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MODERATING VARIABLES BETWEEN USER PARTICIPATION AND SYSTEMS EFFECTIVENESS

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Abstract

Past studies provided mixed results of the tests of the relationship between user participation and systems effectiveness. As it is crucial for both researchers and practitioners to know under which situations user participation leads to an effective system, it is this paper's purpose to propose moderators to the relationship. It is proposed here that goals of three related constituents (users and systems analysts) should be aligned in order for an IS to be effective. As a result, three moderators (organizational commitment, goal and role clarity, and goal congruence) that promote optimization are proposed, as they are factors that align the goals of three constituents. All of them have been studied quite extensively in both management and psychology fields. However, they have not received much attention in the MIS arena.

Introduction

The tests of relationships between user participation and information system (IS) success have been found to be mixed. Some researchers found that the relationship is positive, while others found negative results. As it is essential to know situations where user participation is productive or counterproductive to the IS success, it is then the intention of this paper to search for moderators to the relationship between user participation and IS success.

The proposed moderating variables derive from the concept of optimization. Optimization occurs when a system adapts to its environments to secure the best possible performance of the [whole] system (Hall and Fagen, 1956). In contrast, suboptimization does not guarantee that the total system optimum is reached. Essentially, the whole system needs to optimize in order to survive, even though it could mean that a subsystem may gain at a cost of other subsystem. In the context of information systems, users may cause an information system to be suboptimal. For example, during information system development, users may influence system analysts to design a system such that they can have more leisure time, less workload, or improve only local efficiency while ignoring the efficiency of the whole organization, etc. By doing so, the resulted system could just be beneficial only to that part of the organization, while it might not improve the whole organization.

The purpose of this paper is to propose that user participation does not always lead to IS success, defined here as IS effectiveness, and that there are moderating variables that can mitigate the problem of IS suboptimization. IS success is proposed here to equate to IS effectiveness, which is the *extent to which IS goals are achieved*. The organization of this paper is following. First, MIS literature in the system success arena as well as the past studies on the relationship between user participation and system success is reviewed. Second, a model is proposed. Third, measurements of the constructs in the proposed model are recommended. Finally, conclusions are made.

Literature Review

Surrogates for System Success

Past studies have used system usage, user satisfaction, and user behavior/ attitudes to measure system success (Ives and Olson, 1984). User satisfaction as well as user behavior/attitudes may not be a good measure of system success because it merely

represents the satisfaction of a subsystem (users) and ignores the impact of the system to the whole organization. MeLone (1990) stated that when researchers measure only the user satisfaction, they measure only the users' attitude toward a particular subsystem. The use of system usage as a measure for IS success may not be sufficient to assess the success because researchers who took this approach normally count the amount of the system usage which does not represent the efficiency or effectiveness of the system.

Another way to measure success is to determine the *impact of an IS on individual or organizational performance* (DeLone, 1988). Attempts have been made to determine the effect of computer systems on a firm's profits and to compute the firm's return on computer investment (Garrity, 1963). However, using the monetary figures to measure the success is a difficult task because it is not easy to determine the extent to which an IS contributes to the firm's profits (DeLone, 1988; Saarinen, 1996). Saarinen (1996) viewed system success as a multidimensional construct. He proposed that four main dimensions of IS success were development process, user process, quality of the IS product, and impact of the IS on the organization. Although we agree that the system success should be a multi-dimensional construct, we also believe that the success is also context-dependent. For example, reduced processing time may be the primary goal of a subsystem, while increased flexibility of an IS may be the goal of another.

User Participation and System Success

User participation is defined as "the activities performed by users during systems development" (Barki and Hartwick, 1994). The relationship between user participation and system success has been a popular topic for the research in system success. McKeen, Guimaraes, and Wetherbe, 1994; Saleem, 1996; and McKeen and Guimaraes, 1997 are examples of the studies that tested the relationship. User participation is believed to be a key to system success; however, the empirical evidence does not support this (Saleem, 1996). McKeen and Guimaraes (1997) found that task complexity and system complexity moderate the relationship, holding the system success as a user satisfaction. Saleem (1996) found that users' system-related functional expertise moderates the relationship, holding the system success as the system acceptance. Lin and Shao (2000) found that the relationship was contingent upon system impact, system complexity, and development methodology. However, they measured system success by using user satisfaction.

Despite great contributions made by these researchers, we have seen no research taking into account the suboptimization problem. Nor did they use effectiveness as a dependent measure. This has left a question for future research: "Do degrees of user participation really predict the effectiveness of an IS?"

Organizational Commitment

Organizational commitment has been a popular research topic among organizational and behavioral researchers for decades. Organizational commitment is conceptually defined as an individual's belief in and acceptance of organizational goals and values, willingness to exert effort toward organizational accomplishment, and strong desire to maintain organizational membership (Porter, Steers, Mowday, and Boulian, 1974). Meyer, Paunonen, Gellatly, Goffin, & Jackson (1989) found that a type of organizational commitment, affective commitment (which refers to an identification with the employing organization), positively correlated with job performance. Organizational commitment was also found to be positively associated with prosocial behaviors (O'Reilly and Chatman, 1986) and innovativeness (Katz and Kahn, 1978).

Because of the positive relationships between organizational commitment and work outcomes, it is possible that the commitment can have the same positive effects on IS development. Therefore, organizational commitment is added to the proposed research model in this paper.

Goal and Role Clarification

Goal and role clarification closely relates to the concept of role ambiguity. Role ambiguity occurs when a person does not know expectations of the role set, the activities needed to fulfill the role responsibilities, and the consequences of the role performance (Kahn, Wolfe, Quinn, Snoek, and Rosenthal, 1964). In Sawyer's (1992) study, role ambiguity was measured on a scale ranging from very uncertain to very certain or clear; therefore, he used goal clarity to represent role ambiguity. Sawyer found that goal clarity was positively related to satisfaction. This result supported the findings by Bedeian & Armenakis (1981) and Kemery, Bedeian, Mossholder, &Toulitos (1985), both of which examined the impacts of role ambiguity.

Nevertheless, past research did not explore the impact of goal and role clarity on effectiveness. From reviewing past literature on role ambiguity and clarification, it can be construed that when goals and roles are clear to both users and systems analysts, it will be less likely that the users and the systems analysts are misguided, thereby enabling them to work toward the team's goals.

Goal Congruence

Goal congruence is an important concept that has been found to have a positive impact on team members' satisfaction (Vancouver and Schmitt, 1991; Kristof-Brown and Stevens, 2001). Goal congruence in terms of person-organization fit has been well-documented (see for Bretz and Judge, 1994). Yet rarely has past research considered the impact of goal congruence within work groups on performance outcomes (Kristof-Brown and Stevens, 2001). Herein, the definition of goal congruence is "the congruence between members' goals and their perceptions of those goals held by the rest of the team" (Kristof-Brown and Stevens, 2001). Very few fstudies in the MIS area have taken into account the concept of goal congruence. One of very few studies is that by Andres and Zmud (2002). However, they studied goal conflict, which can be construed as an opposite of goal congruence, and found that low goal conflict led to greater process satisfaction.

Research Model

These moderators derive from interrelationships among organization, users, and systems analysts. In order for an IS to optimize, the goals of these three units must coordinate well. And in order to 'coordinate', this paper proposes three factors that must be met. First, users and systems analysts must be willing to make changes within their existing IS for the benefits of the whole organization—*organizational commitment*. Second, the organization must communicate clear organizational goals and roles to both users and systems analysts—*goal and role clarification*. Finally, team members' (i.e., users and systems analysts) personal goals must be congruous—*goal congruence*. When these three factors are met, it is expected that users', systems analysts', IS', and organization's goals are equalized and that the IS is then driven toward the benefits of the whole organization—optimization. Figure 1 summarizes the aforementioned moderating relationships.

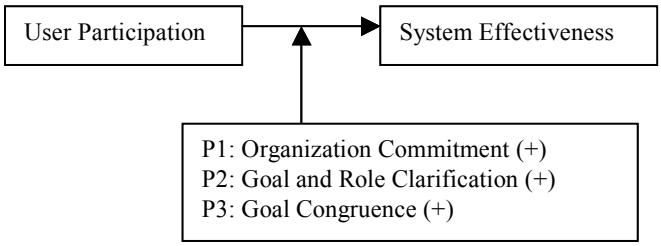

Figure 1. Proposed Model

Moderating Effects

I. Organizational Commitment

If users and systems analysts do not commit to an organization but rather commit to their own needs, the user participation in the systems development will lead to suboptimization. This is because the users and the systems analysts who care for their own needs more than the benefits of the organization may influence their team members to build a system to support their own needs such as reduced workload, more leisure time, or improved efficiency only of the users' system. If users and systems analysts with low degrees of organizational commitment were influential to the systems development, the resulted IS might be rated high on user satisfaction, but this does not guarantee the effectiveness of the system. On the other hand, if users and systems analysts commit to the organization, not to their own desires, then their participation in the system development is hypothesized to lead to optimization.

Proposition 1a: Higher degree of users participation in IS development will result in a positive impact on the system effectiveness, if both users and systems analysts have a high degree of organizational commitment.

Proposition 1b: Higher degree of users participation in IS development will result in a negative impact on the system effectiveness, if both users and systems analysts have a low degree of organizational commitment.

II. Goal and Role Clarification

Systems analysts should perform better when they receive clear goals and roles about their systems development project than when they receive unclear ones. If the latter case were true, the systems analysts would be misguided and therefore could cause an adverse effect on the systems. By the same token, if users receive unclear goals, they could misunderstand the project's goals. Goal and role ambiguity can cause suboptimization because users and systems analysts may miscomprehend or miss some project

goals. Thus, they may end up directing the project toward wrong goals. The resulted IS might seemingly be successful but in fact, it might not bring full benefits to the whole organization. Therefore, we propose the following:

Proposition 2a: Higher degree of users participation in IS development will result in a positive impact on the system effectiveness, if both users and systems analysts receive clear goals and roles for a systems development project.

Proposition 2b: Higher degree of users participation in IS development will result in a negative impact on the system effectiveness, if both users and systems analysts do NOT receive clear goals and roles for a systems development project.

III. Goal Congruence

Even though users have high degrees of organizational commitment and systems analysts receive clear goals, an IS development can still go awry if users and systems analysts do not share the same goals. To be more specific, if users' and systems analysts' goals are not congruent, the systems development team will have to spend more time on resolving the conflicts—may it be due to the differences between personal goals and perceived systems development team's goal or users and systems analysts perceiving the team's goal differently. This incongruence can cause suboptimization because users and systems analysts may resolve the incongruence by compromising each other's needs. Although such a compromise may positively result in more team members' satisfaction, doing so may leave out some goals unachieved, thereby causing suboptimal and ineffective systems. Therefore, we propose that goal congruence within systems development team members can increase the salience of the relationship between user participation and system effectiveness.

Proposition 3a: Higher degree of users participation in IS development will result in a positive impact on the system effectiveness, if users' goals and their perceptions of those goals held by the rest of the team, including systems analysts are congruent.

Proposition 3b: Higher degree of users participation in IS development will result in a negative impact on the system effectiveness, if users' goals and their perceptions of those goals held by the rest of the team, including systems analysts are NOT congruent.

Measurements

Measuring User Participation

User participation refers to "the assignments, activities, and behaviors that users or their representatives perform during systems development process" (Barki and Hartwick, 1989 & 1994). Barki and Hartwick (1994) came up with a measure that reflected existing conceptualizations in participative decision making and was based on a wide range of user assignments, activities, and behaviors. Their resulted measurement items (20-item scale of user participation) of user participation were impressive in terms of both reliability and validity. Barki and Hartwick's questionnaire instrument is one of the best measures of what is available in the MIS studies.

Measuring Organizational Commitment

The affective organizational commitment (i.e., an identification with the employing organization) is different from continuance and normative commitment (Meyer and Allen, 1991). Allen and Meyer (1990) developed organizational commitment scales that measure affective, normative, and continuance commitment. They found that the three types of commitment resulted in different attitudinal and behavioral consequences. Allen and Meyer's (1990) instrument seems to be the most appropriate to use here since it views organizational commitment as three-dimensional constructs mentioned above.

Measuring Goal and Role Clarity

Sawyer (1992) refined the role ambiguity items into two dimensions, namely goal and process clarity. The evidence from the items validation showed that both of Sawyer's items had high reliabilities, and convergent and discriminant validities. Sawyer's items are appropriate here in measuring goal clarity since they measure the clarity of both goals and processes at the same time.

Measuring Goal Congruence

A way to measure the congruence is the D-statistic (Cronbach and Gleser, 1953). D-statistic is the square root of the sum of the squared differences between each goal ranking of the individual and that of the other constituency (e.g., peers, supervisors, or, in the systems development context, systems analysts. D-statistic may be more appropriate to represent goal congruence in this paper because goal congruence is proposed to be a moderator to the relationship between user participation and system effectiveness here.

Measuring IS Effectiveness

A combination of an interpretive method and surveys can be used here. Criteria based on organizational goals should be developed prior to survey development. Since goals are different from one IS to another, it is necessary to develop a context-specific questionnaire to measure IS effectiveness. As Price (1972) suggested, the goals can be identified from 1.) interviewing major decision makers, 2.) observing the activities, and 3.) interpreting the operative goals. An outside evaluator is then needed to assess the goals. The use of an outside evaluator is supported by Parsons (1956) and Thompson and McEwan (1958). As Zammuto (1982) commented, a societal perspective should be employed in making determinations of effectiveness because it is society which grants the legitimacy which allows the organization to exist. Then the questions in the survey should ask all relevant constituents (users, systems analysts, supervisors, or, if possible, top management) to rate how much they think each goal has been achieved from the uses of an IS.

Conclusions

This paper is intended to guide future research in proposing situations where suboptimization can be mitigated. If users and systems analysts commit to an organization, they tend to give more importance to organization than self. Therefore, the participation of the users would be desirable. Moreover, both users and systems analysts must clearly know IS goals and their roles in the systems development; otherwise, they could be misdirect and therefore cause the IS to be ineffective. Finally, the systems development team members (assuming a team is comprised of users and systems analysts) should share the same goals. Conflicts between their goals could cause the system to be ineffective. Even if they could resolve the conflicts by compromising each other's needs, it does not guarantee that a system will be effective. Future empirical studies that test the proposed model in this paper are needed to verify the moderating effects.

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