A Comprehensive Model for Assessing the Quality and Productivity of the Information Systems Function: Toward a Theory for Information Systems Assessment

BARRY L. MYERS
University of Southern Colorado

LEON A. KAPPELMAN
University of North Texas

VICTOR R. PRYBUTOK
University of North Texas

Information Systems (IS) managers are under increasing pressure to justify the value and contribution of IS expenditures to the productivity, quality, and competitiveness of the organization. This paper examines the need for IS assessment and suggests a comprehensive IS assessment framework linked to organizational performance using existing IS assessment theory as a base and incorporating measurement concepts from other disciplines. The existing models of IS success are updated to include the emerging IS success dimensions of service quality and work group impact and provide a comprehensive method for organizing the various measures of IS success. In addition, new measures from recent research are presented to supplement the lists supplied by previous research. Additional research is suggested to advance the IS assessment contingency theory. Such a theory has the potential to contribute to the quality and productivity of the IS function and the larger organization by providing feedback to manage and improve the IS function to better meet the needs of the organization.

Importance of Topic

Frequently, information technology is used without a full understanding of its applicability, effectiveness, or efficacy. IS managers often lack the tools they need to decide if they are accomplishing the right activities (Davis & Hamann, 1988). In addition, these managers often fail to learn if they are meeting the needs of their customers. The productivity of the information systems function has proven difficult to define and measure (Scudder & Kucic, 1991). “Assessing the value of the IT infrastructure is perhaps the biggest single problem for the 90s — the information technology organization is running out of credibility and managers are no longer willing to give us the benefit of the doubt” (Rochester & Douglass, 1991, p. 16). “Companies have come to realize they are paying big money for technology that isn’t being used” (King, 1991, p. 73). Furthermore, a recent survey of senior executives from 220 Fortune 1000 firms found extremely low satisfaction with
returns on corporate technology investments. Over 81 percent of those polled rated their organization’s payback on technology spending as minimal or average (Maglitta, 1993).

No single measure of the value of the IS function has appeared (Carlson & McNurlin, 1992a). “Measuring IS effectiveness” is consistently reported in the top 20 on the list of most-important IS issues by the members of the Society for Information Management (SIM), an organization of IS executives (Ball & Harris, 1982; Branchneau & Wetherbe, 1987; Dickson, Leitheiser, Nechis & Wetherbe, 1984; Niederman, Branchneau & Wetherbe, 1991). In fact, effectiveness of the IS function has proven practically impossible to define and measure (Niederman et al.). Many possible explanations for this difficulty are available. For example, the role of the IS function in business performance can be subtle and difficult to differentiate from other factors (Crowston & Treacy, 1986; Niederman et al.). Some companies use weak ‘surrogate’ measures of IS effectiveness that hide the true value of the IS function (Niederman et al.). Others depend mostly on qualitative rather than quantitative measures (Hartog & Herbert, 1986; Marion, 1992; McLean, Kappelman & Thompson, 1993). Some researchers believe that the lack of evidence of a payoff for the high investment in technology could be interpreted as reflecting serious measurement deficiencies (Baatz, 1994; Berndt & Morrison, 1991; Brynjolfsson, 1993).

Evidence suggests that poor performance of the IS function is a serious inhibitor to good business performance (Carlson & McNurlin, 1992a). Carlson and McNurlin (1992a) also found evidence in several of the organizations they studied that high IS effectiveness is associated with high organizational performance. Others report a clear connection between assessment and productivity (Tayntor, 1994). Better use of information, both internal and external, relates positively to profitability (Strassman, 1990).

Assessment is essential to supply the feedback needed for the effective management and continuous improvement of the IS function. “Just as a human being needs a diversity of measures to assess his or her health and performance, an organization needs a diversity of measures to assess its health and performance” (Drucker, 1989, p. 230). Systematic measurements are needed to guide management action. Without quantitative feedback, managers are dependant upon only experience, intuition, and judgement. As firms become more complex, global, and fast-paced, relying on experience and intuition alone is increasingly problematic (Singleton, McLean & Altman, 1988).

Managers define what is important to the organization and manifest corporate culture in their assessment choices (Eccles, 1991; Strassman, 1990; Tsui, 1994). “What gets measured gets attention” (Eccles, p. 131). The relationship between IS performance and organizational performance should be more carefully explored (Weill & Olson, 1989). It is clear that IS assessment is vital to the organization. Also, IS executives need a comprehensive framework for assessment tied to organizational performance to aid them in developing IS assessment systems.

**Early Work**

Articles discussing the need to assess the contribution of the IS function to the organization began appearing in the late 1970s (King & Rodriguez, 1978; Matlin, 1977; Rolefson, 1978). Early research into assessing the value of the IS function concentrated on economic considerations and introduced the idea that multiple assessment measures were essential to develop a clear picture (Ahituv, 1980; Bender, 1986; King & Schrems, 1978; Matlin, 1979). Most early attempts at assessing the IS function centered on measures of system availability and performance. For example, Borovits and Neumann (1979) described several indices of performance: capacity, response time, throughput rate, overhead percentage, software time measures, reliability measures, system utilization measures, raw speed, and availability. They and others also presented in-depth procedures for system evaluation (Ein-Dor & Jones, 1985).

McLean (1973) was one of the first to call for a shift from a measurement focus on efficiency to effectiveness; in other words, doing the right thing rather than doing the thing right. To do this would require computer professionals to measure and pursue organizational objectives, in addition to pursuing their internal departmental goals. Efficiency and effectiveness are different and require different measures. An efficient IS function is not necessarily an effective one. Efficiency focuses on internal requirements of the IS function, while effectiveness requires an external focus. An example of an IS function efficiency measure is the number of tasks completed per unit of time. An effective IS function, for example, is concerned about the impact of the information provided in helping users do their jobs. Efficiency is concerned with doing things right; effectiveness is concerned with doing the right things (McLean).

Lucas (1972) introduced the idea of including users when assessing the IS function. Others began evaluating various measures of system effectiveness and considering the different viewpoints of the evaluators (Hamilton & Chervany, 1981a; 1981b).

**Assessment Methods and Procedures**

Considerable literature exists that proposes methods and offers recommendations for developing assessment systems. The first and most important point to consider when developing measures is to align all measures of effectiveness with corporate objectives (Thierauf, 1988). This should follow easily once the IS function is aligned with the strategic direction of the corporation (Mendelow, 1983). The goal is to couple vision with performance (Cross & Lynch, 1992) in order to aid the IS function in staying aligned with the corporation in a very complex, ever-changing environment.