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IS project team performance: An empirical assessment

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Abstract

IS project team performance is a topic of increasing importance to practicing managers as well as researchers. This paper discusses the development and testing of a theoretical model of IS project team performance. Empirical analysis suggests that team members' perceptions of their ability to represent users' views during a project is a significant predictor of the team's perception of their overall performance. Another significant predictor is team members' belief in their personal involvement in the development process. However, findings on the influence of cohesion on performance differ from those in other studies: apparently cohesion was not a significant factor in this study.

Keywords: IS project teams; Team-based design; Groups research; Project team performance; Cohesion; Task routineity; Task priority; User involvement; Team member involvement

1. Introduction

Team-based design is one of the most widespread, fastest growing methods designed to improve organizational performance today. Even historically rigid, highly structured firms, such as Kodak and Boeing Aircraft, are breaking down functional barriers and implementing cross-functional teams in order to deliver high quality products and respond more quickly to customer needs. Research in the information systems (IS) area has shown that team efforts are important in improving the quality of information systems [22, 51]. As the importance of teams increases, continued research is needed to gain an insight into the factors influencing successful IS team performance.

Many authors have examined project teams. This research, however, has been focused mainly on the personality characteristics of team members [29, 56]; the relationships and/or interactions among team members [42, 57]; the structure of group decision-making processes [34]; and prescriptions for effective team management [33, 51]. Other research [e.g., [6, 7]] has examined the relationship between IS staff and users, but the project team concept is often implied, rather than explicitly examined. IS researchers have provided few theoretical developments in this domain.

2. Theoretical background

A group is an arrangement between two or more people to work together so as to produce an identifiable good or service in such a manner that the group members are highly interdependent. Project teams are, by definition, a type of group. Therefore, the theory of groups, as discussed in the social

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psychology literature, provides a foundation on which to examine IS project team performance [49].

Groups have been studied in psychology and organizational behavior for some time. Allport [1] was the first American academic to carry out systematic studies in the laboratory. Studies conducted at the Hawthorne plant of the Western Electric Company are seminal in group literature [44]. Further studies have been made by other researchers (e.g., [10, 48, 59]). The literature provides a rich body of theory and evidence to help IS researchers model successful project team performance.

There are a number of theoretical models of groups in which success is the primary outcome [17–19, 32]. However, researchers studying groups should include only a "manageable chunk" of an existing model [40]. Thus, our work included only the most common variables integrated in an exploratory, general model of IS project team performance. Research from these areas is used to define the antecedents of project team performance and the project team performance construct itself.

3. Antecedents of group performance

3.1. Effect of cohesion

Cohesion is viewed as the single strongest predictor of group behavior [16] and is included in several models of groups [15, 41]. However, it is not consistently defined: one researcher said cohesion is the set of forces that act on the members to remain in the group [13], whereas another termed it the strength of mutual positive attitudes among members [37]. Cohesion is also defined as the extent to which individuals stick together [20].

One comprehensive definition of cohesion has been proposed as "an individual's sense of belonging to a particular group and his or her feelings of morale associated with membership in the group" [8]. From a cognitive perspective, the sense of belonging encompasses a cumulative history of experiences with the group. From an affective perspective, it includes feelings that individuals have about the group, as well as their morale.

Groups can be made more successful by strengthening their cohesion [36]. For example, highly cohesive groups are better able to force member compliance with group positions [2, 45, 52], resulting in uniformity of group members [38], and making the group more effective. Highly cohesive groups have been found to generate a larger number of high-quality solutions for a predetermined problem [23] and perform better in terms of technical quality, budget and cost performance, meeting an assigned schedule, value to the company, and overall group performance [30]. Given that IS project teams are a form of group, the following relationship is hypothesized:

H1: Higher levels of perceived cohesion lead to increased perceived IS project team performance.

3.2. Effect of task priority

The group task is also an antecedent of group performance in many models. The amount of task uncertainty and complexity experienced by group members may have an impact on group performance. Uncertainty about how to perform a task is greater for non-routine tasks because non-routine problems are seldom as easy to solve as routine ones. They require more communication between team members in order to complete a task successfully, and they influence the characteristics of team members needed for particular tasks and, thereby, for team performance. In a survey of 68 systems analysts, it was found that when a task is routine, group performance is not perceived as successful [58].

Priority of the task is also believed to influence team performance. If the user loses interest in the project, then it is likely to fail [50]. Furthermore, if the IS staff lose interest in the project or do not perceive it as being important they will not perform as well as expected [27]. Thus, the following are hypothesized:

H2: Non-routine tasks increase perceived IS project team performance.

H3: Tasks with perceived high priority increase perceived IS project team performance.

3.3. Effect of user representation

Another major influence on performance is user involvement which is sometimes examined based on

two dimensions – involvement and participation [6, 7]. In the latter, users are an active part of the development process whereas, in the former, they feel involved because their views are represented either by a colleague, a manager, or someone else in whom the user has confidence. The psychological state of involvement is perhaps a more powerful and more useful predictor of user satisfaction than participation [26]. Not all users can, or want to, participate directly because of time or other resource constraints.

In our study we are only concerned with whether project team members perceived that the user was well represented. Furthermore, when IS staff work with users, they understand the significance of their task, and are more motivated to perform well [11, 24]. Thus we hypothesize:

H4: Perception of high user representativeness increases perceived IS project team performance.

3.4. Effect of team member involvement

Team members' perception of their own involvement in a project is believed to affect team performance [12]. In order for project teams to be successful, all participants must feel involved. Involvement is positively related to perceptions of system usefulness [14]. Team members' perception of their own involvement is, therefore, assumed to affect project team performance.

H5: High team member involvement in the project increases perceived IS project team performance.

4. Measures of project team performance

Group effectiveness or performance has been defined as: the extent to which a group meets or exceeds its standards; group output; organizational commitment; and satisfaction of group members. Some suggest that group performance is multidimensional and should be operationalized relative to the activities of the group [16].

Another group considers performance of design teams as the normal engineering measures of efficiency, effectiveness, and timeliness [21]. Efficiency is the ratio of outputs to inputs, and effectiveness is the quality of work produced. In the context of project teams, efficiency is a subjective perception of efficiency in team operations, and the team's adherence to allocated resources. Effectiveness is measured as the quality of work produced and interaction with people outside the team.

Self-evaluation of performance has been widely adopted in the areas of organizational behavior and human resources management. From the field of organizational behavior, Bandura's [3] work on self efficacy (a person's estimation of his/her ability to achieve target behaviors successfully) suggests that self-appraisals may be valid predictors of performance: individuals who view themselves as capable of performing tasks, tend to do so successfully. When detailed measurements are made, efficacy assessments and subsequent performance are highly correlated [4, 5, 46, 47]; indeed, a reciprocal relationship exists between them.

Not only is the self-appraisal process appropriate for IS project teams, it may also improve the team members' performance during future IS projects. Individuals are often best judges of their own performance, and by getting involved in a project, they may become more motivated to improve their performance. Self-appraisals tap dimensions of performance that are overlooked by other sources [9]. Furthermore, examination of the psychometric properties of self-appraisals of performance indicates that self-ratings reduce some of the perceptual errors made by other raters [39, 53, 55].

Based on theoretical and empirical research in areas of organizational behavior and human resources management, we propose that IS project team members' perceptions of their team success is a useful indicator of IS project success. The proposed model of project team performance is shown in Figure 1.

5. Method

5.1. Data collection

A survey was distributed to 264 members of IS project teams of a Fortune 500 firm in the service sector. The firm was chosen because of its reputation

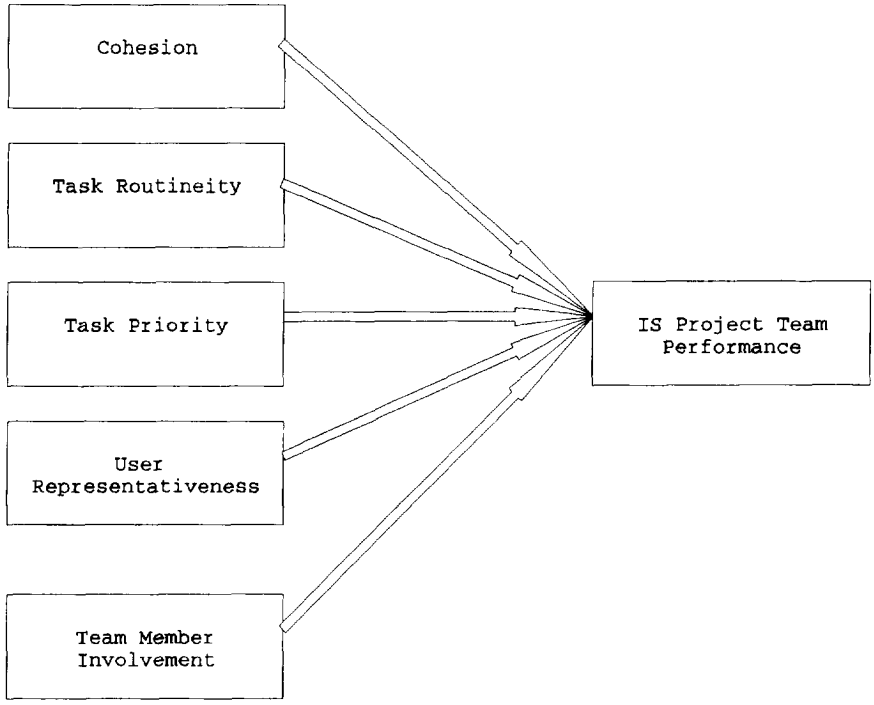

Fig. 1. Proposed model of IS team performance.

for quality customer service – in fact, it has been a recipient of the Malcolm Baldridge National Quality Award. Thus, we expected that project teams in this firm would be well established and well managed and the members oriented toward providing quality information systems to users. A total of 131 surveys were returned for a response rate of 49.6%. The participants were asked to respond to each question for the project and project team in which they were working. The teams develop and maintain a variety of applications, including marketing and customer information, strategic revenue, financial/legal, personnel, and other revenue management applications.

This sampling frame biases findings, because the IS in this firm may be higher in quality than those developed in the general population. However, it does provide respondents that are fairly homogeneous with respect to possible intervening variables, such as corporate culture, management style, industry sector, training, evaluation, and rewards.

Although this firm is noted for quality, individual project teams do not necessarily have the same level of performance as the others. Individuals within a project team may also view their team differently. Furthermore, the teams are working on different projects with different requirements, time frames, and priorities. Thus, we believe that the use of this sampling frame is appropriate.

5.2. *Profile of respondents*

Respondents have used computers for an average of 14.3 years. They have held their current position for an average of 4.1 years and have been with this company for an average of 6.7 years. The majority of respondents are male (58%). A large number are programmer/analysts (41%), programmers (24%), and other types of analysts (13%). Managers (including IS and user-group managers) comprise 16% of respondents, and users only comprise 4%. Users are not a constant component of the teams – after a project is completed, a user is no longer a team member, and it is difficult to determine which users worked with a team on particular projects. Furthermore, one user may work simultaneously with several

project teams. Therefore, because of the nature of these project teams, the proportion of user responses was low.

5.3. Measures

Cohesion: Bollen and Hoyle's Perceived Cohesion Scale (PCS) was used. The PCS includes specific elements of members' perceptions of their group that reflect a tendency to cohere. The scale measures two latent variables – the sense of belonging and state of morale – with three items each. The items were measured on a 5-point Likert scale, ranging from (=5) *strongly disagree* to (=1) *strongly agree*. The validity of the PCS appears acceptable.

Task routineity: Task routineity was measured by a three-item scale designed by Triscari [54] and used by White and Leifer. The items were measured on a 5-point scale ranging from (=5) *strongly disagree* to (=1) *strongly agree*. This scale was found to have acceptable internal consistency.

Task priority: A three-item scale was created to measure the perceived importance or priority of the current team project. The three items are: (1) this project is important to me, (2) this project is an important part of my performance evaluation, and (3) this project is important to my boss. They were measured on a 5-point scale ranging from (=5) *strongly disagree* to (=1) *strongly agree*.

User representativeness: User representativeness was measure by a 5-item scale created by Lawrence and Low [35]. Their scale measures "the extent to which users perceived they had been consulted and their views incorporated in the system". The items were measured on a 5 point scale ranging from (=5) *very high* to (=1) *very low*.

Team member involvement in project: Perceived involvement was measured by an 8-item scale created by Doll and Torkzadeh. Respondents were asked how much they were actually involved in each of eight project team activities. The items were measured on a 5-point scale ranging from (=5) *a great deal* to (=1) *not at all*.

Efficiency, effectiveness, and timeliness: Three dimensions of project team performance were examined [22]. Perceptual measures were used because of the variety of difficulties associated with objective measures of the task [25, 31].

Efficiency, effectiveness, and timeliness were measured with 4 items, 3 items, and 2 items, respectively, based on scales developed by Henderson and modified by Henderson and Lee. Respondents were asked to rate their project team relative to other teams with regard to each item on a 5-point scale ranging from (=5) *very high* to (=1) *very low*.

6. Data analysis

6.1. Exploratory factor analysis

Although each dimension was measured using a scale for which measurement properties had been assessed in prior studies, merging these scales may have changed their measurement properties. Thus, an exploratory factor analysis was performed in order to assess the validity of each of these dimensions in the presence of each of the others (Table 1).

Principle factor analysis was used to derive the dimensions of IS team performance and its antecedents. Results are largely consistent with those of individual scales in previous studies. Seven factors emerged, accounting for 89.6% of the total variance. Names were given to each factor from prior research, except for two factors labeled *involvement in analysis* and *involvement in design*. These were originally thought to comprise one dimension of team members' perception of their own involvement in the development project. However, it appears that involvement in tasks such as determining systems objectives, user needs, and assessing alternative solutions represents a different dimension than activities such as developing input and output formats. The former tasks are part of systems analysis activities whereas the latter are part of systems design [28]. In the original model, the *Performance* indicators were effectiveness, efficiency, and timeliness, but, in our model, they are treated as a single dimension: *Performance*.

Cronbach's α was calculated for each factor as an indicator of its internal consistency. Factors with Cronbach's $\alpha \geq 0.70$ are judged to be high in internal consistency [43]. Routineity is the only factor that fails to meet this criteria (Cronbach's $\alpha = 0.54$). Thus, it is dropped during further analysis.

The results of factor analysis without the three indicators of routineity are provided in Table 2. The

Table 1
Exploratory factor analysis: Seven construct model

Factor (% variance explained) Variable	Factor score	Cronbach's α
Cohesion (41.48%)		0.95
Member of workgroup	0.90	
Part of workgroup	0.89	
Belong to workgroup	0.88	
Happy to be in workgroup	0.79	
Excited about workgroup	0.75	
IS team performance (13.91%)		0.83
Ability to meet project goals	0.77	
Amount of work produced	0.70	
Quality of work produced	0.66	
Adherence to schedules	0.64	
Efficiency of operations	0.59	
Speed of operations	0.55	
Adherence to budgets	0.52	
Involvement in systems analysis (12.45%)		0.92
Initiating the project	0.84	
Determining system objectives	0.83	
Determining users' needs	0.83	
Involvement in systems design (8.09%)		0.88
Developing input forms/screens	0.80	
Developing output formats	0.77	
User representativeness (7.54%)		0.76
Workgroup consulted users	0.75	
Workgroup considered user needs	0.72	
Workgroup understood user needs	0.49	
Priority of the project (4.77%)		0.76
Important to boss	0.69	
Important to performance evaluation	0.65	
Project important to me	0.59	
Routineity (3.92%)		0.54
Understandable sequence of steps	0.52	
Project is routine	0.43	
Project requires many different skills	0.33	

Table 2
Exploratory factor analysis: Final model

Factor (% variance explained) Variable	Factor score	Cronbach's α
Cohesion (47.53%)		0.95
Member of workgroup	0.91	
Part of workgroup	0.88	
Belong to workgroup	0.90	
Happy to be in workgroup	0.74	
Excited about workgroup	0.68	
IS team performance (16.50%)		0.83
Ability to meet project goals	0.78	
Amount of work produced	0.65	
Quality of work produced	0.71	
Adherence to schedules	0.68	
Efficiency of operations	0.57	
Speed of operations	0.46	
Adherence to budgets	0.55	
Involvement in systems analysis (12.52%)		0.92
Initiating the project	0.82	
Determining system objectives	0.86	
Determining users' needs	0.83	
Involvement in systems design (5.99%)		0.88
Developing input forms/screens	0.86	
Developing output formats	0.85	
User representativeness (7.14%)		0.76
Workgroup consulted users	0.75	
Workgroup considered user needs	0.76	
Workgroup understood user needs	0.46	
Priority of the project (8.20%)		0.76
Important to boss	0.65	
Important to performance evaluation	0.67	
Project important to me	0.63	

six remaining factors account for 97.9% of the total variance, and Cronbach's α for each is greater than 0.70. Table 3 provides summary statistics for each factor.

6.2. *Multiple regression analysis*

Table 4 provides results of the regression analysis used to test the hypotheses. The R^2 indicates that 25% of the variance in team performance is explained by our model, which seems high for a model that assesses subjective perceptions of behavioral constructs.

Perception of user representativeness (Hypothesis 4) and IS team member involvement in systems design (Hypothesis 5) are significantly related to perception of team performance. Cohesion (Hypothesis 1), and priority of the project (Hypothesis 3) are, however, not significantly related to perceived performance. The construct *team member involvement in the project* in Hypothesis 5 was ultimately represented as two constructs – involvement in systems design and involvement in systems analysis. The relationship between the latter construct and team performance was not supported. Hypothesis 2, involving task routineity, was not tested because of the unreliability of the measure of task routineity.

Table 3
Summary of variable characteristics

Latent construct	Items	n	Mean	Standard deviation	Cronbach's α
Cohesion[a]	5	129	1.95	0.83	0.95
Task Routineity[b]	3	130	3.33	0.71	0.54
Task Priority[a]	3	129	1.74	0.73	0.77
User Representativeness[b]	3	130	3.90	1.35	0.76
Involvement in Systems Analysis[b]	3	129	3.31	1.36	0.92
Involvement in Systems Design[b]	2	128	3.38	1.32	0.88
Project Team Performance[b]	7	130	3.59	0.64	0.83

[a]1=very high and 5=very low on this attribute.
[b]1=very low and 5=very high on this attribute.

Table 4
Results of multiple regression analysis. Dependent variable – Perception of IS project team performance

Independent variable	T-value	*p*
Cohesion[a]	1.13	0.26
Priority of project[a]	1.04	0.30
User representativeness	3.26	0.00
Involvement in systems analysis	−0.01	0.99
Involvement in systems design	2.76	0.01

[a]Reverse coded prior to regression analysis.

7. Discussion and conclusion

The proposed model of IS project team performance was tested and 2 of the 4 hypotheses were supported. Respondents from the company perceive user representativeness on the task as positively related to their performance. However, we are measuring IS team members' subjective self-perception of these constructs. Findings indicate that when respondents believe they have incorporated users in the process, they consider their efforts to have been more successful. Thus, IS staff members are predisposed to working with users, simplifying the project managers' task of ensuring that user needs are adequately considered.

Perception of performance is also affected by team members' perceptions of their involvement in systems design. This confirms the commonly agreed upon idea that IS staff are technically oriented and prefer programming new applications over other, less technical, tasks.

It is somewhat surprising that cohesion was not found to be related to IS project team performance in this firm. Perhaps the IS staff were different.

This study has tapped two antecedents of IS project team performance: perception of how well users are represented on the team and of team members' own involvement in the technical aspects of development. The findings are largely consistent with prior research on the nature of IS employees, and provide additional insights into their management.

Results should be interpreted in the light of the fact that the findings are based on a single firm with a specific quality orientation. Further research with this model is needed before concluding that these findings are generalizable across firms and settings. Rather, this study provides a framework within which to build on group research in an IS setting. Managers in this firm can however, build on IS team members' predisposition to believe in the importance of working with users to encourage even better representation on project teams. They can structure projects so that the users are a more consistent part of the team. Based on this study, managers should be careful not to destroy cohesion, but be aware that actively seeking to increase it may be only a wasted effort.

References

[1] Allport, F.H., *Social Psychology*, Houghton-Mifflin, Boston, MA., 1924.
[2] Back, K., "Influence through social communication", *Journal of Abnormal and Social Psychology* 46, 1951, 9–23.
[3] Bandura, A., *Social Foundations of Thought and Action - A Social Cognitive Theory*, Prentice-Hall, Englewood Cliffs, NJ., 1986.

[4] Bandura, A. and Adams, N.E., "Analysis of self-efficacy theory of behavioral change", *Cognitive Therapy and Research* 1, 1977, 287–310.

[5] Bandura, A., Adams, N.E. and Beyer, J.C., "Cognitive processes mediating behavioral change", *Journal of Personality and Social Psychology* 35, 1977, 125–139.

[6] Barki, H. and Hartwick, J., "Rethinking the concept of user involvement", *MIS Quarterly* 13(1), 1989, 53–63.

[7] Barki, H. and Hartwick, J., "Measuring user participation, user involvement, and user attitude", *MIS Quarterly* 18(1), 1994, 59–79.

[8] Bollen, K.A. and Hoyle, R.H., "Perceived cohesion: A conceptual and empirical examination", *Social Forces* 69, 1990, 479–504.

[9] Campbell, D.J. and Lee, C., "Self-appraisal in performance evaluation: Development versus evaluation", *Academy of Management Review* 13(2), 1988, 302–314.

[10] Cartwright, D., *Group Dynamics*, Row, Peterson and Co., Evanston, IL., 1960.

[11] Cougar, J.D., "Motivating IS personnel", *Datamation* 15, 1988, 61–64.

[12] Doll, W.J. and Torkzadeh, G., "A congruence construct of user involvement", *Decision Sciences* 22(2), 1991, 443–453.

[13] Festinger, L., "Informal social communication", *Psychological Review* 57, 1950, 271–292.

[14] Franz, C.R. and Robey, D., "Organizational context, user involvement, and the usefulness of information systems", *Decision Sciences* 17, 1986, 329–356.

[15] Gladstein, D., "Groups in context: A model of task group effectiveness", *Administrative Science Quarterly* 29, 1984, 499–517.

[16] Goodman, P.S., Ravlin, E. and Schminke, M. "Understanding groups in organizations", in Cumming, L.L. and Staw, B.M. (eds.), *Research in Organizational Behavior*, JAI Press, Greenwich, CN, 1987, pp. 121–173.

[17] Goodman, P.S., *Designing Effective Work Groups*, Jossey-Bass, San Francisco, CA, 1986.

[18] Guzzo, R.A. and Waters, J.A., "The expression of affect and the performance of decision-making groups", *Journal of Applied Psychology* 67(1), 1982, 67–74.

[19] Hackman, J.R. and Oldham, G., *Work Redesign*, Addison-Wesley, Reading, MA., 1980.

[20] Hartmann, J.J. "Group cohesion and the regulation of self-esteem", in Kellerman, H.K. (ed.), *Group Cohesion: Theoretical and Clinical Perspectives*, Grune and Stratton, New York, N.Y., 1981, pp. 255–267.

[21] Henderson, J.C., Involvement as a Predictor of Performance in I/S Planning and Design, Working Paper, No 175, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge, MA., 1988.

[22] Henderson, J.C. and Lee, S., "Managing I/S design teams: A control theories perspective", *Management Science* 38(6), 1992, 757–777.

[23] Hoogstraten, J. and Vorst, H.C.M., "Group cohesion, task performance, and the experimenter expectancy effect", *Human Relations* 31, 1978, 939–956.

[24] Igbaria, M., "Career orientations of MIS employees: An empirical analysis", *MIS Quarterly*, 1991, pp. 151–169.

[25] Ives, B., Olson, M.H. and Baroudi, J.J., "The measurement of user information satisfaction", *Communications of the ACM* 26(10), 1983, 785–793.

[26] Jarvenpaa, S.L. and Ives, B., "Executive involvement and participation in the management of information technology", *MIS Quarterly* 15(2), 1991, 205–227.

[27] Jeffery, D.R. and Lawrence, M.J., "Managing programming productivity", *The Journal of Systems and Software*, 1985, 3, 49–58.

[28] Jones, M.C. and Price, R.L., "A modified SDLC", *Information Executive* 4(3), 1991, 45–48.

[29] Kaiser, K. and Bostrom, R., "Personality characteristics of MIS design project teams: An empirical study and action-research design", *MIS Quarterly* 6(4), 1982, 43–60.

[30] Keller, R.T., "Predictors of the performance of project groups in R and D organizations", *Academy of Management Journal* 29, 1986, 715–726.

[31] Kemerer, C.F., "An agenda for research in the managerial evaluation of computer-aided software engineering (CASE) tool impacts", Proceedings of the 22nd Annual Hawaii International Conference on System Science, 1989, Kailua-Kona, HI, 219–228.

[32] Kolodny, H.F. and Kiggundu, M.N., "Towards the development of a sociotechnical systems model in woodlands mechanical harvesting", *Human Relations* 33(9), 1980, 623–645.

[33] Kozar, K.A. and Zigurs, I., "Human and machine roles in team product reviews", *Information and Management* 23, 1992, 149–157.

[34] Kraemer, K.L. and Pinsonneault, A., "Technology and groups: Assessments of the empirical research", in Galegher, J., Kraut, R.E., and Egido, E. (eds.), *Intellectual Teamwork*, Lawrence Erlbaum Hillsdale, NJ., 1990.

[35] Lawrence, M. and Low, G., "Exploring individual user satisfaction within user-led development", *MIS Quarterly* 17(2), 1993, 195–208.

[36] Levin, J.M. and Moreland, R.L., "Progress in small group research", *Annual Review of Psychology* 41, 1990, 585–634.

[37] Lott, B.E., "Group cohesiveness: A learning phenomenon", *Journal of Social Psychology* 55, 1961, 275–286.

[38] Lott, A.J. and Lott, B.E., "Group cohesiveness as interpersonal attraction: A review of relationships with antecedent and consequent variables", *Psychological Bulletin* 64, 1965, 251–307.

[39] Mabe III, P.A. and West, S.G., "Validity of self-evaluation of ability: A review and meta-analysis", *Journal of Applied Psychology* 67, 1982, 280–296.

[40] McGrath, J.E., *The Study of Groups: Task Performance, Social Interaction, and Member Change*, Prentice-Hall, New York, N.Y., 1982.

[41] McGrath, J.E., *Social Psychology: A Brief Introduction*, Holt, Rinehart, and Winston, New York, N.Y., 1984.

[42] Newman, M. and Robey, D., "A social process model of user-analyst relationships", *MIS Quarterly* 16(2), 1992, 249–266.

[43] Nunnally, J.C., *Psychometric Theory*, (2nd edn.), McGraw-Hill, New York, N.Y., 1978.
[44] Roethlisberger, F.J. and Dickson, W.J., *Management and the Worker*, Harvard University Press, Cambridge, MA., 1939.
[45] Schacter, S., Ellerton, N., McBride, D. and Gregory, P., "An experimental study of cohesiveness and productivity", *Human Relations* 4, 1951, 229–238.
[46] Schunk, D.H., "Modeling and attributional effects on children's achievement", *Journal of Educational Psychology* 73(1), 1981, 93–105.
[47] Schunk, D.H., "Self-efficacy and cognitive skill learning", in Ames, C. and Ames, R. (eds.), *Research on Motivation in Education*, 1989, vol.3, pp. 13,14.
[48] Seashore, S.E., *Group Cohesiveness in the Industrial Work Group*, University of Michigan Press, Ann Arbor, MI., 1954.
[49] Semprivivo, P.C., *Teams in Information Systems Development*, Yourdon Press, New York, N.Y., 1980.
[50] Shannon, R.E., *Systems simulation: The art and the science*, Prentice Hall, Englewood Cliffs, NJ., 1975.
[51] Stephens, C., "Five CIO's at work: folklore and facts revisited", *Journal of Systems Management*, March 1993, 34–40.
[52] Thibaut, J.W., "An experimental study of the cohesiveness of underprivileged groups", *Human Relations* 3, 1950, 251–278.
[53] Thornton, G., "Psychometric properties of self-appraisal and job performance", *Personnel Psychology* 33, 1980, 263–271.
[54] Triscari, T., Organizations and Information Processing: A Field Study of Research and Development Units Within the U.S. Air Force Systems Commands, Unpublished Doctoral Dissertation, Rensselaer Polytechnic Institute, Troy, New York, 1984.
[55] Wexley, K.N. and Klimoski, R., "Performance appraisal: An update", in Rowland, K.M. and Ferris, G.D., (eds.), *Research in Personnel and Human Resources Management*, vol. 2, JAI Press, Greenwich, CT., 1984.
[56] White, K., "MIS project teams: An investigation of cognitive style implications", *MIS Quarterly* 8(2), 1984, 95–103.
[57] White, K., "A preliminary investigation of information systems and team structures", *Information and Management* 7(6), 1984, 331–335.
[58] White, K.B. and Leifer, R., "Information systems development success: Perspectives from project team participants", *MIS Quarterly* 9(3), 1986, 215–223.
[59] Zander, A.I., "The psychology of group process", *Annual Review of Psychology* 30, 1979, 417–451.

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