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ORGANIZATIONAL JUSTICE PERCEPTIONS AND THEIR INFLUENCE ON INFORMATION SYSTEMS DEVELOPMENT PROJECT OUTCOMES

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ABSTRACT

This study explores organizational justice perceptions of IS development project team members. Specifically, the effect of justice perceptions on efficiency, effectiveness, and elapsed time outcomes of IS development projects is studied using a survey method. The study uses three subscales of organizational justice, distributive, procedural and interactional, that are well known in the general management literature. The findings indicate that both distributive and interactional justice perceptions of team members positively influence the effectiveness and efficiency and procedural justice perceptions positively influence the efficiency and elapsed time outcomes of IS projects. We found that there is no moderating influence of employee type – whether the team member is in house or contract employee – on these relationships.

INTRODUCTION

Leaders of information systems development projects must often cope with conflicting interests and resulting tensions during the course of managing a project. It is important to recognize and deal with these tensions as part of critical project management activities (Lewis, Welsh, Dehler, and Green 2002). Such tensions often manifest in varied forms during the software development life cycle. Questionable resource allocations to different components of a project, manifestations of bottlenecks during software development, and difficulties arising from interdependencies of various components of a project are all expressions of these tensions. The need to actively manage tensions arising while managing projects has long been

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recognized (see for example, Butler 1973). Software project management is often studied from a content perspective. The systems development life cycle (SDLC) and studies focusing on its component activities epitomize this content perspective (see for example, Ahituv, Hadass, and Neumann 1984). While it is important to manage the activities of SDLC, it is equally important to view software development teams as any other group engaged in a creative effort. IS development projects are inherently complex because they deal not only with technological issues but also with organizational factors (Xia and Lee 2004). This study employs a managerial perspective to understand whether organizational justice perceptions of team members could influence project outcomes by creating an environment that fosters innovation and reduces tensions. Organizations could benefit from a clearer understanding of how to manage project-related activities to influence project successes (Aladwani 2002).

Management literature discusses many styles of general management, such as transactional and transformation leaderships and theory X/theory Y (Lewis, Welsh, Dehler, and Green, 2002). In addition to these, organizational justice in the context of project management has been shown to impact team members' behavior (Niehoff and Moorman 1993; Moorman, Blakely, and Niehoff 1998; Tepper and Taylor 2003). We examine in this study whether organizational justice perceptions of project members could be influenced by the managerial behavior of project leaders. Traditionally, there has been a widespread recognition of the importance of the ideals of justice in social organizations. Scholars have devoted considerable attention to a variety of organizational activities ranging from a *fair use* of employment tests to *just* resolution of grievances and even *democratic* decision making in the work place (Greenberg 1990). An IS project leader, who is conscious of how organizational justice perceptions of team members could positively influence project outcomes, can alter his/her leadership style to ensure that the team members have positive justice perceptions. We view such leadership behavior as a facet of management style. Although there are many reasons for creation of close social exchange relationships, organizational justice appears to be an important one. Close social exchange relationships in organizations result in an obligation for the employee to repay the supervisor and this may influence improved performance. Findings from a number of studies suggest the existence of this chain relationship (see for example, Tekleab, Takeuchi, and Taylor 2005). The current study thus represents a migration of this well

CONTRIBUTION

This study offers a significant contribution by bringing theories of organizational justice to the domain of information systems (IS) project-management research. Organizational justice has long been studied in contexts where a supervisor and team members interact. It is grounded in social-exchange and equity theories that have enjoyed rich contributions in the general management literature. And yet, its role has long been overlooked in studying how information system projects can be better managed.

The nuances of managing IS projects and the managerial styles of IS project supervisors do indeed influence project outcomes. While IS studies have taken a content-based approach to project management by focusing on activities of system development life cycle (SDLC), different managerial approaches to system development processes have not been sufficiently explored. This paper considers how a project team's justice perceptions – how equitably they are treated and how fair their project leader is – influence three dimensions of project outcomes: efficiency, effectiveness, and elapsed time of projects. It also examines the role whether the employment type, in-house or contract, affects the project outcomes.

The research model employed in the study is straight forward and addresses this central question of how to manage software projects better. The findings of the study offer prescriptive guidelines based on how different justice perceptions affect different dimensions of project outcomes.

established research theme from general management literature to a software project management context. An important objective of this study is to investigate whether a project leader's organizational justice behaviors influence project outcomes in IS development projects.

THEORETICAL FOUNDATIONS

Theories of social and interpersonal justice have traditionally been employed to understand behavior in organizations (Greenberg 1990). The use of organizational justice in management research has roots in *social exchange* theory (Thibaut and Kelly 1959). In contrast to purely economic exchanges, in a social exchange, parties involved are often unclear about their obligations as well as standards for measuring their contributions. Employees are involved in social exchange relationships in organizations through their interactions with immediate supervisors. The quality of leader-member exchanges have been shown to influence role behaviors and organizational citizenship behaviors (Settoon, Bennett, and Liden 1996; Wayne, Shore, and Liden, 1997). There is strong evidence to suggest that the level of organizational justice present in management decisions is directly related to the quality of social exchange relationships (Masterson, Lewis, Goldman, and Taylor 2000; Tekleab, Takeuchi, and Taylor 2005).

DISTRIBUTIVE JUSTICE

The theory of distributive justice is essentially concerned with how a society or group should allocate its scarce resources among individuals with competing needs or claims. In the project management context, this translates into how the project participants perceive the work as well as the outcomes of the project is distributed among its members. Equity theory (Adams, 1963) considers how an individual evaluates the proportion of his/her input and output, and then compare this with referent others, typically members in the same team. If the person feels inequitable through this comparison, he or she is motivated to reduce that inequity by reducing input or increasing output. It follows that an unfair distribution of work rewards or work itself relative to the abilities and role of a project team member will create tensions within that team member followed by attempts to resolve that tension. It is reasonable to surmise that this will have an impact on the motivation of a team member to contribute to the tasks relating to the project and consequently its outcome. Another theoretical keystone of distributive justice is Leventhal's (1976) *justice judgment model* which proposes that individuals, in general, attempt to make fair allocation decisions by applying different allocation rules to the situations they confront. In the context of software project management, situations may develop where a project manager's application of an allocation rule may not be consistent with an employee's view of work or outcome allocation, leading to tensions within the project team impacting project outcomes.

PROCEDURAL JUSTICE

While distributive justice focuses on the perceived fairness of rewards allocation, procedural justice focuses on the perceived fairness of the processes by which such reward allocations are made. Consideration of fairness in reward allocations or even work allocations has a unifying value, providing fundamental principles that can bind together conflicting parties and create stable social structures (Konovsky 2000). Fairness serves as a guideline in organizational decision making. A substantial body of research demonstrates that people's judgment of how fair an organization is, plays an important role in organizational decisions, behavior and attitudes (Lind, Kulik, Ambrose, and de Vera 1993). In IS development projects, team members must know that fair formal procedures exist for dealing with all issues of project management and the decisions will be rendered in fair manner. Procedural justice is presumed to exist when organizational procedures are based on normatively accepted principles (Cohen-Charash and Specter 2001).

INTERACTIONAL JUSTICE

In addition to a simple delineation of formal procedures, there must also be fairness in the treatment of project team members in the

explaining and enacting of those procedures (Greenberg 1990). The value of fair procedures is that they make it more likely that the distribution of outcomes will be fair (Niehoff and Moorman 1993). Interactional justice refers to the interpersonal interaction of the leader with team members, while distributive justice focuses on the outcome (distributive) and procedural justice refers to the application of common procedures within the project team. Interactional justice is essentially the degree to which the people affected by decisions are treated with dignity and respect. When an employee perceives an interactional injustice, he or she will react negatively toward his or her supervisor and not necessarily toward the organization (Cohen-Charash and Specter 2001). However, if the employee believes the source of the interactional justice is the formal procedures themselves rather than the supervisor enacting the formal procedures (Bies and Moag 1986), he or she may react negatively to the organization itself. In either case, there is justification to hypothesize a relationship between interactional justice perceptions of project members and project outcomes. Table 1 summarizes how the three types of organizational justice are based on various sociological theories.

DISTINCTIONS AMONG DIMENSIONS OF ORGANIZATIONAL JUSTICE

Studies in organizational justice have typically focused on these three particular types of organizational justice: distributive justice, procedural justice, and interactional justice and their relationships to certain social exchange outcomes; although some (e.g. Lam, Schaubroeck, and Aryee 2002) have combined the later two dimensions under the same label of "procedural justice." Organizational justice researchers have long debated the distinction among its different dimensions (Cropanzano, Prehar, and Chen 2002). Without attempting to resolve these differences here, this study recognizes that there may be overlaps among the dimensions of organizational justice and conceptualizes various project outcomes as a result of all three sub dimensions of organizational justice.

RELATIONSHIP BETWEEN JUSTICE DIMENSIONS AND PROJECT OUTCOMES

The role of justice perceptions on IS Development project outcomes is the central focus of this study. Individual perceptions of justice typically lead to shared perceptions of justice within project teams. This shared perception can be hypothesized to influence work outcomes. In other words, the greater the project participants believe that they are treated fairly in terms of all three dimensions of organizational justice, the greater their contribution to the project. A recent study found that organizational justice influences three employee work outcomes: supervisor rating, job satisfaction and absenteeism (Lam, Schaubroeck, and Aryee 2002). To the best of our knowledge, organizational justice perceptions have not been specifically studied in the IT project management context. The current study hypothesizes that the organizational justice perceptions of project team members affect project outcomes. Table 2 provides some examples of the predictive role of various organizational justice dimensions reported in earlier studies. Such a predictive role of organizational justice dimensions reported in earlier studies lends a general support to the purport of the current study.

Table 1: Underlying Theories of Organizational Justice Dimensions

Organizational Justice Dimension	Underlying Theory
Distributive Justice	Equity Theory (Adams 1963), Justice Judgment Model (Leventhal 1976), Allocation Preference Theory (Leventhal, Karuza, and Fry 1980)
Procedural Justice (Formal Procedures)	Equity Theory (Adams 1963)
Interactional Justice	Social-Exchange Theory (Thibaut & Kelly 1959), Theory of Interdependence (Kelley and Thibaut 1978)

Table 2: Examples of Predictive Role of Organizational Justice Dimensions

Predictive Conclusion	Study
Interactional justice perceptions affect supervisor-related outcomes and procedural justice perceptions affect organization-related outcomes	Masterson, Lewis, Goldman, and Taylor (2000)
Distributive justice was a better predictor of for personal outcome than procedural justice. Procedural justice predicted organizational commitment better than distributive justice.	McFarlin and Sweeny (1992)
Procedural justice influences management evaluations, job satisfaction, and perceived conflict more than distributive justice.	Alexander and Ruderman (1987)
Procedural justice predicted organizational commitment.	Konovsky, Folger, and Cropanzano (1987)
Procedural justice accounted for more variance in organizational commitment and trust in a supervisor compared to distributive justice.	Folger and Konovsky (1989)

SOFTWARE PROJECT OUTCOMES

The goal of this study is to examine the effects of organizational justice perceptions on software project outcomes. There are two broad measures of project performance widely recognized in IS literature (Wallace and Keil 2004, Nidumolu 1995). The first is the process performance which describes how well the software development process has been undertaken. The second is the product performance, which describes how useful the system is to the end-users. Objective measures of project success, such as its financial impact, are indeed important. But, they are often impacted by a host of other variables that would confound the central question at hand: how can software project managers manage tensions during software development projects, while recognizing that justice perceptions may positively impact teams' task orientation? It is possible to measure project success using only subjective measures to assess performance due to problems involved in using only objective measures (as in Henderson and Lee 1992). Studies involving multiple organizations cannot use objective measures such as internal accounting data to evaluate project performance. Even within subjective measures both process and product successes are often deemed important (see for example, Jiang, Klein, Hwang, Huang, and Hung 2004). We confine our operationalization of project outcome to just process measures as there is reason to believe that these are more directly impacted by how well the process is managed during IS development. Objective measures, in contrast, may be more easily impacted by resources available to the project team.

MODERATING INFLUENCES

The distinction between contract and permanent employees has been studied in the context of job design of IT software development personnel by Ang and Slaughter (2001). They believe that supervisors tend to restrict the scope of contract employees' job leading to their lower perception of the job environment. They further argue that from a social exchange theory perspective IS contract employees will have less positive attitudes and behaviors based on the specifics of the social exchange relationships and norms of reciprocity. The results from their study indicate that organizations should carefully design and balance the job of contractors and permanent employees. Since the notion of organizational justice pertains to equity in work and reward allocation, it is included in the current study as a moderating variable. Rewards from contract employees come from contract employers and not from the organization where they are currently working. Since fairness in reward distribution is an integral part of organizational justice, inclusion of employee type as a moderator in our research model is further justified. The research model is presented in Figure 1.

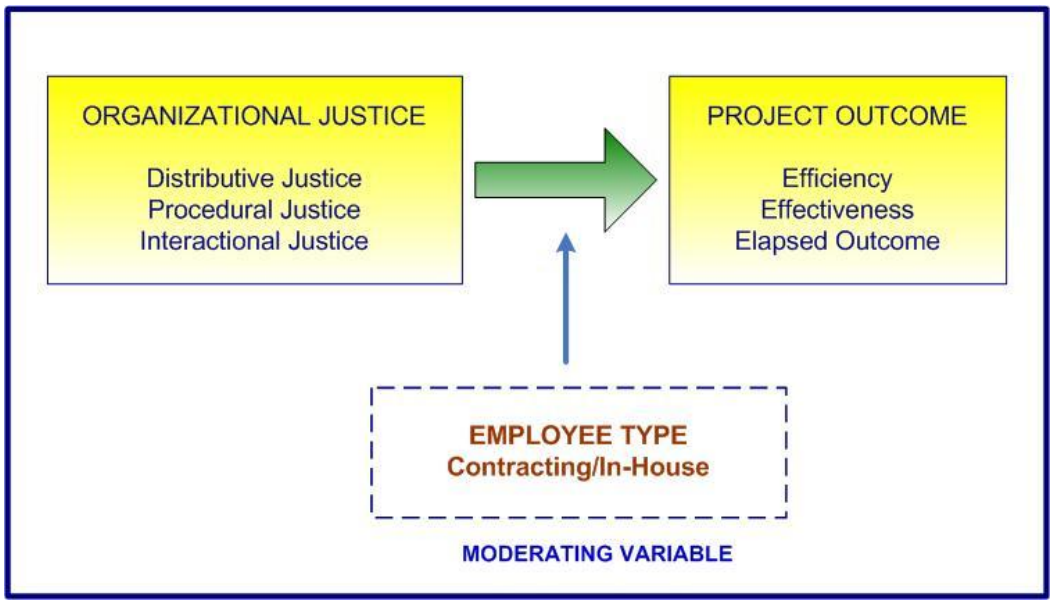

Figure 1: Research Model

HYPOTHESES

The hypotheses for direct influences of organizational justice are delineated assuming that when project participants feel fairer justice perception, the project outcomes will be more favorable. The hypotheses relating to moderating influence of whether the project participant is a contract or in-house employee do not have any directionality associated with them as there are no prior theoretical foundations exploring this moderating effect. Specifically the hypotheses to be tested are:

Distributive justice hypotheses

Hypothesis 1: Distributive justice positively influences the efficiency of the project

Hypothesis 2: Distributive justice positively influences the effectiveness of the project. Hypothesis 3: Distributive justice positively influences the elapsed time outcome of the project..

Procedural justice hypotheses

Hypothesis 4: Procedural justice positively influences the efficiency of the project.

Hypothesis 5: Procedural justice positively influences the effectiveness of the project

Hypothesis 6: Procedural justice positively influences the elapsed time outcome of the project.

Interactional justice hypotheses

Hypothesis 7: Interactional justice positively influences efficiency outcome of the project.

Hypothesis 8: Interactional justice positively influences the effectiveness of the project.

Moderating effects of employee type hypotheses

Hypotheses 10-18: Employee type moderates each one of the nine relationships stated above.

MEASURES

We used Niehoff and Moorman's (1993) scale of organizational justice, measuring perceptions of distributive justice with five items and what they viewed as two components of procedural justice: formal procedures with six items and interactional justice with eight items. All items were measured on a five-point Likert scale. The project outcome was measured by a scale developed by Henderson and Lee (1992) including all its components: efficiency,

effectiveness and elapsed time outcomes. We draw on these measures due to their high internal reliabilities already established, but we slightly reworded the questions and used a five-point Likert scale instead of the seven point scale used in earlier studies to make items consistent with others in our survey. Henderson and Lee (1992) removed the indicator relating to budget for their data analysis since the respondents may not be aware of project budgets. We chose to retain it for two reasons: (1) our survey did not elicit absolute values of budget items, but only how the project performed relative to other similar projects in their environment, and (2) the high internal reliability of this construct in their earlier study (Henderson and Lee 1988). Because of these changes, we proceeded to reestablish the reliability and construct validities of these scales using commonly accepted procedures.

SURVEY

A paper survey was constructed using the scales described above. In addition to the project outcome measures and three dimensions of organizational justice measures, the survey collected additional demographic data including the gender of the respondents as well as information on whether the respondent is an in-house or contract employees. We used twenty contact persons to distribute the survey ensured that the respondents were qualified participants who have participated in a recent project. For the purpose of our study, a qualified participant is defined as one who is working for an organization with at least 100 employees and who has participated in a recent IS development project. The contact persons were personally known acquaintances to the authors who worked for companies that have undertaken recent IS development projects and were asked to solicit responses from project team members. A total 103 responses were returned from a total of 200 surveys that were distributed. We could not identify the respondent's industry in 28 of the total 103 responses. The rest of the responses came from sixteen different industries representing a wide distribution of the survey. We felt the use of contact persons was necessary to identify participants who have recently completed an IS development project. The use of contact persons, although is a form of convenience sampling, is not expected to undermine the conclusions of study. Profiles of the respondents presented in Table 3 indicate a good distribution of gender, national origin, and in-house/contract employees.

Table 3: Profile of the Survey Participants

Gender	n	Percent	Employee Type	n	Percent	National Origin	n	Percent
Male	79	76.70	In-house	81	0.970874	United States	95	92.23
Female	24	23.30	Contract	21	78.64078	Canada	1	0.97
			Missing	1	20.38835	India	2	1.94
						Other	4	3.88
						Missing	1	0.97
Total	103			103			103	

	Duration of Project (in weeks)	Age of Respondents	IT Experience (in years)
Mean	27.72	33.93	9.68
Median	26.00	33.00	8.00
Std. Deviation	18.81	9.89	7.49
Total	103	103	103

DATA ANALYSIS

Data analysis was performed using PLS-Graph 3.0. The procedure to verify the convergent validity was performed using SPSS 14.0 in conjunction with PLS-Graph output. As can be seen from Table 4, composite reliability of all the constructs is above the acceptable values.

We first established the convergent and discriminant validity of all measures as described by Gefen and Straub (2005). When t-values of the outer model loadings are above 1.96, the measures have convergent validity. Table 5 shows the loadings, standard error and t-statistics of all reflective measure in our research model and verifies that the t-values are significant at the 0.05 level.

Table 4: Composite Reliability of Constructs

Constructs	Composite Reliability
Distributive Justice	0.928
Procedural Justice	0.886
Interactional Justice	0.953
Effectiveness Outcome	0.818
Efficiency Outcome	0.834
Elapsed Time Outcome	0.856

Table 5: Loading of Indicator Variables and their t-statistics

Constructs	Indicators	Loadings	Standard Error	T-statistic
Distributive Justice	DISTJST1	0.8239	0.0503	16.3835
	DISTJST2	0.7828	0.0716	10.9386
	DISTJST3	0.8869	0.0310	28.5702
	DISTJST4	0.8768	0.0285	30.7975
	DISTJST5	0.8734	0.0315	27.7144
Formal Procedures	FORMAL1	0.7172	0.0878	8.1707
	FORMAL2	0.8009	0.0659	12.1501
	FORMAL3	0.8321	0.0501	16.6154
	FORMAL4	0.8031	0.0592	13.5608
	FORMAL5	0.7708	0.0667	11.5602
	FORMAL6	0.5647	0.1345	4.1997
Interactional Justice	INTER1	0.9003	0.0697	12.9230
	NTER2	0.8881	0.0736	12.0746
	INTER3	0.8422	0.0721	11.6861
	INTER4	0.8158	0.1163	7.0153
	INTER5	0.8573	0.0459	18.6599
	INTER6	0.9150	0.0311	29.4348
	INTER7	0.8907	0.0317	28.1360
	INTER8	0.8517	0.0399	21.3242
Efficiency Outcome	OUTCOME1	0.8522	0.0466	18.294
	OUTCOME2	0.6854	0.1017	6.7426
	OUTCOME3	0.7596	0.0924	8.2175
	OUTCOME4	0.6786	0.1152	5.8911
Effectiveness Outcome	OUTCOME5	0.7649	0.0836	9.1547
	OUTCOME6	0.8322	0.0470	17.6961
	OUTCOME7	0.7225	0.1038	6.959
Elapsed Time Outcome	OUTCOME9	0.8966	0.0600	14.9518
	OUTCOME8	0.8324	0.0544	15.2899

In order to assess the discriminant validity, a two-step procedure was followed. First, the correlations of the latent variable scores with the measurement items were measured. These show a pattern in which these items load highly on their assigned constructs and not on other constructs. We found the indicators for a given construct had high correlation for the construct it is intended for, compared to other constructs in the research model. Table 6 and Table 7 present the results of the confirmatory factor analysis for establishing the construct validity of the measures employed. Given the close relationship between the formal procedures and interactional justice identified in previous literature (Niehoff and Moorman 1993), this was done in two stages. First, treating organizational justice as a single construct and established that there is clear separation between the dependent and independent constructs in our study. We then considered the three sub dimensions: distributive, procedural and interactional justices; the results show high discriminant validity of the constructs. Given the hazy boundaries between formal procedures and interactional justice dimensions of organizational justice, we believe such a two-stage confirmatory factory analysis is appropriate for our study.

Table 6: Loadings Showing Separation of Independent and Dependent Constructs

	Effectiveness	Efficiency	Elaps. Time	Org. Justice
OUTCOME1	0.6526	**0.8721**	0.4080	0.2770
OUTCOME2	0.4655	**0.6973**	0.2443	0.0340
OUTCOME3	0.3439	**0.7579**	0.3223	0.0846
OUTCOME4	0.3337	**0.5550**	0.0795	0.0640
OUTCOME5	**0.7384**	0.5402	0.1485	0.1432
OUTCOME6	**0.7314**	0.3493	0.2971	0.3027
OUTCOME7	**0.7109**	0.6446	0.1909	0.0817
OUTCOME8	0.1446	0.2467	**0.7607**	0.0479
OUTCOME9	0.3593	0.4013	**0.9428**	0.1082
DISTJST1	0.2583	0.1370	0.0778	**0.7242**
DISTJST2	0.2606	0.1518	-0.0134	**0.6268**
DISTJST3	0.2880	0.2197	0.1385	**0.6738**
DISTJST4	0.3101	0.2412	0.1226	**0.6541**
DISTJST5	0.3826	0.2106	0.1227	**0.6990**
FORMAL1	0.2204	0.2522	0.0567	**0.7353**
FORMAL2	0.2177	0.1933	0.0313	**0.7816**
FORMAL3	0.2419	0.2253	0.1678	**0.7716**
FORMAL4	0.2177	0.2652	0.1926	**0.7625**
FORMAL5	0.1837	0.1270	0.1758	**0.6855**
FORMAL6	-0.0180	-0.0960	-0.0977	**0.5515**
INTER1	0.2268	0.1740	0.0889	**0.8245**
INTER2	0.2527	0.1588	0.0905	**0.8644**
INTER3	0.2917	0.2090	0.1114	**0.8198**
INTER4	0.1676	0.0965	0.0592	**0.8164**
INTER5	0.2607	0.2124	0.1076	**0.7654**
INTER6	0.2980	0.2468	0.0839	**0.8034**
INTER7	0.3487	0.3142	0.0765	**0.8660**
INTER8	0.3025	0.1664	0.0258	**0.7417**

Table 7: Loadings of the measurement Items on various constructs showing the sub dimensions of Organizational Justice

	Distributive Justice	Procedural Justice	Interactional Justice
DISTJST1	**0.8415**	0.5846	0.5936
DISTJST2	**0.7917**	0.5366	0.4585
DISTJST3	**0.8634**	0.5328	0.5064
DISTJST4	**0.8453**	0.5059	0.4902
DISTJST5	**0.8902**	0.5761	0.5346
FORMAL1	0.5562	**0.7794**	0.6767
FORMAL2	0.5174	**0.8244**	0.7546
FORMAL3	0.5092	**0.8544**	0.7313
FORMAL4	0.5344	**0.8527**	0.7107
FORMAL5	0.5551	**0.6904**	0.6318
FORMAL6	0.3340	**0.5777**	0.5851
INTER1	0.5450	0.7455	**0.8776**
INTER2	0.5941	0.7989	**0.9029**
INTER3	0.5950	0.6970	**0.8533**
INTER4	0.5860	0.7340	**0.8437**
INTER5	0.4265	0.7192	**0.8460**
INTER6	0.4703	0.7645	**0.8722**
INTER7	0.5965	0.8044	**0.8868**
INTER8	0.5191	0.6514	**0.7767**

(Loadings of indicators of outcome measures are shown Table 6, and hence omitted here.)

Confirmatory factor analysis of the second stage shows loadings of sub scales of organizational justice: distributive, procedural and interactional justice. The loadings again verify that organizational justice is a global construct consisting of three sub dimensions.

Secondly, as suggested by Gefen and Straub (2005), we tested whether the square root of the average extract variance (AVE) is greater than any correlation with other constructs. A study of the results shown in Table 8 indicates that the square root of AVE of a construct is generally greater than the correlation with other constructs. Although this test appears to indicate a lack of support when comparing procedural justice to interactional justice, the lack of clear separation between these two constructs has been understood by previous researchers including the original developers of this scale (Niehoff and Moorman 1993). This study retains them as separate constructs for two reasons: (1) many previous studies and expositions as elicited throughout the theoretical foundations section treat them as separate constructs, (2) the factor loadings in Table 6 show them as two distinct groups of loadings, albeit close in their values.

Table 8: Comparison of Square Root of AVE with Correlations of Other Constructs

	Distributive	Procedural	Interactional	Effectiveness	Efficiency	Elapsed
Distributive	**0.8497**					
Procedural	0.4450	**0.7536**				
Interactional	0.3900	0.7790	**0.8467**			
Effectiveness	0.4510	0.3890	0.4300	**0.7746**		
Efficiency	0.3590	0.4570	0.4040	0.6690	**0.7469**	
Elapsed	0.2120	0.2960	0.1890	0.2980	0.3740	**0.8649**

TEST OF RESEARCH MODEL AND HYPOTHESES

Tests of significance for these paths were performed using the bootstrap resampling procedure available within PLS-Graph. The path diagram in Figure 2 provides the path coefficients for our research model. All constructs were first order and reflective. The paths for the moderating effects of employee type were all non significant and were omitted from the diagram for clarity. The diagram shows the paths for all the main effects.

The path coefficients and R^2 were extracted from the PLS-Graph output. R^2 of the efficiency and effectiveness outcomes were 0.287 and 0.336 respectively. The R^2 of the elapsed time outcome was 0.134, indicating the weakness of this outcome in the overall research model. The path coefficients and the respective t-values are shown in Table 9.

Table 10 summarizes conclusions regarding all hypotheses stated earlier.

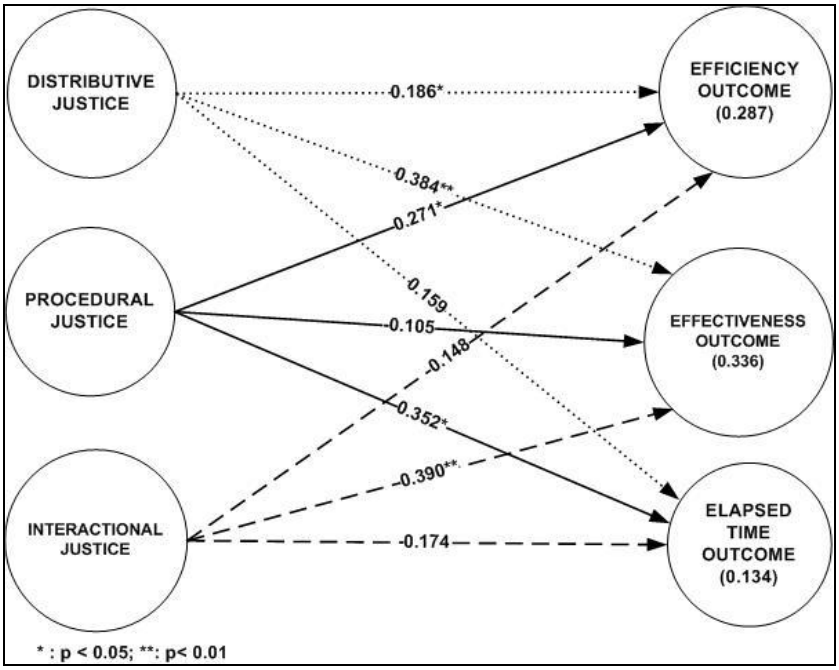

Figure 2: Path coefficients for all paths and R-squared of dependent measures

Table 9: Path coefficients and their t-values

	Efficiency		Effectiveness		Elapsed Time	
	Path	**t-value**	**Path**	**t-value**	**Path**	**t-value**
Distributive Justice	0.1860	1.7680*	0.3840	3.3559**	0.159	1.0226
Procedural Justice	0.2710	1.9471*	-0.1050	0.6844	0.352	1.8403*
Interactional Justice	0.1480	1.0550	0.3900	2.7148**	0.174	0.9088
Emp Type * DJ	0.1520	0.5937	-0.4180	0.2294	-0.766	1.1181
Emp Type * PJ	0.1290	1.5805	1.7170	0.1774	-0.129	0.1434
Emp Type * INTJ	-0.4850	1.1975	-1.4290	0.5224	-0.117	0.9161
	R^2 = 0.287		**R^2 = 0.336**		**R^2 = 0.134**	

Note:* Significant at .05 level ** Significant at .01 level

Table 10: Conclusions of Hypotheses testing

Hypothesis	Link	Support
H1	Distributive Justice – Efficiency	Supported at .05 level
H2	Distributive Justice – Effectiveness	Supported at .01 level
H3	Distributive Justice – Elapsed time	Not supported
H4	Procedural Justice – Efficiency	Supported at .05 level
H5	Procedural Justice – Effectiveness	Not supported
H6	Procedural Justice – Elapsed time	Supported at .05 level
H7	Interactional Justice – Efficiency	Not supported
H8	Interactional Justice– Effectiveness	Supported at .01 level
H9	Interactional Justice– Elapsed time	Not Supported
H10-H18	Moderating Effect of Employee Type	Not Supported

As we note from Table 10, five of the nine main effect hypotheses are supported but none of the moderating effect hypotheses is supported.

DISCUSSION

The objective of our study was to explore whether the relationship of organizational justice behaviors of the project managers toward other participants determine outcomes. Project outcome is very likely influenced by a myriad of other factors such as project resources and technical abilities of the project participants. But, in pursuit of exploring the organizational justice behavior of the project leader as a dimension of the leader's managerial style, our research model included just this one dimension. In addition, we are studying project outcomes in relative terms of how the group performed as compared to other projects of similar scope and nature. So the exclusion of possible other influences on outcomes in the research model is justified. The modest R^2 of our outcome measures is partially explained by the lack of consideration of other factors that might determine project outcomes. The R^2 is still significant to justify real-word application of the research model. Our finding that procedural justice significantly influences efficiency and elapsed time dimensions of project outcomes is consistent with the findings of Masterson, Lewis, Goldman, and Taylor (2000), who found that procedural justice perceptions affect organization-related outcomes. It appears that the elapsed time outcome, a surrogate for project completion time, is impacted to a greater extent by procedural justice. Bearing in mind that we are using this label, procedural justice, to refer to formal procedures during project management, its influence on elapsed time dimension of the project outcome is NOT surprising. Efficiency dimension of the project outcomes is influenced both by distributive and procedural justices but interactional justice does not influence these outcomes. This is also consistent with the earlier finding that interactional justice affects supervisor related outcomes rather than organization related (in our case, project related) outcomes.

The lack of support for moderating influences of employee type needs to be further explored in future studies. Among the myriad of possible moderating factors such as gender, power distance or national origin, we preferred to conceptualize employee type (in-house or contract) as a possible moderator due to its importance in IS context. We also believed that due to existing conceptualizations of the consequences of contract violations in the organizational justice literature (Tekleab, Takeuchi, and Taylor 2005), there may be differences between in-house and contract employees. Intuitively, there is reason to believe that project leaders' organizational justice behavior will influence contract employees to a lesser extent for two reasons: (1) their project participation is short-term in nature, and (2) their rewards, such as compensation and bonuses, are typically from sources outside the organization where the project is developed. We may have to view the lack of support for the moderating influence with caution since our sample size for different

employee types is small: we had 81 in-house employees, and 21 contract employees. This small size may have confounded our results and warrants further study of this and other traditionally used moderators in organizational justice literature, such as gender, national origin, and power distance.

LIMITATIONS

In interpreting the findings of the study, certain limitations of the research design must be taken into consideration. Organizational justice, to the best of our knowledge, has not been studied in the context of managing software projects. Hence we adopted a rather simple research design ignoring much of the possible interplays of justice perceptions along with other project characteristics and behavior. As an example, the nature and of scope of the project, is a dimension that needs further study. We also did not model the project team composition as a dimension. But the favorable results of this study points to developing more complex research models with possible moderating effects of project types. A recent editorial comment (Marcoulides and Saunders, 2006) cautioned against employing small sample sizes in PLS analyses. The proposed model is grounded in existing theoretical knowledge and the reliability and validity of constructs have been verified using well-accepted procedures. We have refrained from using "fancy modeling techniques" and tested a model that is grounded in theory with a straight forward research model specification. While organizational justice is a well studied topic in other organizational contexts, it has thus far been neglected in studies relating to software project management. This study provided an initial testimony to the recognition of "organizational justice" as an important facet of software project management.

IMPLICATIONS OF THE STUDY

The results clearly establish the role of organizational justice perceptions as an important facet of project management studies. Five of the nine main effect hypotheses are supported lending credence to the incorporation of organizational justice in IS project management studies. The lack of clear separation between the formal procedure and interactional justice needs to be further explored by either delineating clearer scales for each or by combining them into one construct.

There are many content based suggestions elicited by the results for managing software projects. Every step of a system development life cycle is well studied with abundance of prescriptive guidelines developed for each one of them. This study considers software development projects as avenues of tensions, and tests whether positive organizational justice behaviors in project management contribute to project outcomes. Favorable findings reported in this study suggest that managers should indeed be cognizant of the organizational justice perceptions of project members. It is important for projects to have clearly prescribed procedures for work allocation and reward systems. In the case of contract workers although the contracting firm may not directly determine the monetary rewards, it may be important for project managers to ensure that work is allocated in a fair manner and wherever possible institute other awards that take into account project performance. It is also important for a project manager to display behavior that conveys interactional justice to project participants.

CONCLUSION

In a larger context, it is often felt that IS is a fertile ground for bringing together theory and practice, and yet there is a disengagement between IS research studies and IS practice (Martin 2004). This study is offered as a contribution to address this concern, albeit from the limited perspective of considering organizational justice perceptions during IS project management, presenting results that are practically relevant. The notion of organizational justice is based on sound sociological theories and is widely studied in general management literature; and yet, largely overlooked in the IS studies. Although our research model incorporates the idea of organizational justice and presents important findings to guide project managers, it is in the hands of future studies to incorporate other

demographic or personal variables that might also influence organizational justice perceptions in addition to the behavior of the project manager. Our goal was to provide an impetus to study organizational justice in software project management contexts. The conclusions of the study should be viewed in that light.

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APPENDIX – A

Item descriptions for all constructs

INDICATOR	ITEM DESCRIPTION
OUTCOME1	The efficiency of team operations
OUTCOME2	The amount of work the team produced
OUTCOME3	The team's adherence to schedules
OUTCOME4	The team's adherence to budgets
OUTCOME5	The quality of work the team produced
OUTCOME6	The effectiveness of the team's interactions with people outside of the team
OUTCOME7	The team's ability to meet the goals of the project
OUTCOME8	The team could have done its work faster with the same level of quality (R)
OUTCOME9	The team met the goals as quickly as possible
DISTJ1	My work schedule for the project was fair
DISTJ2	I think my level of pay for the work I did for this project is fair
DISTJ3	I consider my work load in the project was quite fair
DISTJ4	Overall, the rewards I received were quite fair
DISTJ5	I feel that my job responsibilities were fair
FORMAL1	The project manager made the job decisions in an unbiased manner
FORMAL2	The project manager made sure that all employee concerns are heard before making job related decisions
FORMAL3	The project manager collected accurate and complete information
FORMAL4	The project manager clarified decisions and provides additional information when requested by employees
FORMAL5	All job decisions were applied consistently across all affected employees
FORMAL6	Employees were allowed to challenge or appeal job decisions made by the project manager
INTERACT1	When decisions were made about my job, the project manager treats me with kindness and consideration
INTERACT2	When decisions were made about my job, the project manager treats me with respect and dignity
INTERACT3	When decisions were made about my job, the project manager is sensitive to my personal needs
INTERACT4	When decisions were made about my job, the project manager shows concern for my rights as an employee
INTERACT5	The project manager discussed the implications of the decisions with me
INTERACT6	The project manager offered adequate justification for decisions about my job
INTERACT7	When making decisions about my job, the project manager offered explanations that made sense to me
INTERACT8	The project manager explained very clearly any decision about my job

Note: All items were measures in a 5 point scale from Strongly Disagree to Strongly Agree

Items with (R) suffix were reverse coded.

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