December 2001

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**Using Equity Theory to Understand User Resistance to Change in IS Implementations: Instrument Development**

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**Abstract**  
User resistance to change in the form of information system implementations has been the subject of much research. The Equity-Implementation model, based upon equity theory, has been suggested as a theoretical means for understanding this resistance. While conceptual papers have been written on the topic, measures for the constructs in the model have not been advanced. This paper describes the development and initial testing of such measures. Two ERP implementations were selected as the domain for the validation of these measures as users are typically required to utilize these non-voluntary systems as part of their daily work, and these implementations are accompanied by widespread organizational change.

**Introduction**

The successful implementation of information systems (IS) within organizations has been a common interest for both academic researchers and business managers. User resistance to new systems has long been regarded as an important consideration in system implementations and has often been regarded as a foregone conclusion. Researchers and practitioners assume that people inherently resist change, and thus users will inherently resist a new information system. This assumption is being challenged, however, by research suggesting that people resist some artifacts of change, such as loss of comfort and status, but do not automatically resist all changes (Dent and Goldberg 1999). Instead of assuming users will resist a new system, researchers should investigate which artifacts of a new system are viewed unfavorably by users.

The Equity-Implementation (E-I) model (Joshi 1991), based upon equity theory (Adams 1963), provides a framework for investigating how end-users respond to a new information system. Equity theory, a general theory of social behavior, has been used for decades to understand how workers respond to inequitable situations in the workplace. It proposes that workers evaluate equity or fairness in the workplace by analyzing their inputs and outcomes (costs and rewards) and by comparing their inputs and outcomes to other reference groups. Equity theory predicts that individuals in an inequitable situation will resist the situation and attempt to restore equity by manipulating their own and others’ inputs and outcomes. The E-I model is based on the premise that people do not inherently resist all changes and uses equity theory to explain how users respond to change in the form of a new information system (Joshi 1991).

This paper describes an on-going research project in which the E-I model is extended and operationalized. A survey instrument is under development, and details on the pre-test and pilot study phases of the instrument validation process are provided. Due to space limitations, only a few examples of the scales developed are provided. An empirical evaluation of the usefulness of the model in understanding users’ resistance to new systems is the ultimate goal of this research project.

**Extensions to the E-I Model**

Joshi’s E-I model described the process employed by a user in assessing the fairness or equity of a system implementation. The model included three levels of analysis in which the user evaluated 1) the change in their own outcomes and inputs as a result of using the new system, 2) the change in their own relative outcomes as compared to the change in the relative outcomes of their
employer, and 3) the change in their own relative outcomes as compared to the change in the relative outcomes of other users in their own reference group. Users could employ all three levels of analysis in assessing the equity of the new system implementation. In addition, Joshi noted that a fourth level of analysis, comparing the relative outcomes of different departments, might be appropriate when a strong departmental affiliation exists.

While Joshi stated that users’ assessment of equity at the three (or four) specified levels would affect their resistance to the new system, or cause them to view the system unfavorably, the construct of resistance (or unfavorable view of the system) was not included in the model or operationally defined. In addition, no measures were developed for any of the constructs referenced in the model. An extended E-I model shown in Figure 1 depicts four levels of input and outcome analysis, the resulting four assessments of equity or fairness, and the user’s overall satisfaction with the system. The user’s satisfaction with the system was used as a surrogate for the user’s view of the system or resistance to it based upon prior equity theory research in reference disciplines (Oliver and Swan 1989; King, Miles, and Day 1993). Also, prior research on user satisfaction with a centralized IS function has shown a strong, positive relationship between user’s perception of equity or fairness and their satisfaction with the IS function (Joshi 1989).

Instrument Development

For the purpose of developing and testing the instrument and eventually administering the instrument to empirically test the extended E-I model, we solicited three organizations that had recently implemented enterprise resource planning (ERP) systems for data collection purposes. We selected implementations of ERP systems because these systems are typically not voluntary (i.e., users must access the system and related reports to perform their jobs) and thus are subjected to a change as a result of the system implementation. Additionally, ERP systems are generally associated with widespread organizational change. No data were collected from these organizations during the stabilization phase (Ross and Vitale 2000) of the ERP implementation; all data were collected 12-18 months after initial implementation.

Given the lack of prior measure development for the constructs depicted in the extended E-I model shown in Figure 1, scales for each of the constructs were created. Where possible, scales from related constructs in IS and other reference disciplines were adapted to fit the current context. All items were formatted as a 7-point, Likert-type scale anchored by strongly disagree and strongly agree. In addition, scales for relevant control variables were included in the instrument but are not reported in this paper due to space limitations. An instrument validation process (Straub 1989) was planned and has been partially completed. The phases of this process are described below.

Pretest Phase

In developing measures for the inputs and outcomes at the four levels of analysis, we began by generating a list of inputs and outcomes based upon existing research that applied equity theory to IS implementations (Joshi and Lauer 1999) and to general work environments (Miles, Hatfield, and Huseman 1994). Scales were needed to capture users’ perceptions of inputs and outcomes at all four levels of analysis. Prior equity theory research has shown that measuring and calculating differences or ratios from specific, or facet, inputs and outcomes is a complex (and problematic) process as the importance or weight placed on specific inputs and outcomes varies among individuals (Farkas and Anderson 1979). For example, one user may place more importance on pay as an outcome, whereas, another user may view the use of one’s abilities as the most important outcome. For this reason, we included an explanatory list of possible inputs and outcomes in the survey and developed scales to measure the users’ overall perceptions of inputs and outcomes. Three scale items were developed for the overall inputs and for the overall outcomes at each level of analysis resulting in a total of 24 items (6 items per level of analysis). The input scale items for the first level of analysis are shown in Table 1.
Table 1. Scale to Assess Overall Inputs at the First Level of Analysis

| My overall inputs have **increased** in using the new SAP system as compared to the old system or paper-based process. |
| My overall inputs were **lower** when I used the old system or paper-based process. |
| As a result of using the new SAP system, my overall inputs have **decreased**. |

Scales to measure the users’ overall perceptions of fairness or equity at each level of analysis were developed using comparable scales in equity theory research (Huseman, Hatfield, and Miles 1987; Oliver and Swan 1989). These scales also serve as manipulation checks for the overall input and outcome scales. For example, the items shown in Table 2 were used to measure the users’ perception of fairness or equity at the first level of analysis. The means for these items should be positively correlated with the absolute difference between the means of the outcomes and inputs scales items listed in Table 1. Similarly, three scale items were developed to assess the users’ overall satisfaction with the new system.

Table 2. Scale to Assess the Users’ Perception of Fairness at the First Level of Analysis

| Using the new SAP system has been a fair deal for me. |
| The change to the new SAP system was **not** fair to me. |
| I have been treated fairly as a result of using the new SAP system. |

To improve the content validity of the instrument, we began with an initial draft of the survey and then interviewed several IS/implementation managers, several ERP users, and one ERP trainer from three organizations using ERP systems. During the interviews, these individuals were given copies of the draft survey and the survey items included were verbally discussed. Interviewees were asked to comment on any omissions (i.e., inputs or outcomes not represented in the example list) or confusing statements. Modifications were made to the instrument based upon their responses.

**Technical Validation Phase**

We subsequently asked 75 users from organization #1 to complete a revised draft of the instrument. Responses from 37 users were obtained. Reliability scores from the paper-and-pencil survey data collection have been used to further refine some scale items for pilot testing purposes. These initial responses suggest support for the extend E-I model at the first and third levels of equity analysis.

**Pilot Testing Phase**

A random sample of 200 users has been selected from organization #2 to participate in the pilot study phase of the project. Upon completion of the technical validation phase, the current version of the survey instrument will be distributed to these users. Reliability and factor analysis will be performed on the data collected to further assess instrument validity.

**Planned and Future Research**

Upon completion of the pilot study phase, the final instrument will be distributed to the remaining 1,500 users in organization #2. Results from the pilot test will be presented at the conference. Future research plans include administering the instrument to ERP users in other organizations and investigating the manner in which users attempt to make perceived inequitable system implementations more equitable. Prior equity theory research suggests turnover, job performance, and organizational citizen behaviors as potential means for users to respond to inequitable situations.

**References**

References are available upon request.