

Information Systems Assessment based on Business Excellence Models

Paul B Cragg

Department of Accountancy, Finance and Information Systems

University of Canterbury

Christchurch, New Zealand

paul.cragg@canterbury.ac.nz

ABSTRACT

Much attention has focused recently on business excellence, and excellence models have been created to encourage firms to evaluate and subsequently improve their business processes. Most of these instruments pay some attention to information systems. This paper focuses on the information systems content of both the Baldrige and EFQM excellence models. The information systems content of both models is analysed with the purpose of creating an instrument that will enable a small firm to carry out an assessment of their information systems area. The analysis identified six questions from the EFQM excellence model that could help managers of small firms assess their information systems. Although the six questions are a subset of the EFQM model, they should be validated empirically for their new purpose.

Keywords

Information systems, EFQM, Baldrige, benchmarking, small firms.

INTRODUCTION

Much attention has focused recently on business excellence, and excellence models have been created to encourage firms to evaluate and subsequently improve their business processes. Numerous excellence models exist, and some have been adapted for small firms. These excellence models typically cover a range of activities, including strategic leadership, quality, performance, and other key processes.

The focus on business excellence has spawned a number of self-assessment tools that have been designed to help firms identify where they stand and/or to get firms started on the business excellence journey. For example, the EFQM believe that their self-assessment instrument provides “a useful starting point and indicator for subsequent activities” (EFQM, 1999, p. 7).

The business excellence models cover a wide range of topics, eg, leadership and strategy. However, they tend not to directly refer to the area of information systems (IS) which is an

area that has become more important to small firms, spurred by the relative cheapness and pervasiveness of information technology, including the e.business revolution. This research aimed to propose a tool that could be used by small firms to conduct a self-assessment of their IS activities. If possible, the tool would be based on an existing business excellence model rather than the creation of yet another model.

Thus the research set out to analyse the content of the most popular business excellence tools. The Baldrige and EFQM models were selected and the analysis focussed on their self-assessment tools. In terms of a research question, the research set out to determine which parts, if any, of either the Baldrige or EFQM self-assessment instruments could be used to evaluate a small firm's IS. This paper presents the results of this analysis, firstly for the Baldrige model, and then for the EFQM model. The conclusions section proposes a set of six questions that could be used to evaluate a small firm's information systems activities.

Prior Research on Information Systems and Excellence

Although there is growing literature in both the Information Systems area and the area of Business Excellence, there is very little work that has attempted to bring the two areas together. One rare example is the SIM working groups on quality who proposed an IS excellence model based on the Baldrige criteria (SIM, 1992). They proposed a total of 27 quality matrices for self-assessment by IS departments. They proposed that IS managers could use the tool to assess their position on each matrix ranging from "just starting" to "world class", by evaluating their current practice against five levels of practice identified by SIM.

Also, Cortada (1998) examined the practices of many large firms to identify 'best' practices in IT. Amongst Cortada's IT best practices are alignment with business strategy, and the careful selection and monitoring of IT projects.

Although little research has combined both IS and Excellence, there have been many attempts within the IS field to incorporate principles that are reflected in models of excellence. For example, there is much literature about TQM and IS, eg, Ravichandran & Rai (2000). This literature examines a range of topics, including: the quality of software systems, the quality of the software development process, and the quality of the service received by customers/users of IS. There have been many attempts to create metrics that could help firms monitor and improve IS within a firm (Seddon et al, 1999). Two of the most commonly used measures are of user information satisfaction (UIS) and IS service quality, using an instrument called SERVQUAL. SERVQUAL is the more recent of the two instruments and aims to measure how satisfied users are with the information systems within a firm (Pitt et al, 1997).

The closest work to the aim of this paper is the instrument by Ravarini et al (2002) who have created a way of providing an "IS check-up" for a small firm, ie, an instrument aimed at assessing the health of a small firm's IT. Their methodology focuses on IT alignment, based primarily on the IT fit for each part of a small firm, for example, the sales area, accounting, logistics, etc. Their assessment evaluates the actual IT support in each area and the potential for IT for the area. Their exploratory application of the model in small firms indicates that some units within small firms are well supported by IT but there are plenty of opportunities for IT to play a greater role within small firms.

The IS content of the 2003 Baldrige Criteria for Business Excellence

The Baldrige Criteria for Performance Excellence (Baldrige, 2004a) contains the following seven categories:

1. Leadership
2. Strategic planning
3. Customer and market focus
4. Measurement, analysis and knowledge management
5. Human resource focus
6. Process management
7. Results

The fourth category refers to Measurement, Analysis and Knowledge Management. As a category it has a weight of 90 points in the total score of 1000 for the full model. The category is broken down further into the following two topics:

4.1 Measurement and Analysis of Organizational Performance, which is split into the two topics of 'Performance Measurement' and 'Performance Analysis' (45 pts).

4.2 Information Management, which is split into two topics 'Data and Information Availability' and 'Organisational Knowledge' (45 pts).

Under category 4.1, firms are asked to "Describe HOW your organization measures, analyzes, aligns, and improves its PERFORMANCE data and information at all levels and in all parts of your organization". The first part of this category encourages firms to focus on performance measurement practices. Firms are encouraged to have information systems that:

- Track both operational and organizational performance
- Support operational and strategic decision making
- And are up to date.

The second part of this category encourages firms to focus on the analysis of performance data. Firms are encouraged to:

- Analyse data that supports both performance reviews and strategic planning
- Communicate results to others within the firm.

Under category 4.2, firms are asked to "Describe HOW your organization ensures the quality and availability of needed data and information for employees, suppliers and partners, and CUSTOMERS. Describe HOW your organization builds and manages its KNOWLEDGE ASSETS. The first part of this category encourages firms to focus on data and information availability, including the reliability, security and user-friendliness of both hardware and software systems. The second part encourages firms to manage organizational knowledge. This includes not just the knowledge of employees, but also

knowledge from customers, suppliers and other partners. In addition, this category is concerned that all data, information and knowledge is timely, reliable, secure, accurate and confidential.

As well as the guide to the seven criteria, the Baldrige website also provides a guide to self-assessment (Baldrige 2003). As part of a ten step process, firms are encouraged to use the Baldrige self-assessment instrument (Baldrige, 2004b). The instrument has been prepared as a tool that an owner of a small firm could use with all staff including employees, managers, and supervisors. The purpose is to solicit views within the firm with the view of determining areas of the business that need the most attention. The Baldrige website also allows owners access to web-based self assessment using e-Baldrige. This instrument is aimed at helping owners carry out an 'organizational profile', which is step 4 of their 10 step process. (The instrument is not an electronic form of the "Are we making progress?" self assessment instrument).

The Baldrige self-assessment instrument (Baldrige 2004b) includes a total of 40 statements and covers the seven topics of the Baldrige model. Employees and managers are asked to rate each statement using a five point scale from 'strongly disagree' through to 'strongly agree'. The instrument includes the following six statements for category 4 on Measurement, Analysis and Knowledge Management:

- a. I know how to measure the quality of my work.
- b. I know how to analyze (review) the quality of my work to see if changes are needed.
- c. I use these analyses for making decisions about my work.
- d. I know how the measures I use in my work fit into the organization's overall measures of improvement.
- e. I get all the important information I need to do my work
- f. I get the information I need to know about how my organization is doing.

In addition, four other categories include the following statements associated with information systems issues.

Leadership: 1d - My organization's leaders share information about the organization.

Customer and Market Focus: 3d – I ask if my customers are satisfied or dissatisfied with my work.

Process Management: 6b – I collect information (data) about the quality of my work.

Business Results: 7c – I know how well my organization is doing financially.

Furthermore, the whole of the 'business results' criteria reflects a reliance on information systems, i.e., a firm would need systems that make it easy to report and analyse results for a wide range of activities including customers, products, financial, staff and society.

Overall, the Baldrige self-assessment instrument contains a total of 40 statements, 10 of which refer to information systems. Furthermore, the Baldrige criteria recognise that information flows play a key role in firms. However, the focus of the Baldrige criteria is on data, particularly the availability of data. None of the 10 statements refer to the

management of systems that would help in the collection, analysis and storage of data. Thus the Baldrige self-assessment instrument could help a firm analyse its information needs but it could not help a firm analyse its information management practices.

The Baldrige Criteria literature (Baldrige 2004a) does indicate the need for firms to manage the resource of data, information and knowledge. Category 4.2 indicates that hardware and software systems should be reliable, secure and user-friendly, and that all data, information and knowledge should be timely, reliable, secure, accurate and confidential. Thus this part of the Baldrige literature could be useful in the evaluation of data management. However, Baldrige (2004a) does not present this in a form that could be used easily for self-assessment.

The IS content of the 2003 EFQM Excellence Model – SME

The small firms version of the EFQM Business Excellence Model (EFQM, 2001) contains the following nine criteria:

1. Leadership
2. People
3. Policy and strategy
4. Partnerships & Resources
5. Processes
6. People Results
7. Customer Results
8. Society Results
9. Key Performance Results

Five of the criteria are considered as 'enablers' and four as 'results', where 'enablers' influence 'results'. The 'enablers' are: leadership, policy and strategy, people, partnerships and resources, and processes. The 'results' are: people results, customer results, society results, and key performance results. (See Appendix 1).

The most obvious treatment of information systems within the EFQM model is within criterion 4: partnerships & resources. The five parts of this category refer to managing:

- a. External partnerships
- b. Finances
- c. Buildings, equipment and materials
- d. Technology
- e. Information and knowledge

The EFQM's self-assessment questionnaire (EFQM, 1999) includes a total of 50 equally weighted questions for the nine criteria. Of these, five questions relate to criterion 4 on partnerships & resources. Managers are asked to evaluate each question based on the four possible responses of: not started; some progress; considerable progress; fully

achieved. Two of the five questions relate specifically to information systems, they are:

4.2 - Does your organisation ensure that all relevant information, including data on process performance, suppliers (including supplier performance), customers (including customer satisfaction) and benchmarks, is reliable, up to date, and quickly available and easily usable by appropriate personnel (including suppliers/distributors/customers where appropriate)?

4.5 – Is there a routine method for ensuring that alternative and new technologies are developed and implemented, and the use of intellectual property and knowledge optimised in order to gain an advantage on both products and services?

In addition, other criteria include the following statements associated with information systems issues.

Policy & Strategy – 2.1 - Does your organisation use widespread and appropriate data inputs to develop its strategy and business plans and does this data include the performance of internal processes, supplier performance, customer requirements and satisfaction, competitor and benchmark data?

Processes – 5.3 – Is there a comprehensive and reliable method for understanding customer's perceptions, needs, and expectations and the markets in which it operates?

Processes – 5.7 – Are the support (“back-room”) activities (eg, accounts, IT, despatch, data processing, personnel, legal, and secretarial) documented, controlled and continuously improved to at least the same level as the main product and service activities?

Key Performance Results – 9.7 – Are the results of the support and administration activities (eg, IT, planning, legal, security, accounts) showing an improving trend and can they be shown to be comparable/better than other organisations?

In addition, the four criteria that reflect results also reflect the need for information systems. For example, criteria 6 on customer results shows a need to collect various data, eg, customer satisfaction, loyalty, warranty claims, and complaints. Firms are expected to analyse and use this data in appropriate ways. Similarly, firms are expected to collect and analyse data regarding staff satisfaction, society results, as well as financial results like profit, volumes and market share.

Overall, the EFQM fundamental concepts and criteria recognise that information flows play a key role in firms. Overall, the EFQM self-assessment instrument contains a total of 50 statements, six of which refer to information systems. Three of these six EFQM questions relate to data availability (2.1, 5.3, and 9.7). The other three EFQM questions (4.2, 4.5, and 5.7) refer to the management of IS. In these three questions, the EFQM model recognises that firms should manage IT, including controlling, improving and introducing new technologies. Thus the EFQM literature could be useful in the evaluation of data availability and could also provide feedback on data management.

Discussion and Conclusions

Both the Baldrige and EFQM models show that data, information and knowledge is important to firms. For example, the Baldrige self-assessment instrument contains ten statements that could be considered directly relevant to information systems. The EFQM self-assessment instrument contains six statements that could be considered directly relevant to information systems. Thus both excellence models reflect a significant role for information systems within firms.

With the objective of using one of the models for the self-assessment of Information Systems, the 10 questions in the Baldrige self-assessment instrument focus solely on data availability. Although the EFQM self-assessment instrument has only six statements aimed at information systems, these six are evenly split between data and management. This analysis indicates that the EFQM self-assessment instrument would be superior to the Baldrige self-assessment instrument for the purpose of a quick evaluation of a firm's information systems. We thus recommend that the six questions contained in Table 1 could help provide small firms with a speedy evaluation of their information systems.

Table 1: Six EFQM questions for the evaluation of IS (sourced from EFQM 1999)

EFQM Criteria	
Policy & Strategy 2.1	Does your organisation use widespread and appropriate data inputs to develop its strategy and business plans and does this data include the performance of internal processes, supplier performance, customer requirements and satisfaction, competitor and benchmark data?
Processes 5.3	Is there a comprehensive and reliable method for understanding customer's perceptions, needs, and expectations and the markets in which it operates?
Key Performance Results 9.7	Are the results of the support and administration activities (eg, IT, planning, legal, security, accounts) showing an improving trend and can they be shown to be comparable/better than other organisations?
Partnerships & Resources 4.2	Does your organisation ensure that all relevant information, including data on process performance, suppliers (including supplier performance), customers (including customer satisfaction) and benchmarks, is reliable, up to date, and quickly available and easily usable by appropriate personnel (including suppliers/distributors/customers where appropriate)?
Partnerships & Resources 4.5	Is there a routine method for ensuring that alternative and new technologies are developed and implemented, and the use of intellectual property and knowledge optimised in order to gain an advantage on both products and services?
Processes 5.7	Are the support ("back-room") activities (eg, accounts, IT, despatch, data processing, personnel, legal, and secretarial) documented, controlled and continuously improved to at least the same level as the main product and service activities?

Analysis based on the above six questions could be useful to a small firm. The results may be even more helpful to a firm if they had some comparative data. For example, it may help a firm if they could compare their own data with published EFQM data for similar small firms.

Although we are recommending the use of the above six statements by small firms, it is important that this instrument is proved to be valid and reliable. Business excellence

models, including the EFQM model, have a mixed record regarding validity and reliability. McAdam & Welsh (2000) claim that, although the EFQM Model has been well accepted by managers there has been little rigorous empirical research aimed at the model. For example, Eskildsen et al (2000) believe that the model should be simplified. Such results prompted Kristensen et al (2001) to develop a Danish business excellence index where they reduced the 9 topics of the EFQM to four: leadership, people, systems, and results. They used PLS analysis to argue that the EFQM's 9 criteria reflect 4 not 9 underlying constructs. Furthermore, Baxter & MacLeod (1999) focused on the leadership criteria of the European Excellence Model. They concluded that "the EFQM subcriteria seem too superficial and the measurement process imprecise". Thus the above six item instrument for IS should be tested rigorously. They may be found to be reliable and valid. Six items may prove to be too few. It seems likely that we may need a fuller instrument to reflect, for example, other aspects including IS leadership, IS strategy etc. Also, the EFQM questionnaire uses a four point scale; this may be too narrow to discriminate effectively.

REFERENCES

Baldrige (2003), Getting Started with the Baldrige National Quality program: A Guide to Self-Assessment and Action, Baldrige National Quality Program, <http://www.baldrige.nist.gov/> (accessed 23/4/2004)

Baldrige (2004a), Criteria for Performance Excellence, Baldrige National Quality Program, http://www.baldrige.nist.gov/Business_Criteria.htm (accessed 23/4/2004)

Baldrige (2004b), Are We Making Progress?, Baldrige National Quality Program, <http://www.baldrige.nist.gov/Progress.htm> (accessed 23/4/2004)

Baxter, L.F. & MacLeod, A. (1999) Measuring business excellence: The case of leadership, Management Services, Enfield, July, 43:7, 14-17.

Cortada, J.W. (1998), Best Practices in Information Technology, Prentice Hall PTR.

Eskildsen, J.K., K. Kristensen, H.J. Juhl (2000), The Causal Structure of the EFQM Excellence Model, Proceedings: First International Conference on Organisational Excellence, (Ed. R. Edgeman), Colorado, August, 783-795.

EFQM (1999), Determining Excellence, EFQM Publications, Brussels.

EFQM (2001), Moving from the SME Model to the EFQM Excellence Model, EFQM Publications, Brussels, http://www.efqm.org/model_awards/sme/intro.htm (accessed 23/4/2004).

Kristensen, K., Eskildsen, J.K. & H.J. Juhl (2001), Benchmarking Excellence, Measuring Business Excellence, 5:1, 19-23.

McAdam, R. & W. Welsh (2000), A critical review of the business excellence model applied to further education colleges, Quality Assurance in Education, 8:3, 120-130.

Pitt, L.F., Watson, R.T. & Kavan, C.B. (1997), Measuring information systems service quality: concerns for a complete canvas, MIS Quarterly, 21:2, 209-222.

Ravarini, A., M. Tagliavini, G. Buonanno (2002), Information System Check-Up as a Leverage for SME Development, Ch 4, Managing IT in Small Business, (Ed. S. Burgess), 63-82, IDEA Group.

Ravichandran, T. & A. Rai (2000) Quality management in systems development: An organizational system perspective, MIS Quarterly, Sept, 24:3, 381-416.

Seddon, P.B., Staples, D.S., Patnayakuni, R. & Bowtell, M.J. (1999), Dimensions of Information Systems Success, Communications of the AIS (CAIS), Vol 2, Article 20.

SIM (1992), Quality Assessment and Planning Tools for IS, SIM working groups on quality, Oct, Society for Information Management, Chicago.

Appendix 1 The EFQM Excellence Model - SME (EFQM 2001)

