

Towards An Information Systems Excellence Model

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Abstract

This paper proposes an IS excellence model based on the concept of business excellence. The Baldrige excellence model contains seven criteria, including: leadership; strategic planning; customer and market focus; human resource focus; process management; measurement, analysis and knowledge management; and business results. For each of these criteria, the paper explores significant IS literature to develop corresponding criteria in the IS context. The proposed model extends the existing work on IS Success and provides an holistic framework that brings together many topics that are often researched in relative isolation, eg, IS leadership, IS strategy, IS service quality, and IS user satisfaction.

Keywords

Business excellence, IS excellence, IS evaluation, Baldrige excellence criteria, IS success.

INTRODUCTION

Investments in Information Systems continue to grow in organisations. At the same time, many organisations seek means to understand and better measure the performance of their information systems function. It is therefore important to identify what areas of IS function performance should be measured and how these areas can be measured. Effective mechanisms should enable the IS function to evaluate its performance, identify key areas for improvement, plan and implement appropriate improvement initiatives, and re-assess its performance.

In a constantly changing environment, effective IS function performance is a shifting goal, hence it is also important that an iterative approach of continuous improvement be used to evaluate performance (Luftman, 2004). Assessment of IS function performance coupled with continuous feedback, effective management and continuous improvement is therefore essential for a high-achieving IS function. Assessment of the IS function has been studied in the context of IS success. However, current research is fragmented as studies concentrate mainly on IS success outputs, individual factors or individual IS projects. None of these models unify all the measures and antecedents of IS function performance. Therefore, the purpose of this paper is to propose an IS excellence model which integrates prior research in the area of IS performance and organisational performance.

A concept which has been used successfully to represent organizational performance is business excellence. The concept of business excellence has been captured in the form of business excellence models that reflect the important components of business excellence, including factors and results. A major strength of business excellence models is that they embrace a range of organisational activities that collectively contribute to business performance, including leadership, quality systems, and business results. In light of the need for a comprehensive model for assessing IS function performance and its antecedents and impacts, this paper adapts the concepts of excellence and excellence models to the IS context. The paper proposes an IS excellence model for the evaluation of the IS function. The discussion concludes with opportunities for further research and development of the framework.

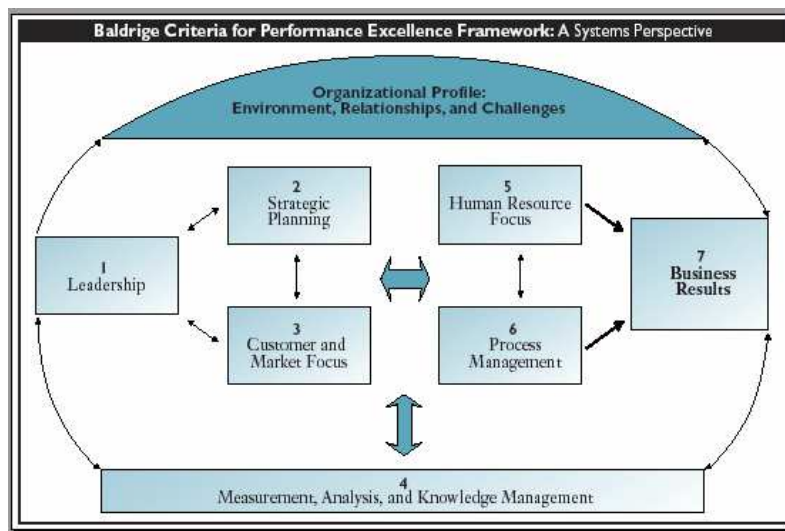
BUSINESS EXCELLENCE

The idea of *performance excellence* or *business excellence* has largely replaced concepts such as total quality management (TQM) (Dale et al., 2000) and is viewed by some as an evolution of the TQM approach to performance management (Kanji & Moura, 2002). The excellence movement has created comprehensive frameworks and assessment tools to help firms improve performance excellence. These assessment tools include business excellence

models. These models have been used for many years as the basis for determining national quality awards. Compared with earlier performance improvement initiatives, (eg. ISO9000()), business excellence models have a broader, more comprehensive focus (Dwyer, 2001).

One business excellence model is the Baldrige Criteria for Performance Excellence, which provides a framework and assessment model that seeks to equip organisations to achieve performance excellence (Baldrige, 2004). The Baldrige model builds on core values and concepts such as visionary leadership, customer-driven excellence, organisational and personal learning, agility, valuing employees and partnerships, managing for innovation, and management by facts. These are exemplified in seven *Criteria Categories*, namely *leadership*, *strategic planning* and *customer and market focus* representing the *leadership triad*¹, *human resource focus*, *process management* and *business results* representing the *results triad*². The *measurement, analysis and knowledge management* category is considered critical for the effective management of an organization and implementing a fact-based, knowledge-driven system for improving performance and competitiveness (See Figure 1). Finally, the model includes an *organisational profile* which describes the environment, key working relationships and strategic challenges, and therefore sets the context for determining which items are important and how each should be measured.

Figure 1: The Baldrige Criteria for Excellence Framework
 Source: Baldrige (2004). Criteria for Performance Excellence.



Business excellence models, such as the Baldrige model, are used in many countries (eg. U.S.A., Australia, UK, New Zealand, and South Africa). They are used to assess business performance across and within various industries/sectors (e.g. small firms, telecommunications, education, medicine, manufacturing, government), organisations, and individual business units. The Baldrige model in particular is one of the most widely used models for promoting quality, productivity, and competitive improvements, and is relevant to manufacturing and service industries, government, health, and small businesses (Porter & Tanner, 2004). The model has been adapted by the European Foundation for Quality Management (EFQM) for national and regional quality awards, for self-assessment, and for use by small firms (EFQM, 1998). Westerveld (2003) also examined how the EFQM-model could be applied to project performance.

The benefits of BEMs include providing organisations with a set of internally generated performance measures which can be determined by context and through negotiation (MacLeod & Baxter, 2001), providing a method of self-assessment and measurement that can deliver improved performance (Oakland, 1999, p 30), and identifying areas that managers should focus on for performance improvement (Leonard & McAdam, 2002). As a result, the evidence is mounting that the excellence approach improves business performance (Evans & Jack, 2003; Hendricks &

¹ The leadership triad emphasize the importance of leadership vis-à-vis strategy planning and customers.

² The results triad focuses on key resources and processes that address organisational work that yields business results.

Singhal, 1997; Porter & Tanner, 2004). However, excellence models do have critics. For example, McAdam & Welsh (2000) claim that, although such models have been well accepted by managers there has been little rigorous empirical research aimed at the models. For example, Kristensen et al (2001) used PLS analysis to reduce the nine topics of the EFQM to four: leadership, people, systems, and results.

While business excellence models are widely used across industries and have been well received by organisational managers, the framework has received little attention in the IS literature. This may be due to the non-specific nature of the criteria to the IS context. For example, while Myers et al (1997) suggest that the "Baldrige Award criteria provide an excellent example of an organisation-wide, quality assessment systems", they argue that "it lacks adequate guidance for the development of a comprehensive IS assessment system" (p. 10). However, contrary to this view, SIM working groups on quality proposed an IS excellence model based on the Baldrige criteria (SIM, 1992). The model included 27 quality matrices for self-assessment by IS departments; however there is little evidence in the IS literature that IS managers have used such tools. This paper therefore suggests that the Baldrige model could provide a useful framework that can be applied to the IS context and used to evaluate and assess IS function performance.

IS EXCELLENCE

IS research recognises the need for a comprehensive model that identifies key elements of IS function performance and its antecedents, and validates the link between IS function performance and organisational performance. Attempts to produce appropriate assessment models have yielded useful approaches and frameworks such as best practices (Cortada, 1998), Total Quality Management (Chow & Lui, 2003), IS Assessment Framework (Myers et al. 1997); IS success model (DeLone & McLean, 2003), the Core Capabilities Model (Feeny & Willcocks, 1998), and the IS Function Performance Evaluation Model (Saunders & Jones, 1992). However, these attempts have key limitations.

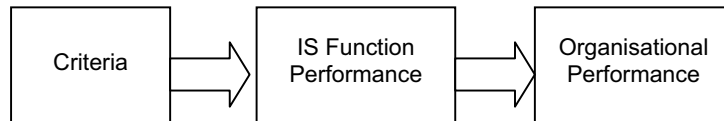
For example, the main thrust of the IS Success model proposed by DeLone and McLean (1992, 2003) was to define IS success and provide a framework that unified the wide body of literature on IS success and could then be used to evaluate IS success. In a similar vein, Saunders and Jones (1992) also proposed a model that attempted to provide a unified view of IS function performance. Myers et al (1997) offered a more comprehensive model of IS assessment that combined the DeLone & McLean IS Success Model and the Saunders and Jones IS Function Performance Evaluation Model into a single IS assessment model. Though more comprehensive than its predecessors, this model also focused on IS function outcomes. However, none of these models included the factors impacting the key dimensions of performance.

The Core Capabilities Model (Feeny & Willcocks, 1998) on the other hand identified a portfolio of nine capabilities (e.g. IS/IT governance, business systems thinking, designing technical architecture, contract facilitation, vendor development) required for delivering a high performance IS function. Although Feeny & Willcocks discussed these capabilities in the context of recruiting an IS team capable of delivering a high performance IS function, these capabilities can be more broadly viewed as major requirements of the IS function. However this model did not look at outcomes nor offer a set of criteria for assessing each capability.

The IS literature identifies several key factors impacting IS function performance. These include user involvement, top management support, organisational commitment, staff infrastructure, CEO-CIO relationship, IS department structure, IS planning process, IS implementation, design of the IS product and service, and quality of information available to IS staff (Chow & Lui, 2003; Ranganathan & Kannabiran, 2004). However, unlike the literature for areas such as IS success and IS function performance, there has been little attempt to unify this literature into a coherent framework that can be used to evaluate and assess IS function performance; there is also little agreement on what to measure and how to measure each factor (eg. Luftman, 2004).

Using a business excellence framework, this paper will synthesize prior research on factors for achieving a high-performance IS function and measures of performance into a coherent set of criteria that can be used to evaluate IS function performance and achieve excellence. The remaining sections of this paper will discuss the adaptation of the Baldrige model to the context of IS function performance evaluation. The proposed IS-Excellence framework will examine each of the seven Criteria Categories as well as major requirements (items) for each criteria category. This intent is illustrated in Figure 2 below.

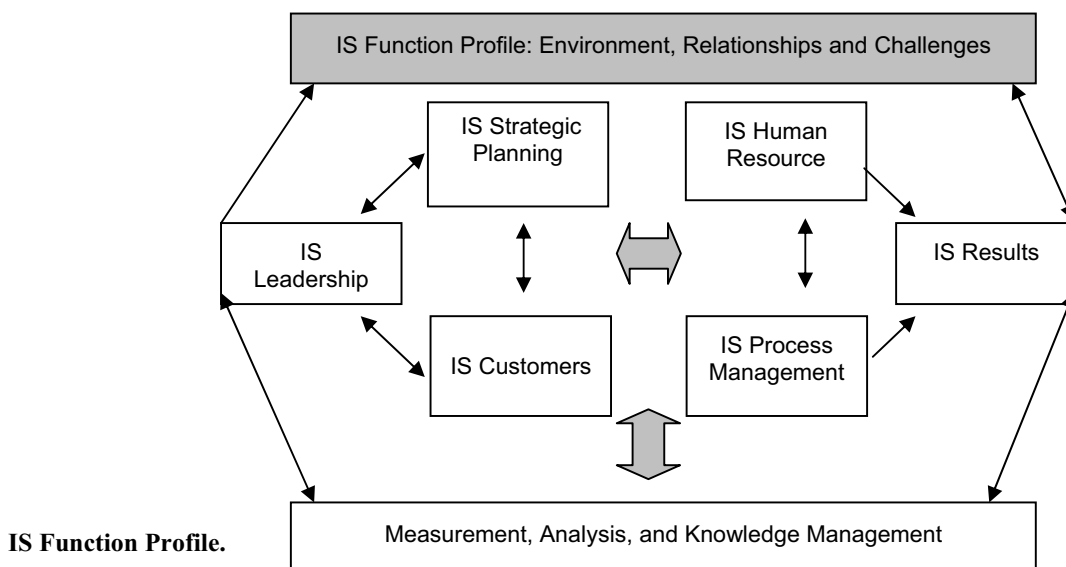
Figure 2: IS Excellence and Performance



IS EXCELLENCE MODEL

The main thrust of this paper is to propose an IS excellence model as an adapted version of the Baldrige model. The following sections demonstrate that the Baldrige criteria, as depicted in Figure 1, are highly applicable to IS. Importantly, the focus of the adapted model is on the whole IS function, rather than specific systems, or all applications within a business, or on an organisation's ability to develop systems (See Figure 3). The subsequent sections examine prior IS research for each of the seven *Criteria*.

Figure 3: IS Excellence Model



How information systems are used and hence what is expected of the IS function depends on characteristics of the internal and external environment of the organisation. The IS Function Profile is therefore essential to an evaluation of the IS function. It describes the environment in which the IS function operates, key stakeholder relationships (e.g. top management, users/customers, and external service providers), key challenges facing the IS function, and approaches to process improvement. This aspect of the model sets the stage for determining appropriate measures of IS function performance, and thus addresses a key weakness of current IS assessment frameworks (DeLone & McLean, 2003; Myers et al., 1997; Saunders & Jones, 1992).

The IS function profile includes the IS function's *structure* (e.g. hierarchical, self-directed team-based), *location* (e.g. centralised or decentralised), *governance system* (e.g. business monopoly, steering committee, and *key relationships* with stakeholders (e.g. with internal and external customers, CEO-CIO link, supply-chain relationships, vendor relationships, end-user developers), including their expectations and requirements. The internal organisational environment (e.g. organisational culture, structure) will also impact the IS function as also changes and characteristics of the hardware, software, data, human resource, and telecommunications environment. Useful

models for characterising and understanding the IS function's environment include the IT Interaction Model (Silver et al, 1995).

To maintain a focus on performance and process improvement, existing research shows that IS functions use systems such as total quality management, critical success factors, IT Scorecard, benchmarking, IT dashboard, IT value metrics and 'best practices' (Baschab & Piot, 2003; Chow & Lui, 2003; Cortada, 1998; Graeser et al., 1998; Teo & Ang, 1999).

1. IS Leadership

IS leaders are the IS personnel such as IT manager, CIO or IS team leader, who belong to the senior management team, or have a strong influence on the managerial effectiveness of information systems in the company. IS leadership may be characterised by adapting the criterion used in the "leadership" factor of the Baldrige model. Accordingly, IS leaders: (a) develop the mission, vision, values and ethics and are role models of a culture of IS Excellence; (b) are personally involved in ensuring the organisation's information system is developed, implemented and continuously improved; (c) interact with IS stakeholders, eg, top management and system users; (d) reinforce a culture of IS excellence with the organisation's people; (e) identify and champion organisational change established through IS.

The growing emphasis on the strategic use of IS, and the necessity for alignment of IS strategy with business strategy have highlighted the significance of IS leadership (Bergeron et al, 2001; Cross et al, 1997; Chan et al, 1997). With the increased dependence of organisations on IS and the greater influence of IS leaders in the overall decision making process, some IS leaders are now able to directly affect the strategic direction of the company (Applegate & Elam, 1992). Cross et al (1997) identified leadership and guidance skills as a core requirement for IT/IS managerial staff to achieve effectiveness. IS leadership has been identified by Feeny and Willcocks (1998) as one of the nine core IS capabilities that enable a business to consistently address the major challenges. The significance of IS leadership in IS excellence is also evident in the project excellence model developed by Westerveld (2003), where IS leaders are key elements of directing IS projects. The impact of leadership in change management (Kotter, 1995) and the fact that IS leaders play a significant role in IS directed organisational change (Markus & Benjamin, 1996) should also be considered. Therefore there is very strong evidence that the IS leadership factor is relevant in an IS excellence model.

2. IS Strategic Planning

This aspect of the Baldrige model includes Strategy Development and Strategy Deployment. *Strategy development* refers to addresses key factors of the development process, like competitive environment, strengths, weaknesses, as well as the organisation's strategic objectives. *Strategy deployment* on the other hand is concerned with how organisations convert their strategy into action plans, including: how action plans are developed; allocation of resources; specific plans; and key performance measures for tracking progress.

Both of the above sub-criteria apply to the IS function and have considered in IS strategic planning literature . For example, a number of IS planning methodologies have been proposed, eg, Ward & Peppard (2002). Also, Earl (1989) clarified what is meant by the term IS Strategy by indicating that strategy for IS comprises three inter-dependent parts: applications strategy, technology strategy, and management strategy. Thus, any IS planning methodology has to address what applications (IS strategy), what technology (Information technology (IT) strategy), and how the applications and the technology will be managed (Information management (IM) strategy). Some of the latest thinking reflects the need for *IT alignment*, and particularly the fit between business strategy and IT strategy (Luftman, 2004). Henderson & Venkatraman (1993) outlined different types of alignment and Chan et al (1997) reported a positive relationship between IT alignment and firm performance.

3. IS Customers

Within the Baldrige model, Customer and Market focus looks at how the organization determines the requirements, expectations, and preferences of its customers and markets (i.e. *Customer and Market Knowledge*), and how the organisation builds key relationships with its customers (i.e. *Customer Relationships and Satisfaction*). Key factors impacting customer acquisition, satisfaction, loyalty and retention, and consequent business expansion are also examined.

Customer and market focus has been explored in the IS literature in terms of user/customer relations. User satisfaction and IS quality have been widely accepted as critical dimensions of IS function performance (DeLone & McLean, 2003). As such, understanding IS quality (i.e. information quality, system quality, and IS service quality), and the requirements and expectations of users and customers as well as user/customer satisfaction have been a key focus of IS research (DeLone & McLean 2003; Ives et al., 1983; McKinney et al., 2002; Pitt et al, 1995). As a largely internal service function, customer loyalty, retention, and consequent expansion of the market, and the wider market focus are less common issues for most IS functions. However, as users become more autonomous in their IS decision-making, these issues are likely to become more important.

4. Measurement, Analysis and Knowledge Management

This Baldrige criteria includes two components: the measurement and analysis of organisational performance and information and knowledge management. The first category is broken down further into two topics: Performance Measurement and Performance Analysis. Both of these are relevant to IS Excellence. The two parts of the category would focus on performance measurement of the IS Function and performance analysis of the IS Function. Seddon et al (1999) reviewed and classified the many attempts to create metrics that could help firms monitor and improve IS. Seddon et al (1999) used the model to categorise numerous IS effectiveness measures, by stakeholder and by system perspective. For example, one measure was the quality of IS service (SERVQUAL), where *individuals* evaluate the *whole IS function* in terms of quality of service. Seddon et al (2002) build on the above matrix by reporting empirical evidence of evaluation practices used by firms for three different aspects of IT: individual IT projects/applications; the full IT applications portfolio; and the IT function.

The Information and Knowledge Management category addresses the availability of quality, timely information and the building and management of knowledge assets. For the purposes of the IS Excellence model we focus on the role of IS and the IS function in the knowledge management process. The main objectives of knowledge management from an IS perspective are: to make knowledge visible and to show the role of knowledge in the organization; to support knowledge sharing and to build a knowledge infrastructure (Davenport & Prusak, 1998). Current research in knowledge management indicates the need for a match between the IS solutions (KM systems) used to support the above objectives and specific KM initiatives. Kankanhalli et al (2003) link the choice of a KM systems to the process it supports (codification vs. personalization). Alavi and Leidner (2001) review perspectives of knowledge and the corresponding role of IT to support knowledge management. For example, if knowledge is defined as an object then the role of IT is to gather, store and transfer knowledge. While the role of information technology as a major KM enabler has been widely recognized, it cannot be assessed in isolation as authors also emphasise the importance of organisational environment and knowledge structure (Gold, et al 2001; Davenport, et al 1998; Argote, et al 2003).

5. IS Human Resource

The Baldrige model's Human Resource category looks at how the organisation's *Work Systems* and jobs, and *Employee Learning and Motivation* mechanisms enable employees to develop and use their full potential in alignment with the organization's objectives and plans. This category also examines how the work environment and employee support climate supports performance excellence, and employee well-being, satisfaction, and motivation (i.e. *Employee Well-Being and Satisfaction*).

IS research has examined aspects of the work environment such as job performance evaluation, supervisor support and career anchoring, career management, planning and progression, skills analysis and alignment, IS recruitment, hiring and retention, IS training and development, and IS-staff job, and career satisfaction and motivation (Baschab & Piot, 2003; Igarria, 1991; Jiang & Klein, 1999/2000; Lee, 2002). For example, in an environment characterised by constant change and technological advancement, a key human resource issue lies in identifying the current and future skills that are needed (Byrd & Turner, 2001; Schwarzkopf, et al. 2004). Research has also found that technical skills were valued more by CIOs (Byrd & Turner, 2001). The lack of CIO support for softer skills (e.g. interpersonal skills, business skills) raises concerns, as these are critical for achieving the goal of IS function excellence.

Research in IS-staff satisfaction and motivation also shows a need to be attentive to issues such as career management and career-path development, employee burnout, organisational commitment, role conflict, role ambiguity, work exhaustion and stress which often lead to high turnover intentions (Igarria, 1991; Lee, 2000; 2002; Moore & Burke, 2001; Sethi et al, 1999). For example, Lee (2002) found that the career-path development for IS professionals is often ill-defined - even when career plans are prepared, within an environment of high uncertainty

and high flux/high staff turnover, these plans may not materialise. An analysis of the dominant career goals also showed that most IS professionals aspire to senior management positions or "technopreneurship" (own boss) positions over the longer term (Lee, 2000). However the latter is not normally aligned with organisational objectives and will therefore challenge IS function performance initiatives.

6. IS Process Management

This category consists of two parts: value creation processes and support processes. Value creation processes refers to the methods of identifying key value creation processes, how they add value, what their requirements are, and performance indicators for each process. Similarly, support processes examine the key processes for supporting the value creation processes, their requirements, how they are designed to meet the requirements, and performance measures for control and improvement. Within the context of the IS Excellence model this item includes IS processes that help determine value creators, their support processes, their requirements and performance measures.

Luftman (2004) identified 38 main IS processes and discusses their relative importance. The processes are divided into three main categories: strategic, tactical and operational. The author argues that the most important IS processes are the processes which are critical to the company success. Luftman states that the processes should be ranked based on their impact on the organisation's critical success factors and their relative effectiveness (e.g. good, fair, poor). He recommends that processes that are critical to the business but in poor condition should be improved first.

Feeny and Willcocks (1998) identified nine IS capabilities which are core to the business's future capacity to exploit IT successfully. For each of the core capabilities the authors identify the skills required to achieve them, the appropriate time horizon (long-term vs. short-term) and the motivating values embedded in the capabilities. The CobIT framework identifies 34 IT processes and provides tools to assess and measure the organisation's IS capability for these processes. The tools include some elements of performance measurement (outcome measures and performance drivers for all IS processes); a list of critical success factors for each IS process; maturity models to assist in benchmarking and decision-making for capability improvements.

7. IS Results

The Baldrige Business Results category looks at key measures of organisational performance, including customer satisfaction, service performance, financial and marketplace performance, human resource results, operational performance, and governance and social responsibility. Table 1 uses the Baldrige sub-criteria and identifies many possible measures that could be incorporated into a set of IS Results, including some of popular measures like user satisfaction and service quality. Thus the IS literature already recognises that IS performance has many dimensions. For example, the Reformulated IS Success model (DeLone & McLean, 2003) shows the need to measure: information quality, system quality, service quality, intention to use, user satisfaction, and net benefits. Furthermore, Graesser et al (1998) also argue that IS performance requires multiple measures, and argue for the IS function to use an IT balanced scorecard, as an adaptation of the balanced business scorecard (Kaplan & Norton, 1992). Graesser et al (1998) replicate Kaplan & Norton's four quadrants for their IT scorecard: financial, customer, internal processes, and learning and growth.

The IS Excellence Model in Practice

The major purpose for the IS excellence model is to provide a comprehensive framework for organisations to improve their IS function. The concepts discussed above, i.e. of an IS excellence model, could not become useful to organisations until it was incorporated into a methodology for IS improvement. This methodology would need to include a mechanism for evaluating an organisation's IS function. For example, it may require the creation of an instrument similar to those created for the evaluation of business excellence. For example, the Baldrige criteria are evaluated using a series of questions for each part of the model (Baldrige, 2004). Thus something similar would be needed to evaluate an organisation's IS function. The subsequent evaluation could either be undertaken by trained assessors or through self-assessment (Porter & Tanner, 2004). The evaluation using the IS excellence model could be initiated by the CIO or some other senior IS person. The evaluation could be used to identify opportunities for improvement, and then for the IS function to take appropriate action to improve their IS. A more sophisticated and advanced use of the model would be to gather then compare data for multiple IS departments. For example, a large firm may have numerous IS units and they may use the model to benchmark their performance. Alternatively, an organisation may be able to select one or more organisations to benchmark with.

Table 1: Possible Measures for IS Results

Key Area	Indicators and Key Measures
7.1 Customer-Focused Results	End-user satisfaction; Web-satisfaction (McKinney, Yoon, & Zahedi, 2002); User satisfaction (Ives, Olson, & Baroudi, 1983); Client satisfaction (Graeser et al, 1998).
7.2 Product and Service Results	Information Quality (DeLone & McLean, 2003); Service Quality (Pitt, Watson, & Kavan, 1995); Quality of Service; System Quality (Myers et al, 1998)
7.3 Financial Results	Cost Reduction; ROI; Productivity; Budget Effectiveness (Graeser et al, 1998); Added value of IT (Graeser et al, 1998);
7.4 Human Resource Results	Skills and Abilities Igarria (1991); Career Satisfaction (Baschap & Piot, 2003), (Hsu, Chen, Jiang, & Klein, 2003); IS-Employee Burnout (Sethi et al, 1999), Turnover Intention (Igarria, 1991).
7.5 Organisational Effectiveness Results	IT Impact; Net Benefits (DeLone & McLean, 2003);
7.6 Governance and Social Responsibility Results	IS Governance (Peterson, 2004); Ethical Behaviour (Ballentine et al., 2000)

One key advantage of the proposed IS Excellence model is that it would address the need for a comprehensive set of measures of IS performance. Importantly, the IS Excellence model includes a broad set of important enablers of IS performance, e.g. leadership and strategy. At present, there seems to be no similar instrument in the public domain. Models such as the Core Capabilities model, the IS Success model and the IT Balanced Scorecard (DeLone & McLean, 2003; Feeny & Willcocks, 1998; Graeser et al, 1998) include common enablers of IS performance (e.g. IS/IT governance, system and information quality) and results (eg. organisational impacts). A major strength of the proposed IS excellence model is that it includes a more comprehensive range of both enablers and results, such as IS leadership, IS strategy, IS staffing and IS processes.

An IS Excellence model could have several benefits. For example, it can be used to identify 'best practices' in IT, and identify key characteristics for IT leadership. Unlike benchmarking models which are often unavailable to non-subscribers, business excellence models such as the Baldrige framework are publicly available and easily adapted to each organisation, while providing a standard against which IS functions can be measured across industries. Like business excellence models, an IS Excellence model can also rely on internally generated performance measures which can be determined by the specific organisational profile and through negotiation. This aspect will largely avoid a key hurdle of determining (and agreeing on) which matrices are the most appropriate for measuring the criteria. An IS excellence model can also provide a checklist of critical success factors that can then be selectively monitored. Finally, both the business excellence model and an IS excellence model, like the IT Interaction model (Silver et al., 1995) could also be useful for IS teaching.

CONCLUSIONS and FUTURE DIRECTIONS

The concept of business excellence has become increasingly popular as an approach to performance improvement for organisations. Although IS research has yielded some very useful models for assessing the performance of the IS function, these are largely focused on outcomes. In contrast, business excellence models provide a more holistic approach to achieving performance excellence by considering not only outcomes and their measurement but also environmental impacts as well as antecedents of performance excellence. Based on widely accepted business excellence frameworks and IS literature, this paper proposed an IS Excellence model for evaluating IS function performance. Future research could generate debate regarding which criteria should be included and how these should be measured. Different models may be proposed. The final outcome is likely to benefit IS by providing a greater understanding of IS performance.

The relative success in organisations of the excellence concept, coupled with the availability of some IS-specific self-assessment tools such as the UIS and SERVQUAL, indicates that an IS excellence model is feasible. However, since not all areas are covered by useful self-assessment tools, there are research opportunities to develop tools to assess item indicators for various criteria such as IS leadership and IS processes.

Finally, the IS excellence model provides a framework that unifies many aspects that are often researched in relative isolation (eg. IS leadership, IS strategy, IS service quality, and IS user satisfaction), and provides a useful structure for future research.

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