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THE DEVELOPMENT OF MEASURES TO ASSESS THE PERFORMANCE OF THE INFORMATION SYSTEMS FUNCTION: A MULTIPLE-CONSTITUENCY APPROACH

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Abstract

While the importance of measuring the performance of the information systems function (ISF) is well recognized, no comprehensive instrument exists to assess the ISF's performance. This research develops a theoretical model of the ISF's performance based on existing research. The proposed model consists of three dimensions: systems performance, information effectiveness, and service performance. Based on the model, an instrument is developed to capture the perceptions of various IS user constituency groups. Therefore, in addition to validating the ISF performance instrument, this research also attempts to empirically differentiate IS users into parsimonious groups and to compare the differences in ISF performance assessments by the various constituencies.

1. RESEARCH OBJECTIVES

Assessment of the IS function's performance has long been an important issue to executives. This interest is evident from the IS "issue" studies (Brancheau et al. 1996) as well as the popularity of publications such as *ComputerWorld Premier 100* and *InformationWeek 500*. However, there have been only limited attempts to develop formal information systems function (ISF) performance measures. Existing research has focused on specific aspects of overall ISF performance such as systems quality, IS value, productivity improvements, and gains in competitiveness. A more comprehensive means is needed to gauge the performance of the entire IS function.

The objective of this research is to develop an instrument for evaluating IS functional performance. Since non-IS employees are the primary users of the products and services offered by the IS function, this research focuses on the evaluation of IS functional performance by non-IS personnel. The first question that needs to be addressed is: What are the appropriate performance measures for the IS function? Also, because some measures might be more relevant to certain employee groups than others, the second question is: How can IS users be differentiated into parsimonious groups, each of which might evaluate the ISF differently?

2. THEORETICAL FOUNDATIONS

IS performance evaluation has been investigated from three perspective: IS effectiveness/success, IS function evaluation, and IS service quality. These may be supplemented by adopting viewpoints from organizational effectiveness and using a multiple-constituency approach.

2.1 IS Effectiveness/Success

DeLone and McLean (1992) categorized over 100 "dependent variables" into six categories and developed an IS success model to describe the relationships between the categories. They concluded that IS success should be a multi-dimensional measure and recommended more research to validate their model. Other researchers have since tested and expanded their model. Readers are directed to Seddon et al. (1999) for a comprehensive review of IS effectiveness literature.

2.2 IS Function Evaluation

Only a few studies directly address comprehensively evaluating the performance of the IS function. Wells (1987) studied existing and recommended performance measures for the IS function and identified six important goals/issues. Saunders and Jones (1992) developed and validated 11 IS function performance dimensions through a three-round Delphi study. They proposed an IS function performance evaluation model to help organizations select and prioritize IS performance dimensions and to determine specific measures for each dimension.

2.3 IS Service Quality

Recognizing the importance of services provided by the IS function, SERVQUAL (Parasuraman et al. 1991), has been adopted to measure IS service quality (Pitt et al. 1995; Waston et al. 1998) with promising results. However, the controversy over SERVQUAL in marketing (Cronin and Taylor 1994) has carried over into IS (Van Dyke et al. 1997), suggesting that more research needs to be conducted to measure IS service quality.

Thus, although the research literature offers several possible avenues to evaluate the IS function's performance, most studies have been limited to a single perspective and lack comprehensiveness.

2.4 Organizational Effectiveness

The organizational effectiveness literature may provide a sound basis for augmenting those studies in IS. Steers (1975) reviewed the organizational effectiveness literature and identified eight problems in organizational effectiveness assessment. In order to help researchers address those problems, Cameron and Whetton (1983) offered seven guidelines that should be followed when undertaking organizational effectiveness studies and demonstrated the usefulness of those guidelines.

2.5 Multiple-Constituency Approach

The multiple-constituency approach also offers insights that can be helpful in assessing the ISF. It departs from other approaches to organizational effectiveness by relaxing the single organizational effectiveness statement assumption to include multiple statements of effectiveness that reflect the evaluations of diverse individuals and groups. Each constituency would use a set of effectiveness measures that it deemed appropriate and important, which may be different from the measures used by other constituencies. Tsui (1990) has implemented this approach in the human resource (HR) context by identifying its constituencies and showed that the different constituencies do differ in their evaluation of the HR subunit.

3. RESEARCH MODEL

3.1 Domains of ISFP Construct

Using Cameron and Whetton's (1983) guidelines, the IS function performance (ISFP) construct is defined in terms of the perception non-IS people have of the performance of activities related to, or performed by, the IS function which they have personally experienced. This perceptual measurement of the IS function's performance is different from the popular satisfaction measures (Bailey and Pearson, 1983) because it is designed to assess people's perceptions of the IS function rather than to capture users' attitudes toward a specific system.

Users' perception of IS activities derive from their use of information systems and technologies (IS/T) and services provided by the IS function. IS research has traditionally separated systems and information as two distinct constructs (DeLone and McLean 1992). Following the model suggested by Pitt et al. (1995), the domain of ISFP construct consists of the three main causes of IS success: system quality, information quality, and service quality. However, system and information quality are "attributes of applications, not of IS departments" (Seddon, 1997, p. 244). In addition, IS users might well attribute the impacts of IS "products" and services to IS functional performance. Therefore, in this study, the three elements of IS success are enlarged in scope to reflect systems performance, information effectiveness, and service performance in the ISFP construct. Using LISREL notation, a model of the ISFP construct is presented in Figure 1.

- *Systems Performance*: Assesses the quality aspects of systems such as reliability, response time, ease of use, etc., and the various impacts that systems have on the user's work.

- *Information Effectiveness*: Assesses the quality of information in terms of the design, operation, use and value (Wand and Wang 1996) provided by systems as well as the effects of the information on the user's job.

- *Service Performance*: Assesses the user's experience with services provided by the IS function in terms of quality and flexibility (Fitzgerald et al. 1993). The services provided by the IS function would include activities ranging from systems development to help desk to consulting.
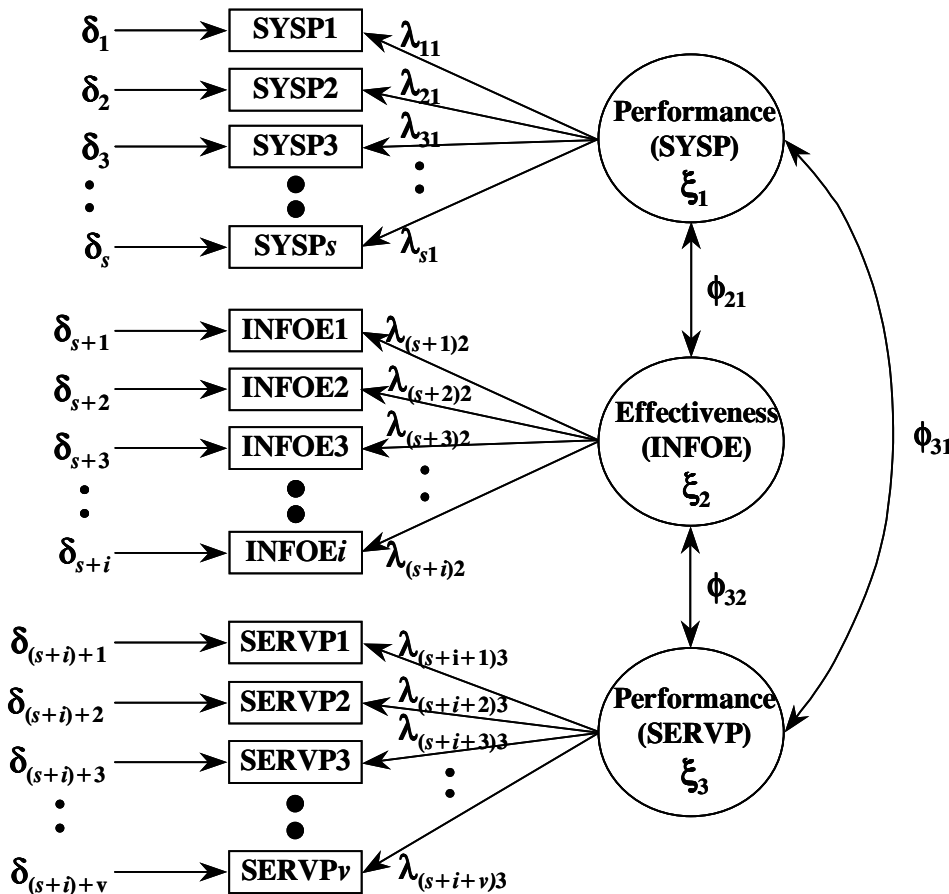

Figure 1. Three Dimensional Model of ISFP Construct

3.2 A Nomological Network for the ISFP Construct

A nomological network, shown in Figure 2, that specifies "probable (hypothetical) linkages between the construct of interest and measures of other constructs" (Schwab 1980, p. 14) further clarifies the ISFP construct and provides a further basis for the construct validation process.
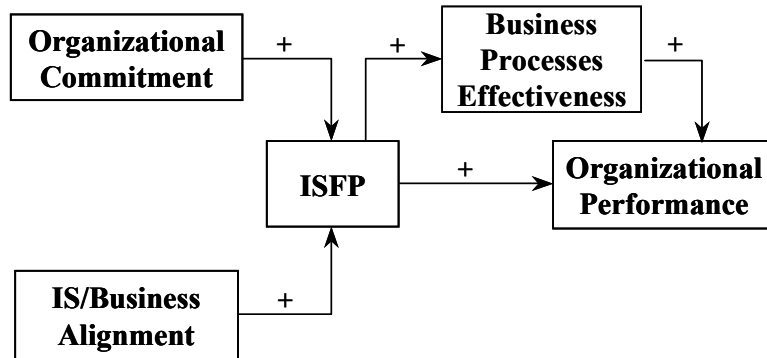

Figure 2. Partial Nomological Network of the ISFP Construct

Antecedents of the ISFP construct: Factors such as top management support, IS executive hierarchy, IS budget, and performance monitoring are described by Essex et al. (1998) as "organizational commitment." Research has suggested that those factors are important to IS function activities (Raghunathan and Raghunathan 1989). Organizational commitment describes the level of organizational support for the IS function. Better support would be expected to lead to better performance, as indicated by the plus sign in Figure 2.

The second antecedent of the ISFP construct is the alignment between IS and business. While most such research focuses on modeling the process of alignment (Henderson et al. 1996; Teo and King 1997), only a few studies concentrate on measuring the alignment and the effect of alignment (Chan et al. 1997). This literature clearly suggest that IS/business alignment is one important factor that positively affects the performance of the IS function.

Consequences of the ISFP construct: Although a positive relationship between IS effectiveness and business performance has been suggested, the evidence of such an effect has proved to be elusive. Using "user information satisfaction" and "strategic impact of IS" as IS effectiveness measures and several perceptual measures as business performance, Chan et al. empirically showed a small but significant positive relationship between IS and business performance. Since ISFP is posited as a more comprehensive measure of IS performance, the relationship should hold in this study.

Aside from directly impacting organizational performance, the IS function should also have an indirect effect on organizational performance through its impact on the effectiveness of business processes. IS/T have traditionally been installed to improve efficiencies of internal operations. The use of IS/T have since been expanded to improve both intra- and inter-functional business processes. The value-chain model has been adopted by IS researchers to examine the potential impact of IS/T on business processes and ultimately the organization's competitiveness (Davenport 1993). This literature suggests there should be a direct and positive relationship between IS function performance and the effectiveness of business processes.

3.3 Constituencies of the IS Function

Employees interact with the IS function through using IS/T on their job. Based on three principles of how computers help improve knowledge workers' productivity (Hirschhorn and Farquhar 1985), Doll and Torkzadeh (1998) suggested that IS/T are used for decision support, work integration, and customer service. By analyzing employees' usage pattern of IS/T on those three functions in fulfilling their job requirements, parsimonious constituency groups may be identified. A revised definition of the three IS/T functions that address how people use IS/T in their work is given below:

- *Support decisions*: the extent that IS/T are used to help in decision processes such as rationalizing decisions or analyzing available information, explaining or justifying reasons for decisions, or providing guidance throughout the decision-making process.

- *Integrate work:* the extent that IS/T are used to help coordinate one's own work with others horizontally, monitor one's own work performance, or communicate vertically with superiors or subordinates to coordinate work.

- *Provide services*: the extent that IS/T are used to help in serving other people, both within and outside the focal person's own work unit or organization.

Using the three functions of IS/T as major job components, it is possible that there may be seven constituency groups, as depicted in Figure 3. This research will empirically test whether all seven groups actually exist and it will analyze the variations of performance measures used by each group. Because this grouping is based on the nature of the users' job requirements with respect to their use of IS/T, which may be different from the users' functional responsibilities, the resulting groups would give the IS function a different lens to view how it can better serve the users' needs. The type of systems and IS services required to support decisions are quite different from those required to integrate work or provide services. Lack of performance in one or more of the three ISFP dimensions identified by a constituency group could help the IS function to focus its attention on the areas, both in terms of the user group and the type of systems or services, that need improvements.
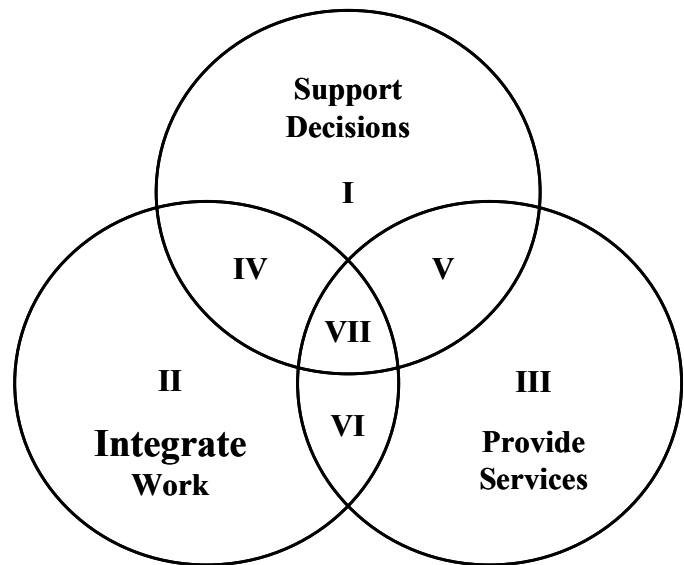

Figure 3. Potential Groupings of Constituencies

4. RESEARCH METHOD

In order to develop measurement instruments with good psychometric properties, the "updated paradigm" that emphasizes establishing unidimensionality of measurement scales (Gerbing and Anderson 1988) will be followed.

Two instruments and two respondent groups will be used in every firm in this study. The first respondent group—IS users—will be used to validate the ISFP instrument. Using the seven guidelines suggested by Cameron and Whetton (1983), the boundary of the ISFP measures and its underlying dimensions have been defined. Sample items for each dimension were generated by collecting as many existing items from past research as possible and developing additional new items from reviewing relevant current literature. To ensure the content validity of the instrument, multiple rounds of Q-sorting have been conducted (Moore and Benbasat, 1991). In addition, the instrument developed by Doll and Torkzadeh (1998) to assess "system use" has been adopted to determine the constituency groups of the IS function. The second respondent group and instrument will be used to collect responses to all other constructs in the nomological network, thus avoiding common source bias in assessing nomological validity. All items in the second survey are collected from previously-tested instruments.

Since the main objective of this research is to validate the ISFP instrument, a cross-sectional "matched-pair" mail survey is used. Both instruments are sent to IS executives. The IS executive is asked to respond to the second survey and forward the enclosed ISFP instruments to three IS users, following selection guidelines that are provided. To ensure sufficient responses for rigorous statistical analysis for instrument validation, a mailing of 2,000 companies is targeted.

Data analysis will focus on two interrelated aspects: validation of the ISFP measures and determination of the multiple constituency groups and the variations in their evaluation of IS functional performance. In validating the measurement instrument, unidimensionality will be established first, followed by assessment of reliability, convergent, discriminant, and predictive validity (Sethi and King 1994). Cluster analysis will be used to determine the number of constituency groups. Once the number of constituencies has been empirically established, the differences in factor structures for each of the constituencies will be analyzed and compared.

5. EXPECTED CONTRIBUTION

This research offers researchers a comprehensive "baseline" ISFP instrument, which may be further refined and utilized as the dependent variable in other research models. It contributes to research in multiple-constituency contexts by offering ways to empirically assess effectiveness with multiple constituencies. This research will also provide practitioners with a valid measure of the IS function's performance, which can be used to identify strengths and weaknesses of the function, to compare their own performance with that of other organizations, and to identify differences in performance dimensions and assessment across various constituency groups.

6. CURRENT STATUS AND PRESENTATION AT ICIS

The instrument has gone through several rounds of Q-sort. The design and pretest for the instruments are completed. The pilot test is currently being conducted and the main data gathering is expected to be conducted in August or September of 2000. At the conference, we expect to have completed data collection and report the results which would include validation of the instrument, the identification of the user groups that we found, and comparative evaluations of the IS function across the user groups.

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