Chapter 3.3

A Multitrait–Multimethod Analysis of the End User Computing Satisfaction and Computer Self–Efficacy Instruments

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ABSTRACT

Researchers are employing confirmatory factor analysis (CFA) with multitrait-multimethod (MTMM) matrices to estimate parameters representing trait, method, and error variance, as well as parameters representing the correlations among traits (or factors). This study utilizes CFA with MTMM matrices to assess the convergent validity, discriminant validity, and the presence and effects of method variance in the end-user computing satisfaction instrument (EUCSI) and the computer self-efficacy instrument (CSE).

The results of the study indicate that, in these samples, the two instruments demonstrate adequate convergent and discriminant validity, but that method variance is present and accounts for a large proportion of the variance in both models. Further, the proposed factor structure of the EUCSI appears to be unstable as a result of the effects of multiple methods, while the proposed factor structure of the CSE remains stable in the presence of the methods.

INTRODUCTION

The development of constructs and instruments to operationalize them provide a theoretical basis for research in a discipline (Venkatraman & Grant, 1986). Indeed, concerns with management information systems as a cohesive research discipline have long included inadequate construct development and a lack of valid, reliable measurement

constructs (see, e.g., Dickson, Benbasat, & King, 1980; Keen, 1980).

In the ongoing process of instrument validation, researchers are employing confirmatory factor analysis (CFA) with multitrait-multimethod (MTMM) matrices to estimate parameters representing trait, method, and error variance, as well as parameters representing the correlations among traits (or factors; Bagozzi & Yi, 1990; Byrne, 1994; Schmitt & Stults, 1986; Widaman, 1985). Using CFA with Widaman's (p. 6) taxonomy of covariance structure models allows researchers to test for statistically significant differences between hierarchically ordered, or nested, models. These tests permit researchers to assess convergent validity, discriminant validity, and the presence and effects of method variance (Bagozzi & Yi; Widaman).

Two instruments (among others), widely used in MIS studies, have research streams devoted to assessing their validity and reliability: the end-user computing satisfaction instrument (Doll & Torkzadeh, 1988; see Table 1) and the computer self-efficacy instrument (Murphy, Coover, & Owen, 1989; see Table 2). The purpose of this study is to utilize CFA with multitrait-multimethod matrices to assess the convergent validity, discriminant validity, and the presence and effects of method variance in these two instruments.

BACKGROUND

Convergent validity occurs when a measure correlates highly with other variables that should measure the same construct (Cronbach & Meehl, 1955). Discriminant validity occurs when a measure fails to correlate highly with measures of different, distinct constructs (Cronbach & Meehl).

Cronbach (1946) described the concept of method variance by noting that test responses may be influenced by variables other than the one ostensibly tested. Method variance is that variance attributable to measurement method rather than to the constructs of interest (Bagozzi & Yi, 1990; Campbell & Fiske, 1959). Researchers

Table 1. The end user computing satisfaction instrument

Content
        C1: Does the system provide the precise information you need?
        C2: Does the information content meet your needs?
        C3: Does the system provide reports that seem to be just about exactly what you need?
        C4: Does the system provide sufficient information?

Accuracy
        A1: Is the system accurate?
        A2: Are you satisfied with the accuracy of your system?

Format
        F1: Do you think the output is presented in a useful format?
        F2: Is the information clear?

Ease of Use
        E1: Is the system user-friendly?
        E2: Is the system easy to use?

Timeliness
        T1: Do you get the information you need in time?
        T2: Does the system provide up-to-date information?

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