INVESTIGATING THE EFFICACY OF ORGANIZATIONAL EFFECTIVENESS TOOLS IN IT PROJECTS

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ABSTRACT

The technology industry has received poor marks on its ability to deliver successful projects on time and on budget. According to Sribar & Passori [32], 72% of all IT projects are late, over budget, lack functionality, or are never delivered as planned. Varley [36] suggested that poor communications, unrealistic expectations, competing agendas, resistance to change, and lack of agreed upon metrics are key contributors to project failure. These issues are not the problems, but rather are *symptomatic of poor project management discipline*. The root cause of poor project management, according to Varley [36], is often attributable to poor project management techniques, ineffective project team structure (team risks), a lack of client (end-user) project participation, and unmanaged scope changes.

Understandably, technology is most often not to blame for the project failure. Rather, it is the human and organizational dynamics that go awry during the implementation of a technology change. While there has been much speculation and limited research regarding the causes of project failure, there has not been much investigation regarding tools and techniques technical project managers can utilize to prevent (or minimize) the effects of these typical project pitfalls. This paper reports upon a qualitative action research investigation on the impact of Organizational Effectiveness (OE) tools in IT projects. The study was conducted in a graduate-level IT project management course offered at a major research university. The results of the research validate the efficacy of OE tools and behaviors in IT project management and consulting. The study measured the effectiveness of the OE approach, project time, team satisfaction, and client satisfaction on corporate technology projects. The paper identifies and elaborates upon a number of elements that affect project success. Organizational aspects of project management are explored and discussed.

Utilizing a participatory action research model, the study found that organizational effectiveness tools make a significant difference in a variety of project management dimensions. Team effectiveness ratings were obtained from team members and external corporate raters. Results indicated a significant relationship between certain aspects of team effectiveness and the use of organizational effectiveness tools. The implications of this study may extend beyond the project management boundary and may be applicable to other group settings where managers attempt to effect organizational change.

Keywords: project management, project tools, organizational effectiveness tools

INTRODUCTION

In order to be able to define, plan, implement, and complete a project successfully, a solid understanding of the diverse aspects of project management is necessary. Many definitions of project management exist. Pitagorsky [26] defined a project as: *"an endeavor in which human, material and financial resources are organized, in a novel way, to undertake a unique scope of work, of a given specification, within the constraints of cost and time, so as to achieve a beneficial change defined by quantitative and qualitative objectives."* To this author, the essential features of a project are its uniqueness and novel organization to achieve a beneficial change.

Greer [12] defines project management as the planning, organizing, directing, and controlling of resources for a finite period of time to complete specific goals and objectives. The project manager must coordinate, facilitate, and take responsibility for the successful completion of the project. Project management utilizes many managerial control methods and a variety of tools and techniques. Usually, an organization institutes project management when a complex job that cuts across departmental lines needs to get done and top management does not have the time to devote to the planning, execution, and completion of the effort. Knutson & Blitz [18] divide project management into four main parts – planning, scheduling, implementing, and completion/termination.

In the project management literature that embraces the diverse sociological aspects of project management, in general, there is an extremely limited and rather shallow coverage of the effectiveness of project management tools and methodologies and their challenges within project team environments. There are, of course, some exceptions to this observation. The exceptions are cases in which the authors delve more deeply into the effectiveness of project management approaches within project team environments (Lientz and Rea [22]; Ayas, [3,4]; Smith and Dodds, [33]; Sense and Antoni, [30, 31]).

Organizational Effectiveness is defined as the planned use of tools, practices and behaviors that encourages optimum effectiveness of people and organizations as a whole (Burke, [7]). Innovation is a product of organizational effectiveness and learning (Cayer, [8]). Innovation can be defined broadly as "an idea, a product or process, system or device that is perceived to be new to an individual, a group of people or firms, an industrial sector or a society as a whole" (Rogers, [29]). Innovations can occur in three broad domains: product, process and organizational. According to Edmondson and Moingeon [10], organizational effectiveness and innovation are considered "intangible" resources because they are very difficult to imitate. Such resources constitute a kind of "capital" for an organization which is a source of competitive advantage. Therefore, companies are trying to use organizational and team effectiveness and innovation in order not only to solve existing problems but also to improve their status continuously in the face of changing conditions. Little is known about the processes that make projects and organizations effective.

Projects manifest an organization's strategy. Some researchers have argued that project processes and tools affect the way people create new knowledge, which in turn determines organizational effectiveness (Smith & Dodds, [33]). Researchers have long emphasized continuous improvement of products and processes and have prescribed a broad set of tools and organizational mechanisms for the purpose (Juran & Gryna [20], Kackar, [17], Hedburg, [14]). However, for the most part, they have provided no guidance on the effectiveness of particular methods in project environments. Nor have they provided guidance about how to match tools and mechanisms to the nature of problems encountered.

A long-accepted concept in technology management holds that firms create, store, and analyze data and knowledge about market opportunities and technological possibilities and use this knowledge to justify projects to develop appropriate physical goods, systems, and procedures. Thus, products and processes embody organizational knowledge (e.g. Leonard-Barton [21], Pisano [25]). Hence, if the knowledge and processes possessed by a firm are sound, it will be well placed to create good products and processes (Bohn [6]).

Consequently, systematic analyses about the efficacy of organizational and team effectiveness processes and tools could potentially reveal insights about this evolving area of research. Unfortunately, our understanding of organizational effectiveness and its connection with project management is quite limited. In recent years, Hayes and Jaikumar [13], Vakola, [34], and Adler [1] have the importance of the issue but much work remains to be done.

PROBLEM STATEMENT

The prime purpose of this paper is to make a contribution to understanding this intra-project management dilemma and thereby address a gap in both the project management and organizational learning literatures. The paper does this by introducing and briefly

elaborating upon the findings of an investigation into project management/organizational effectiveness tools and methodologies within a particular set of project cases. The study provides a structural frame in which to understand and explore the situated nature of project management in this context and to study personal, project team, and client perceptions and effectiveness. In that vein, this paper does not lay claim that the findings from this study are necessarily applicable in every project case, but that they do at least serve as an embarkation point for prompting practitioner and researcher debate about the role of project management/organizational effectiveness tools in this dynamic workplace-learning arena. They also provide a base for further and wider investigation into the sociological or situated issues of effectiveness in project team contexts.

Furthermore, based upon discourse in the project management and organizational learning fields, and upon the findings of this research, a secondary purpose of the paper is to suggest that project team participants must pay systematic (not ad hoc) attention to the application of methodologies and tools within projects. In doing so, project participants must also develop an understanding of the local situational factors that will structurally support or impede their particular project context and devise their own specific approaches to facilitating project success within their team. The following discussion will outline the project case context, the research method pursued and the findings from the research.

RESEARCH METHODOLOGY

A participatory action research method was selected to investigate the effectiveness phenomena in the project teams, principally because both the client companies and the academic partner had specific needs. The participating companies wanted to support the learning and development of the project team members in accordance with their organizational goals and hence, they wanted action directly and indirectly influencing their activities within the project environment. Meanwhile, the researchers wanted an opportunity to intimately evaluate processes and team dynamics in this project context, which might then contribute towards the development of a model of a project-based methodology for organizational effectiveness. A participatory action research process met the needs of all participants.

EXPERIMENTAL DESIGN

Research concerning organizational effectiveness and its connection with project management is quite limited. Research suggests that such a linkage may be plausible (Smith & Dodd [33]), therefore, the hypothesis for this investigation was that project team effectiveness is positively related to the use of organizational effective tools.

Participants

The subjects in this study were forty-five students in a graduate-level IT project management and consulting course at a major research institution. The purpose of the course was to teach IT project management and consulting methodologies by having the students function as members of a consulting team for real corporate clients. The team members in this study were relatively homogeneous. The average age of team members was 22.6 years (SD=2.9). A majority of team members were male (83.2%), and most had limited project management experience (M=2.6 years, SD=2.2). Team size had a mean of 4.2 (SD= 2.1), with a range of 3 to 5 members. The subjects were assigned to one of seven consulting teams. Each team was assigned a corporate project (Figure 1).

Corporate Client	Project Description
A	Wireless Application Research & Prototyping
B	Campus Wireless Service Development
C	IT Project Trends Research
D	IT Product Research and Evaluation
E	Medical Wireless Data Collection & Design
F	Wireless Network Technology Evaluation
G	Software Design & Prototyping

Figure 1: Corporate IT Project Descriptions

The seven teams were divided into two subgroups: (1) a control group of three teams that followed a standard project management methodology and did not use the organizational effectiveness tools as part of their project and (2) an experimental group of four teams that utilized four organizational effectiveness tools in addition to the standard project management methodology.

The organizational effectiveness tools utilized in the study were developed by a national IT consulting firm. The following is a description of the four organizational effectiveness tools used in the study:

1. Team Charter: This tool enables project team members and corporate clients to create an over-arching mission statement and plans for how the project will succeed. This is intended to: 1) clarify the project elements such as vision, scope, and risks, 2) understand the client's position and client elements, 3) articulate roles and goals on both sides, 4) identify team calendar and timelines, and 5) provide further references for team success.

2. Assessing Stakeholder Buy-In: This tool is used to facilitate dialogue with the corporate client regarding how to build the necessary support for the solution / proposed change. The tool assesses the organizational support behind the proposed solution and, therefore, helps project leaders: 1) identify specific individuals and groups who are stakeholders of a proposed project, 2) determine the minimum amounts of support necessary to implement the project, 3) develop action steps for building the required commitment from these key stakeholders, 4) enable the team to recognize who has a vested interest in their project, where they stand on that project, and how the team can better utilize key stakeholders.

3. Teams and Conflict Checklist: This tool assesses the level of perceived conflict within a team. This is intended to: 1) enable team facilitators and/or leaders to compile information and design strategies to reduce affective conflict and refocus attention to task and 2) allow the team to capitalize on differing opinions by mitigating affective conflict.

4. Proactive Conflict Management: This tool allows the teams to plan how to proactively address conflict or potential conflict within the team or with the client, early in an engagement. This is intended to: 1) allow the teams to deal with conflict more effectively, 2) identify those aspects that impede the team's performance early, rather than later when the problems/concerns become overwhelming, 3) provide a forum for open discussion of issues both within the team and with the client, and 4) serve as a catalyst for mapping current risks and creating strategies to mitigate those risks.

Data collection procedures

Data was collected from the team members and client company representatives who worked closely with the project teams. Questionnaires were developed to collect data at the beginning and end of the project. All measures were collected on 5-point Likert-type scales. To assess the internal consistency of each scale the Cronbach alpha procedure (Cronbach, [9]) was used. While the team was the unit of analysis in this research, the data for this research were collected from individuals. Therefore, where appropriate, justification was provided for the aggregation of the data to the team level of analysis. The researchers examined the $r_{WG(J)}$ scores (James, Demaree, & Wolf [16]), which produces a measure of consensus among respondents and "justification for aggregation" (Koslowski & Hattrup [19] p. 162). An $r_{WG(J)}$ score greater than .70 represents a high level of agreement (George [11]).

The study was conducted in five phases:

1. **Baseline Measurement of Subjects**
   A questionnaire was administered to all subjects. The instrument was designed to measure IT project experience and perceptions about the subject's communication and team conflict resolution abilities.

2. **OE Tool Implementation with Experimental Groups**
   Four organizational effectiveness (OE) tools were utilized for the study; two internal-facing (team) tools and two client-facing tools (Figure 2). The developer of the OE tools conducted a training session for the teams that comprised the experimental treatment group in order for the teams to effectively utilize the tools within their project environments. The training session included the goals and objectives of this research, a description of the tools and skills/behaviors necessary for implementation, and what was required from each team to participate in this study.

Internal Tools	Description
Teams & Conflict Checklist	Assesses the level of perceived conflict within a team at a given point
Proactive Conflict Management	Helps teams plan how to proactively address conflict or potential conflict early in an engagement
Client-Facing Tools	Description
Team Charter	Builds strong team behaviors and outcomes during an engagement cycle
Assessing Stakeholder Buy-In	Assesses and begins to build the necessary support to implement a change within an organization

Figure 2: Study Organizational Effectiveness Tools

3. **Monitoring and Documentation of Team Progress**

A weekly progress report was utilized to monitor how the control and experimental groups progressed in their project environments. The progress reports were analyzed and coded.

4. **End of Project Questionnaires to Measure Differences Between Groups**

End of project measurement was obtained through a client and a student questionnaire. The end of project questionnaires contained both quantitative and qualitative components. Both corporate clients and team members were given identical questionnaires. The quantitative aspects of the questionnaires focused on team and client ratings of the following dimensions of project management: (a) communications; (b) key stakeholder buy-in; (c) project satisfaction; (d) team cohesiveness; (e) scope management; (f) project goal alignment; (g) team conflict; and (h) perceptions of project results. The organizational effectiveness tools utilized were designed to facilitate and enhance these dimensions of project management. The qualitative portion of the questionnaires allowed for elaboration to the quantitative responses. The qualitative responses were analyzed and coded.

5. **Evaluation of Final Team Deliverables**

The project deliverables were evaluated by the corporate sponsors and the course instructor using a scoring rubric. The rubric was co-developed by the corporate sponsors and the course instructor prior to the initiation of the study. The rubric was designed to measure alignment of project deliverables with project goals and objectives as well as the overall quality of the deliverables. The rubric was designed to reflect the internal criteria that the corporate sponsors utilize to evaluate project deliverables.

RESULTS

The project team effectiveness was analyzed by examining (1) the quantitative portions of the end of study team and client questionnaires; (2) the qualitative portions of the end of study team and client questionnaires (3) the project team status reports; (4) the final team deliverables.

Team and Client Questionnaires

In this research, team effectiveness was assessed on eight sub-dimensions: (a) communications; (b) key stakeholder buy-in; (c) project satisfaction; (d) team cohesiveness; (e) scope management; (f) project goal alignment; (g) team conflict; and (h) perceptions of project results. The internal consistency reliability for the effectiveness scale was, alpha=.98 for the experimental teams composite self-ratings, alpha=.92 for the control teams composite self-ratings, alpha=.88 for control teams corporate sponsor ratings and alpha=.91 for experimental teams corporate sponsor ratings. As seen in Table 1, there was a high degree of consensus among respondents and a strong justification for aggregation of the data.

Table 1: r $_{WG(J)}$ scores

	Control Team Self Responses	Experimental Team Self Responses	Control Team Sponsor Responses	Experimental Team Sponsor Responses
Communications	.96	.94	.88	.92
Stakeholder Buy-In	.84	.88	.97	.99
Project Satisfaction	.91	.84	.81	.93
Team Cohesiveness	.97	.95	.85	.96
Scope Management	.86	.91	.88	.89
Project Goal Alignment	.81	.97	.90	.96
Team Conflict	.87	.95	.97	.92
Project Results	.93	.98	.82	.93

ANOVA's were conducted on data generated from each of the criterion measures. Where statistically significant F-ratios were found to exist, Scheffe post hoc analysis was utilized to conduct comparisons among the individual means. Alpha was set at the .05 level for all analyses. Analysis of the team and sponsor questionnaire data suggests that different aspects of team effectiveness, as assessed by the corporate project sponsors and the team members, were significantly related with the use of organizational effectiveness tools.

Table 2 presents the means and standard deviations from the self-responses of the experimental teams and the control teams on each criterion measure. Two–way ANOVA conducted indicated statistically significant main effects in the areas of project satisfaction ($F=(1,45)=72.53$, p. <.001), team cohesiveness ($F=(1,45)=158.69, p.<.001$), scope management ($F=(1,45)=73.16$, p.<.001), project goal alignment ($F=(1,45)=43.07, p.<.001$), and project results ($F=(1,45)=53.29, p.<.001$) for the experimental group.

Statistically insignificant interactions were found to exist between the control and experimental groups in the areas of communications, stakeholder buy-in, and team conflict.

Table 2: Means and Standard Deviations for Each Treatment Group On
Evaluative Criterion Measures – Self-Responses

		Mean	STD Dev.
Communications	T1	3.47	.697
	T2	3.58	.578
Stakeholder Buy-In	T1	2.89	.567
	T2	3.08	.543
Project Satisfaction	T1	2.74	.562
	T2	4.15	.543
Team Cohesiveness	T1	2.79	.419
	T2	4.58	.504
Scope Management	T1	2.58	.607
	T2	4.08	.560
Project Goal Alignment	T1	2.95	.705
	T2	4.19	.567
Team Conflict	T1	3.63	.684
	T2	3.88	.588
Project Results	T1	3.21	.713
	T2	4.54	.508

T1 = Composite Control Teams
T2 = Composite Experimental Teams

Table 3 presents the means and standard deviations from the corporate sponsor responses of the experimental teams and the controls teams on each criterion measure. Two –way ANOVA conducted indicated statistically significant main effects in the areas of project communications ($F=(1,14)=69.43, p. <.001$), project satisfaction ($F=(1,14)=47.02, p. <.001$), and project results ($F=(1,14)=11.14, p. <.05$) for the team experimental group. The remaining dimensions of team effectiveness studied (team cohesiveness, scope management, project goal alignment, stakeholder buy-in, and team conflict) produced statistically insignificant differences between the corporate project sponsors of the control group and the corporate project sponsors of the experimental group.

The qualitative data from the teams also suggest that the use of organizational effectiveness tools in the project management experience made a positive impact on team effectiveness. Eight categories were utilized for data analysis: (1) communications; (2) key stakeholder buy-in; (3) project satisfaction; (4) team cohesiveness; (5) scope management; (6) project goal alignment; (7) team conflict; and (8) perceptions of project results.

The teams lacking OE tools addressed scope-related issues extensively. Their comments focused generally upon issues related to team and client communications, team cohesiveness, and project scope management issues. The teams that utilized OE tools in their project were generally satisfied with the project experience. Their comments were almost entirely positive, focusing on how the team functioned and communicated. The comments of the corporate sponsors of the teams lacking OE tools focused generally upon issues related to team and sponsor communications and project scope management issues. The corporate project sponsors of the teams that utilized OE tools in their project were generally satisfied with the project experience. Their comments were almost entirely positive and generally focused team communications and team cohesiveness.

Table 3: Means and Standard Deviations for Each Treatment Group On
Evaluative Criterion Measures – Corporate Sponsor Responses

		Mean	STD Dev.
Communications	T1	2.50	.548
	T2	4.75	.463
Stakeholder Buy-In	T1	2.67	.516
	T2	3.00	.535
Project Satisfaction	T1	2.50	.548
	T2	4.50	.535
Team Cohesiveness	T1	3.33	.816
	T2	3.38	.744
Scope Management	T1	3.83	.408
	T2	4.00	.535
Project Goal Alignment	T1	3.67	.516
	T2	4.13	.354
Team Conflict	T1	3.50	.548
	T2	3.63	.744
Project Results	T1	3.17	.753
	T2	4.25	.802

T1 = Composite Control Teams
T2 = Composite Experimental Teams

Weekly Status Reports

Each project team submitted a status report to the project sponsor and course instructor. Eight categories were utilized for the analysis of the reports: (1) communications; (2) key stakeholder buy-in; (3) project satisfaction; (4) team cohesiveness; (5) scope management; (6) project goal alignment; (7) team conflict; and (8) perceptions of project results. The qualitative data from the reports suggest that the use of organizational effectiveness tools in the project management experience made a positive impact on team effectiveness. The teams lacking OE tools addressed scope management issues forty-one percent more often than did the teams that utilized OE tools. Team and client communication and team conflict were addressed fifty-four and forty-three percent more often (respectively) for the teams that did not utilize the OE tools.

Final Project Deliverables

The project deliverables were evaluated by the corporate sponsors and the course instructor using a scoring rubric that was co-developed by the corporate sponsors and the course instructor prior to the initiation of the study. The rubric was designed to measure alignment of project deliverables with project goals and objectives as well as the overall quality of the deliverables. A quantitative score from one to 10 was assigned to ten different evaluative criteria and a final score was tabulated. The teams the utilized the OE tools in their projects scored, on average, eleven percentage points higher than the teams that did not utilize the OE tools.

RESEARCH LIMITATIONS

There were no difficulties encountered with the sampling procedures, data collection, data analysis, and

overall execution of this study. This study utilized a participatory action research method to investigate the effectiveness phenomena in the project teams. Participatory action research requires active collaboration between the researcher(s) and the community for meaningful data collection (Yin [37]). The community in this study consisted of the project teams and their corporate sponsors. All corporate sponsors were at remote locations and communicated with their respective project teams through conference calls, email, groupware, and video conferencing technology. This limitation may have affected the amount of interaction between the team and the client corporation. However, this situation mirrors the virtual project team environment found in many organizations today (Amison and Miller [2]). In this manner, the project teams accurately reflected the real-word situations of their counterparts within the client companies.

The projects were conducted through a fifteen-week semester and each subject reported spending an average of ten hours per week on his or her project. This time limitation may have affected the "real-word" community environment and interaction time. The researchers, in conjunction with the client corporations, selected and scoped the projects in a manner that greatly mitigated this possible limitation. Each project was an initial phase of a larger effort. After the initial, in-class phase of the project, all projects were continued either by the teams working for the client or by the client company. In this manner, the fifteen-week semester was not a limiting factor in the selection and development of a real corporate IT project. In fact, according to Amison and Miller (2002), many corporate project team members are part of multiple project teams and are required to spread their time between their day-to-day work responsibilities and their project-related responsibilities. In this respect, the study environment closely mirrored project environments found on many organizations today and required a similar amount of time per week as that expected of many project team members within the client organizations.

The average age of team members was 22.6 years (SD=2.9). A majority of team members were male (83.2%), and most had limited project management experience (M=2.6 years, SD=2.2). While these facts may affect the ability to generalize the findings of this study to older, more experienced groups, the composition of the teams makes this study very relevant to current workforce issues. Few project effectiveness studies examine younger teams with limited project experience. Insights into methodologies and tools that increase the effectiveness of younger project teams is becoming a topic of interest as baby boomers begin to retire and the

demographic of corporate America becomes drastically younger (O'Bannon [23]).

CONCLUSION

The hypothesis of the study suggested that team effectiveness would be positively related to the use of the selected organizational effectiveness tools in the project management experience. Analysis of the quantitative and qualitative data suggests that the organizational effectiveness tools utilized in the study did positively impact the project management experience, particularly in the areas of project communications, project satisfaction, team cohesiveness, scope management, project goal alignment, and project results.

The use of organizational effectiveness tools in the project management process, whether rated by team members or team corporate sponsors, may be predictive of higher levels of team effectiveness. These results are similar to previous findings regarding collective team efficacy. For example, Hodges and Carron [15], Prussia and Kinicki [27], and Riggs and Knight [28] all found previous team effectiveness to be positively related to subsequent collective team efficacy. Recent research has taken a broad interest in the examination of constructs previously studied solely at the individual level of analysis and elevated them to the group level of analysis (e.g., Bandura [5], Pearce, Gallagher & Ensley [24]).

The results of this research suggest that the use of organizational effectiveness tools and project team effectiveness may be reciprocally related. However, these results should be interpreted with caution. More research is needed to further clarify the relationship between OE tools and team effectiveness across a broader array of organizational contexts with alternative empirical analyses. In an experimental setting, for instance, one might control which OE tools have a greater impact on team effectiveness. Also, an investigation in to the use of organizational effectiveness tools by the same team members in multiple project environments would provide more insight to the predictive ability of the use of OE tools for collective team efficacy over time. Nonetheless, the OE tools-team effectiveness relationship appears to be an important factor to consider when managing IT projects.

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