGreevy [2006], Peterson [2007], Thamhain [2004a], Wheelan [2005], Weinkauff and Hoegl [2002] | 9 |
| Competence | Ajmal and Koskinen [2008], Jackson and Klobas [2008], Jha and Iyer [2007], Johns [1995], Kasvi, Vartiainen, and Hailikari [2003], Kotnour [2000], Sense [2007a], Tarricone and Luca [2002] | 8 |
| Cooperation | Baiden et al. [2006], Fleming and Koppelman [1996], Kloppenborg and Petrick [1999], McDonough [2000], Muzio et al. [2007], Seriki [2007], Tarricone and Luca [2002], Thamhain [2004b] | 8 |
| Clarity of Purpose/ Shared Understanding | Bishop [1999], Carson et al. [2007], Clarke [1999], Fortune and White [2006], McDonough [2000], Seriki [2007], Taveira [2008], Thamhain [2004a, 2004b] | 8 |
| Interpersonal Relations | Baiden et al. [2006], Katzenbach and Smith [1993], Kirkman et al. [2002], Muzio et al. [2007], Seriki [2007], Tarricone and Luca [2002], Taveira [2008] | 7 |
| Teambuilding | Ayas [1996], Bubshait and Farooq [1999], Cleland [1995], Harvey et al. [1998], Johns [1995], Thamhain [2004a], Weinkauff and Hoegl [2002] | 7 |
| Coordination | Bishop [1999], Cleland [1995], Hoegl and Gemuenden [2001], Hyväri [2006], Jha and Iyer [2007], Thamhain [2004b] | 6 |
| Mutual Responsibility/ Accountability | Bishop [1999], Cleland [1995], Seriki [2007], Thamhain [2004b], Wheelan [2005], Weinkauff and Hoegl [2002] | 6 |
| Conflict Treatment | Bishop [1999], Fleming and Koppelman [1999], Hoegl and Gemuenden [2001], Muzio et al. [2007], Thamhain [2004b], Weinkauff and Hoegl [2002] | 6 |
| Creativity/ Innovation | Bresnen et al. [2003], Fong [2003], Gray [2001], Kotnour [2000], Liebowitz and Megbolugbe [2003], Thamhain [2004a] | 6 |
| Self/Collective Efficacy Confidence | Kloppenborg and Petrick [1999], Law and Chuah [2004], Rousseau et al. [2006], Thamhain [2004b], Zaccaro et al. [2001] | 5 |
| Cohesiveness | Fleming and Koppelman [1996], Hoegl and Gemuenden [2001], Kirkman et al. [2002], Seriki [2007], Tarricone and Luca [2002] | 5 |
| Representation/ Membership | Bishop [1999], Hoegl and Gemuenden [2001], Sarker and Lee [2003], Soja [2006], Taveira [2008] | 5 |
| Priority Setting | Bishop [1999], Hoegl and Gemuenden [2001], Thamhain [2004b], Wheelan [2005] | 4 |
| Openness | Fong [2003], McGreevy [2006], Seriki [2007], Sense [2007a] | 4 |
| Achievement Orientation | Muzio et al. [2007], Thamhain [2004a, 2004b], Weinkauff and Hoegl [2002] | 3 |
| Flexibility | Baiden et al. [2006], Muzio et al. [2007], Seriki [2007] | 3 |

Table 2: Determinants of Project Team Success – Continued

| | | |
|------------------------|--|---|
| Emotional Intelligence | Bubshait and Farooq [1999], Luthans [2002], Robbins [2003] | 3 |
| Feedback | Bishop [1999], Fortune and White [2006], Weinkauf and Hoegl [2002] | 3 |
| Conflict | Cleland [1995], McGreevy [2006], Thamhain [2004a] | 3 |
| Networking | Bishop [1999], Cleland [1995], Thamhain [2004a, 2004b] | 3 |
| Vision | Bresnen et al. [2003], Kloppenborg and Petrick [1999], Thamhain [2004a, 2004b] | 3 |
| Proactiveness | Cleland [1995], Kloppenborg and Petrick [1999] | 2 |
| Decisiveness | Bishop [1999], Seriki [2007] | 2 |
| Initiative | Fong [2003], Muzio et al. [2007] | 2 |
| Negotiation | McDonough [2002], Taveira [2008] | 2 |
| Risk | Thamhain [2004a] | 1 |
| Persistence | Zaccaro et al. [2001] | 1 |
| Transparency | Seriki [2007] | 1 |

Moreover, Hoegl and Gemuenden [2001], based on empirical evidence from 575 project team members, find that communication, coordination, balance of member contributions, mutual support, effort, and cohesion are the six facets of teamwork quality in innovative projects. In another empirical investigation, Gray [2001] identifies free expression of ideas and concerns, questioning, participation in goal setting, innovation, and intrinsic satisfaction from the work itself as important determinants of successful project teams. Moreover, in a recent article by Taveira [2008] management support, correct team composition, team leader role, team training, negotiated decision making approaches, and team effort were found to have a significant effect on team achievement/performance. A study by Soderlund [2004a] suggests a shift in emphasis on themes such as learning, participation, commitment, and action to focus on and better understand the behavioral aspects of project organizations. Findings by Jha and Iyer [2007] also stress the importance of commitment, coordination, and competence for project success.

In another study, Bishop [1999] identifies top management support, clarity of project objectives and scope, appropriate leadership, team autonomy, communication, reward system, and trust, as well as respect, as determinants of successful cross-functional project teams. An empirical study conducted by McDonough [2000] finds that project goals, empowerment of the team, assignment of appropriate human resources, and the creation of productive climate are important ground-setting factors, while cooperation, commitment to the project, ownership of the project, and trust and respect among team members are the most important team behaviors in achieving the success of cross-functional teams.

In a field study conducted by Soja [2006], factors like team composition, involvement, empowerment, and top management support are found to have the greatest influence on ERP implementation success, among others. Similarly, Sarker and Lee [2003] emphasize strong and committed leadership, open and honest communication, and a balanced and empowered team as the social enablers of successful ERP implementation, while Nah and Delgado [2006] reveal that team composition, skills and compensation, and top management support are the most critical success factors to both the implementation and upgrade of ERP across its lifecycle. Another empirical study by Parr and Shanks [2000] asserts the importance of management support and commitment to change as the necessary condition to the success of ERP implementation. Furthermore, Kirkman et al. [2002] based on their interview with seventy-two executives, team leaders, and team members; identify trust, cohesion, and team identity as important factors to virtual team success.

As a consequence of the vast amount of determinants of PTS, our review reveals that the literature is both diverse and fragmented. It is important to note that most of the studies we reviewed are orientated toward the identification and discussion of a relatively distinct and limited set of factors, in which case full understanding of the determinants and the interrelationships among them become least feasible. Moreover, most of the studies use different words to describe similar approaches or perspectives. Our review generally suggests that there is little agreement on the specific dimensions that constitute PTS; furthermore, research on the interrelationships between these dimensions is scarce. There is an apparent need to develop a conceptual framework that goes beyond the simplistic discussion of the factors (antecedent conditions) leading to PTS. It is possible, therefore, to integrate a variety of factors that are hypothesized to result in or affect PTS.

We observed that three important themes that focus on team processes (the interaction between team members and team performance behaviors) and actions that are relevant to achieving team goals [Mathieu et al., 2008] tend to dominate the literature. For example, several scholars consider project team leadership to be a vital means of ensuring that the performance of team members results in project success (e.g., Bishop, 1999; Cleland, 1995; Geoghegan and Dulewicz, 2008; Kaulio, 2008; Peterson, 2007; Thamhain, 2004a, 2004b). Other scholars, in contrast, emphasize the importance of knowledge creation and sharing practices in project environments to provide

members with the requisite knowledge to fashion creative responses to project demands, develop a sense of self-competence and confidence, shared commitment to the project and its objectives, and greater clarity on project work requirements (e.g., Bresnen et al., 2003; Brookes, Morton, Dainty, and Burns, 2006; Fong, 2003; Jackson and Klobas, 2008; Kasvi et al., 2003; Kotnour, 2000; Liebowitz and Megbolugbe, 2003; Sense, 2007a). Still other scholars stress the importance of shared vision and a unified sense of purpose that is needed to provide members with successful integration of individual thoughts and actions to achieve project objectives (e.g., Bishop, 1999; Fleming and Koppelman, 1999; Hoegl and Gemuenden, 2001; Johns, 1995; McDonough, 2000; Thamhain, 2004a, 2004b). Considering the focus of the studies and the constructs that repeatedly appear in the literature, research on PTS can be grouped into three categories (see Table 3).

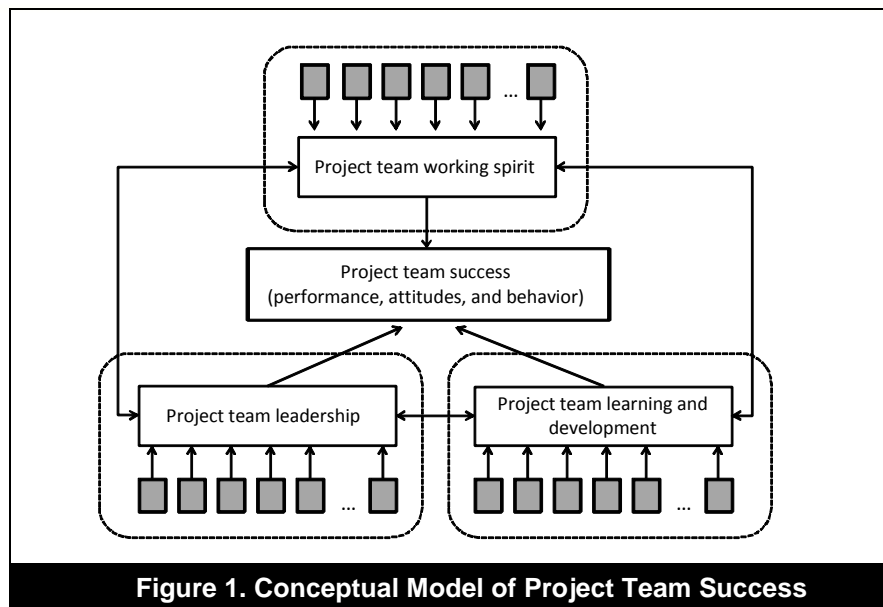
Table 3: Studies on Project Team Success (Examples)

| Areas of Focus | Studies |
|---------------------------------------|---|
| Project Team Working Spirit | Baiden et al. [2006], Bishop [1999], Clarke [1999], Bubshait and Farooq [1999], Fleming and Koppelman, [1999], Hoegl and Gemuenden [2001], Hyväri [2006], Jha and Iyer [2007], Kirkman et al. [2002], Kloppenborg and Petrick [1999], Luthans [2002], McDonough [2000], McGreevy [2006], Muzio et al. [2007], Robbins [2003], Sarker and Lee [2003], Seriki [2007], Taveira [2008], Tarricone and Luca [2002], Thamhain [2004a, 2004b], Weinkauff and Hoegl [2002], Webber [2002], Zaccaro et al. [2001] |
| Project Team Leadership | Bishop [1999], Carson et al. [2007], Clarke [1999], Cleland [1995], Fleming and Koppelman [1996], Geoghegan and Dulewicz [2008], Gray [2001], Hiller et al. [2006], Hyväri [2006], Jha and Iyer [2007], Kaulio [2008], McDonough [2002], McGreevy [2006], Nah and Delgado [2006], Parr and Shanks [2000], Peterson [2007], Sarker and Lee [2003], Seriki [2007], Soja [2006], Taveira [2008], Tarricone and Luca [2002], Thamhain [2004a, 2004b], Wheelan [2005], Weinkauff and Hoegl [2002], Zaccaro et al. [2001] |
| Project Team Learning and Development | Ajmal and Koskinen [2008], Ayas [1996], Bresnen et al. [2003], Brookes et al. [2006], Bubshait and Farooq [1999], Fong [2003], Gray [2001], Jackson and Klobas [2008], Jha and Iyer [2007], Johns [1995], Kasvi et al. [2003], Kloppenborg and Petrick [1999], Kotnour [2000], Liebowitz and Megbolugbe [2003], Muzio et al. [2007], Sense [2007a, 2007b] |

Although every single study listed in Table 3 has certainly advanced the understanding of PTS, a conceptual model is likely to reveal additional insights, because frameworks and reviews such as the present one are typically considered to be more than the sum of its parts, thereby creating a meta-knowledge about the subject area [Schwarz, Mehta, Johnson, and Chin, 2007]. Bearing the diversity and fragmentation of the literature in mind, it is advantageous to systemize and structure the existing insights in a way which makes possible an integrative thinking about the determinants of PTS. Therefore, we adopt a conceptualization that views the success of IST project teams along three dimensions, namely (i) project team working spirit, (ii) project team learning and development, and (iii) project team leadership. We posit that the dimensions can meaningfully cut across different studies and embrace the various conceptualizations of PTS found in the literature. In the following, we define the three dimensions.

- *Project team working spirit:* This dimension includes determinants which measure the existence of collective belonging and unified sense of purpose, combined effort and organized cooperation, as well as successful integration of individual thoughts and actions to achieve project objectives (adapted from Hoegl and Gemuenden, 2001).
- *Project team learning and development:* This dimension includes determinants which measure the existence of the creation, sharing, utilization, and application of knowledge to enhance individual and collective contribution to project performance and self-development (adapted from Kotnour, 2000).
- *Project team leadership:* This dimension includes determinants which measure the existence of good project team leadership that fosters a favorable team environment, as well as mutual responsibility and accountability for project results (adapted from Thamhain, 2004a).

The three dimensions consist of components that broadly represent the defining characteristics of project teams and significantly contribute to PTS. As discussed, they involve and mostly focus on how members interact (project team working spirit), how knowledge is constructed and shared within project work settings (project team learning and development), and how leadership is provided (project team leadership). To provide a better understanding toward PTS in the IST project environment, as well as project success in general, in this article we present a conceptual model consisting of three interrelated dimensions. We use Figure 1 to demonstrate the importance of each of these dimensions to PTS and to suggest the implications of the proposed model for both theory and practice. In order to synthesize the literature and provide propositions that guide future research, the model thus draws attention to these major dimensions that are important across IST projects.



Based on the definitions above, the thirty-five determinants (listed in Table 2) were divided and organized into one of the three dimensions. The categorization was carried out by the two authors of the present article who *independently* conducted the classification. In five cases there was no agreement. To determine the inter-rater reliability, we used the Cohen's Kappa coefficient [Cohen, 1960]. This measure indicates the degree of consistency of coding between two persons, while the possibility of random match is already taken into account. According to Landis and Koch [1977], values for the Cohen's Kappa coefficient are "substantial" between 0.61 and 0.80 and values above are "almost perfect." The value of Cohen's Kappa coefficient for the thirty-five classified factors was 0.84 [$p_o=1-(5/35)$] and $p_c=1/9$; see Cohen, 1960, p. 40]. Hence, our categorization results are highly reliable. In the five cases in which there was no agreement, the first author assigned the factors to one of the three dimensions.

Figure 1 shows the proposed model, the three dimensions (project team working spirit, project team learning and development, and project team leadership), as well as their relationships. In the following, we discuss the components of the three dimensions in detail. Having discussed the three dimensions, we then make explicit the interrelationships among them.

Dimension 1: Project Team Working Spirit

Empirical studies show that the formation of project teams may have a number of positive effects such as reduced cycle time in product development and overall cost savings [Fleming and Koppelman, 1996], increased team motivation and confidence [Bishop, 1999], enhanced creativity and innovation, an improved product quality, as well as high service quality [Loo, 2003; McGreevy, 2006]. However, these effects are usually possible only if individual thoughts and actions are successfully integrated through cooperation [Fleming and Koppelman, 1996; McDonough, 2000; Thamhain, 2004b], respect and mutual trust [Bishop, 1999; Kirkman et al. 2002; McDonough, 2000; Peterson, 2007; Thamhain, 2004b; Webber, 2002], and good interpersonal relations [Baiden et al., 2006; Tarricone and Luca, 2002]. Tarricone and Luca [2002, p. 58], for example, stress the importance of "group cohesiveness, interdependence, collaboration, communication, interpersonal skills ... as a means to create a synergistic team environment."

Although project team working spirit is an important dimension of PTS, many factors influence its prevalence, for example, lack of clear-cut decision making authority, complexity involved in team assignment and evaluation, resistance to cooperation, and lack of a suitable environment [Fleming and Koppelman, 1996]. Moreover, Kloppenborg and Petrick [1999, p. 12] write that "substandard performance, insensitivity to project problems, defensive shirking of responsibility, not completing tasks on time, people arriving late and leaving early, and the gradual erosion of team collaboration are some of the adverse impacts of weak team character." Major reasons for a low degree of project team working spirit are also differences in individual backgrounds and personalities as well as priorities and interests, the existence of power struggle, and improper communication within project teams [Farooq and Bubshait, 1999].

For project team working spirit to exist, it demands members to share common purpose, cooperate with others, communicate relevant work information, trust and respect each other, remain cohesive, achievement-oriented, and committed to project goals [McDonough, 2000; Thamhain, 2004b]. Moreover, team members must be willing to deal

appropriately with conflict, challenge, and disagreement, and they must practice and encourage loyalty to the team [Bishop, 1999]. To preserve team spirit and ensure the productive contribution of members, the existence of conflict treatment mechanisms within project teams is, therefore, crucial [Thamhain, 2004b]. There should be a common concern among team members to learn to fight and clean conflicts straight away with others as they occur to address differences and maintain cohesiveness [Fleming and Koppelman, 1999; Hoegl and Gemuenden, 2001].

In this regard, intensive communication within project teams plays a vital role to share information regarding project work, ensure transparency and team integration, and build mutual trust [Bishop, 1999; McDonough, 2000; Peterson, 2007; Sarker and Lee, 2003; Thamhain, 2004b]. In other words: "Good communication with high level of trust, honesty, and respect for others is critical in building and maintaining high team performance" [Bishop, 1999, p. 8]. It has been argued that shared experience concerning project work is important to lower the potential for conflicts and resistance to cooperation and to facilitate commitment and better acceptance of change. Moreover, the existence of appropriate social settings was believed to facilitate successful communication within and across projects [Bishop, 1999; Johns, 1995; Thamhain, 2004b].

There is growing evidence that suggests that project team members should be equally committed to work with full energy and enthusiasm individually and collectively to achieve project objectives [Fleming and Koppelman, 1996; Jha and Iyer, 2007; Seriki, 2007; Thamhain, 2004b]. In fact, this builds on the existence of clarity of purpose and shared understanding about project mission and objectives [Bishop, 1999; McDonough, 2000; Thamhain, 2004b]. In general, clarity about the project mission, objectives, structure, governance, authority and responsibility, work interfaces, and communication channels helps project teams to carry out project activities with a lower number of difficulties and less cost; to put it differently: project teams with a high level of clarity of purpose, confidence, and sense of project ownership perform better than others [McDonough, 2000; Thamhain, 2004b]. It boosts high commitment of members from the inception of the project to its implementation, which, in turn, increases the likelihood of project success [McDonough, 2000].

The success of project teams also depends on the persistence of members in the face of setbacks and failures. Members' firm stance to work under adverse conditions as problems crop up influences PTS. Zaccaro et al. [2001, p. 257] write: "Truly effective teams are those that are able to maintain high levels of performance, even as team and the environmental circumstances become decidedly adverse. Such high performance requires that teams develop norms and operating procedures that promote individual and collective flexibility and adaptability."

Moreover, the concept of self and collective efficacy (i.e., the internal beliefs and collective confidence of teams in the attainment of desired objectives) is important [Law and Chuah, 2004; Rousseau et al., 2006; Thamhain, 2004b; Zaccaro et al., 2001]. In order to succeed, the feeling of self-worth must drive project teams. Thus, members must have and share team confidence; the individual and collective efficacy to mobilize the motivation, talents, resources, and courses of action necessary to achieve project objectives.

Another important determinant of project team working spirit is fairness in terms of involvement in project activities [Bishop, 1999; McDonough, 2000; Sarker and Lee, 2003; Taveira, 2008; Thamhain, 2004b]. These scholars argue that project teams should be composed of people with the right mix of knowledge, skill, experience, qualifications, and other important attributes necessary for the project. If the perceived level of fairness is low, project team members and/or stakeholders are likely to develop resentment. As a consequence, support is difficult to obtain from those members and/or stakeholders who perceive a lack of fairness. Thamhain [2004b, p. 43] stresses that "teams that are hastily organized with people who are poorly matched to the job requirements are frequently subject to conflicts, low morale, sub-optimum decision making, and ultimately, poor project performance." This suggests that it is important to form teams with maximum care as it substantially undercuts the positive perception of project representation.

Another stream in the literature discusses the importance of knowledge of emotional intelligence (self-awareness, self-management, and self-regulation) (e.g., Luthans, 2002; Robbins, 2003). In essence, emotional intelligence is considered to be an important aspect of project team working spirit, thereby influencing PTS. The above review discussion leads to the following proposition:

P1. The prevalence of project team working spirit in project work settings enhances the success of IST project teams.

The components have been defined from the above review discussion (refer to Appendix B).



| Table 4: Components of Project Team Working Spirit | |
|--|----------------------------|
| • Achievement Orientation | • Cooperation |
| • Clarity of Purpose and Mutual Understanding | • Emotional Intelligence |
| • Cohesiveness | • Interpersonal Relations |
| • Collective Efficacy / Confidence | • Mutual Trust and Respect |
| • Commitment | • Persistence |
| • Communication | • Representation |
| • Conflict Treatment | |

Dimension 2: Project Team Learning and Development

The learning aspect has been discussed as an important dimension of PTS in the literature. To accomplish tasks in a project successfully, team members are required to have the necessary knowledge, skills, and expertise. Moreover, knowledge generation and sharing practices in projects are also discussed in the literature as important factors contributing to PTS. Fong [2003, p. 480], for example, writes that “project team members with diverse skills, knowledge and experiences are required to work together to resolve the issues or problems encountered in a project.” In a similar vein, other scholars argue that the success of projects considerably depends on the ability of members to capture, apply, and share knowledge and skills [Bresnen et al., 2003; Jackson and Klobas, 2008; Kasvi et al. 2003; Kotnour, 2000; Sense, 2007a].

Project team members must acquire knowledge and skills, because then a precondition does exist to remain competent, visionary, and innovative, as well as proactive and flexible, to readily adjust to new project demands and to cope with the dynamics of the project environment. Hence, the practice of knowledge generation, dissemination, and management becomes an important component of project team learning [Ajmal and Koskinen, 2008; Bresnen et al., 2003; Kotnour, 2000]. Team members are typically required to possess multiple perspectives to conceive new ideas, practices, and methods which may lead to superior project results [Gray, 2001; Kotnour, 2000]. Thus, in the process of realizing project objectives, team members need to be open to emergent ideas and information and ongoing change initiatives within the project system [Fong, 2003; Seriki, 2007]. To this end, the management of project knowledge competencies in organizations becomes imperative [Kasvi et al., 2003] as “increased knowledge is associated with increased project performance” [Kotnour, 2000, p. 404].

Generally, through team learning, members are expected to generate the capacity to see the “big picture,” anticipate and identify potential project roadblocks, and strike a deal with and secure support from all stakeholders [Thamhain, 2004b]. A holistic approach to the development of project teams is important to help them make well-informed decisions and assume calculated risk in executing project activities. Webber [2002, p. 207], for example, notes how “the early development of a team climate for trust results in effective team communication, coordination and cooperation.”

Moreover, team members should have the intention to share the knowledge and expertise they possess with others and raise within their teams the awareness to reach together the common project goal. This is of particular importance because “projects are collective, purposeful activities based upon the development of common understandings and interpretations of means and ends” [Jackson and Klobas, 2008, p. 329]. Central to understanding project team learning is, therefore, the interest and readiness among team members to cultivate and utilize individually and collectively held knowledge and expertise. Such practices provide members with a sense of belongingness, shared commitment to project objectives, and greater understanding within project teams. Moreover, it fosters the individual and collective contribution of members to project outcomes, which ultimately induces the development of project teams [Sense, 2007a].

To raise the competency of project teams, appropriate orientation and training and/or external coaching is required [Law and Chuah, 2004; Taveira, 2008]. The knowledge and skill acquisitions in domains like problem solving, communication, conflict resolution, goal setting, and planning are important in teams [Hartenian, 2003]. Apart from technical or functional expertise, Katzenbach and Smith [1993] also stress the relevance of problem solving and decision making as well as interpersonal skills in a team environment.

Desired competencies typically vary widely, ranging from the most “visible” ones (those related to the technical aspects of the task) to the most “invisible” ones (those related to the human aspects of the task) [Tarricone and Luca, 2002]. However, there is often a tendency to underestimate the value of the invisible competencies (e.g., tacit knowledge) that result from team interaction and communication processes in project team settings [Bresnen et al., 2003; Fong, 2003; Jackson and Klobas, 2008].

Project team learning is a social process associated with collective engagement in information and knowledge sharing practices [Bresnen et al., 2003; Brookes et al., 2006; Jackson and Klobas, 2008; Sense, 2007a]. Therefore, through expediting intra-project learning [within projects], inter-project learning [across projects], and the provision of the necessary support toward shared experience, project organizations can provide the platform for self-development as well as improved project team performance [Kotnour, 2000]. Liebowitz and Megbolugbe [2003] suggest an array of knowledge management solutions in projects: lessons learned/best practices, knowledge fairs, online communities, communities of practice, expertise locator, news updates, and Web-based expert systems. These solutions are intended to help project managers to conceptualize and implement knowledge management initiatives. Moreover, a study by Schindler and Eppler [2003] also provides insights into methods for documenting and using lessons learned from projects.

Moreover, orientation toward project team learning is facilitated through effective communication processes, training support, regular team building sessions, project status and review meetings, experience sharing, coaching and mentoring, social events, and brainstorming [Thamhain, 2004b]. A number of scholars also recognize team building as a means of enhancing greater cohesion and commitment among team members [Ayas, 1996; Cleland, 1995; Kirkman et al., 2002; McDonough, 2000; Thamhain, 2004b; Weinkauf and Hoegl, 2002]. Ayas [1996, p. 132], for example, defines team building as “the process of taking a collection of individuals with different needs, backgrounds and expertise and transforming them into an integrated, effective work unit.” Thus, our second proposition based on the above review is:

P2. The ability of project team members to acquire, share, and apply knowledge in project work settings enhances the success of IST project teams.

| | |
|-------------------------|-------------------|
| • Competence | • Openness |
| • Creativity/Innovation | • Proactiveness |
| • Decisiveness | • Risk Assumption |
| • Flexibility | • Team Building |
| • Initiative | • Vision |
| • Negotiation | |

The components have been defined from the above review discussion (refer to Appendix B).

Dimension 3: Project Team Leadership

Project team leadership is another major dimension of PTS as it brings purpose, clarity, direction, motivation, and the necessary integration to teams [McDonough, 2000; Thamhain, 2004a]. Teams are about collective engagement, and collective engagement is about establishing acceptable interaction patterns and behaviors in a team environment [Zaccaro et al., 2001]. In fact, “leadership must invest in the success of the teams and consider themselves an integral part of the team and its process” [Yeh, Smith, Jennings, and Castro, 2006, p. 195]. Leadership is responsible to establish and provide an appropriate team climate that fosters a system to integrate and coordinate the individual and collective contributions of team members (e.g., Salas et al., 2005). Zaccaro et al. [2001, p. 452] maintain that “the success of the leader in defining team directions and organizing the team to maximize progress along such directions contributes significantly to team effectiveness.” Effective leadership processes are perceived as means to an end, thereby helping teams to achieve the desired objectives and goals. Leadership clarifies team roles and capabilities, identifies resources available, and creates the environment that makes it possible for team members to work together effectively [Salas et al., 2005].

So far, there is no one best type of leadership style that is universally applicable to teams. However, recent work by Carson et al. [2007] reveals an evolutionary shift from individual to shared leadership, a leadership that is collectively provided by team members. Based on social network theory, they define shared leadership as “an emergent team property that results from the distribution of leadership influence across multiple team members” [p. 1218]. Inherent in this position is the assumption that leadership is perceived as a shared duty in which team members assume the roles, responsibilities, and functions of leadership in order to address the increasing complexity, ambiguity, and knowledge intensive nature of project tasks. Team members influence and motivate each other to pursue a common goal and contribute toward its accomplishment. Hence, leadership originates in the team and is provided through team members instead of a single source that is formally assumed in many organizations. Carson et al. identified the importance of shared purpose, social support, and voice [participation] for the development of shared leadership, which is in turn positively correlated with team performance.

Likewise, such thinking has been gaining ground in project work settings as the role of project team leadership in the process of cultivating shared team leadership behaviors goes beyond the conventional thinking underpinning

leadership hierarchy in projects [Bishop, 1999; Cleland, 1995; Thamhain, 2004a]. Thamhain [2004a, p. 534], for example, considers the project manager as the “social architect” “who ... provides overall project leadership for developing multidisciplinary task groups into unified teams and fostering a climate conducive to involvement, commitment, and conflict resolution.” In a similar vein, Cleland [1995] considers project activity as a collective responsibility in which every member actively contributes his or her part of the share toward the success of the project.

Here, the central essence of project team leadership lies in the expectation that the leadership function is shared and performed by many (or even all) members of project teams in the desire to reach together common project goals and objectives [Cleland, 1995; Peterson, 2007; Seriki, 2007; Thamhain, 2004b; Weinkauff and Hoegl, 2002]. So team members not only share mutual responsibility and accountability for project results but also in the creation of successful project teams. Project team leadership is best understood as a collective enactment because the success of the overall project leadership is closely associated with the team interaction process [Hiller, Day, and Vance, 2006]. They found that collective leadership enactment, which included variables such as planning and organizing, positively predicted supervisor-rated team performance. Other scholars have also demonstrated that shared team leadership relates positively to team performance (e.g., Carson et al. 2007).

The advancement in performance, thoughts, and behaviors of team members is likely when leadership provides a platform whereby team members can build a common understanding, ensure high level of involvement, and establish conflict resolution strategies [Cleland, 1995; Thamhain, 2004a]. Cleland [1995, p. 86], for example, suggests the provision of a “diffused leadership expertise” in which “every member of a team has an opportunity to be a leader.” Team members who are bestowed a greater decision-making power tend to be more effective than those without [Ayas, 1996; Bishop, 1999; Cleland, 1995; McDonough, 2000; Peterson, 2007; Sarker and Lee, 2003; Thamhain, 2004b]. Cleland [1995, p. 85] writes that “empowering people and giving them responsibilities can charge them with the need to develop leadership abilities.” Moreover, team members do more interesting, challenging, and rewarding project work if given more authority and decision-making responsibility in a project work setting [Cleland, 1995; McDonough, 2000; Thamhain, 2004b]. This also benefits organizations in a variety of ways. According to McDonough [2000, p. 224], for example, “by allocating decision making authority at the project team level, firms were able to reduce the time it takes to make decisions, solve problems, and take actions.”

Bearing this in mind, empowering team members in setting project plans, making decisions, and monitoring progress provides an opportunity for team members to exercise team leadership activities [Bishop, 1999; Cleland, 1995; Peterson, 2007; Thamhain, 2004b; Wheelan, 2005]. This, in turn, creates possible synergies and facilitates the contribution of team members toward the effectiveness of team leadership. As project goal setting, problem solving, and decision making process increasingly draws on the efforts, viewpoints, talents, and contributions of its members, project organizations benefit in terms of increased level of leadership responsiveness and quality.

Furthermore, team leadership involves networking with all potential stakeholders toward the realization of project objectives [McDonough, 2000; Thamhain, 2004b]. It is important to clarify with potential stakeholders the expectations and potential problems with respect to a given project. Furthermore, Thamhain stresses the importance of team networking in terms of the integration of project teams both internally and externally to win the support and commitment of all stakeholders. Team leadership plays a significant role in “lobbying for resources, protecting the group from outside interferences, and managing the impressions of outsiders [McDonough, 2000, p. 225].

Project team leadership also concerns the organization, coordination, communication, and supervision of project goals and resources in order to better meet project schedule, budget, and quality [Bishop, 1999; Hyväri, 2006; Thamhain, 2004b]. “The leader communicates with team members about the focus of the project, project changes and developments, and individual member responsibilities” [McDonough, 2000, p. 225]. It has to also provide performance standards with honest and adequate feedback [Bishop, 1999; Weinkauff and Hoegl, 2002]. In addition, motivation is important to unleash the creative potential of team members toward superior project results [Bishop, 1999; Clarke, 1999; Cleland, 1995; Peterson, 2007; Thamhain, 2004b]. According to Bishop [1999], equity in recognition and reward within project teams should be based on merit, otherwise lack of perceived fairness and equity in the evaluation, recognition, and reward system can negatively influence the morale and commitment of team members and consequently the success of projects.

Moreover, the provision of supportive organizational climate and the promotion of a culture which supports continuous involvement and engagement is a major determinant of PTS [Gray, 2001; Thamhain, 2004b]. The support may include human, financial, information, working facilities and hygiene, job security, training opportunities, and so on. According to Thamhain [2004b], it also includes the identification of sources of conflict, confrontations, disagreements within teams, and the provision of resolution strategies to address conflicts. The existence of a proper conflict management system helps in ensuring team cohesiveness. In general, a strong and committed

leadership is recommended to be the necessary condition for ensuring PTS (e.g., Peterson, 2007; Sarker and Lee, 2003; Thamhain, 2004b). From the above discussion, the third proposition is:

P3. The prevalence of strong project team leadership in project work settings enhances the success of IST project teams.

| | |
|-----------------------|---|
| • Conflict Resolution | • Priority Setting |
| • Coordination | • Participation |
| • Empowerment | • Shared Responsibility and Mutual Accountability |
| • Feedback | • Support |
| • Motivation | • Transparency |
| • Networking | |

The components have been defined from the above review discussion (refer to Appendix B).

VI. INTERRELATIONSHIP OF THE DIMENSIONS

Figure 1 shows the three dimensions of PTS, each of which is constituted by a number of components of PTS (the gray boxes in Figure 1; for details see Table 2 and Appendix B). The double-sided arrows in Figure 1 between project team working spirit, project team learning and development, and project team leadership show that the three dimensions of PTS are hypothesized to be mutually reinforcing; that is, we expect reciprocal effects.

If project teams exhibit a high sense of team working spirit, they are more likely to communicate and share knowledge and skills to advance and implement new project ideas and vice versa. Hence, project team working spirit influences project team learning and development. Sense [2007b], while discussing the need for a better understanding of the learning phenomenon within the project context, suggests the need to recognize the practical and social aspects of learning apart from the cognitive processes. He further outlines how lack of collective preparedness and defensive behaviors affect learning processes within project teams. Moreover, findings from a study conducted by Bresnen et al. [2003, p. 165] show that “the process of knowledge capture, transfer, and learning in project settings rely heavily upon social patterns, practices, and processes.” Accordingly, collaborative mechanisms and joint efforts provide members with team identity and cohesiveness, which is a precondition for knowledge creation and sharing.

When project teams experience good project team leadership, they are hypothesized to be more likely to achieve the common project goals. Project team leadership affects PTS because it provides an internal supportive climate. In essence, leadership helps to (i) set expectations, (ii) instill positive energy, (iii) gain support and commitment, (iv) ensure transparency and trust, and (v) integrate and balance individual contributions to achieve project objectives and goals [Bishop, 1999; McDonough, 2000; Serik, 2007; Thamhain, 2004a]. Hence, project team working spirit, which binds team members together, needs to be energized by project team leadership. Bishop [1999, p. 8], for example, notes that “the primary responsibility of the leadership position is to secure the involvement and commitment of members to the team goals and objectives.” In a similar vein, Thamhain [2004a, p. 540] views leadership as “the essential component of project team work. It is the art of creating a supportive work environment.” Project team leadership thus can either facilitate or constrain the free flow of communication and ideas, which ultimately affect project team working spirit and project team learning practices positively or negatively. According to Thamhain [2004b, p. 43], “creating ... a high-esteem image ... leads to increased involvement, better communication, lower conflict, higher commitment, stronger work effort, and higher levels of creativity.” Consequently, there is a reciprocal relationship between the specific manifestations of project team leadership, project team working spirit, and project team learning and development. Bishop [1999, p. 8], for example, argues that “the leader must have good coordination and organization skill so that talents of members are effectively tapped.” Moreover, project team leadership can positively influence project team working spirit by enabling several team behaviors like cooperation, commitment, project ownership, and respect and trust [McDonough, 2000].

One should not underestimate the value of project team learning and development in shaping team members' perceptions about what is desirable and valued in a project work setting. It is, thus, hypothesized to have an impact on both project team leadership and project team working spirit. The prevalence of knowledge generation and sharing practices within project teams not only fosters the capacity to deliver the best possible project results but also improves both project team leadership and project team working spirit. This is because “they generate the personal and group knowledge which contributes to their own success” [Jackson and Klobas, 2008, p. 329]. There is a growing realization that project team learning practices foster and improve innovative efforts, adjustments to changes in the project environment, and synergistic solutions to project problems [Kotnour, 2000]. Learning practices also provide vision, forums to discuss and learn, and behaviors that enhance communication and

involvement [Taveira, 2008]. Hence, it may serve as an effective means for introducing the right skills and attitudes in project work settings.

Altogether, the contribution of project team working spirit, project team learning and development, and project team leadership to PTS is significant. Here, PTS in IST projects is hypothesized to be influenced by these three dimensions, which in turn are closely interrelated. The three dimensions are proposed to have predictive power whether project teams are successful or not and hence constitute the major building blocks of PTS. The underlying argument of the present conceptual model is that the better the three dimensions are, the higher the probability of the success of IST project teams. In order to attain a high performance level and maximize the possibility of PTS, we recommend that an attempt must be made by organizations to work on the three dimensions, which are essential but not sufficient on their own to ensure PTS. As a consequence, both academics and practitioners need to pay attention to the three success dimensions, their interrelationships, and the underlying components (see Table 2 and Appendix B) to develop a comprehensive understanding toward the success of IST project teams. Hence, the last proposition is:

P4. The three dimensions of PTS are interrelated and, hence, taken together, can best explain and represent the success of IST project teams.

VII. MODEL EVALUATION: PRELIMINARY EMPIRICAL EVIDENCE

We conducted focus group interviews involving project experts working on BPR and IT projects within the service sector in Ethiopia. Data based on focus group interviews may be used primarily to assess the completeness of the dimensions proposed by our model. However, despite the insights that our interviews may yield, it must be noted that the main objective of the focus group interviews is not to provide an empirical test of the proposed model. Rather, the data presented here provide preliminary empirical evidence for the utility of our model. Thus, our empirical assessment has the character of a qualitative pilot study, and it is *not* a quantitative psychometric evaluation study.

The results of our interviews are based on two rounds of interviewing sixteen project experts (consisting of project managers, coordinators/team leaders, and experts/officers). We interviewed experts with relevant and solid experience in BPR and IT projects in eight organizations within the Ethiopian service sector. In this article, we present a summary of the interview results. A full explanation of the research methodology (sample, data collection and analyses procedures, and interview protocol) is presented in Jetu, Riedl, and Roithmayr [2011].

The data are based on semi-structured interviews with the experts to explore their perceptions of the concept of project success and the factors leading to PTS. Specifically, we asked the following questions:

1. How do you define and explain project success in relation to your project experience and knowledge?
2. How do you understand project teams and their contributions to the successful realization of projects (like BPR and IT projects) in your respective organizations?
3. What do you think are the special indicators/parameters of PTS?

With regard to the *first question*, the responses reveal that there has been a major shift from the traditional way of looking at projects to a broader perspective that encompasses the interests of all stakeholders. This changing perception is reflected, for example, in the following statements:

If stakeholders (this includes end users, owners of the project, project team, board of management and others who hold an interest) are happy with the result of the project, then the project is successful. (Expert 8)

Providing proper information about the general progress of the project, creating a common understanding and having realistic expectations about the result of the project by all stakeholders ... will help the success of the project. (Expert 4)

A project is successful if it attains its goals, assists strategic planning, creates learning opportunities for its team members and has a combined social and economical impact in addition to being completed within its predefined time framework and resources. (Expert 15)

Projects may have a national and international effect; stakeholders alone cannot be taken as a major factor that shows the success of the project, though they can be seen as one indicator. (Expert 6)

The major indicators/parameters of project success identified on the basis of the interviews include clarity of project purpose, meeting predetermined plan, continuity/acceptance by stakeholders (satisfaction), contribution to

organizational objectives/strategic plan, impact on the community, learning opportunities for team members, and proper communication schemes with all stakeholders.

Having established the definition of project success, it was further of interest to ask the experts the *second question*. The experts acknowledged that little attention was paid to the human element in many projects. Despite this finding, however, the experts stress the importance of people (project teams) in the implementation and realization of BPR and IT projects:

It is difficult to separate projects from people and people from projects. Achieving certainty with regard to the positive or negative impact of individuals on the project would be a major input to the success of a project. Since people are the major part of a project, they should be given great emphasis. (Expert 4)

The identity of the team is decisive from the design through the implementation process of the project. It is through the role of the team that the success and failure of the project is decided. The other things can be achieved using money and technology, but the role of people is irreplaceable, particularly in relation to properly understanding, committing, and executing the objectives of a project. (Expert 11)

Altogether, the experts have underlined the decisive role of project teams in every stage of the project starting from its inception to its implementation. This supports the view of other scholars such as Cooke–Davies [2002] and Henrie and Sousa–Poza [2005]. Their responses are a clear indication that organizations need to strike a balance in terms of the emphasis they place on projects and the people who are becoming more and more integral to the success of projects.

The *third question* sought to explore in greater depth the indicators of PTS. The experts were requested to list and rank the indicators that they feel define the profile of a successful project team in the Ethiopian context. The indicators are listed in Appendix C. The indicators are grouped into three categories by merging those items that are related in one way or the other. As reflected in the following statements, we observed considerable diversity of views on the indicators and their priority. For example, one of the experts arguing in favor of the importance of leadership noted that:

When we hammer a nail, if it went wrong from the beginning, then the end will also be bad. In leadership too, if things are bent from the top, then it is difficult to correct (straighten) them later and the problem will become more and more complex. (Expert 4)

The centrality of project team leadership is also stressed by other scholars (e.g., McDonough, 2000; Thamhain, 2004a). Other experts, in contrast, argued for the prevalence of a common understanding and ownership of project vision and corresponding objectives and goals. Clarity of purpose is cited as the most decisive factor in order to lay the corner stone for common understanding (e.g., Bishop, 1999; McDonough, 2000; Thamhain, 2004b). In a similar vein to the above reflections, it was pointed out that team members need to possess the positive attitude that can bring significant project results right from the inception of the project. The statement by one expert exemplifies this view:

If the team has common vision assisted by good communication, speaks the same language as a result of participation, communicates the progress of the project to stakeholders and believes in the project, then these are successes. (Expert 1)

The experts have also stressed the need for practical commitment, persistence in paying every sacrifice in order to achieve project objectives and goals (e.g., Jha and Iyer, 2007; McDonough, 2000; Soderlund, 2004a; Thamhain, 2004b), and transparency in relationships and communication, the existence of concerns to maintain open, honest, and transparent communication and information sharing schemes (e.g., McDonough, 2000; Thamhain, 2004b). In addition, subordination of personal interest to project objectives, nonexistence of conflict of interest, integrity and honesty regarding needs and expectations, mutual trust and respectfulness during discussions and team work, and the prevalence of positive conflict treatment and supportive team spirits during project execution within project teams were noted as the most decisive qualities.

Another important condition shared during the interview was the importance of developing a sense of shared project leadership toward the success of projects (e.g., Bishop, 1999; Carson et al., 2007; Cleland, 1995; Thamhain, 2004a). The experts believed that influencing by reasoning is essential to build new teams, move them forward and achieve project objectives and goals. One expert, for example, noted that:

If he/she is passing only hard and fast rules from above and if he/she is a kind of person who says I know everything, that could be difficult and not workable these days. In fact, such an attitude might hold true and

have functioned during earlier times or in military systems. However, in recent projects, it is impossible to do anything if there is no collective leadership. (Expert 8)

Moreover, what becomes clear from the interview discussion is the importance of a participatory approach in decision making or independence from top management influence, and fairness and transparency in the selection and involvement of project team members. Such perceptions are supported by the following statements:

If studies and their decisions were made behind closed doors ... it has an impact on the perception of the employee—the one who executes the reform ... Therefore, there has to be communication in every status of any project. And the communication has to be up-down and horizontal/peer-to-peer. (Expert 4)

The team has to make its own assessment and come up with correct and final project results, which it found out to be suited to the organization. (Expert 14)

Although most experts agreed that top management support is the driving force behind projects, and hence top management must have the right to evaluate and approve project results, there is a feeling that direct and excessive interference can negatively affect PTS and thereby the success of projects in general. According to the experts, what is required is the provision of an elevating vision, adequate psychological and material support (in terms of human, financial, information, and training opportunities) in order to encourage commitment and engagement of project team members, and motivate them to unleash their creative potential and give their very best toward superior project results.

Several of the experts also allude to the view that the team selection process should fairly treat and enhance the desire of those who have the potential (the necessary qualification, experience, skill, and expertise) to participate, cooperate, and succeed.

Finally, project knowledge and understanding are identified as an important factor influencing PTS. The experts consider this the capacity to deliver project results through knowledge-sharing practices and the internalization and application of what members have heard and experienced. For example, the following statements reflect this important aspect leading to a successful project team:

People need to share their knowledge in order to speak a common language. If there is sharing of knowledge, they can easily achieve project goals without frictions and sacrifice. ... Capacity is also needed to achieve results using all that we have. Capacity includes understanding what we have read and heard. (Expert 11)

Efforts should be made to develop a common understanding through round table discussion. Whether we like it or not, the work demands so. This is a must. Otherwise, it is impossible to work in a team. (Expert 16)

The viewpoint that team learning needs to be perceived as a natural process in project work settings is emphasized (e.g., Bresnen et al., 2003; Sense, 2007b). There is a common thought that the practice of acquiring and sharing knowledge is crucial to identifying and defining individual members' capacities and roles in the project, and to further developing and implementing new project ideas and solutions, thereby improving overall project performance. This is also better explained in the words of the experts:

When we work in team, we plan, identify problems and seek solutions together. We jointly develop a sense of ownership and this will foster in-built commitment and initiative. The learning process will pave the way for the team to continuously improve and remain successful. (Expert 7)

When the understanding in team work is developed, one team member can identify the strong and weak sides of the other team member and then be able to appreciate the stronger side. This will help to identify the best quality of the team to share and carry out the project activity based on their full willingness and capacity. (Expert 4)

Taking a closer look at the discussion by the experts, the dimensions of PTS have evolved to reflect a comprehensive perspective that encompasses project ownership and team working spirit to the one that considers project knowledge and understanding, as well as shared project leadership, as the most important dimensions of a successful project team. Thus, the observations from the focus group interviews are generally consistent with the findings of our literature review on the dimensions of PTS. In essence, the interview statements from our study provide first-hand evidence that our list of the components of the PTS dimensions is fairly inclusive and reliable (refer to Appendix C). However, future studies must reveal the empirical validity of the dimensions and components of the conceptual model, as well as the interrelationships among the factors (see Figure 1).



VIII. SUMMARY, IMPLICATIONS, AND FUTURE WORK

In this review, we analyzed a considerable body of literature (e.g., team effectiveness and management, cross-functional teams, virtual teams, ERP teams, and project teams) to identify the wide array of determinants that have been hypothesized to relate to PTS. Our review revealed that studies have largely focused on individual determinants leading to PTS. As little work has been done to synthesize the various studies on project teams, the present review proposed a model that integrates the currently piecemeal studies available in the body of literature and thereby contributes to this emerging research stream.

Building on previous studies (both theoretical and empirical investigations), we discussed three important and conceptually distinct dimensions of PTS in IST projects along sets of propositions, each of which is operationalized on the basis of a number of components of the dimensions of PTS. In doing so, the model we propose could help practitioners and researchers in the field better understand the three dimensions and the interplay among them in enhancing the success of IST project teams. Thus, the success of IST project teams is best seen as a multidimensional construct. Practitioners, project managers in particular, will make informed and better decision when they know how each of these dimensions influences PTS.

Although we believe that our conceptual model is comprehensive, we do not claim that it is conclusive, as it focuses on the internal environment of project teams. Our framework does not consider the situational and organizational context in which project teams operate. Project teams perform different project activities and face different demands. Hence, PTS may be significantly influenced by power, organizational politics, pressure from the environment and culture, among other factors [Fortune and White, 2006; Gray, 2001; Leybourne, 2007; Neal, 1995; Soderlund, 2004a]. Bearing this in mind, other success dimensions or determinants (like organizational factors and other contextual realities affecting IST project team's functioning) could be added to address the unique reality (specific nature) of a given project team, thereby explaining a higher proportion of the variance of PTS. Thus, future research should also examine the influence of factors that have not been considered in this article. Moreover, there might be differences in the degree to which the three success dimensions are being emphasized and considered among different IST projects. Nevertheless, the proposed framework seeks to outline major determinants of PTS that have both theoretical and practical relevance in the IST field.

The relationships shown in the present model (see Figure 1) are based on our review work; they have not been validated empirically, although we provided preliminary empirical evidence on the relevance of the three dimensions through focus-group interviews with project experts in the field. Hence, the next phase of this research involves empirical investigation of the tentative propositions outlined in this article. Research is needed to examine if these dimensions demonstrate an empirical relationship with the success of IST project teams so that results can be generalized across different project teams. In other words, it becomes important to empirically investigate and understand how the three dimensions and the underlying components operate, which is a possible avenue for future research. This would imply an in-depth conceptualization of the determinants of PTS in IST projects. These conceptualizations could be useful to guide practitioners and project managers' intervention strategy to measure, monitor, and enhance project team performance. While the three dimensions are proposed to play a critical role in the success of IST project teams, it is far more complex than what is presented here. It is also important, both from a theoretical and practical viewpoint, for future research to identify the antecedents of the determinants (the impact of contextual variables), thereby moving backwards in the causal chain of PTS.

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APPENDIX A. DISTRIBUTION OF PAPERS ACROSS JOURNALS

Table A–1: Distribution of Papers Across Journals

| Journals | No. sample articles |
|---|---------------------|
| Project Management | |
| • <i>International Journal of Project Management</i> | 30 |
| • <i>Project Management Journal</i> | 11 |
| 1. Sub-total | 41 |
| Team Effectiveness and Management | |
| • <i>Team Performance Management: An International Journal</i> | 6 |
| • <i>Leadership Quarterly</i> | 2 |
| • <i>Journal of Organizational Behavior</i> | 2 |
| • <i>Small Group Research</i> | 2 |
| • <i>Management Science</i> | 1 |
| • <i>Academy of Management Journal</i> | 1 |
| • <i>Journal of Management</i> | 1 |
| • <i>Organizational Science</i> | 1 |
| • <i>Australian Journal of Management and Organizational Behavior</i> | 1 |
| • <i>Harvard Business Review</i> | 1 |
| • <i>International Journal of Quality and Reliability Management</i> | 1 |
| 2. Sub-total | 19 |
| Management Information System | |
| • <i>MIS Quarterly</i> | 8 |
| • <i>Journal of Management Information Systems</i> | 3 |
| • <i>Information and Management</i> | 3 |
| • <i>The DATA BASE for Advances in Information Systems</i> | 2 |
| • <i>Communications of the ACM</i> | 2 |
| • <i>Information Systems Management</i> | 1 |
| • <i>Journal of Strategic Information Systems</i> | 1 |
| • <i>International Journal of Information Management</i> | 1 |
| • <i>Journal of Computer Information Systems</i> | 1 |
| • <i>Journal of Information Technology</i> | 1 |
| • <i>Journal of Enterprise Information Management</i> | 1 |
| • <i>European Journal of Information Systems</i> | 1 |
| • <i>Decision Support Systems</i> | 1 |
| 3. Sub-total | 26 |
| Cross-functional Teams | |
| • <i>Journal of Product Innovation Management</i> | 1 |
| • <i>Project Management Journal</i> | 1 |
| • <i>Journal of Management Development</i> | 1 |
| 4. Sub-total | 3 |
| Virtual Teams | |
| • <i>Academy of Management Executive</i> | 1 |
| • <i>Journal of Management</i> | 1 |
| 5. Sub-total | 2 |
| Other Journals | |
| • <i>Educational and Psychological Measurement</i> | 1 |
| • <i>Journal of Industrial and Commercial Training</i> | 1 |
| • <i>Applied Ergonomics</i> | 1 |
| • <i>Biometrics</i> | 1 |
| 6. Sub-total | 4 |
| Dissertation | 1 |
| Books | 5 |
| Grand Total | 101 |



APPENDIX B. DEFINITIONS OF THE COMPONENTS OF THE DIMENSIONS OF PTS

Table B-1: Definition of the Components of Project Team Working Spirit

| Components | Definition |
|---|--|
| Achievement Orientation | The drive and orientation of the project team to accomplish and realize project objectives, achieve desired end results, and meet project schedule, quality, and cost |
| Clarity of Purpose/Mutual Understanding | The existence of a clear sense of purpose and shared understanding on project objectives, project structure, governing rules and procedures, authority and responsibility, work interfaces, communication channels, and so on within project teams |
| Cohesiveness | The prevalence of valuing unity within diversity (harnessing individual differences), existence of team identity and emotional attachment (belongingness), fair and productive competition, and concern and mutual support for others |
| Collective Efficacy/Confidence | The belief and confidence that a project team has in their abilities to mobilize the motivation, the talents, the resources and courses of action necessary to carry out the project work and succeed |
| Commitment | The dedication of the project team to work with full energy and enthusiasm individually and collectively to achieve project objectives and goals |
| Communication | The existence of concern to maintain open, honest, transparent, and built-in procedures to access, share and exchange knowledge, ideas, issues, information, and perspectives pertaining to the project work on regular basis |
| Cooperation | The prevalence of a genuine intention to work together, readiness to collaborate and support each other in problem solving, decision making, and sharing work load and responsibility for the smooth functioning of the project work |
| Conflict Treatment | The prevalence of constructive and productive conflict treatment within the project team and concern to immediately resolve differences with others |
| Emotional Intelligence | The prevalence of self-awareness (one's feelings), self-management (one's emotions and impulses), and self-motivation (willingness to put in a great deal of effort); and ability to sense and handle the emotions of others within project teams |
| Interpersonal relations | The prevalence of smooth relationships, practice of listening to each other, seeking the views and ideas of others, respecting the needs, feelings, and capabilities of others, and exchanging constructive feedback to one another within project teams |
| Mutual Trust and Respect | The prevalence of honesty and trust on needs and expectations, and respect within a project team so as to work, think, and act jointly |
| Persistence | The determination of a project team to work hard, cope with internal and external pressures; and sustain momentum in the face of setbacks and failures |
| Representation | The fairness and adequacy in the assignment of project team members based on abilities, skills, knowledge, and expertise; and participation of stakeholders based on their potential contributions toward the success of the project work |

Table B-2: Definition of the Components of Project Team Learning and Development

| Components | Definition |
|-----------------------|---|
| Competence | The ability of the project team to set and pursue clear and sound project goals, plan project tasks, and excel in performing assigned project duties and responsibilities |
| Creativity/Innovation | The ability of the project team to conceive and introduce new and improved practices (ideas, methods, tools, and strategies) in order to deal with ambiguity and provide creative solutions to project problems |
| Decisiveness | The ability of the project team to make well-informed decisions based on the best and most available and appropriate sources of data and information in order to achieve project objectives and goals |
| Flexibility | The ability of the project team to recognize own strengths and weakness, readiness to accept constructive criticism and suggestions without losing face, adjust approaches or strategies to fit different people and project conditions |
| Initiative | The ability of the project team to initiate and remain on project track, seek and take on high levels of responsibility to deliver a top collective project performance |
| Negotiation | The ability of the project team to strike a deal with and secure support from top management, clients, sponsors, and others who have vested interest in the project work or outcomes |
| Openness | The openness of the project team to emergent project ideas, new project information, ongoing change initiatives within the project system, and readiness for learning and development opportunities |
| Proactiveness | The ability of the project team to anticipate and recognize potential project roadblocks, and identify the tools to respond and take corrective actions on a timely basis |
| Risk Assumption | The willingness and readiness of the project team to take and assume calculated risk and learn from mistakes and weaknesses in furtherance of the project performance |



Table B–2: Definition of the Components of Project Team Learning and Development – Continued

| | |
|---------------|--|
| Team Building | Building an integrated and effective project team through the provision of training support, conducting team-building sessions, holding project status and review meetings, experience sharing, coaching and mentoring, social events, discussion forum on major occurrences in the project work |
| Vision | The capacity of the project team to foresee and focus on the big picture, properly define future directions, and choose strategic actions in the fulfillment of project objectives and goals |

Table B–3: Definition of the Components of Project Team Leadership

| Components | Definition |
|---|---|
| Conflict Resolution | The identification of sources of conflict, confrontations, disagreements within the project team and resolution strategies to address them as and when they occur |
| Coordination | The existence of proper organization and monitoring of the project team’s activities (goals and resources) to better meet schedule, quality, budget, and expectations |
| Empowerment | The provision and exercise of more freedom and discretion (authority and accountability) to project teams to do a more interesting, challenging, and rewarding project work |
| Feedback | The prevalence of honest and adequate feedback on project progress, and demonstration of fair assessment and evaluation in both individual and overall project team performance |
| Motivation | The encouragement of the project team to unleash their creative potential and give their very best toward superior project results; and existence of fair recognition, compensation and reward schemes based on expertise, and contribution to the project work |
| Networking | The maintenance of effective communication, contacts, and relationships with important internal as well as external project partners or stakeholders |
| Participation | The involvement and productive engagement of project team members in contributing views and ideas toward the project’s goal setting, problem solving, and decision-making process |
| Priority Setting | The existence of prioritization of project plans and activities (work structures, schedules, budgets, and deliverables) based on sound judgment and awareness of their potential implications to project outcomes |
| Shared Responsibility and Mutual Accountability | The existence of shared responsibility and mutual accountability for actions and all project results/outcomes—no face saving and blame culture within project team. |
| Support | The existence of elevating vision, adequate psychological and material support in terms of required resources like human, financial, information, working facilities and hygiene, guidance, job security, training opportunities, etc. |
| Transparency | The existence of proper communication in order to secure commitment and ensure trust on project objectives, plans (directions), priorities, resources available, project team roles and constraints, commitments, and performance expectations clearly and adequately |

APPENDIX C. INDICATORS OF THE PROFILE OF A SUCCESSFUL PROJECT TEAM

Table C–1: Indicators of the Profile of a Successful Project Team

| Dimensions | Indicators |
|-------------------------------------|---|
| Project Ownership and Team Spirit | <ul style="list-style-type: none"> • Should own and internalize the vision of the project • Should have similar/common understanding on project goals and objectives • Should have positive attitude toward project and team members • Should share responsibility and accountability for results • Should exhibit practical commitment to project objectives and goals (determination and persistence in paying every sacrifice to achieve project objectives and goals) • Should exercise transparency in relationships and communication (openness, respectfulness, trust and understanding during discussion, knowledge sharing, and teamwork) • Should exercise positive conflict while executing the project goals and objectives • Should subordinate personal interest to project objectives/nonexistence of conflict of interest and personal integrity • Should manifest supporting team spirits |
| Project Knowledge and Understanding | <ul style="list-style-type: none"> • Should possess the skill necessary to carry out the project activity • Should identify and define individual members’ capacity and role in the project • Should be ready to learn from each other • Should be forward-looking and proactive (possess problem solving attitude) • Should be flexible in problem solving and decision making • Should conduct timely awareness programs on developments |

Table C–1: Indicators of the Profile of a Successful Project Team – Continued

| | |
|---------------------------|--|
| Shared Project Leadership | <ul style="list-style-type: none">• Should be based on influencing by reasoning• Should follow participatory approach/bottom-up collective approach• Should be feedback-oriented regarding progress and accomplishments• Should be independent from top leadership/management direct interference or influence• Should endeavor to maximize strong/best qualities of project teams• Should have adequate communication and support from top leadership/management• Should consider predetermined team selection criteria (irrespective of kinships or personal advantages)• Should involve project team leaders in the team selection process |
|---------------------------|--|

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