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## Information Systems Success Research: The “20-Year Update?” Panel Report from PACIS, 2011

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# Communications of the Association for Information Systems

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## Information Systems Success Research: The “20-Year Update?” Panel Report from PACIS, 2011

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### Abstract:

This article summarizes a panel held at the 15<sup>th</sup> Pacific Asia Conference on Information Systems (PACIS) in Brisbane, Australia, in 2011. The panelists proposed a new research agenda for information systems success research. The DeLone and McLean IS Success Model has been one of the most influential models in Information Systems research. However, the nature of information systems continues to change. Information systems are increasingly implemented across layers of infrastructure and application architecture. The diffusion of information systems into many spheres of life means that information systems success needs to be considered in multiple contexts. Services play a much more prominent role in the economies of countries, making the “service” context of information systems increasingly important. Further, improved understandings of theory and measurement offer new opportunities for novel approaches and new research questions about information systems success.

**Keywords:** IS success, IS impact, information systems research

**Editor’s Note:** The article is based on a panel presentation at Pacific Asia Conference on Information Systems, held in Brisbane, September 2011.

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## I. INTRODUCTION

Organizations continue to make substantial investments in information systems (IS), expecting positive impacts to the organization and its employees. Such investments in contemporary IS are under increasing scrutiny and pressure to justify their value and contribution to the productivity, quality, and competitiveness of organizations [Markus, Axline, Petrie and Tanis, 2003], regardless of whether the economy is booming or busting. As difficult as it may be, research has also emphasized the importance of systematically measuring information system success. With contemporary organizational-wide IS, measuring success takes on special importance since the costs and risks of these large technology investments rival their potential payoffs.

Academic research has a long-standing tradition of research on systems evaluations, dating to the 1970s [King and Rodriguez, 1978; Matlin, 1979; Rolefson, 1978]. The IS Success Model by DeLone and McLean [1992] is one of the most cited IS studies ever published. Other more general approaches such as the Balanced Scorecard have also received great attention over the years. Yet, as Sabherwal, Jeyaraj and Chowa. [2006, p. 1849] observe, “Despite considerable empirical research, results on the relationships among constructs related to information systems success, as well as the determinants of IS success, are often inconsistent.” In order for IS success research to be relevant to practitioners and continue as a vibrant research stream for academia, we must continue to seek improvements in existing measures and identify fresh approaches to measuring IS success and impact.

This paper reports on a discussion among four panellists who at PACIS 2011 in Brisbane, Australia, offered different but complimentary perspectives on current issues and a research agenda for IS success research.

## II. BACKGROUND: INFORMATION SYSTEMS SUCCESS

Keen described IS as “the effective design, delivery, and use of information technologies in organizations” [1980, p. 16]. We believe the “effectiveness” or “success” of information systems is an important aspect of the information systems field in both research and practice. However, with the evolution of systems, users, and user requirements, the manner in which we evaluate the success of an information system has changed over time as the context, purpose, and impact of IS has evolved. It is therefore essential to understand what these changes have been and what they mean for the future. In general, IS success research evaluates the effective creation, distribution, and use of information via technology. Information systems are long-term investments whose performance is subjected to a range of contextual factors. Moreover, as a long-term investment, the IS is expected to yield a continuing flow of benefits into the future [Gable, Sedera and Chan, 2008].

Historically, researchers employed objective financial indicators to assess the impact of an information system, such as return on investment and return on assets [e.g., Brynjolfsson and Hitt, 1996]. However, as many have argued [Davenport, 2000; Kaplan and Norton, 2000], contemporary information systems also provide substantial non-financial benefits. Considering this, organizations are moving beyond traditional financial measures of information systems success [Rubin, 2004]. Researchers have developed several methods for assessing IS success using intangible measures, of which the IS Success Model and the IS impact model (which drew extensively on the IS Success Model) have been some of the most influential [DeLone and McLean, 1992; DeLone and McLean, 2003]. These models use assessment of the system by its stakeholders. In particular, the DeLone and McLean IS Success Model [1992] has been widely adopted in a number of research contexts, including e-commerce, knowledge management systems, and ERP, and has been validated across a range of geographic boundaries.

### The Evolution of the IS Success Model

Shortly after the publication of the DeLone and McLean success model, IS researchers began proposing modifications to this model. Accepting the authors’ call for further development and validation, Seddon and Kiew [1996] studied a portion of the IS Success Model (i.e., system quality, information quality, use, and user satisfaction). In their evaluation, they modified the “use” construct because they “conjectured that the underlying success construct that researchers have been trying to tap is Usefulness, not Use” (p. 93). Seddon and Kiew’s concept of usefulness is equivalent to the idea of perceived usefulness in TAM by Davis [1989]. They argued that, for voluntary systems, use is an appropriate measure; however, if system use is mandatory, usefulness is a better measure of IS success than use is. DeLone and McLean [2003] responded that, even in mandatory systems, there can still be considerable variability of use, and therefore the variable “use” deserves to be retained.

Many researchers using the IS Success Model failed to heed the cautions of the original authors. DeLone and McLean state, "...they [researchers] used the model like a drunkard uses a lamppost—for support rather than for illumination. They overlooked the main conclusion of the article—that IS success is a multidimensional and interdependent construct—and that it is therefore necessary to study the interrelationships among, or to control for, those dimensions....Researchers should systematically combine individual measures from the IS success categories to create a comprehensive measurement instrument" [1992, pp.87-88]. Although DeLone and McLean did not choose to measure (or control for) the inter-relationships between various dimensions of IS success, subsequent studies [e.g., Petter, DeLone and McLean, 2008] have used multidimensional measures of IS success in their empirical studies and have analyzed the interrelationships among them.

In 2003, DeLone and McLean revised their IS Success Model and responded to many of the criticisms of the original version. The updated model has weathered criticism and has received widespread acknowledgement as one of the watershed studies in the IS discipline. Since 1992, the model has been tested in full or in part in more than 200 studies. Petter et al. [2008] note that, as a field, we have made substantial strides towards understanding the nature of IS success. They noted that the original authors had carried out an extensive review of the empirical and conceptual literature on IS success to inform the 10-year update of the original IS Success Model [DeLone and McLean, 2003]. In particular, a body of empirical evidence is accumulating as some researchers have synthesized the literature on relationships in the DeLone and McLean IS Success Model using the quantitative technique of meta-analysis [e.g., Bokhari, 2005; Mahmood, Hall and Swanberg, 2001; Sabherwal et al., 2006], while others have focused on developing standardized measures that can be used to evaluate the various dimensions of IS success [e.g., Sedera and Gable, 2004]. Despite strong progress in this research area, how we can effectively measure the success and impact of information systems remains a central question to our field. We cannot regard it as "answered" without risking stagnation. This panel drew together a number of different perspectives on measuring information systems success, including some new reflections from one of the original authors of the IS Success Model, Ephraim McLean.

### III. DARSHANA SEDERA: "WHAT SYSTEM?"

The first speaker and workshop chair, Darshana Sedera argued that a central question to any IS evaluations involves understanding what we mean by "the system" and being clear about the nature, scope, and boundaries of the evaluation. Sedera suggested that, as the first step in every IS success study, researchers must explicitly specify the type of system/application that they are evaluating and develop appropriate approaches and measures.

He introduced studies on system typologies that identify the salient differences between *different types of systems*. For example, McAfee [2006] identifies three types of systems: Function IT, Network IT, and Enterprise IT, and notes that there are substantial differences between these in terms of their core purpose, the types of users (i.e., potential study participants), and system outcomes. Thus, an IS success study should derive its objectives, approach, and measures according to the type of the IS. Sedera added: "...in most cases, one must select the scope of the system/application for evaluation...." For example, a system can be defined as narrowly as a particular process, module, or function (e.g., procurement process) or as broadly as an application portfolio. Considering both the system type and the scope of the system provides useful boundaries for a system evaluation. Thus, akin to arguments in Burton-Jones and Straub [2006], researchers must select appropriate measures for the circumstances without relying on "omnibus" measures.

#### Types of Information Systems

At a high level, information systems can be classified as (1) hedonic—developed for pleasure and enjoyment, or (2) utilitarian—developed to improve individual and organizational performance [van der Heijden, 2000]. However, hedonic applications in organizations are not common. Thus, in this discussion, Sedera adopted the utilitarian sub-classifications of McAfee [2006]. The characteristics of each system type are explained in the discussion that follows. Sedera acknowledged there are other analogous classifications of system types, but chose McAfee's classification for success measure specification based on its simplicity in combination with pertinent discussions on key-user groups and system complexity.

In brief, *Function IT* is defined as IT that assists with the execution of discrete tasks. Its characteristics are that it can be adopted without additional complements (other new or changed systems or processes), offers some degree of automation of tasks, and frequently has a single user-group. Examples of Function IT include computer-aided design software and statistical software. *Network IT* is defined as IT that facilitates actions without specifying their parameters. It does not impose complements but lets them emerge over time. It does not embed specific tasks or sequences and accepts data in many formats. Examples of Network IT are instant messaging, wikis, blogs, email, and mashups. *Enterprise IT* is defined as IT that embeds and specifies business processes. These systems impose complements throughout the organization; they also define and mandate tasks, processes, and data formats. Use is

typically mandatory. These systems are often highly automated and span multiple user groups and organizational units. Sedera suggested that these broad categories of system have characteristics in common that can guide the evaluation approach. For example, evaluation of a Function IT system might focus on the degree to which it enhances the productivity of its target user group. Sedera also recognized that, more and more, Functional IT is trying to add hedonic values to systems for better adoption and user acceptance, which must be a consideration in future IS success research.

### Scope of Evaluation: The “System of Interest”

As suggested in Seddon, Staples, Patnayakuni and Bowtell [1999], isolating the “system” for evaluation can be difficult, but it must be done if our evaluations are to be meaningful. Even after scoping the boundaries of the system evaluation, certain aspects might still be conflated in the minds of evaluators as well as researchers. The aspects are: other systems; the portfolio of systems; the portal in which the system is included; the infrastructure; the IT function; IT support or service quality; and the administrative area with which the system is most closely associated.

Sedera suggested that a key challenge for the researcher here is to collect perceptions of the system of interest without being influenced by aspects that are a part of the wider system but not part of the system of interest to the investigation. As noted in several recent studies [Petter et al., 2008; DeLone and McLean, 2003; Gable et al., 2008], most past studies recycle measures and constructs without much considerations to type and scope of systems. This presents a clear opportunity for IS researchers to develop contextualized but still generalizable measures based on the type of IS being evaluated and the scope of the evaluation. The relationship between IS scope of the evaluation and type of IS is depicted in Figure 1.

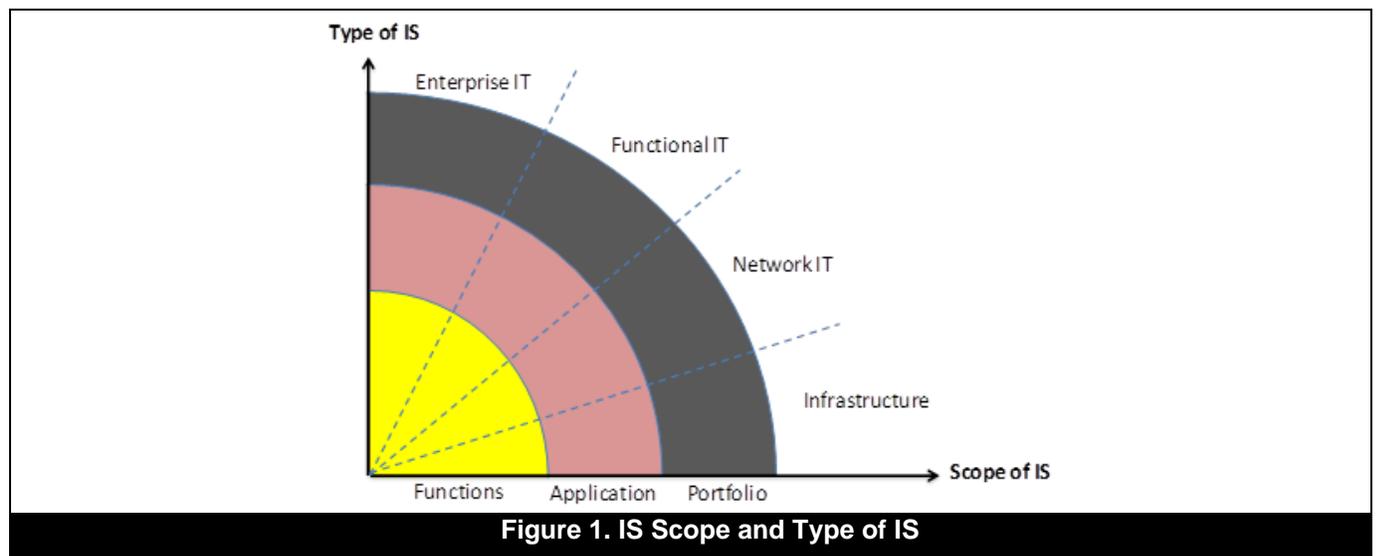


Figure 1. IS Scope and Type of IS

Overall, Sedera argued that it is apparent that the type and nature of the system, along with users’ perceptions of the system scope, may affect perceptions of success. He offered some examples: perceptions of the quality of the system may be influenced by perceptions of the infrastructure; or a system may be perceived as slow because the associated infrastructure is inadequate or underpowered. However, in such situations, evaluators may not be knowledgeable or aware of the circumstances beyond their immediate work systems and would not recognize the issues pertaining to IT infrastructure. He noted that the scope of the system for evaluation purposes can be defined more narrowly or more broadly, depending on the nature of the evaluation. Mismatches of scope can make it difficult or impossible to compare and benchmark systems. For example, when services are delivered using Web portals, respondents might find it difficult identify the “system” being evaluated. It may not be clear which “system” they access and how they receive information. If the researcher evaluates the quality of the Web portal at a high level, such information would not be adequate to address management and performance issues of the underlying services that are delivered via the portal.

However, despite these complexities, Sedera was not ready to consign any consideration of developing generalized measures to the “too hard basket.” He argued that careful attention to the scope and type of IS being evaluated can provide measures that strike the right balance between being situated and being generalizable.

#### IV. MARY TATE: “JUST ASK SOMEONE”

Following the theme of whether we have saturation in IS success measures (there are more than 6,000 citations of the original IS Success paper [DeLone and McLean, 1992] and the 10-year update paper [Delone and McLean, 2003] according to Google scholar), the next speaker, Mary Tate, asked whether there are alternatives to basing measures of success on user perceptions and self-reports.

##### Issues and Alternatives to Perception-Based Measures

Self-reports and user perceptions, often based on surveys, are popular forms of measurement. This is partly because other methods for evaluating the success of information systems are decidedly challenging. There are a number of reasons why this is the case. Establishing a relationship between the characteristics of a specific IS and individual or firm outcomes is difficult because IS may be only one of many factors that affect such outcomes. Many studies of IT outcomes aim to measure the value of IT by focusing directly on how much value is added, but the value from IT also arises indirectly through IT-enabled augmentation of non-IT inputs [Mittal and Nault, 2009].

Further, what constitutes a “good” outcome from an information system may vary considerably from context to context. A very small percentage decrease in the cost of a transaction might be considered a success for an organization that operates on high volumes and low margins, while the same saving might be considered a poor outcome in a different context.

Since economic measures are difficult to obtain, researchers and practitioners often rely on subjective assessment and surrogate measures [Saarinen, 1996]. Tate suggested this means that although measures of information systems success are often quite “precise,” are quantitative, and use robust statistical techniques; the inputs are self-reports and user perceptions of quality and outcomes; in other words, a “just ask someone” approach to IS success measurement. Tate posed the questions that should be asked: What aspects of success are survey respondents reporting when they answer survey questions? What comparisons are they making? Are these evaluations good proxies for IS success? What alternatives exist?

##### What Are Survey Respondents Reporting?

Tate argued that not all survey responses are equivalent, and a number of factors can result in responses to ostensibly the same questions having different meanings. Tate pointed out that self-report measures frequently do not distinguish adequately between beliefs and attitudes, with the result that it can be unclear what respondents are actually reporting. According to classic social psychology theory [Fishbein and Ajzen, 1975], belief formation involves the establishment of a link between two aspects of an individual’s world. One is direct observation via the senses of a [technology] object, and the other is the individual’s pre-existing experiences. Since people rarely doubt the validity of their own senses, descriptive beliefs are usually held with maximum certainty. Beliefs that go beyond directly observable events are inferential beliefs. These are formed from descriptive beliefs; for example, the presence of certain information may be used to infer usefulness.

However, inferential beliefs can also be based on previous inferences and past experience. By way of example, Tate invited the audience to consider the information quality construct, indicated by completeness, ease of understanding, personalization, relevance, and security [DeLone and McLean, 2003]. Descriptive beliefs held by the user could include the presence of an https address or the requirement for a strong password. Based on these, the user may infer that the information in the system is secure. However, inferential beliefs are also based on their previous experience (experiential residue) [Fishbein and Ajzen, 1975]. If a respondent had recently had an account compromised, he or she might answer a question about the security of the system differently.

Similarly, a respondent who does not have recent, or perhaps any, first-hand experience of some aspect of the system may draw on past experience in the form of word of mouth or prior experience with a comparable system. Persons new to the organization who had used the same system in their previous employment would likely draw largely on that previous experience unless they were specifically instructed not to. Thus, what respondents are reporting in response to survey questions depends on their experiential residue and the degree to which they are invited to recall such past experiences in the survey context—or discouraged from doing so.

Another confounding factor is that not all respondents are equally qualified to comment on all aspects of IS success. A chief IT architect may be uniquely positioned to respond to questions about system quality, while a chief financial officer may be able to offer expert testimony on cost savings. However, the rank-and-file stakeholder may be simply reporting “water cooler conversations” when responding to these same questions.

Overall, there is a risk that stakeholders may not be recalling the same system features when formulating their responses, or may be basing their responses on word of mouth. Tate suggested that more consistent and

meaningful responses can be obtained by setting specific tasks for the user to complete before completing the survey and by inviting the user to respond based on this very specific recent experience. This is likely to yield more consistent results. Tate concluded that unless the conditions she discussed are carefully controlled for, it is difficult to substantively interpret survey responses. While general perceptions and the informed opinions of expert witnesses are both potentially valuable, they are not the same and should not be compared. Similarly, general inferential beliefs about aspects of system quality, based on the totality of a person's experience, including that with other comparable information systems, are not the same as beliefs associated with a specific recent interaction, although both may be practically and theoretically interesting.

### **What Comparisons Are Respondents Making?**

Tate continued to develop the theme of self-reports of IS success dimensions by arguing that in making value and quality judgments, respondents are making valid comparisons. Although survey research generally relies on single measures of perceptions of quality and value, we are implicitly operating in an expectation-confirmation paradigm [Oliver, 1980]. If we adapt expectation-confirmation theory for an IS success context, this would posit that expectations of quality along the various IS success dimensions, coupled with perceived performance, would lead to quality evaluations. If a system exceeds expectations on a specific success dimension—positive disconfirmation—the respondent will likely give high ratings on that dimension. On the other hand, if a system falls short of expectations—negative disconfirmation—the respondent will choose a value towards the lower end of the quality scale.

This insight invites further questions, so Tate suggested questions such as: What are respondents' expectations of system quality, information quality, and service quality based on? What are the antecedents to respondents' expectations and therefore to their quality assessments? What are respondents comparing the system to? These questions have been investigated to some degree in service quality and satisfaction research in the marketing field, but not to our knowledge with specific reference to information systems success. For example, antecedents of perceived service quality posited by marketing scholars include marketing communications, word of mouth, prior experience, perceived service alternatives, and personal needs [Zeithaml, Berry and Parasuraman, 1993]. It is clear that these antecedents could easily be different for different respondents. To return to our previous example, a new employee will likely be comparing the system currently being evaluated with comparable systems in his or her previous place of employment.

These questions are typically not asked in an IS success context, but they could be and should be. Understanding the antecedents of value and quality expectations, Tate suggested, is likely to yield valuable insights into how to improve perceived quality and consequent outcomes.

### **Is "Asking People" a Good Proxy Measure for IS Success?**

If we begin to draw these arguments together, Tate suggested that we need to ask ourselves whether, given the vagaries of subjective and surrogate measures, they are really good proxies for measuring IS success. While surrogate measures collected via survey research are expedient, the substantive interpretation of the results can easily be clouded by the issues raised by the panelists. Sedera emphasized the importance of clearly identifying the system of interest (what system are respondents referring to?), and McLean pointed out the potential confusion arising from the multiple meanings of "service." Tate argued for a more nuanced understanding of the antecedents and formation of quality evaluations. Overall, while the panel acknowledged the popularity of "just asking people" about IS success, panelists also emphasized the importance of understanding and mitigating as much as possible the factors that can confound survey responses. In addition to this, other measurement methods should also be used.

### **What Can We Do Instead?**

Far from being saturated, Tate suggested that there are many exciting research opportunities for improving measures of IS success and impact. In particular, given the well-established nature of the IS Success Model, Tate argued for the use of multiple methods to be triangulated with IS success surveys to understand better the extent to which surrogate measures are truly representative of quality and success. Other quality and value measures with different theoretical provenance could include micro-economic approaches—for example, the Theory of Production [Brynjolfsson and Hitt, 1996] or Consumer Theory [Brynjolfsson, 1996]; industrial and organizational theories—for example Agency Theory [Bakos and Nault, 1997] or Transaction Cost Theory [Clemons and Row, 1991]; socio-technical perspectives; and Resource-Based Views of the business value of IT [e.g., Bharadwaj, 2000].

Finally, Tate questioned whether the dependent variables of IS success, use, satisfaction, and net benefits should be revisited. There is increasing interest in the agility and responsiveness of the IS function. Information systems speed and agility was identified as the second most important issue for IT executives in the 2010 SIM survey

[Luftman and Derksen, 2012]. Recent research suggests that IS agility should be considered not only as a reactive capability in responding to business change, but also a pro-active capacity for sensing the need for change, as a tool of innovation [Hobbs and Scheepers, 2009]. The 10-year update of the IS Success Model [DeLone and McLean, 2003] yielded many fresh insights. However, the environment continues to change. New dimensions of IS success, such as IS agility could be candidates for inclusion in a new 20-year update of the IS Success Model.

## V. EPHRAIM MCLEAN: WHAT DO WE MEAN BY “SERVICE” IN IS SUCCESS?

The third speaker, Ephraim McLean, was one of the original authors of the DeLone and McLean IS Success Model. As one of the most influential researchers studying IS success over many decades, McLean was uniquely positioned to reflect on its past, present, and future. McLean noted that one of the widely discussed and highly influential additions made in the 10-year update to the DeLone and McLean IS Success Model was the inclusion of the *service quality* of the information systems function as a component of IS success. It therefore came as a surprise to the audience when McLean said that after nearly another decade, he felt that the many definitions of service quality that have evolved have confounded the definitions that he and DeLone intended.

### Issues with Information Systems “Service Quality”

“Service” is a much used and abused term, and McLean expressed concern about the multiple meanings imputed to “service” and how they are misinterpreted in the context of the IS Success Model. McLean described what he and DeLone had been thinking when they added the “service quality” construct to the IS Success Model. McLean looked back to the definition provided in their 2003 paper, which defined service quality “as measuring the quality of the information technology *department* or *organizations*, as opposed to individual IT *applications*, by measuring and comparing users’ expectations against their perceptions of the service provided by the IT department” [2003]. Clarifying this further, McLean said they had intended to add a construct to capture a measure of the “goodness” or quality of the entire IT function, not merely the individual systems and applications that the IT function provides. Measures of the service quality of the IS function, McLean said, were supposed to address such important IS success questions as: Are new IT applications delivered on time? Have they been produced within budget? Are they cost effective? Do they produce the promised economic benefits? Are users’ concerns addressed satisfactorily? Is our project management capability world class (e.g., CMMi Level Four or Five)?

Further developing Tate’s assertion of the emerging importance of the agility and responsiveness of the IS function, and whether that should be included in the model, McLean suggested another success criteria, implied but not fully captured in the “service quality” construct, might be “Are organizational information systems easily changed to meet new requirements?” The notion of the quality of the overall IS function as opposed to individual systems or applications also resonated with Sedera’s presentation. In his discussion of the “system of interest,” Sedera pointed out that it can be difficult to determine what the word “system” means to respondents when they answer questions about information system success, impact, and quality. Are they including project management? The support function? Or even, as Tate and McLean suggested, the responsiveness and agility of the IS department or function?

Overall, McLean said, the IS success that they had intended to capture was some measures of the extent to which the IS function is “doing the right things—as opposed to merely doing the things right.” McLean acknowledged that with the benefit of hindsight, many of these important questions were not fully captured in the “service quality” addition made in 2003. He went on to say that the interpretation of this construct had strayed even further from its initial intent as a result of the proliferating definitions and uses of the term “service” by many other researchers.

In its narrowest interpretation, McLean suggested that information systems service quality may not add anything to our understanding of IS success beyond what was already encompassed in the parsimonious 1992 model. Perhaps good *service quality* is just the combination of *systems quality* and *information quality*, and the new term is redundant. However, we still have the issue of the various unanswered questions about the success of the IS function, so it is likely we do need a new construct to capture these measures. However, Mclean suggested that using the term “service quality” may not be the best way of achieving that.

If we expand our view of *service* in information systems beyond simply a combination of information and system quality, Mclean suggested, we immediately encounter another question—*service* for whom? Even in 2003, when DeLone and McLean considered the efficacy of the IS Success Model in an e-commerce context, they had already identified that “service quality” may be experienced by both internal and external users, and that “users” might be customers. “[Service quality’s] importance is most likely greater than previously, since users are now our customers” [DeLone and McLean 2003, p. 25]. This trend has only increased. A developer of a mobile phone application only has “customer-users.” This suggests it is essential to understand the role, or roles, that survey respondents are performing when they report on service quality.

There is also the possibility that respondents may have some altogether different notion of service in mind, based on one of the many competing definitions currently in use. Someone with a more technical system focus could be involved with the implementation of Software as a Service (SaaS). The service in SaaS does not refer to the information systems function. SaaS is a layer in cloud computing architecture that provides users with complete, turnkey software applications on the Internet [Leavitt, 2009]. Software or applications are hosted as services in the cloud and delivered via browsers on a subscription basis. Authentication and authorization security policies are used to ensure the separation of user data. This approach can eliminate the need to install, run, and maintain the application on local computers [Yang and Tate, 2012].

Service-Oriented Architecture (SOA), McLean pointed out, is another fairly technical definition of “service” in an IS context. SOA is an approach to flexible, easily configurable, re-usable information technology infrastructure and applications. Within SOA, a service is defined as “a function that is well-defined, self-contained, and does not depend on the context or state of other services.”<sup>1</sup> SOA is defined as “a collection of services.” These services communicate with each other in various ways, for example by simple data-passing of two or more services coordinating an activity.

McLean then noted that we hear praise, for example, for Amazon’s customer service [Pralhad and Ramaswamy, 2000]. The notion of service here is the added value enabled by the expertise in business intelligence and data mining, which drives personalization and recommendation engines. “Each time an Amazon customer accesses the company’s Web site, the on-line bookseller provides recommendations based not only on the customer’s previous purchases but also on the purchases of other people who have bought similar books. As its customers’ tastes and preferences evolve, Amazon’s engagement with them reflects those changes” [Pralhad and Ramaswamy, 2000, pg. 80]. This use of data mining to improve the customer’s experience is going beyond the intent of the “information quality” construct and offers yet another perspective on information systems “service.”

Yet another definition of “service,” McLean noted, is the classification of economic activities into sectors, including the service sector, which is characterized by temporary ownership or temporary access to services. According to the United States Census Bureau<sup>2</sup>, the service sector consists of truck transportation; messenger services and warehousing; information sector services; securities, commodities, and other financial investment services; rental and leasing services; professional, scientific, and technical services; administrative and support services; waste management and remediation; health care and social assistance; and arts, entertainment, and recreation services. In this case, service quality could potentially be referring to the contribution of this entire sector to economic growth.

“So...” McLean concluded, “my questions for my fellow panelists—and the audience—are: If “Service” has so many conflicting meanings, what is a better word (or words) for this organizational activity? Or, is perhaps measuring the success of the IS function of an entire organization, or indeed the success of an entire industry, so different from measuring the success of individual IT applications that an entirely new ‘20 year’ update of the D&M Success Model is needed?”

#### **IV. ANDREW BURTON-JONES: “BLUE OCEANS” RESEARCH IN IS SUCCESS**

The final speaker was Andrew Burton-Jones. Burton-Jones urged the audience to conduct “blue oceans” research: to extend their conceptualizations of information systems success beyond incremental research based on refinements to the IS Success Model. The IS Success Model has generated many valuable insights, but it does not represent the final word in understanding information systems success. Burton-Jones challenged researchers to make research on IS success more innovative, realistic, and impactful. He focused on two main areas for innovation: theory and measurement.

Burton-Jones introduced an approach for developing innovative theory based on Yoo [2010] and explained how this could generate fresh approaches to theory and measurement of IS success. First, we need more process theories that examine the motors of change over time. Rather than simply taking a snapshot of an information system, as in a cross-sectional survey, we should be developing success narratives. To do this, we need to understand how information systems success comes about. How can success be developed or selected over time? Can it be sustained? What are the motors of change?

Another useful lens for theorizing is system theories, particularly those at different levels of abstraction. Both the IS Success Model and the IS impact model consider the individual and organizational impacts of information systems. Burton-Jones suggested that a systems approach can allow these different levels of the organization to be modeled

<sup>1</sup> [http://www.service-architecture.com/web-services/articles/service-oriented\\_architecture\\_soa\\_definition.html](http://www.service-architecture.com/web-services/articles/service-oriented_architecture_soa_definition.html)

<sup>2</sup> <http://www.census.gov/econ/services.html>

using a multi-level view. Multi-level models that include the organization and the individual can frame questions such as: How does individual impact turn into collective impact? To what extent can success be controlled top-down by management, and to what extent is it emergent from bottom-up practices?

Another key driver of innovative IS success research is the diffusion of information systems beyond the organizational context, where it now mediates many aspects of our everyday life. Burton-Jones suggested that Yoo's [2010] paper on experiential computing offered new directions for research into IS success. Yoo notes that rather than the traditional view of an "information system" in an organizational context, we now live in a world of ubiquitous and embedded digital artifacts, which shape and mediate our everyday lived experiences [Yoo, 2010]. Burton-Jones suggested, following Yoo's argument, that "experiential computing calls for a reorientation of our focus from task performance and information processing to lived experiences of everyday life activities that are digitally mediated. User needs are, therefore, much broader than informational needs for task performance in organizations, reflecting deeper basic human needs and values" [Yoo, 2010, p. 217].

This suggests that the meaning of "information systems success" and the dependent variables of individual and organizational impact may be too limited for contemporary contexts of IS use. On the one hand, we may wish to be more specific and examine the perspectives of individual users of IS systems and understand what "success" means in the context of everyday life. On the other hand, we may wish to take a much broader viewpoint and examine the extent to which information systems can be "successful" for communities and society at large.

Burton-Jones argued that, as well as seeking innovation in theory, we can also innovate in the types of measures used for IS success. Picking up on Tate's call to look beyond survey research and to consider multiple measures using different measurement approaches, Burton-Jones extolled the value of qualitative measures. Burton-Jones noted that there were surprisingly few qualitative or mixed methods studies of success and urged researchers to develop richer and more insightful measures. He asked: "What would we gain from a better understanding of the context of IS success?" This might include questions such as: What is the history behind a measure of success? What are the politics behind a measure of success, and what impacts do measures have on behavior? What are the different interpretations of a measure of success; for example, might success be viewed differently from different stakeholder perspectives? How do people and stakeholder groups make sense of a measure of success?

Overall, Burton-Jones concluded that information systems success is one of the most enduring and important areas of IS research. However, like anything else, it can get stale if we limit ourselves to particular contexts, measures, and models. Burton-Jones emphasized that there are many opportunities for exciting and important work in this area. He finished with this call to action for IS researchers: "Now is a very good time to be working on this topic."

## V. WRAP UP

This well-attended panel finished with some concluding remarks from Sedera, the chair, and discussion with the audience. People welcomed the opportunity to hear McLean, as one of the most senior and widely-cited scholars in the field debating with Sedera, Tate, and Burton-Jones. The take-away message from the panel was that there is an exciting agenda for information systems success and impact research. McLean himself was supportive of the 20-year update of the IS Success Model, and reflected in particular on the modification of the "service quality" construct introduced in the 10-year update.

What should the 20-year update include? Based on McLean's argument, the notion of the "service quality" of the IS function as, "are we doing the right thing," needs exploration. Service is a complex notion that has become broader and received more research attention in the last decade. What are the implications of this for information systems success research? It is possible that entirely new success factors such as the agility and responsiveness of the IS function should be added to the model. The 20-year update could also consider the increasingly multi-layered nature of information systems themselves. As discussed by Sedera, this means that the scope of what we understand to be the "information system" may be ambiguous. Drawing on taxonomies of information systems, Sedera asked: "Do we mean information systems at an enterprise, functional, network, or infrastructure level? Do we mean, for example, a single application, a type of application, a suite of applications, or the entire IT function in an organization?"

The 20-year update might not be an omnibus measure but rather a set of contingency-based measures. In the last 10 years, a great deal of methodological progress has been made with respect to psychometric survey research. Tate considered the vagaries of survey research and using individual perceptions as a proxy measure of success. She proposed that, instead, we should consider seeking non-perceptual measures of information systems success. She also noted that notions like success are frequently inherently comparative. Echoing recent conversations about the TAM model and its antecedents in an organizational context [Benbasat and Barki, 2007; Venkatesh and Bala,

2008), she asked whether it would be valuable to understand what comparisons people are making when they evaluate success.

Burton-Jones proposed an approach for revisiting the whole notion of success, using qualitative measures to develop innovative theories and measures of IS success and impact and to provide examples of the new questions and insights that could be generated. These could potentially result in a 20-year update that would look very different from its predecessors. Overall, the panelists as well as the audience finished on a high note, looking forward to a new chapter of research in this critically important area.

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*Editor's Note:* The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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