VALADATING QUALITY SYSTEM FRAMEWORK THROUGH PREIMPLEMENTATION PROCEDURES IN LOCAL AND INTERNATIONAL COMPANIES

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Abstract:
This paper covers in detail the validation of the designed quality culture framework, implementation flowchart and self-assessment. The validation procedures are based on the findings from literature review, questionnaire survey, and face-to-face interviews. These sources of information were the base for development of the QMS framework, implementation flow chart, and self-assessment questions. By using the self-assessment questions, Libyan companies can evaluate their QMS status, and they can decide which part of the implementation flowchart they start with. The validation of the framework is conducted with foreign manufacturing companies and Libyan quality experts. Through discussions and rework of the designed body of the quality culture framework, the implementation flowchart and the
self-assessment, the involved experts agreed to start the implantation of the framework proposed. The final validation processes of the framework will be conducted through six months implementation in five Libyan manufacturing companies. Once the final validation had been conducted, it will be visible if the framework operates in improving the company's QMS status.

**Keywords:** QMS, quality culture, implementation flowchart, self-assessment, Libyan manufacturing companies

1. **Introduction**

The quality culture framework (as shown in figure 1) [1], and QMS implementation flowchart proposed for Libyan manufacturing companies (as shown in figure 2) [2], needs to be validated. This part is considered to be crucial because this is where a practicable of the conceptual implementation framework for Libyan industrial companies was introduced. A QMS self-assessment is designed based on the work of Ab Rahman and Tannock [3], Ab Rahman [4], HKMA [5], Jung et al. [6], Lau et al. [7], Malcolm Baldrige National Quality Program [8] and QMEA [9]. The author contacted a number of quality experts in Libya and industrial managers working in foreign companies. First, the author contacted four managers working in foreign different manufacturing companies, and then the author arranged four meetings with experts in Libya who have a good quality management background.
Figure 1: Quality culture conceptual implementation framework
Source: [1]
II. Framework Validation with Foreign Companies

Figure 2: QMS implementation flowchart, Source: [2]
Details of the foreign companies participated in the validation shown in Table 1. All four companies are large size manufacturing companies and considered to be a TQM companies as mentioned by the interviewees. The interviewees have suggested a number of remarks regarding the QMS implementation framework and the assessment steps. Remarks on the quality culture implementation flowchart, interviewees suggested to introduce a quality culture department in the company hierarchy chart to plan for quality activities, follow up the activities with different departments within the company, and take correction measures where needed. The importance of suppliers feedback is discussed with the interviewees, in which insisted and agreed to be added to the flowchart. Some explanations regarding the assessment questions were performed, the interviewees suggested some remarks to be added to make the assessment more clear and beneficial, which had been added and been agreed.

Due to time limitations available for this study, and based on the interviewees experience, the author asked the interviewees about the time period necessary for the validation of the quality culture framework, three of the interviewees working for C1, C2, and C4 assured that a time of six to eight months is enough to test the validity of the framework, where interviewee working for C3 assured that a minimum of eight months is needed for such a task. Chin and Dale [10] and Chin and Pun [11] achieved a full implementation of their TQM framework in Chinese manufacturing companies within a twelve months period, where on the other hand, Ab Rahman and Tannock [3] validated their TQM framework in Malaysia within a six months period. The author decided to conduct the validation processes within six months period, with an assessment procedure every three months of implementation. That was based on; time limitations for the study, interviewees’ suggestions and the literature available.
The author took the necessary measures on the comments and advices on improvements of the self-assessment questions and the quality culture implementation framework and flowchart. The comments and suggestions were sought in relation to its feasibility, practicality, easiness of implementation and overall structure, i.e. whether it was simple and understandable. The author had passed the new quality culture assessment to all four interviewees and asked them to use it to evaluate their company's current quality practices status. This is done to overview the quality culture assessment form for any more corrections and modifications, and to have an overlook of their company's quality practices status. Figure 3 illustrates the status of the seven MBNQA variables and the overall MBNQA score in each company. It has been clear from the figure that all items of MBNQA and the overall percentage are more than 50%, which indicate that all four foreign companies participated in the validation have a good quality management system in their companies.

Table 1: Details of the foreign companies participated in the validation

<table>
<thead>
<tr>
<th>Interviewee position</th>
<th>Company details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code &amp; Size</td>
</tr>
<tr>
<td>Section Head</td>
<td>C1 Large</td>
</tr>
<tr>
<td>Manufacturing Manager</td>
<td>C2 Large</td>
</tr>
<tr>
<td>Executive</td>
<td>C3 Large</td>
</tr>
<tr>
<td>QC Manager</td>
<td>C4 Large</td>
</tr>
</tbody>
</table>

III. Framework Validation with Libyan Experts
The QMS framework, quality culture flowchart and the assessment questionnaire, after been validated with the four foreign companies, had been arranged with four Libyan quality experts working in the manufacturing, and oil and gas sectors. These experts have working experience more than 20 years, and have a very good background of QMS and Libyan manufacturing culture.

The chosen Libyan experts were selected based on social and tribal relations. Two of the experts were working in the iron and steel company (LE1 is a production manager at Hot Strip Mill, and LE2 is a quality control manager of the company). The third expert LE3 is a production manager at Zliten Cement Plant which belongs to Ahleya Cement Company, and the fourth expert LE4 is working in Ra's Lanuf refinery as a maintenance manager.

All four experts (LE1, LE2, LE3 and LE4) promised to comply with the request to participate in validating the framework, implementation flowchart and the assessment questionnaire. They encouraged the author to continue his efforts to help the local Libyan companies improve their quality culture.

The experts had offered some constructive suggestions to enhance the implementation of the framework and flowchart. LE2 and LE3 insisted that the quality awareness is very important in order to increase employees support, and that companies must be careful planning and executing training programs. LE1, LE2 and LE4 suggested some modifications in the position of check points in culture change and in QMS implementation, which had been modified in the implementation flowchart [2]. For the self-assessment validation, all experts (LE1, LE2, LE3 and LE4) had different remarks on some questions and their meanings, which had been improved in language for clarity.
Figure 3: Assessment of the foreign companies participated in the validation
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During the meetings with the experts, the validation time period required and the possible companies for implementation were discussed in detail. LE1, LE2 and LE4 expected a long time period for implementation in large size companies, in which they expected more than one year for such task, where LE3 expected eight months to be enough to execute the task. On the other hand, and along with the author, all experts suggested and insisted to make partial implementation since the main objective of the implementation task is to validate the framework, which means that it is easier and better to choose one production line in each company, which will be easily conducted, controlled and managed for such task. In general, all four Libyan experts were very happy with the overall perception of the framework, and they concluded that it is simple and contains a sensible approach. They also concluded that the framework covers all the initial aspects of quality culture implementation since it was together with the self-assessment which has been developed in line with the quality criteria.

Conclusion

Quality culture framework and the implementation flow chart proposed for Libyan manufacturing companies had been presented for discussion with local and international experts in the application of total quality systems for the purpose of benefiting from their knowledge and modifying the proposed system before the application process. Through deep and continuous discussions, the system has been modified and is ready for implementation. The experts interviewed suggested implementing the framework for six months in a number of Libyan companies, and can be modified in the future as needed. The system is initially considered valid for the application.

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Biographies

Mostafa Ahmed Shokshok is currently an Assistant Prof. at the Department of Mechanical and Industrial Engineering - Al Asmarya Islamic University. Presently, his research field is Quality control and manufacturing systems. He received a certificate of applied science (1986) from Acadia University - Canada. Then, continued his study and received a Bachelor of Mechanical Engineering degree in 1989 from Dalhousie University – Canada. During his work time with The Iron and Steel Company in Misurata 1989-2004, the researcher invested his free time and awarded a Master of Science degree in Industrial Engineering from the College of Industrial Technology Misurata in year 2002. Moreover, he was awarded his PhD degree in Industrial Engineering in the area of manufacturing and quality control from National University of Malaysia (UKM) in 2013.