

A PRACTICAL TOOL FOR SMALL AND MEDIUM ENTERPRISE QUALITY PERFORMANCE IMPROVEMENT

Mohd Nizam bin Ab. Rahman, Baba bin Md. Deros, Rozli bin Zulkifli and Ahmad Rasdan bin Ismail

Manufacturing Management Group

Department of Mechanical and Materials Engineering,
Universiti Kebangsaan Malaysia, 43600 UKM, Bangi, Selangor

E-mail: mnizam@vlsi.eng.ukm.my

ABSTRACT

Quality performance in manufacturing may be assessed in several different ways. The aim of this paper is to present a practical tool that can be used by manufacturing companies, especially Small and Medium-sized Enterprises to assess and improve their quality performance through self-assessment practice. By means of two case study companies, the authors demonstrate the effectiveness of the self-assessment tool. Self-assessment tool offers the company to develop and maintain their own quality practices more clearly, setting their own pace, identifying constraints, strengths and weaknesses for business strategy improvement and excellence. A 'before-and-after' result of two manufacturing companies is presented. The results suggest that the self-assessment as a practical tool for quality performance improvement is suitable for companies to enhance progress on their quality journey. Conclusion and suggestions are also made for further research.

Keywords: Operations Management, Quality Improvement, Self-assessment, Small and Medium Sized Enterprises (SMEs)

1. INTRODUCTION

It is frequently discussed that quality is a key to gain competitive advantage. For manufacturing companies committed to pursue business improvement, quality performance is always viewed as a strategic way of doing business. Embarking upon, implementing and sustaining a quality practices culture and its process require change in strategies and techniques that should be applied across the company. The challenge therefore, is how to incorporate quality performance practices into the strategic planning process and ensure that all companies functions are involved, mainly if they are related to Small and Medium-sized Enterprises (SMEs). It is widely accepted that many SMEs suffer both from limited managerial expertise and from financial constraints, such that many are unable to hire a consultant to improve their quality performances.

In their previous articles based on empirical fieldwork [1], the authors have suggested that Malaysian SMEs require a simple and well-structured approach to develop quality practices. From these studies, it was clear that many companies did not know how to start a quality journey. Therefore, the aim of this paper is to suggest how self-assessment as a practical tool, to be used by SMEs to improve their quality practices, using quality award criteria as a business excellence approaches.

The idea to establish the self-assessment started from an understanding of the typical problems and constraints suffered by SMEs in their quality development and performances. This is considered crucial for Malaysian SMEs, for whom a self-assessment must fit their characteristics and constraints [2]. The authors' fundamental objective of writing this paper was to set out an economical, practical and a simple approach, comprehensive of quality best practices for SMEs, including aspiration towards business excellence and ISO 9001 certification. The other objective is to suggest the main concepts and criteria behind quality self-

assessment implementation, which support its implications for quality-related engineers such as production, maintenance, quality control and quality assurance engineers.

2. SELF-ASSESSMENT AND QUALITY AWARD APPROACH

An initial analysis and diagnosis of a company, using self-assessment as a formative tool, can help one to map out a clear path towards TQM implementation, as well as allowing a company to discern its strengths and weaknesses clearly. Mann *et al.* [3] suggest that the application of a self-assessment approach is the first step towards a company's achievement of excellence. In addition, as proposed by Fuentes *et al.* [4], the process of quality implementation requires a working structure that acts as a reference standard to guide and assess the process implemented. This is because self-assessment is a systematic tool and an organisation's activities can be reviewed regularly and thus their results can be set against a benchmark of quality excellence [5]. Hewitt [6] and Wilkes and Dale [7], meanwhile have pointed out that the European Foundation for Quality Management (EFQM) Model of Business Excellence does little to help SMEs in their business environment. These authors therefore have suggested that an appropriate self-assessment tool should be used before applying for an award. This is a strategic planning practice, together with self-assessment, can be used as a guide or a benchmark for interested manufacturing companies aiming to win a quality award (e.g. Malaysian or national quality award), as well as to achieve business excellence.

Companies may resort to different approaches to self-assessment such as through questionnaire, workshop or award simulation [5]. However, the ultimate aim of the self-assessment is to provide a starting point for a company on the process of understanding the needs of a quality excellent culture and the development of quality practice requirements. The self-assessment acts as an

alternative means for a company intending to improve their quality development without adopting complicated modern quality models. Based on studied by Tari [5]; Soltani *et al.* [8]; and Khoo & Tan [9] stressed that many business organisations nowadays are using self-assessment approaches as their performance appraisal tool to enhancing their competitiveness in the global market. Hence, it is vital to include the right elements in the self-assessment. In order to establish a credible basis for the self-assessment, the questionnaires were developed based on the Malaysian Quality Management Excellence Award (QMEA) criteria [10], as well as information from other published materials, such as the 2002 Malcom Baldrige National Quality Award (MBNQA) criteria [11] for performance excellence. The QMEA criteria consists of seven categories; Top Management Leadership and Management of Quality (TMLMQ 200 points), Use of Quality and Information (UQI 100 points), Human Resources Management (HRM 200 points), Customer Focus (CF 150 points), Quality Assurance of External Suppliers (QAES 50 points), Process Management (PM 100 points), and Quality and Operational Business Result (QOBR 200 points).

Self-assessment tool does not suggest that all quality and excellence criteria should be assessed and all issues taken on board at the same time. Priorities will inevitably be dependent upon the company targets, resources and current problems. The self-assessment process can be started by reviewing the various options among the criteria provided. For example, starting with one of the QMEA criteria, perhaps the Top Management Leadership and Management Quality criterion, and subsequently followed by with the other six criteria. It must be remembered that the various criteria may be applied only when they are needed, according to company requirements and capability, and under uncertain situation need not be applied wholesale. This approach allows the company to pace their own quality development and avoid unnecessary difficulties, such as being overwhelmed by the size of the entire task. It is believed that when the SMEs obtain positive outcomes at an early stage, it should help to provide future motivation and trust in quality award application or other quality initiatives [2].

3. DESIGN AND VALIDATION OF THE SELF-ASSESSMENT TOOL

In order to develop and establish a robust self-assessment tool, it is necessary to: (i) investigate the barriers that may hinder the self-assessment implementation; (ii) identify basic quality activities which will support the self-assessment implementation process; (iii) study how SMEs can introduce and implement self-assessment and its quality initiatives, and what are the appropriate further initiatives for quality implementation; and (iv) validate the suitability of the self-assessment for company application. These objectives were achieved through a research programme, in which the authors contacted two case study companies (named here as Companies 1 and 2) as pilot study companies as well as to obtain the comments and advice on the design of the self-assessment questions and its implementation. Case study method was chosen because this type of approach is preferred when “how” and “why” questions are being asked during interview or discussion sessions. Besides observation, the interviews were conducted with the person responsible for the self-assessment implementation in each company. The interviews took about two hours, on average at each session, and each was tape-recorded. The case study was conducted during multiple sessions, which

were completed in May 2006. This entire approach was designed to allow these companies to scope and develop their own quality journey, especially in terms of the preparation and remedial actions related to each quality activity and the expected results. However, the selection of initial quality initiatives is flexible, and will be largely dependent upon each company’s business objectives, existing initiatives and capabilities.

Throughout the questionnaire construction, discussions were also held with practitioners and experts in the field, to check on the clarity of the questions, the appropriateness of the proposed scale, the indicators and the illustrations applied, as well as their overall presentation. All the assisting practitioners and experts were asked to act as assessors, answering all the questions and completing all the calculations. It was stressed by the experts that, since many SME staff have a relatively low educational level, it was important to keep the questions as simple as possible. Respondents suggested that questions have to be asked in general and matched with company capabilities; therefore ‘if appropriate’ or ‘if applicable’ was added to some questions. As for improvement, all the self-assessment questions were revalidated and enhanced. Finally, all the experts agreed that it was, in general, a sensible and practical approach to assess company’s quality performance. The questions were readily understood; it was easy to use and was also illustrated with some interesting cartoons. A simple calculation process was used to calculate the scores at the end of the questions. The example of self-assessment questions is presented in the Appendix 2, which includes some of the QMEA criteria and its associated questions.

4. SELF-ASSESSMENT PRACTICE

The proposed self-assessment tool was designed to help any SMEs or company to begin looking systematically at their business strategy and be able to highlight the key improvement areas. Once completed, it will show company strengths and weaknesses, so that it can build on the good practice that already exists and it will give a clear indication of those improvement opportunities, which are appropriate to take action in company business strategy. Company will see both where most effort needs to be focused and where they are already making progress, as well as it will provide a framework to help company clarify priorities. The self-assessment attempts to answer some hesitation queries relating to business performances, for example; “What is your company quality level achievement?” or “Where is your product going in market competition?” or “How you sustain your internal and external customer satisfaction?” and etc.

The self-assessment starts with a description manual in which the assessor (e.g: Quality Control Engineer or Senior Managerial level) shall understand the procedure of the self-assessment. The self-assessment consists of seven criteria according to QME Award. The assessor will decide the criterion or criteria that will be assessed and answer all questions provided. The assessor should be genuine and honest to the answer of questions asked. The assessment would take approximately an hour to complete. If a question appears not to be applicable to the scope of company business, leave it blank and move on to the next question. Copy the total score of each criterion into calculation sheet. With referring to the description, the assessor will identify all the questions with lower scores, judge for further action and determine its priority. If the result is unsatisfactory, remedial action shall be planned according to the priority of the problem

or task/activity. The priority of the task/activity can be ranked in the Gap Analysis Form (as provided in the Appendix 2).

The assessor shall continue and conduct the performance measurement, and report on how this new activity is progressing and present this to the management. According to the report or data collection, if the results are still unacceptable, the remedial action shall be continued and transformed. For the new or modified process/activity, the committee or top management shall confirm all actions taken on the new process, before releasing it for standardisation and if necessary, Standard Operating Procedure (SOP) should be prepared. As a suggestion, the top management should have a company Quality policy or a Quality Management (QM) implementation process, as a clear road map and practical guide for quality continuous improvement. The company can draft both a short and long term plan for introducing QM in their company. This self-assessment will help the manager or engineer to understand the requirements of quality management system, quality action plan, quality improvement ideas and choose the relevant techniques or approaches. The assessment shall be periodically repeated for company continuous improvement and documentation, such as, for every 6 months or annually basis. This practice is necessary for excellent business performance practices. If a company has noticed this assessment is too hard for their business, it is suggested that they fix on criterion that might helps they most.

How it is work? An example is provided next for question 1.1 on ‘Top Management Leadership and Management of Quality (TMLMQ)’ of the self-assessment questionnaires; “1.1 Does your company have a vision and mission statement?”. With indicators provided (see Appendix 1), the assessor has to identify the most suitable answer for the above question. If the assessor consider that this ‘Yes, and over time, I have seen real benefit from doing it’, he/she has to mark accordingly. Now choose the score (i.e. score = 8) for this question and mark the appropriate number in the right hand column. Continue to other questions of the page. Move on through all the issues in the same way and total the scores. Move across the columns, marking questions accordingly. A higher Quality Criterion Score (QCS) means a good achievement and a lower QCS means improvement is needed. The lower QCS shows the company weak points and some reforms to the system or process would be necessary. Next, it is recommended to look at the pattern of every answers and identify which issues give you lower scores, and it is important to ask your self, according to the following scores in Table 1.

Table 1: Quality criterion scores (QCS)

OCS	Action
0	Is it right to ignore these activities?
2	Should I alter or resume these activities?
4	Am I putting in the effort or resources needed to support these activities?
6	Which of these activities should I make even better?
8	How can I identify the ‘strengths’ on which to build and improve even more?
10	How do I unite and then share these success?

Finally, according to the QCS and if the company has decided those issue or process need to be improved, they then have to record, process or issue its priority in the form provided. This analysis guides the company in planning their quality improvement activities. The form acts as a formative and supportive procedure of quality improvement, and keeps the company informed from time to time. As company make improvements, keep a log of the positive effects those improvements have, and learn to build on the company own good practice. It is advised to prepare a standard operating procedure for each new process that has been approved. The total scores of the self-assessment figures the company quality level and it can be link to the performance class as suggested in Table 2 below.

Table 2: Performance class with respect to QMEA criteria

Total Score	Performance Class
850 to 1000	Excellent
700 to 849	Very good
550 to 699	Good
400 to 549	Average
250 to 399	Poor
249	Very Poor

5. RESULTS OF THE SELF-ASSESSMENT

The proposed self-assessment is designed to allow a company to pace their quality development process, using their own approach. This is important, because only the company itself knows their circumstances and constraints, and can judge which approach is best suited for them. To test the self-assessment practice, trials were conducted at two Malaysian manufacturing SMEs for a period of 6 months. As stressed by Dale *et al.* [12], studying over a longer period could build significantly on the theory development and research findings. Thus the studies were conducted within three different period of time. Interviews with

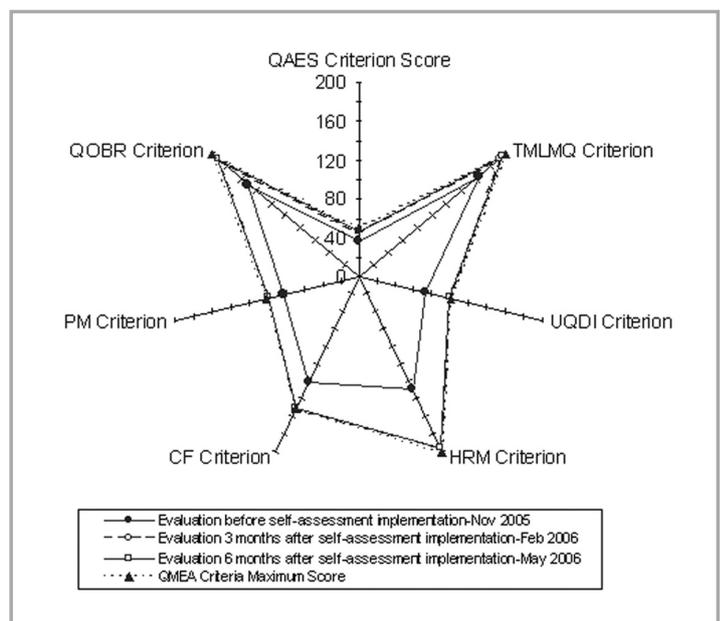


Figure 1: Trial Results of the self-assessment at Company 1

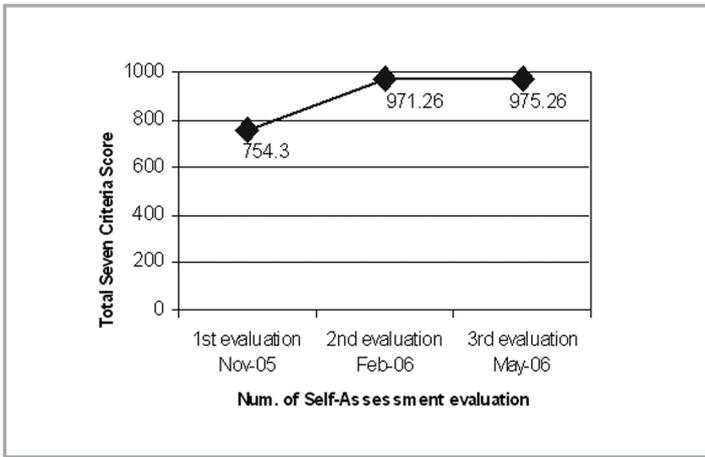


Figure 2: Total seven criteria score for Company 1

company’s top management helped to provide a richer feedback on detailed areas of application. Key results of the trial study are illustrated by the ‘before-and-after’ radar plots in Figure 1 and Figure 3 respectively, which also show the maximum score possible for each criterion of the seven QMEA criteria.

Company 1 showed significant improvements in all criteria; those in which they were previously weakest. Company 2 meanwhile showed substantial improvements in most of criteria with smaller improvements. During third evaluation, Company 1 proved that the total overall score for all QMEA criteria was 975.26 of 1000 point, compared with only 754.3 point during first evaluation in which it means 29% increment. Referring to Table 2, the performance level of quality practice for Company 1 is considered excellent based on the total score for all QMEA criteria. Thus, it can be concluded that the company’s top management had taken the corrective actions to overcome and solve their problems as well as continuously improving it further. It is quite interesting as through self-assessment implementation together with top management supports, the company can move from very good stage to excellent stage of quality practice performance. Discussions with management level of this company suggest that besides top management commitment and training, there is a need to promote and make people know about the importance of self-assessment. This in turn will clearly encourage the culture for improvement and managers should continuously monitor people, procedure and process as well as taking ownership of the system suggested or being implemented.

Figures 3 and 4, respectively, present the results studied for Company 2, which shows an overall score for all QMEA criteria. These figures suggested that the company has taken smaller efforts compared with Company 1 in implementing the self-assessment as a tool for quality improvements. There is a little concern for Process Management at this company and perhaps some change or study is needed to monitor their production process. During the third evaluation, Company 2 showed that the total overall score for all QMEA criteria was only 668.8 of 1000 point, making up 13% increment based on first evaluation which was 592.7. This however leaves the company in a good performance class of quality practice based on Table 2. Discussion with the top management of this company revealed that besides timely matters such as arrangement, cooperation, production planning and scheduling etc, the company need more support and understanding of the self-assessment implementation from the researchers. This is

necessary in order to promote and make the company committed and aware about the contribution of self-assessment as a tool for their business improvement and as a strategy for quality practice improvement. This will help Company 2 to clearly define their quality culture and develop proper system for improvements.

The results showed by both companies were considerably encouraging and this evidence suggests that there is a need for a fundamental change in the traditional or current quality practices of company’s performance appraisal. As mentioned by Company 1, conducting company’s performance appraisal through self-assessment to assess existing quality practices can provide clear information to pinpoint required changes that need to be overcome at various levels throughout the company. Both companies had started their appraisal though creating an awareness of quality and encouraging the involvement of employees through formation of teams. Stressed by Company 1, the teams were provided with training about process improvement, know-how and problems solving skills.

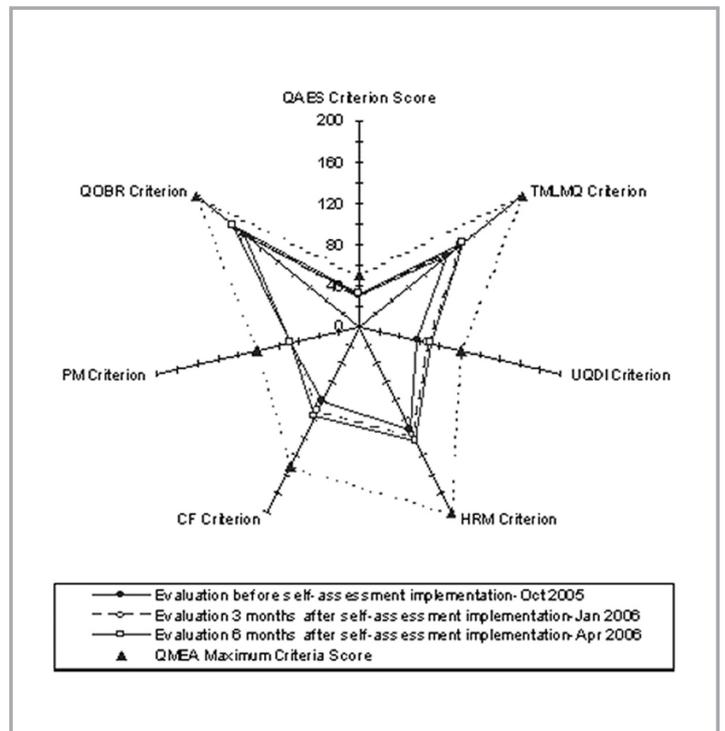


Figure 3: Trial results of the self-assessment at Company 2

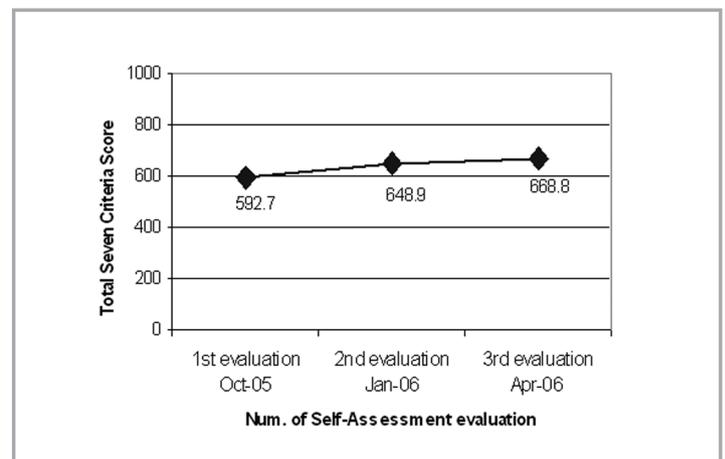


Figure 4: Total seven criteria score for Company 2

The other reason why the self-assessment implementation was considered to be effective, especially to the Company 1, was primarily due to highly and clearly shared of quality vision amongst employees in this company. That meant, employees in this company had perceived the programme as being part of the company vision for quality improvement and consequently had boost enthusiasm for change.

In general, it can be concluded that there are still a lot of opportunities for improvement with respect to the assessment tool as well as to the quality award criteria and application. From the responses of company, it appears that the self-assessment can offer a useful contribution to the SME companies in improving their quality awareness and performance towards business excellence and better quality management practice. The self-assessment approach was successful, as it had a strong motivating factor on the companies, which resulted in genuine improvement. According to interviews with the top management of case study companies, performing an internal audit practices using the self-assessment tool to assess existing quality practices, techniques and approaches, as well as identifying strengths and weaknesses; can provide clear information for company's business and process improvements. This practice need to be tackled at various levels throughout the company.

Interviews and discussions with the case study companies also suggested that a quality glossary in a short introduction handbook to quality management should be prepared, to clearly explain the quality practice requirements for companies. This will also help companies to see their quality journey more clearly as well as plan and predict the results of the investment and effort which are required.

6. CONCLUSIONS AND SUGGESTIONS

The results show that the studied companies could use self-assessment as a tool for continuously improves their quality practices. Following the implementation trials outlined above, the authors had the opinion that the self-assessment represents a practical tool for quality development in manufacturing companies. The self-assessment approach can act as a stepping-stone towards improvement of profit, business excellence, internal and external customer satisfaction and management expertise. However, success in the application, adoption and implementation of any quality activities will, as always, depend largely upon a high level of management commitment and enthusiasm for quality.

By using the self-assessment, a company can obtain a clear picture of which criteria are most critical to their current developmental needs, in relation to their organisation capability and circumstances. The self-assessment suggests the company quality improvement direction, by identifying strengths and weaknesses in business performance. Stakeholders and managers can thus establish strategies that will help their organisation pass through the difficult early stages of quality management implementation more effectively. The self-assessment will contribute to answer the difficult questions, highlighted by many companies, on how to start their quality journey with a flexible approach. SMEs cannot be expected to have everything prepared from the start of their quality journey, due to their lack of resources, such as money, time, people and management expertise. Hence, they must be allowed to proceed with quality performance and its development at their own speed. It should be

possible to practice the self-assessment at individual department level, as well as in a very small business.

The most important thing is to look at the self-assessment as a tool or part of a company continual process improvement, and not as a separate activity. For companies that planning to achieve quality awards, the self-assessment can guide them with the elements and criteria of the QMEA, and is also related to the highest-level Malaysian quality award, the Prime Minister Quality Award (PMQA), as well as to leading business excellence models such as the MBNQA and EFQM. As company requirements and business needs change, a longitudinal study could help refine and update the self-assessment elements, and help to make it more generic to meet a wider range of business needs, such as, in service industry or non-profit organisations.

Two limitations in this research are the human factors and the culture's temptation. These limitations could be suitably complemented by future research work in some directions; example, comparing among domestic, joint venture and foreign companies A further study should also aim to identify the specific cultural elements that facilitate success for companies in implementing modern quality practices such as six sigma, supply chain etc. Co-operation between academics and quality experts, in a comparative study of quality practices development, could provide a useful perspective for government, quality practitioners and industrialists. ■

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PROFILES



DR MOHD NIZAM AB RAHMAN

Dr Mohd Nizam Ab Rahman is a senior lecturer in Quality and Operations Management at the Department of Mechanical and Materials Engineering, UKM. His research interests include quality operations, modern quality management such as supply chain, BSC, Six sigma, Production SPC etc. He graduated in Industrial Physics in 1996 and obtained an MSc in 1999 from Universiti Teknologi Malaysia. He has been working as an R&D Engineer with Panasonic AVC Networks, and has worked in Japan for a couple of years.



EN. ROZLI ZULKIFLI

Rozli Zulkifli was born in Selangor in 1971. He received his B.Eng(Hons) in Mechanical Engineering and MSc in Advanced Engineering Materials from the University of Liverpool. Currently, he is a lecturer at the Dept. of Mechanical & Materials Engineering, Universiti Kebangsaan Malaysia.



ASSC. PROF. DR HJ. BABA BIN MD. DEROS

Baba Md. Deros is a graduate member of IEM and holds BSc (Hons) in Mechanical Engineering from University of Glamorgan, United Kingdom, Master of Science in Manufacturing Systems Engineering from University of Warwick, United Kingdom and PhD in Manufacturing Management. He has been working as a lecturer in several Polytechnics and currently as an Associate Professor in the Department of Mechanical and Materials Engineering, Faculty of Engineering, UKM.



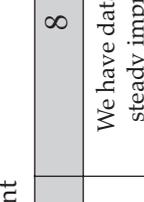
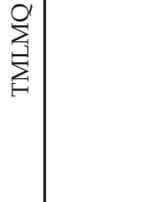
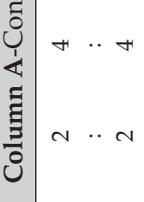
EN. AHMAD RASDAN BIN ISMAIL

Ahmad Rasdan bin Ismail is a graduate member of IEM and holds a BEng. (Hons) (UKM), as well as a Masters of Science in Manufacturing Systems Engineering (UPM). He has been working in the engineering field including as a design engineer at R&D PROTON and also as a consultant for many projects under UKM.. Ahmad Rasdan is currently a lecturer in manufacturing engineering at the UKM.

Appendix 1

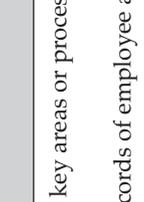
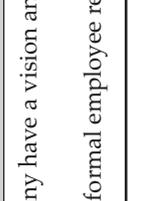
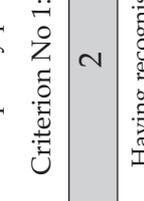
How to start? Consider whether quality practices or issues have been implemented. It looks at the way you do things in your business.

Criterion No 1: Top Management Leadership & Management of Quality (TMLMQ) – 200 point

0	2	4	6	8	10
No, I haven't thought about it 	Having recognised the need for this, I am thinking of doing something 	Deployed in the organisation but not effective 	Deployed effectively in parts of the organisation, OR Partly effective throughout organisation 	Yes, and over time, I have seen real benefit from doing it 	We do this very well and could be seen as world class practice 
Issues					
0	Column A-Consider whether				QCS
1.1 : 1.20	Does your company have a vision and mission statement? : Do you carry out formal employee reviews or appraisals?				10 : 10
Write down in calculation sheet <=					

Or What your business is achieving.

Criterion No 2: Use of Quality and Information (UQI) – 100 point

0	2	4	6	8	10
No 	Implementation attempted but unsuccessful 	Some trials inconclusive results OR No real evidence of benefits yet 	We have data showing some improvement 	We have data showing steady improvement 	We have data showing excellent performance 
Issues					
0	Column A-Consider whether				QCS
2.1 : 2.13	Are performance of key areas or processes measured and controlled? : Do you maintain records of employee accidents?				10 : 10
Write down in calculation sheet <=					

Appendix 1 (continued)

Consider whether quality practices or issues have been implemented. It looks at the way you do things in your business.

Criterion No 5: Quality Assurance of External Suppliers (QAES) – 50 point

0	2	4	6	8	10
No, I haven't thought about it 	Having recognised the need for this, I am thinking of doing something 	Deployed in the organisation but not effective  	Deployed effectively in parts of the organisation, OR Partly effective throughout organisation  	Yes, and over time, I have seen real benefit from doing it 	We do this very well and could be seen as world class practice 
0	Issues				QCS
5.1	Does your company material's quality requirements are being met by suppliers?				
:	0	2	4	6	8
5.10	Do you work with your suppliers to make sure that they deliver what you want?				
:	0	2	4	6	8
5.10	Write down in calculation sheet <=				QAES criterion total

Or What your business is achieving.

Criterion No 7: Quality and Operational Business Result (QOBR) – 200 point

0	2	4	6	8	10
No 	Implementation attempted but unsuccessful 	Some trials inconclusive results OR No real evidence of benefits yet 	We have data showing some improvement 	We have data showing steady improvement 	We have data showing excellent performance 
0	Issues				QCS
7.1	Do you have a productivity performance data?				
:	0	2	4	6	8
7.20	Do you look at how current and past performance can show the way for the future?				
:	0	2	4	6	8
7.20	Write down in calculation sheet <=				QOBR criterion total

