A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level

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ABSTRACT

Fifteen years ago, DeLone and McLean published their original model of IS success, which received considerable attention in the literature. Given the widespread acceptance of the model, we conducted a meta-analysis to determine whether the model had been validated by research studies reported in the literature. By aggregating the results of 52 empirical studies that examined relationships within the IS success model at the individual level of analysis, we found support for the relationships that encompass the model. We also offer insights on IS success based on the findings of our work.

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1. Introduction

At the first International Conference on Information Systems, Keen [18] posed a key question that needed to be answered by the IS field to establish a coherent discipline, namely: "What is the dependent variable?" In 1992, DeLone and McLean (D&M) addressed this question by defining IS success as the dependent variable of the field. Their review of the literature resulted in a taxonomy of IS success consisting of six variables: System Quality, Information Quality, Use, User Satisfaction, Individual Impact, and Organizational Impact. The model also identified the various relationships among these success variables; but, at the same time, cautioned researchers that the model needed "further development and validation" [9].

Considerable research has been devoted to examining the effectiveness of IT. Numerous papers have been published on the topics of IS success, evaluation, effectiveness, and acceptance. Since D&M first published their model, over 1000 publications have referenced their work; and at least 150 empirical studies have examined some or all of the relationships in the model. However, the various relationships in the IS success model have found differing levels of support within the empirical literature. Some studies found high correlations among the variables, while others found either low or nonsignificant correlations. Therefore, to reconcile these conflicting results, we applied meta-analysis to examine each of the relationships.

2. The history of the D&M IS success model

2.1. The original D&M model

D&M reviewed the literature published in 1981–1987 in seven publications to develop a taxonomy of IS success. This taxonomy was based upon Mason's modification of the Shannon and Weaver model [37] of communications which had identified three levels of information: the technical level (accuracy and efficiency of the system that produces it), the semantic level (its ability to transfer the intended message), and the effectiveness level (its impact on the receiver). Mason adapted this theory for IS and expanded the effectiveness level into three categories: receipt of information, influence on the recipient, and influence on the system [27].

D&M identified categories for system success by mapping an aspect of IS success to each of Mason's effectiveness levels. This analysis yielded six variables of IS success: System Quality, Information Quality, Use, User Satisfaction, Individual Impact, and Organizational Impact. *System Quality* was equivalent to the technical level of communication, while *Information Quality* was equivalent to the semantic level of communication. The other four variables mapped to Mason's subcategories of the effectiveness level. *Use* related to Mason's "receipt of information." *User*

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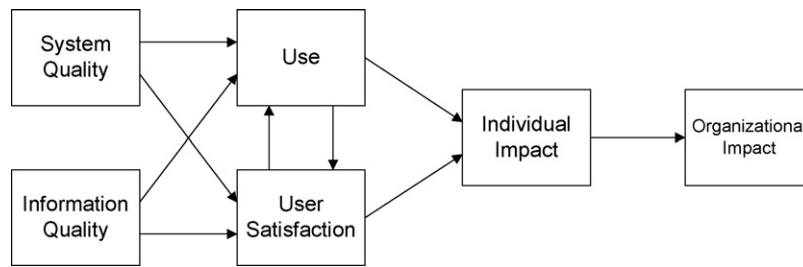E-mail address: spetter@mail.unomaha.edu (S. Petter).

Fig. 1. DeLone and McLean original IS success model.

Satisfaction and *Individual Impact* were associated with the "information's influence on the recipient." *Organizational Impact* was the "influence of the information on the system."

D&M developed their initial taxonomy using established theories of communication adapted to IS. These theories suggested that the flow of information was linear; however, they suggested that for IS, these different measures of success were *independent*, but that there was *interdependency* among them. Fig. 1 shows the original model.

D&M suggested that researchers should use this model in a predictive manner, yet they cautioned that one must measure and/ or control each of the variables in the model to ensure a complete understanding of IS success. D&M called upon others to validate their model.

2.2. D&M 10-year update

In the years that followed, several researchers altered or extended the model, while others adapted it for specific applications, such as knowledge management [e.g., 17,21] or e-commerce [e.g., 11] systems. Recognizing these potential improvements over their original model, D&M acknowledged these modifications and revised their model accordingly [10]. The updated model is shown in Fig. 2.

D&M also modified their model to address some limitations of the original model. A key addition in the updated model was the inclusion of Service Quality as an additional aspect of IS success [31]; it was added because the changing nature of IS required the need to assess service quality when evaluating IS success. D&M also recommended assigning different weights to System Quality, Information Quality, and Service Quality depending on the context and application of the model.

Another modification was the elimination of Individual Impact and Organizational Impact as separate variables, replacing them with *Net Benefits*. This change addressed the criticism that IS can affect levels other than individuals and organizations. Thus, the updated model accounted for benefits occurring at any level of analysis (workgroups, industries, and societies also experience IS success [29,36]); the choice of which level was to be determined by the researcher using the model.

Seddon [33] proposed a well-known respecifications of the original model; one of his concerns was that the model had elements of both process and variance models, making it, in his view, difficult to interpret and use. His change separated the process and variance components; however, D&M contended that this made the model too complicated and lacked parsimony. D&M stated that their original model, as a process model, had three components: creating and using the system, and the effects of its use. However, each of these steps was necessary, but not sufficient, for the outcome. They also supported the variance component by citing many empirical studies that fully or partially examined portions of the model.

Reflecting on this debate, another enhancement to the 2003 model was clarification of the Use construct. The authors explained this as: "Use must precede 'user satisfaction' in a *process* sense, but positive experience with 'use' will lead to greater 'user satisfaction' in a *causal* sense". They felt that, given the variability of IS and their contexts, it may sometimes be appropriate to measure Intention to Use (an attitude) rather than Use (a behavior). They went on to state that if *Intention to Use* was a measure, then increased *User Satisfaction* would lead to a higher *Intention to Use*, which would subsequently affect *Use*. This resulted in the addition of Intention to Use in the updated model.
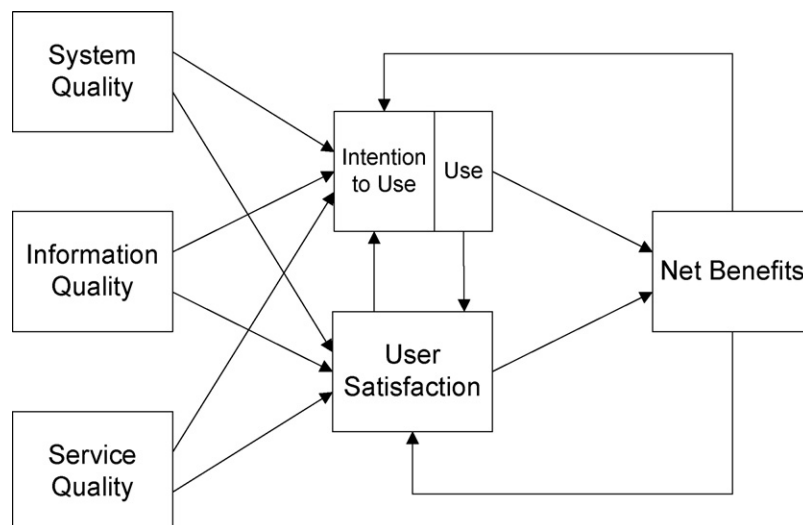

Fig. 2. DeLone and McLean updated IS success model.