

Three Dimensions of Quality for Project Managers

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Abstract

Quality is the degree to which a set of inherent characteristics fulfill requirements.

Quality metrics must be measurable objectives with specific target values. There are three project dimensions for which project managers must consider quality: product quality, project quality and project management quality. Product quality is a measurement of the conformance of manufactured or produced items to the design requirements. Quality metrics are typically acceptance and rejection rates. Six sigma is a quality process that targets the six sigma level of standard deviation, which equates to an acceptance rate of 99.99966%. This is typically the quality dimension that the PMBOK process “Plan Quality” is concerned with. Project quality is concerned with the degree to which an overall project, rather than products created as part of the project, complies with project requirements. The requirements are established at the beginning of every project as part of the initiation and scope management processes. Project management quality considers how well the project manager complies with the project management requirements processes. CMMI is a common way of capturing project management requirements, with established processes documented and archived. At the end of a project it is possible to numerically evaluate the number of project management processes the project manager used, and thus a measurable quality metric can be developed.

Introduction

Quality is defined by the International Standards Organization (ISO, 2000) as “the degree to which a set of inherent characteristics fulfill requirements.” One of the key features of quality, according to the Project Management Institute (PMI, 2009, p. 200) is that it involves metrics that describe some project objective and how the quality process will measure it using specific, measurable values. This means all quality measurements must be real, numerical values rather than categories of compliance like “good,” “better” or “inadequate.”

With these concepts in mind it is interesting to consider what the term quality means to a project manager. There are three dimensions of “quality” that a project manager must consider in managing a project:

- 1) Product Quality
- 2) Project Quality
- 3) Project Management Quality

Product Quality

The quality of the products or outputs of a project are the classic consideration for a project manager. This is the subject of the quality plan called for in the “Project Quality Management” knowledge area of the PMBOK (PMI, 2009, p. 189). One of the more important milestones in the development of the quality industry was a series of lectures given to Japanese management teams in 1950 by Edward Deming (Deming, 1950). The subsequent implementation of quality assurance and quality control has become firmly rooted in the global manufacturing industry. Over the years the field has evolved an industry standard, ISO 9001:2000 (ISO, 2000).

Emphasizing that quality measurements must be numerical rather than categorical, one of the classic values of quality control is reject rate of manufactured components for being out of design specifications. If three parts out of 1,000 are thrown out because they are outside of the specified acceptable criteria, this results in a 0.3% rejection rate, a very measureable metric. This reject rate percentage is the basis of the most common quality management system, six sigma (Shrotriya, 2009). Prior to six sigma the classic view of quality was a 99% acceptance rate. This means that one item out of 100 of manufactured product could be rejected for quality reasons, and the production process was considered of acceptable quality. In statistical terms, six sigma is a measure of standard deviation equivalent to 99.99966%. So instead of having an acceptable manufacturing rejection rate of 1 part in 100, the acceptable rejection rate is now considered to be less than four parts per million.

It is around this production concept that PMBOK includes “Plan Quality” in its planning process group. Outputs for quality planning include a quality management plan with quality metrics and checklists, and a process improvement plan. For some projects, such as those involving manufacturing, services or data provided to a customer, quality management is a fairly straightforward process. A entire field of study has been devoted to this topic of quality, demonstrated by the variety of sources on the topic, including textbooks by Rose (2005), Evans & Lindsey (2011) and Kloppenborg & Petrick (2002).

Typically, a project manager’s role in quality planning, control and assurance is minimal since the field is so well developed that any project large enough to require a manufacturing, services or data quality control plan is also large enough to employ a quality control manager who handles planning, execution and control. The project

manager's job then becomes one of managing the quality control manager, rather than actually performing the quality management functions directly.

Project Quality

The second dimension of quality that concerns a project manager is that of project quality. A project might produce a deliverable with six sigma quality of manufactured items, services or data that meet the customer's criteria, but the scope of the project might be much more than those measured items. How do you define the quality of the overall project above and beyond the quality controlled deliverables? Pfeiffer (2009) summarizes project quality as "conformance to requirements." A well planned and well managed project begins with a sound scope statement and well-defined requirements. The degree to which the project conforms to those requirements defines the overall quality of the project when the project is complete.

In keeping with the ISO definition that quality is "the degree to which a set of inherent characteristics fulfill requirements," and the PMBOK standard the defines quality metrics as measurable, this approach to measuring overall project quality makes sense. By definition, using requirements conformance as a metric satisfies the ISO requirement that quality is a measure of how well the project fulfills requirements. Equally important, however, is the applicability of the PMBOK standard that the quality metric, in this case conformance to requirements, be numerically measurable. If all the project requirements are identified clearly and completely during the planning phase of a project, it is a simple matter to review those requirements at the close of a project and count the number of requirements that are and are not met. This includes requirements

above and beyond traditional manufacturing requirements. The percent of requirements met then becomes the quality factor for the overall project.

Project Management Quality

The final dimension of quality related to a project manager's job is the quality of the overall project management process. Moving up from the lowest level of quality, manufacturing, to the project level, compliance with project requirements, we now look at the quality of the project manager's work. This involves an evaluation of how well the project manager performed his duties in relation to the proscribed processes he is supposed to follow. Just as a manufactured project deliverable might be of high quality, but the overall project might not meet all of its requirements, it is also possible that a project might have met all of its requirements without the project manager having done a quality job. So now we have to look at what processes the project manager should have followed and compare that with the processes that were actually followed. In general, we are effectively now evaluating how well the project manager followed the PMBOK or whatever project management standards are being used.

This is difficult to do in a project environment that has not matured sufficiently to have well-established processes in place. This need for well-established processes is the thrust of the motivation behind Capability Maturity Model Integrated (CMMI), developed by Carnegie Mellon University (CMU, 2012). CMMI is a process improvement model that focuses on establishing a consistent, documented set of processes an organization follows to, among other things, manage projects. A mature organization (certified at CMMI levels 3, 4 or 5) has a well-defined set of processes a project manager should follow when managing projects. This well-defined set of

processes enables organizational quality control by auditing a project manager's work to determine how well the pre-determined processes were followed. Again, the ISO9001 definition of quality is adhered to since there is a set of requirements to be fulfilled, and the PMBOK standard of having quality metrics that can be quantified is satisfied since the number of processes that are followed and not followed can be counted. Since the project management process transcends and individual project the project management quality standard is typically monitored at the project management office (PMO) level rather than at the project level. But the project manager is held accountable to these quality standards nonetheless, and should consider them carefully in carrying out project management responsibilities.

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