December 2001

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THE IMPACT OF SOFTWARE UPGRADES ON INDIVIDUALS AND ORGANIZATIONS: A LONGITUDINAL STUDY

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Abstract

Research in the area of software upgrades and IS implementation suggests that the implementation of an information system has a profound impact on users and organizations. Further, it has been suggested that changes in individuals and organizations are related to characteristics of the software implementation process. In an attempt to investigate the nature of these relationships, the outline of an ongoing empirical study is presented. The research develops a theoretical model of the effect of IT infrastructure changes on individuals and organizations, and the details of an empirical test of the model are presented. The study is longitudinal in nature, as data are collected at three different times during the software implementation cycle. Data analysis and preliminary results will be presented at the conference.

Introduction

In an organization, an IT infrastructure is defined as the hardware, software, people, procedures, and data that combine to support information flow (Broadbent et al., 1996), and when identifying the most often cited problems of IS management in organizations, the problem of IT infrastructure development is certain to arise. Studies have shown that organizations are struggling to develop and support effective IT infrastructures, and increasing demands placed on IT infrastructure components complicate the process of attempting to maintain a responsive IT infrastructure (Brancheau et al., 1996). Repetitive hardware and software upgrades to meet the demands not only incur significant monetary costs, but also they are practically impossible to support (Shaw, 2001). In part due to these factors, infrastructure problems represent possibly the largest area of open problems in the IS research field (Zmud, 1997). In fact, the problem of maintaining a responsive IT infrastructure is often attacked with numerous hardware and software upgrades to meet increasing demands on the IS staff and the information system in general; however, very few research studies have attempted to investigate the efficiency and effectiveness of such a solution. It seems reasonable to question the logic behind the multitude of hardware and software upgrades to which many organizations are resigned, and studies are needed to determine more efficient methods of meeting the infrastructure demands (Shaw, 2001).

Theoretical Model

One existing model of IS success suggests that characteristics of an information system such as system quality and information quality lead to user satisfaction and/or system usage, which in turn lead to individual and organizational impacts of the information system (DeLone and McLean, 1992). If one considers the existing model in the specific case of a change in IT infrastructure (e.g., upgrading software or hardware), a new model can be developed which suggests that the characteristics of the changes in technological and information components of the system will impact changes in the acceptance and use of the system, which will in turn affect the individual and organizational impacts of the IT infrastructure.

It has been suggested that there are four major components of technological change when an IT infrastructure component is replaced (Shaw, 1999). Similarly, DeLone and McLean (1992) and others (e.g., Seddon, 1997) have suggested that user acceptance is dependent upon the quality of a system and the information that it provides; however, it is also likely that a number of factors such as user training and user support moderate the effect of technological changes on the user acceptance of IT changes (Benamati, 1997; Shaw, 2001). Further, researchers have suggested that user acceptance drives the impact of an information system on individuals as well as on organizations. In total, these previous findings suggest a model of the effects of technological...
change on individuals and organizations, and a graphical representation of the suggested relationships is given in Figure 1. The model in Figure 1 is somewhat similar to the Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989), and indeed, the IS success model upon which Figure 1 is based is entirely consistent with the TAM (DeLone and McLean, 1992; Seddon, 1997); however these models (and thus Figure 1) provide a context for the TAM that incorporates the original TAM constructs while extending it to include broader measures of IS success.

![Figure 1. The Impact of Technological IT Infrastructure Changes on Individuals and Organizations](image)

The model given in Figure 1 has been developed and tested, to a limited extent, in prior research (Shaw, 1999; Shaw, 2001); however, it has only been tested at one given point in time. Similarly, prior research using this model and others has focused on a snapshot of the implementation of an information system. On the other hand, there is little or no evidence as to what happens to the magnitude and nature of the suggested relationships over time. Thus, it would be quite useful to conduct an exploratory, longitudinal study to hypothesize the longitudinal effects of IT infrastructure change. This paper proposes such a study to aid in the formation of a strong theoretical framework involving the model given in Figure 1.

**Methodology**

A field study is currently underway at a Fortune 500 company, and the study involves the collection of data associated with the transition to a new version of the company’s proprietary time management and project tracking software. End-users of the software will be asked to complete an online survey distributed to the users by the project sponsor via email. The survey will be administered at three points in time: immediately (1 week) prior to the implementation, 6 weeks after the implementation, and 12 weeks after the implementation. These time frames were chosen because they correspond with previously demonstrated levels of adaptive activity during IS implementations (Tyre and Orlikowski, 1994).

Data from the user surveys will be analyzed using traditional survey analysis techniques including psychometric analysis. Partial least squares (PLS) will be used to evaluate the path relationships in Figure 1, since the number of respondents will likely be below the minimum threshold needed for structural equation modeling via LISREL. Survey questions have been adapted from previously used and validated measures of the constructs shown in Figure 1 (e.g., Nelson and Cheney, 1987; Doll and Torkzadeh, 1988; Leonard-Barton and Deschamps, 1988; Davis, 1989; Lee et al., 1995; Shaw, 1999; Shaw, 2001).

**Summary**

The first two phases of the data collection (before the implementation and six weeks after the implementation) are complete, and it is anticipated that the remainder of the data will be collected in the next few weeks, which should provide enough time for the data analysis to be complete in time for presentation at the conference. At that time, a new theoretical model should be available which incorporates the effect of IT infrastructure changes over time. Such a model will be invaluable in planning, evaluating, and developing IT infrastructures in organizations. In addition, the longitudinal nature of the study makes it quite unique in its approach, and the resulting theoretical work should be a useful contribution to IS literature.
References