ABSTRACT

Component Based Software Development (CBSD) offers the twin advantages of reduced development costs and shorter lifecycles. Software components can broadly be classified into In-House and Commercial Off-The-Shelf (COTS) components. Of the two, the quality of COTS components is much more difficult to assess because COTS components are sold as black boxes with no access to the source code at all. Many research institutions have been studying methodologies for component development and standardization. However, from the consumers’ viewpoint there is little achievement in the research of quality evaluation of COTS components. This is because of various issues such as lack of information provided by vendors, heterogeneous nature of COTS components, lack of consensus between different users, variation of requirements from organization to organization and finally the question of who gets to evaluate the COTS component quality.

One way to resolve these issues is to try to develop a standard for COTS component quality using a product oriented approach from the consumers’ point of view. The objective of this research is to develop a comprehensive quality model that is suitable for use by end users to assess the quality of COTS components. The first step is to demarcate clearly COTS components from the rest of software components and find exact specifications for COTS components. The second step is to develop suitable quality models for the COTS components so defined. The third step is to assess the validity of the above model using suitable statistical tests.

It was realized that with the continuing rise in the demand for software component based products, the terms - component, in-house
component, COTS and reusable components have become overloaded and rather conflicting over the years. In this direction, a seven dimensional vector (T, R, U, S, T, A, D) that can be used to specify software components and distinguish between in-house components, COTS components, reusable in-house and reusable COTS components was proposed.

Once a nomenclature was proposed, the next step was to build a quality model based on ISO 9126 and the above specification for COTS. The model has ten high level quality factors and hence it is called as Q’Facto 10. Appropriate quality factors, criteria and measures have been identified in the model. The proposed quality model was given for peer review and critical comments were received by anonymous reviewers of the published papers. Based on the reviewers suggestion, the Q’Facto 10 model was upgraded to the Q’Facto 12 model which is built using the ISO 25000 [SQuaRE] quality standard. The upgraded model has twelve quality factors and is hence called the Q’Facto 12 quality model.

The primary objective for the model design is that it should enable software engineers in the IT industry who play the role of component users to evaluate the quality of the COTS components when they purchase them from third party vendors and integrate them with their systems. Therefore to validate and test the usefulness of the model, it was required that software professionals carry out an appraisal about the proposed quality factors and the measures. With this idea in mind, two questionnaires were prepared and given to a sample set of twenty users. Finally, a statistical analysis was carried out using the Student’s t Test.