



A Systematic Approach to Diagnose the Current Status of Quality Management Systems and Business Processes

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A Systematic Approach to Diagnose the Current Status of Quality Management Systems and Business Processes

Purpose - This paper presents a systematic approach to conduct a diagnosis of the current status of a company's quality management systems (QMS) and business processes.

Methodology - The approach proposed is based upon the (1) assessment of the maturity level of a company's QMS, for which a 'maturity diagnostic instrument' is also proposed, (2) a self-assessment exercise using a business excellence model, and (3) a first party quality audit.

Findings - The integration of a QMS' maturity assessment, a self-assessment exercise and a quality audit may provide a more thorough evaluation of various company's systems and operations. This paper provides organisations, and their managers, with a systematic approach to help them understand better the current performance of their QMSs and business processes.

Originality/value - This paper's main contribution consists in the proposal of a novel approach for organisation to measure and understand the status of their QMS and business processes. Subsequently, better management decisions to improve a company's operations can be taken.

Keywords: Business Excellence Models; Quality Audits; Quality Management Systems;
Quality Maturity

Paper Type: Conceptual Paper

1. Introduction

Effective measurement to understand a company's performance is considered to support the management of business processes and change, long-term success, employee's motivation, better communication, resource allocation, and the formulation of a company's strategy (Kumar *et al.*, 2008; Bourne *et al.*, 2000; Sinclair and Zairi, 1995). In this context, understanding the current performance of an organisation's quality management system (QMS) and business processes is instrumental in determining subsequent management decisions to effectively improve its operations. Garza-Reyes *et al.* (2015a) and Rocha-Lona *et al.* (2013) have highlighted the need for measuring the status of QMSs and commented that this activity should be recognised by organisations as a key element for improving business performance. This is because, as suggested by Öztas *et al.* (2007), measuring the effectiveness (i.e. status) of QMSs enables managers to understand how closely they are from meeting their targets and hence take better decisions for improving their processes. Traditionally, organisations have measured their QMSs through activities that include: internal benchmarking, internal self-assessment, comparison of the level of QMS activities against peers, assessments by people external to the company, analysis of internal and external audit results and attempting to understand how an outside independent observer might see the company (Öztas *et al.*, 2007; Al-Nakeeb *et al.*, 1998). However, in some instances, these approaches have been criticised for being subjective, unclear and because of the lack of a systematic approach for their deployment (Öztas *et al.*, 2007). For this reason, some research has been conducted to propose different models and instruments to measure the status of QMSs. For example, Öztas *et al.* (2007) developed two matrix models to measure the effectiveness of QMSs in the Turkish construction industry. Van der Spiegel *et*

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3 *al.* (2005) proposed an instrument called IMAQE-Food to measure the effectiveness of QMSs
4 in the food industry. Similarly, Singh and Smith (2006) created an instrument, which was
5 validated within the context of Australian manufacturing organisations, to measure quality
6 management practices. These methods, however, have been developed considering the
7 specific needs and factors affecting specific industrial sectors, for which their transferability
8 may need to be studied further. Other quality management measurement instruments
9 proposed in the literature have included those proposed by Saraph *et al.* (1989), Flynn *et al.*
10 (1994) and Grandzol and Gershon (1998). However, according to Singh and Smith (2006),
11 none of those instruments reflect the current state of quality practices as they have
12 considerably evolved over the recent years. In other words, they can be considered outdated.
13 Finally, although other models such as the Capability Maturity Model Integrated (Menezes,
14 2002) have also been developed, these are mainly used by organisations to better control
15 certain processes, including quality processes, but not to assess the status of their QMSs.
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32 This paper contributes to the QMSs field by presenting a systematic approach, see Figure
33 1, that intends to help organisations carry out a diagnosis of the status of their QMS and
34 business processes. The systematic approach was designed and proposed in a conceptual
35 form based on the relevant Quality Management literature and the experience of this author
36 as academic, researcher, industrialist and consultant after having worked on several projects
37 for multinational organisations that wanted to design, implement, or improve their QMSs.
38 Considering the limitations of the QMS measuring models and instruments previously
39 discussed, the proposed approach is intended to be a generic method that could be employed
40 in any industrial sector and context to provide an easy to conduct and interpret assessment of
41 the status of not only QMSs but also business processes. Thus, the approach may be
42 considered more inclusive than those models and instruments previously found in the
43 literature. The approach is based on the definition and understanding of the maturity level of
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3 a company's QMS and on the assessment and identification of its strengths and opportunities
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5 for improving its core business processes. The approach also integrates quality audits to
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7 provide further information regarding the compliance of the QMS with the standards of
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9 customers, suppliers, partners, collaborators, industry sector or even government. The paper
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11 also highlights the importance and necessity of integrating the QMS and business processes
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13 diagnostic proposed in this paper into the organisation's business plan and strategy to create
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15 an improvement agenda.
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22 **Insert Figure 1 in here**
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27 **2. QMS Maturity Level**

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32 The method proposed suggests that a diagnosis of the status of a company's QMS and
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34 business processes can be initiated by an assessment of the maturity of a company's
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36 procedures, processes, structure and resources dedicated to assure that their products and/or
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38 services satisfy their customers' expectations. Within the context of this paper, 'maturity'
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40 refers to the degree of knowledge, effective deployment, use and concrete positive results
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42 obtained from a company's QMS. The six-level categorisation model proposed by Dale and
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44 Lascelles (1997) provides a simple tool for classifying and understanding the current
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46 organisational situation in reference to the degree of maturity of its QMS. Dale and Lascelles'
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48 (1997) model categorises the adoption of Total Quality Management (TQM) principles into
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50 six levels. The six levels of categories an organisation may fall under are: 1) Uncommitted; 2)
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52 Drifters; 3) Tool pushers; 4) Improvers; 5) Award winners; and 6) World-class. Table 1
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54 presents a brief description of the six categories in relation to an organisation's characteristics
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of TQM adoption related to each level. In the approach proposed, these are used as a platform for performing the maturity assessment.

Insert Table 1 in here

Appendix 1 presents a ‘maturity diagnostic instrument’ (MDI), which has been adapted based on Dale and Lascelles’ (1997) model. Besides helping to measure the maturity of an organisation’s QMS, the MDI can also aid in setting a general ‘current and future improvement’ comparative base, identify specific limitations, and thus business improvement needs. As Dale and Lascelles’ (1997) categorisation has been combined with a Likert scale, the MDI can also procure a level of development measure for every specific sub-category.

When using the MDI, only one number (e.g. 1. strongly agree, 2. agree, 3. agree slightly etc.) has to be circled for each of the 84 sub-categories shown in Table 3 presented in Appendix 1. This will indicate the assessor’s perception regarding the position of the company in relation to each of these sub-categories. Subsequently, the numbers that have been circled have to be transferred to the corresponding columns of the scoring table (Table 4 in Appendix 2). Finally, they need to be added, and the result of each sum divided by 14. This will provide comparable scores. In this case, the highest score will indicate the organisation’s status of quality maturity and category (e.g. ‘uncommitted’, ‘drifters’ etc.) in reference to the Dale and Lascelles’ (1997) classification.

2.1 Maturity diagnostic instrument (MDI) validity and reliability

Crowther and Lancaster (2008) suggest that it is important to ensure that questionnaire instruments are precisely and preventively inspected before they are distributed and/or used.

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3 This ensures the validity and reliability of the questionnaire instrument to make sure that it
4 effectively fulfils its purpose as a valid and reliable instrument to collect data (Crowther and
5 Lancaster, 2008). This will provide consistency and accuracy to the collected data (Saunders
6 *et al.*, 2012). To validate a questionnaire instrument, Robson and McCartan (2016) suggest
7 conducting a small scale pilot study prior to its distribution and/or use. This method was
8 adopted by the author to validate the MDI. In this case, in accordance with the
9 recommendations of Robson and McCartan (2016), a target of 10 subjects was used for the
10 pilot study. Thus, the MDI was sent out to 5 academic experts in the subject of Quality
11 Management and 5 Quality Professional Industrialists. The experts' review of the MDI
12 ensured the validity of MDI's content, face validity and construct validity by providing detail
13 feedback on the content, appearance and readability of the questionnaire (Kirkham *et al.*,
14 2014). The feedback received from the 10 academic and industrialist Quality Management
15 experts was used to improve MDI in these three validity categories.
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34 On the other hand, Robson and McCartan (2016) emphasise four types of threats to
35 reliability, namely; subject or participant error, subject or participant bias, observer error and
36 observer bias. The objective of the pilot study was to ensure that the subject/participant error
37 and subject/participant bias were overcome by eliminating unrelated questions and
38 ambiguities when understanding and answering the questions. The academic and industrialist
39 experts also had the opportunity of providing feedback on whether any additional questions
40 were needed to address the issue as well as to provide feedback on the linguistic and
41 presentation aspects of the questionnaire. The observer error and observer bias threats were
42 irrelevant for the reliability of the MDI as it was designed using fixed-alternative questions
43 that did not require interpretation (Binti Aminuddin *et al.*, 2015). To ensure that respondents
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3 had the same interpretation of the questions, some of these were rectified as a result of the
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5 feedback obtained from the pilot study.
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10 **2.2 Results interpretation**

11 An important consideration is the diagnosis made based upon the data interpretation. Some
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13 organisations may fall mid-way between some of the categories (Dale and Lascelles, 1997).
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15 On the other hand, other organisations may present 'hybrid' quality processes, procedures,
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17 structures and resources found in two or more groups (Dale and Lascelles, 1997). Thus, a
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19 general overview of the QMS status will be obtained by defining a specific category based on
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21 the highest score. However, assessing the amount of variance for each of the 84 sub-
22
23 categories in relation to the neutral points (i.e. score of 4) will provide a simple but more
24
25 meaningful diagnosis. In this case, the more severe the problem is, the closer the score will be
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27 to 7. Scores of 1 will indicate an optimum quality process or practice, while scores below 4
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29 will express the lack of existence of a problem.
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35 Although the MDI proposed can be used as a simple mechanism to evaluate the current
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37 status of an organisation's QMS at a specific point in time, its real potential is that it can
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39 serve as a measure of improvement. For instance, various evaluations can be conducted at
40
41 different points in time and the scores in each category and sub-category compared; if the
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43 score increases, this would indicate that the organisation has made some progress in that
44
45 particular sub-category or improved within the six-level category of Dale and Lascelles
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47 (1997).
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52 **2.3 Conducting the evaluation using the MDI**

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54 The assessment of QMS maturity using the MDI is suggested to be carried out by a
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56 multidisciplinary team comprised of staff from different levels (e.g. top and middle
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3 management, supervisors, shop-floor operators, etc.) of the organisation and different
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5 functional areas (e.g. quality, production, inventory management, human resources, etc.).
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7 With this, different perspectives and feelings will be taken into consideration, ensuring a
8
9 thoughtful and hence reliable assessment. In order for the organisation to 'buy-into' the QMS
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11 maturity assessment and its results, it is preferable for the assessing team to have sufficient
12
13 credibility. To reduce subjectivity and avoid an inaccurate interpretation of the results, it
14
15 would be recommended that the same team performs the different evaluations of the maturity
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17 of the organisation's QMS. This will not eliminate the subjectivity of the MDI completely,
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19 but it will contribute to reduce variability in the assessors' perceptions and thus improve the
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21 reliability of the quality maturity assessment (Estorilio and Posso, 2010).
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27 **3. A Self-Assessment Approach for Identifying Strengths and Opportunities for** 28 29 **Improvement in the Organisation's Business Processes** 30 31

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34 Determining the organisation's strengths and opportunities for improvement in its core
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36 business processes is considered the next stage in diagnosing the status of a company's QMS
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38 and business processes, see Figure 1. The MDI introduced in the previous section would have
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40 already provided the organisation with some insight on its strengths and opportunities for
41
42 improvement. However, a more thorough measure and analysis involving different aspects of
43
44 the organisation's business activities and core processes are required to achieve this. A
45
46 business excellence model (BEM) can provide an organisation with a powerful method of
47
48 self-assessment to achieving this. The use of the BEMs has quickly moved from one of mere
49
50 award participation to a more holistic approach employed by organisations to self-assess their
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52 operations (Rocha-Lona *et al.*, 2010). A self-assessment exercise using a BEM can provide
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3 organisations with a detailed 'picture' of their business processes and help in identifying
4 areas in need of improvement.
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10 **3.1 A best practice approach for conducting a self-assessment process**

11 Various authors and experts have proposed different approaches to effectively carrying out a
12 self-assessment exercise. Table 2 presents a comparison of some of these approaches. Based
13 on these, the literature, and industrial and research experience of this author, the following
14 method for conducting the self-assessment process is suggested:
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28 *Stage 1. Preparing the organisational environment for the self-assessment process*

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30 Setting up the organisation's environment to positively respond and contribute to the self-
31 assessment process is essential to its success. For this reason, some preparatory work before
32 conducting the self-assessment process is suggested to be performed in order to create a
33 contributive environment. The preparatory work may include:
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42 • The formation of a 'review committee' to not only act as a reviewer but also as a
43 champion of the self-assessment process. As suggested by Antony and Preece (2002), the
44 review committee may preferably be comprised of top management employees able to
45 directly communicate with the company's CEO, influence strategic decisions, carry out
46 follow-up actions and correct direction if necessary.
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- 49 • Gaining commitment from all the organisation's employees to ensure that the self-
50 assessment process is not perceived to be yet another audit (Hillman, 1994). In a self-
51 assessment process the organisation's performance and improvement are evaluated against
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3 a model for continuous improvement. By contrast, in traditional audits checks are carried
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5 out to assess whether the organisation complies with certain procedures laid out in
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7 manuals or standards.

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10 • A review of the organisation's mission statement, or creation of one, to make sure that it is
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12 based on important values in regard to its customers (e.g. quality, flexibility, agility,
13
14 dependability, etc.), and that it appeals to the company's stakeholders (Antony and Preece
15
16 2002).

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19 Some other factors include the following:

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21 - Ensuring commitment and involvement of top management, and relevant functional
22
23 areas, in the design and development of the self-assessment instrument.
- 24
25 - Ensuring commitment from top management to dedicate the needed resources (e.g. time,
26
27 personnel, finances, information, consultants, etc.) during the self-assessment process.
- 28
29 - Setting a communication channel through which to disseminate targets, execution
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31 progress and results of the self-assessment process to all company employees.

32 33 34 35 36 37 *Stage 2. Selecting a BEM*

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39 The selection of the BEM that is the most appropriate to carrying out the self-assessment
40
41 process would be one of the responsibilities of the review committee. BEMs have different
42
43 structures, focuses and characteristics. In this case, specific organisation's characteristics and
44
45 factors, such as size, industry, product/service, culture, quality maturity, geographical
46
47 location and nationality, and experience with self-assessment can be taken into consideration
48
49 for the selection of the BEM. 'There is no "best" framework, only an appropriate framework'
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51 (Porter and Tanner, 1998). Organisations may tend to adopt those BEMs available in their
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53 own countries or the most widely used or known (e.g. Deming, Malcolm Baldrige, EFQM
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55 etc.). However, if main BEMs are thought not to be appropriate enough to assist the
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3 organisation in the attainment of its strategic goals, a 'hybrid' and more specific model, based
4 on the criteria of the established models, can be created. Although a hybrid BEM would
5 certainly serve the specific needs and strategic goals of an organisation, it will not facilitate
6 benchmarking with other organisations or benefit from the annual review and refinement of
7 established models.
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13 14 15 16 *Stage 3. Forming and training the assessment team*

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18 The BEM's criterion addresses a wide range of areas that include leadership, people
19 management, people satisfaction results, business analysis and process management (Garza-
20 Reyes *et al.*, 2015b). Realistically, no single person is likely to have an in-depth knowledge
21 of all these areas. As a consequence, Porter and Tanner (1998) comment that it is a usual and
22 suggested practice for the assessment team to be comprised of approximately six members
23 from different functional areas of the organisation. The assessment team in charge of
24 performing the self-assessment process may be or may not be the same team in charge of
25 evaluating the maturity of the organisation's QMS using the MDI previously introduced.
26 However, as the definition of the organisation's maturity level and the self-assessment
27 process are part of the approach for diagnosing the status of the QMS and business processes,
28 it would be preferred for the same team to perform both assessments. This will ensure some
29 consistency and reduce the natural subjectivity involved in performing both evaluations.
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46 The role of leader within the assessment team would prefer to be assumed by a senior
47 employee. His/her main responsibility will lie in acting as a direct link to the review
48 committee as well as managing, motivating and supervising the assessment team. It would be
49 suggested for all the personnel involved in the assessment team to be trained to ensure that
50 they acquire the knowledge, expertise and skills required to perform a reliable, consistent and
51 honest self-assessment.
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3 The knowledge, expertise and skills may include:

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5 • A good understanding of the overall self-assessment process and a deep understanding of
6
7 the key steps most relevant to every team member.
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10 • A good degree of understanding of the BEM selected, e.g. its criteria and sub-criteria,
11
12 tools, etc.
13
14 • An understanding of the cost and benefits of the self-assessment process and its role in
15
16 continuous improvement.
17
18 • A development of the team members' technical and personal skills to ensure a consistent
19
20 assessment.
21
22 • A development of the skills necessary to collect and analyse data as well as identify the
23
24 gaps between the BEM's criteria and the current state of the organisation.
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27 • A development of the skills necessary to write and provide clear and comprehensive
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29 feedback as well as to propose and implement the appropriate measures for bridging the
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31 gaps identified.
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36 *Stage 4. Collecting the data and information needed for the self-assessment process*

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39 In this stage of the self-assessment process, the assessment team is required to collect and
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41 present all the information needed to perform the organisation's self-assessment against the
42
43 selected BEM criteria and sub-criteria. In terms of the data collection, this can be obtained
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45 through: formal and informal interviews with staff, managers and directors; questionnaires;
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47 examination of the company's documents; and information and perception of the assessment
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49 team members. Most of these data collection methods will require site visits, which will
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51 provide greater objectivity and a means of clarifying and verifying the data collected.
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55 On the other hand, based on the Gadd's (1995) empirical research, an assessment team can
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57 capture and present the information using one of the following methods:
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3 1. *Award-type position statement.* When an organisation participates for a quality award such
4 as the European Quality Award (EQA), it has to produce a document of no more than 75
5 pages in length. Gadd (1995) comments that while the preparation of this document is
6 lengthy and time-consuming, some organisations still decide to produce it for self-assessment
7 purposes, even if they do not intend to apply for the award. The empirical research carried out
8 by Gadd (1995) suggests that the way in which the data are collected to produce such a
9 document varies considerably. For example, in some cases only one middle-level employee
10 was in charge of the data collection, while in others only one director, or a group of directors,
11 was in charge of such collection of data. Since a multidisciplinary assessment team would
12 have probably been formed and trained by this stage, the collection of the data needed to
13 produce the document could be part of its responsibilities. This would make the data
14 collection process more efficient and meaningful.
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30 Porter and Tanner (1998) suggest breaking down each BEM sub-criterion or area into a set
31 of questions and statements. For example, assuming that the organisation has decided to use
32 the EQA model, the assessment team can 'translate' its criteria into questions such as: 1)
33 What does the organisation currently do in this area? 2) How does it do it? 3) How widely
34 used are these practices? 4) How is the organisation's approach reviewed and what
35 improvements are undertaken following a review? 5) How is the organisation's approach
36 integrated into normal business operations?
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48 2. *Pro formas and worksheets.* An alternative to the preparation of submission documents is
49 to capture and present the data in pro formas and/or worksheets. Gadd (1995) recognises that
50 although this method is much less exhaustive than the preparation of submission documents,
51 it can still serve as an effective and less time-consuming alternative. In this case, responses to,
52 for example, the questions previously stated can be recorded in the form.
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3 3. *Discussion groups.* A third alternative that does not involve the previous collection of data
4 or preparation of any documentation is the use of discussion groups. In this approach, the
5 assessment team, based on their experience and perception of the organisation, can provide
6 the information at the same meeting and time that the assessment takes place. This method
7 would obviously require less preparation time and effort but does call for an in-depth
8 knowledge of the organisation's core business processes on the part of the assessment team.
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18 *Stage 5. Assessing and scoring*

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20 In this stage, every member of the assessment team may individually evaluate every criterion
21 and sub-criterion of the BEM selected and submit a score based on their perception of such
22 criteria being implemented and practiced within the organisation. Although scoring is a
23 subjective exercise within the self-assessment process, the training previously provided to the
24 assessment team members in stage 3 can contribute to the reduction of a natural variation of
25 scoring. Main BEMs such as the EFQM and Malcolm Baldrige provide their own methods,
26 guidelines and charts for performing the scoring. It is therefore suggested that the scoring
27 methods and tools proposed by the BEM selected in stage 2 be used. Alternatively, an
28 organisation may wish to simplify or adapt the scoring system of a main BEM to its own
29 specific and direct needs and capabilities. The disadvantage of developing an 'in-house'
30 method for, in this case, scoring, is that (as previously discussed) it is more difficult to
31 benchmark with other organisations that use a different scoring approach.
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49 *Stage 6. Achieving consensus*

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51 The next stage in the self-assessment process is to reach a scoring consensus for each
52 criterion and sub-criterion evaluated as well as for the strengths and opportunities for
53 improvement of the organisation. This is because every member of the assessment team
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3 individually scores the organisation's performance against the BEM criteria and sub-criteria.
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5 Consensus is traditionally sought in a 'consensus meeting' led by the assessment team leader.
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7 As a rule of thumb, and in order to conduct the consensus stage more efficiently, the EQA
8
9 assessment indicates that if there is a less than 30% variation in the assessors' scores, then all
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11 the scores are simply averaged. This will provide an overall score for a specific criterion or
12
13 sub-criterion. However, if the variation is greater than 30%, then a discussion, agreement and
14
15 rescoring have to be undertaken. If after the rescoring a less than 30% variation is not
16
17 achieved, then the team leader can consider to take the best view and complete the consensus
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19 scorebook. It would be suggested to adopting and following this simple set of consensus
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21 criteria established by the EQA assessment in order to ensure a fast and efficient, but still
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23 objective, consensus process.
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30 *Stage 7. Producing the feedback report*

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33 Once a consensus has been reached, the following stage consists of the assessment team's
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35 leader writing a first draft feedback report, which can later be circulated to the other members
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37 of the assessment team. In this case, the assessment team members will review the report and
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39 include any observations, comments or make any amendments they believe should be
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41 incorporated into the report. The feedback report can be considered the major outcome of the
42
43 self-assessment process. In particular, Porter and Tanner (1998) suggest that a well written
44
45 and structured feedback report provides the following information:
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- 50 • *An overview of the assessment process.* This might include how it was conducted, who
51 participated in the assessment, the criteria and sub-criteria considered and evaluated, how
52 the data were collected, etc.
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- 3 • *An executive summary.* This should provide a concise description and impression of the
- 4
- 5 assessment and submission.
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- 8 • *A list of strengths and opportunities for improvement for each criterion and sub-criterion.*
- 9
- 10 • *The overall and individual score for each criterion and sub-criterion.*
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14 Finally, it is recommended for the self-assessment report to be passed onto the review
15 committee. The review committee will then discuss and coordinate improvement plans and
16 actions, and their prioritisation, with top management. It is typically at this stage that the
17 assessment team concludes the self-assessment exercise, although the review committee may
18 still require further clarification from either the team leader or the whole assessment team. It
19 is suggested that top management and the review committee include the assessment team in
20 the following stage of the QMS diagnostic, in this case, the quality auditing process. The
21 inclusion of the assessment team in the proposal and implementation of the appropriate
22 measures undertaken to bridge the gaps between the BEM criteria and the organisation's
23 current performance is also recommended. The self-assessment team would be comprised of
24 employees who are 'experts' and have an in-depth knowledge of the organisation's
25 functioning and processes. For this reason, their participation can prove invaluable to the
26 successful completion of the post-self-assessment stages.
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45 **4. Quality Management Audits**

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49 For some organisations, quality audits are a mandatory activity that needs to be performed in
50 order to comply with requirements from their customers, suppliers, partners, collaborators, or
51 industry sector and even to fulfil government regulations. Quality audits help organisations,
52 and those that request them, monitor and assure that a QMS is in place and working
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3 effectively. In turn, products or services that comply or exceed quality standards would be
4 expected. Oakland (1989) comments, ‘a good quality system will not function without
5 adequate audits and reviews’. It is for these reasons that the approach proposed in this paper
6 suggests the conduction of quality audits. Quality audits will provide further information
7 about the QMS and organisation’s business processes, particularly whether they comply with
8 the required standards. It is not within the scope of this paper to provide a detailed review of
9 the quality auditing process. This is an extensive topic within the quality management area
10 that has been clearly and extensively covered in specialised publications by, for example,
11 Johnstone *et al.* (2015) and Phillips (2015). Instead, the main objective of this section is to
12 explain how quality audits can be integrated and contribute to the diagnostic of the status of a
13 QMS and business processes, see Figure 1.
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28 In general terms, quality audits fall under three main categories: first-party audits,
29 second-party audits and third-party audits (Bernardo *et al.*, 2010). In a first-party audit, the
30 assessment of the quality system against a particular standard is carried out internally within
31 the organisation, whereas in a second-party audit this is done by a customer or supplier
32 (Bernardo *et al.*, 2010). In a third-party audit, an independent organisation not involved in
33 any contract with the customer and supplier, but acceptable to both of them, carries out the
34 audit (ISO, 2005). It is suggested that a first-party audit is the easiest and most efficient type
35 of audit to perform when this activity is integrated into the QMS and business processes
36 diagnostic. This is because the same team involved in the maturity assessment and self-
37 assessment process can conduct the quality audit. As this team may have been involved from
38 the initial stage of defining the maturity of the QMS and through the self-assessment process,
39 it would already have an in-depth knowledge of the QMS and core business processes of the
40 organisation. In addition, by the end of the quality auditing process, the assessment team
41 members would have acquired an overall ‘picture’ of the status of the organisation’s QMS
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3 and business processes. This will also facilitate the reporting and debriefing of such status to
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5 top management.
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8 Figure 2 presents a general illustration of the stages of a quality audit process. In the initial
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10 planning stage, different aspects that include the audit's purpose, time lines, scope, resources
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12 needed, etc. are identified and defined. Once the audit plan is complete, its implementation
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14 can begin. The implementation stage consists of several activities that include the collection
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16 of information, its comparison against the standard or criteria and the initial review of this
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18 comparison. In terms of the collection of data, quantifiable evidence is more reliable than
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20 subjective evidence, so auditors can aim at collecting this type of information whenever
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22 possible. The selection of the most appropriate method for collecting data may be based on an
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24 evaluation of cost, time, the risk of obtaining a bad judgment and the resources available to
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26 perform the audit.
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34 **Insert Figure 2 in here**
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40 The initial review stage follows the data collection activity. As part of this activity, the
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42 auditors review and analyse the data obtained after their comparison against the standard.
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44 This will lead to the allocation of non-conformities. Finally, the auditors will prepare a report
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46 and debrief the organisation on the differences found between the evidence collected and the
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48 standard. As the quality auditing process will provide an in-depth review and evaluation of an
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50 organisation's QMS against a specific standard, the information obtained from it will enrich
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52 the overall diagnostic of the QMS and its business processes.
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5. Role and Importance of the QMS and Business Processes Diagnostic on Operational Improvement and Business Strategy

A vital and initial step that may enable an organisation to improve their operations is to diagnose and understand the maturity of its QMS and the strengths and weaknesses of its core business processes. Evaluating whether the QMS complies with the standards set by the organisation's customers, suppliers, partners, etc. is also part of this initial step. Once achieved, the organisation can then propose and deploy an action plan to address the areas for improvement highlighted in the overall diagnostic of its QMS and business improvement activities. In the particular case of self-assessment processes, empirical evidence has revealed that the decisions and improvement agenda created based on such processes are rarely documented (Rocha-Lona *et al.*, 2008). As a result, it is difficult to estimate the degree to which self-assessment influences improvement actions or whether or not its results are simply kept in the desk drawer of the organisation's CEO or directors, with no improvement actions being drawn and implemented. It is therefore of major importance that the organisation integrates the diagnostic of its QMS and business processes into its business plan and strategy. This would provide the organisation with an effective mechanism by which to: 1) define adequate improvement actions; 2) transform these improvement actions into an improvement agenda; 3) implement, review and sustain the improvements; and 4) document the results obtained. Recent research by Rocha-Lona *et al.* (2010) suggests that BEMs are suitable frameworks for supporting strategic planning and business improvements. Similarly, the diagnostic of a QMS can also support improvement actions if integrated into the organisation's business plan and strategy.

6. Conclusions

This paper proposes a systematic approach for conducting a thorough diagnosis of a company's QMS and core business processes. In particular, the initial step of the diagnostic consists of defining the maturity level of the organisation's QMS. To do this, the paper proposed an MDI developed and adapted from the six-level categorisation model of Dale and Lascelles (1997). Defining an organisation's QMS maturity may contribute not only in providing a better understanding of its quality capabilities, structure, procedures and processes but also a comparative platform from which to later assess any improvements achieved.

As a second step, the QMS and business processes diagnostic approach proposed in this paper suggests that an identification of the strengths and opportunity for improvement in the organisation's business processes has to be carried out. To do this, a self-assessment exercise using a main BEM, or alternatively a tailored model that draws different criteria from different BEMs, is recommended. For this reason, the paper takes a detailed look at the key steps in the self-assessment exercise and proposes a series of stages based on best practices of experts in the area, the literature and this author's own experience. These include setting the organisational environment for the self-assessment process, selecting a BEM, forming and training the assessment team, collecting the data and information needed for the self-assessment process, achieving consensus, assessing and scoring and producing a feedback report. Understanding and practicing these steps are vital to performing a self-assessment exercise and developing the organisation's capability to carry out such processes. Finally, the methodology also integrates quality audits as a means to providing information about the compliance of the QMS in relation to customers, suppliers, industry, or government standards. The paper also briefly discusses the importance of integrating the QMS diagnostic

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3 into the organisation's plan and strategy as an approach to more effectively drive
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5 improvement actions and their implementation.
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8 The systematic approach presented in this paper has been designed and proposed in a
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10 conceptual form based on the experience of this author as academic, researcher, industrialist
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12 and consultant after having worked on several projects for multinational organisations that
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14 wanted to design, implement, or improve their QMSs. Therefore, the necessity to validate the
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16 proposed method is stressed, for example, by empirically testing the systematic approach
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18 proposed through an industrial case study or a multi-case study approach. Additionally,
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20 although the MDI proposed has been validated through a small scale pilot study, this is
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22 recommended to be re-evaluated using appropriated statistical methods. These are part of the
23
24 further research agenda derived from and proposed by this paper.
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Appendix 1



Table 3. Maturity Diagnostic Instrument (MDI)

| Sub-category | Strongly Agree | Agree | Slightly Agree | Neutral | Slightly Disagree | Disagree | Strongly Disagree |
|---|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| 1. Quality improvement (QI) initiatives <i>are not</i> only carried out to achieve ISO 9000 registration or comply with customer requirements | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Initial enthusiasm after implementing a quality management system (QMS) or QI programme <i>does not</i> fade overtime | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Organisation holds an ISO 9000 certification (or is close to obtaining it) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Organisation recognises that the effective implementation of a QMS requires cultural change | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Organisation has a culture where quality <i>is not</i> dependant on the commitment and drive of a limited number of individuals | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. A total integration of continuous improvement (CI) and business strategy to delight customers exists | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Organisation <i>does not</i> only apply quality management (QM) tools and techniques due to customers' presence, monitoring and pressure | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. Organisation <i>has not</i> expressed disappointment about the current QMS | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. Organisation employs a selection of quality management tools (e.g. SPC, QC, FMEA, mistake proofing, quality improvement groups etc.) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Organisation recognises the importance of customer-focused CI | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. All employees are involved in CI | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. Organisation's purpose and values are defined and communicated at all levels | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. Not only does the quality department drive the QMS and maintain ISO certification but all staff participate and have concern for quality | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. Organisation <i>is not</i> susceptible to the adoption of the latest QM fads | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. Organisation <i>does not</i> tend to look for the latest QI approaches/tools for a 'quick fix' | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. Senior management shows commitment towards QI through both leadership and personal actions | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. A number of successful organisational changes have been made | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. Organisation has developed and applied a unique success model | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. Success of quality initiatives <i>is not</i> linked to the success of external audits only | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. Management teams <i>do not</i> try a variety of approaches in response to the latest QM fads | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 21. All senior management members are committed to the organisation's QMS | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 22. Organisation has formulated a quality strategy and implemented, at least, a good portion of it | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 23. Business procedures and processes are efficient and responsive to customer needs | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 24. Organisation places a positive value on internal and external relationships (e.g. with employees, customers etc.) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 25. QM <i>is not</i> considered a contractual requirement and an added cost | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. Senior management <i>does not</i> assume that CI occurs naturally and/or is self-sustained | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 27. CI efforts are not only concentrated in manufacturing/operations departments but also in other departments of the organisation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 28. A problem-solving infrastructure and a proactive QMS are in place | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 29. Process improvement results are measurable and carried out through effective cross-functional management | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| Sub-category | Strongly Agree | Agree | Slightly Agree | Neutral | Slightly Disagree | Disagree | Strongly Disagree |
|---|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| 30. Organisation works in partnership with stakeholders | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 31. Priority is given to QI in terms of time and/or allocation of resources | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 32. Organisation has adopted different quality philosophies (e.g. Deming, Crosby, Juran, SPC, ISO, TQM, Six Sigma etc.) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 33. A QMS exists and the data it provides is used to its full potential | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 34. A long-term and company-wide education/training programme is in place | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 35. Strategic benchmarking is practiced at all levels | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 36. QMS helps to identify opportunities to improve the ability of the company to satisfy its customers | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 37. Corrective actions <i>are not</i> only taken in response to customer complaints | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 38. Continuous improvement is perceived as a strategy, not as a programme only | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 39. Long-term results in all organisational aspects (as opposed to short-term results regarding product output and quality only) are expected | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 40. Individual staff carry out improvement activities within their own spheres of influence and on their own initiative | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 41. A system for internal and external performance measurement is in place | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 42. Organisation is constantly looking to identify new/more products, services or characteristics which will increase customer satisfaction | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 43. Support to solve problems <i>is not</i> based on their impact on sales/turnover only | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 44. A plan for effectively deploying a QMS exists | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 45. Processes <i>do not</i> have considerable potential for improvement | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 46. Importance of staff involvement in CI is recognised, communicated and celebrated | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 47. Employees at all levels reflect a participate culture | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 48. A QI culture is no longer dependent on top-down drives but it is also driven laterally through the whole organisation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 49. Quality of design has a high priority | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 50. Management <i>is not</i> over susceptible to outside intervention and <i>does not</i> easily get distracted by the latest QM and CI fads | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 51. All parts of the organisation believe that the current QMS is effective | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 52. Benchmarking studies have been initiated and the results used for CI | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 53. Management practices a culture of empowerment | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 54. The vision of the entire organisation is aligned to the voice of the customer | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 55. Organisation has made an acceptable investment on quality education and training | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 56. Quality department has a high status within the organisation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 57. Momentum of improvement initiatives is easy to sustain | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 58. Organisation has QI champions among some senior management members | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 59. Current QMS is sincerely viewed by all employees as a way of managing the business to satisfy and delight customers, both internal and external | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| Sub-category | Strongly Agree | Agree | Slightly Agree | Neutral | Slightly Disagree | Disagree | Strongly Disagree |
|--|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| 60. Total quality is the organisation's 'way of life' and 'way of doing business' | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 61. Senior management <i>does not</i> take responsibility for CI/QI activities | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 62. The 'born and died' of improvement teams <i>is not</i> a constant phenomenon | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 63. Training on quality tools is aimed at persons that can influence their further application | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 64. Trust between all levels of the organisation exists | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 65. Perception of stakeholders of the company's performance is surveyed and acted on to drive improvement actions | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 66. Quality values are fully understood and shared by employees, customers and suppliers | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 67. Organisation has had positive previous experience with ISO, TQM or other quality management approaches | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 68. Cultural changes have taken place after the implementation of CI/QI programmes | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 69. Quality tools and techniques are implemented strategically and not only reactively and when necessary | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 70. There is low preoccupation with numbers (e.g. financial measures) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 71. Results of improvement projects are effectively utilised | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 72. Each person in the organisation is committed, in an almost natural way, to seek opportunities for improvement | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 73. There <i>is not</i> an overwhelming emphasis on the achievement of financial measures | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 74. Appropriate knowledge of the current QMS exists | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 75. Meeting output targets <i>is not</i> the only key priority for the majority of managers; there are no conflicts between the prod./operations department with quality department | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 76. QI drives and direction <i>do not</i> rely only on a small number of individuals | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 77. All things are done right first time | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 78. Dependability is emphasised throughout the organisation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 79. There is a long-term plan for corrective actions for reoccurrence of problems | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 80. Self-assessment is performed and improvements identified are addressed | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 81. The organisation has a flexible QMS not only designed to fulfil customer regulations | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 82. If key directors/managers/individuals leave, business mergers occur, organisational restructuring takes place etc. there <i>is no</i> danger of losing momentum or failure in terms of QM/QI initiatives | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 83. QMS is effective and it does help to identify opportunities to improve the ability of the company to satisfy its customers | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 84. Waste is not tolerated | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Table 1. Description of organisation characteristics in relation to the six Dale and Lascelles (1997) categories

| Level | | General Characteristics |
|-------|---------------|---|
| 6 | World-class | Organisations would have integrated quality improvement programmes with their business strategy to creatively delight their customers |
| 5 | Award winners | Organisations would have quality improvement deep rooted into their organisational culture and be able to compete for quality awards such as the Deming Prize or Malcom Baldrige National Quality Award |
| 4 | Improvers | Organisations may have made important advancements in quality improvement after having been engaged with it for 5 to 8 years. They would recognise quality improvement as a culture and not only as the implementation of some tools or use of quality concepts |
| 3 | Tools pushers | Organisations would have ISO 9000 certification and meet the QMS requirements of one or more major customers. They would be employing some quality management tools, e.g., statistical process control, quality circles, cause-and-effect diagram, etc. |
| 2 | Drifters | Organisations would have received advice on TQM, and probably been engaged on a quality improvement programme for 12 to 18 months |
| 1 | Uncommitted | Organisations would usually be limited to gaining ISO 9000 certification and would have not started formal processes for quality improvement |

Table 2. Self-assessment approaches found in the literature

| Gadd (1995) | Porter and Tanner (1998) | Hillman (1994) | Antony and Preece (2002) |
|----------------------|---------------------------------|---|--|
| Stages | | | |
| 1. Data gathering | 1. Choosing a framework | 1. Develop commitment | 1. Constitute a steering committee |
| 2. Assessment | 2. Forming the assessment team | 2. Plan self-assessment cycle | 2. Mission statement |
| 3. Plans and actions | 3. Collecting the information | 3. Establish model and reporting system | 3. Set strategic goal |
| | 4. Assessing and scoring | 4. Communicate plans | 4. Choose a BEM |
| | 5. Consensus | 5. Educate staff | 5. Training and education |
| | 6. Site visits and verification | 6. Conduct self-assessment | 6. Assign responsibility for assessment of individual criteria |
| | 7. Feedback | 7. Establish action plan | 7. Collecting data/info for self-assessment |
| | 8. Action planning | 8. Implement action plan | 8. Carry out comparison with BEM chosen |
| | | | 9. Develop of a corrective/preventive action |
| | | | 10. Monitoring the assessment plan |
| | | | 11. Authority to proceed for self-assessment plan |

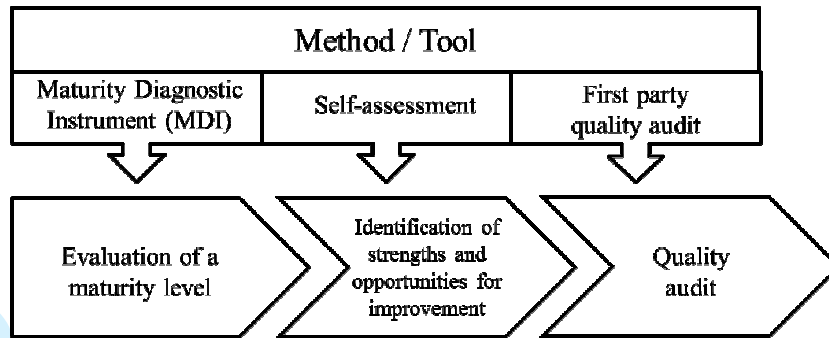


Figure 1. Approach to evaluate the current status of QMSs and business processes

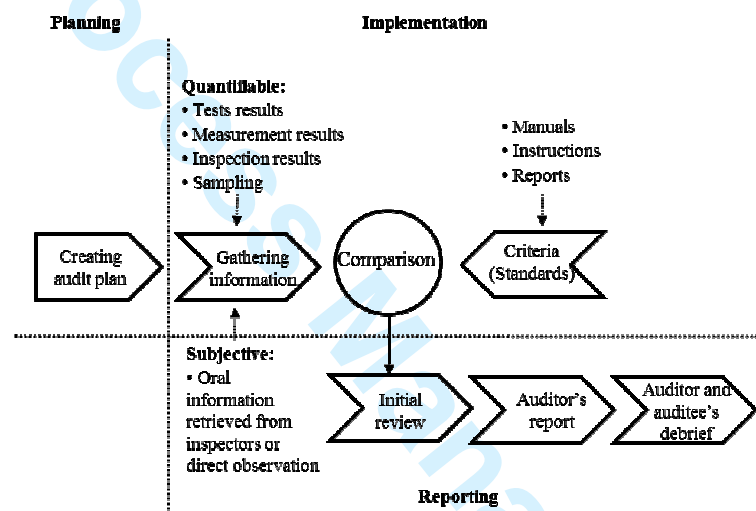


Figure 2. Quality auditing process