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Nnaji A. Chidimma

QUALITY MANAGEMENT METHODS: VIABILITY FOR THE PROJECT MANAGEMENT ACTIVITY

Definition of the project quality management was generated through segregation of basic approaches to understanding the project quality management according to classification we have done. Relying on quantitative and qualitative analyzes of experts' opinion it was proved that virtually all the tools presently used for project quality management and measurement are not effective and efficient in reality because they were created for mass-productive thus functional activity, but do not consider much features of the project itself and the project management activity features. The approach was offered to consider the project quality management activity as a whole, using the created model which embraces different managerial levels. According to this approach existing quality management methods were re-grouped by four quality management activities in project. In order to implement those types of activities during the project life circle phase by phase project quality appraisal method was suggested, as well as two instruments to implement it: template for initialization phase project quality appraisal and Sample of planned-factual review approach to project quality management. Fig. 2, tabl. 5, ref. 15.

Key words: project product, project process, project phase, project life cycle, project product exploitation, quality management methods, stakeholders' requirements, customer satisfaction.

INTRODUCTION

Problem statement in a general view and its actuality. Managing project quality is one of the biggest floorer in project management, and the main reason for this is because of its subjective, as well as its complex nature. Down through the history, project quality management researchers and experts have attested to the fact that project quality assessment, as well as management is difficult and sometimes seems impossible, at least until towards the end of the project execution or even after the project product has been delivered to the customers. This is made evident in the fact that very often, project core stakeholders lack the ability to evaluate and know the actual quality of a project result until the benefit-realization-point, when it is nearly too late to do anything to resolve the deviations. Sometimes even the projects that are considered by the project team to be with zero defects can be perceived, by

customers, and or other stakeholders to be of low quality [1]. Thus the conception that it is more difficult to measure the quality of project results during the project execution, but far easier once it is too late.

In our world today, the level of market competition is very high, customer demands are ever changing, and their requirements and expectations are strikingly high, hence all organizations, including project managers seek ways to improve the level of quality of the project results they deliver. Though in the quest to address this situation, many quality gurus have over the years come up with different methods and approaches to measure quality, nevertheless, most of them albeit still in use till date, have proved abortive in realizing the intended result. For example, some propositions that process improvement is a prerequisite for any quality results, quality improvement happens only when people begin to pay attention to quality, that “if only a little documentation is good, then overmuch is achieved”, etc. have all been tested and proven ineffective, as a mere doing of all these things has never guaranteed high quality of project results.

Analysis of the last researches including attempts to solve the problem, highlighting of its unsolved part. First challenge in making our research is to understand the essence of the basic term – “quality management”. The reason for us to consider it as a challenge is that there are many definitions given to quality management by different authors. Some suggested that it means the act or ability to undertake some actions, processes and procedures that assure the satisfaction of customer’s stated and implied requirements, in order words, a project is required to satisfy the specified requirements and even exceed it before it can be considered as good quality. Other researchers defined project quality management as the process of ensuring that the properties or characteristics (functionality, reliability, durability, and so forth) of a given project meet the intended need of the customers [2]. Let’s consider most bright thoughts of the most famous researchers here.

Edward Deming defined project quality management as the creation of processes and procedures and resources for employees to produce quality product [3].

Kaizan related project quality management to continuous improvement of procedures and people [4], while Joseph Juran expounded it as processes that ensure the production and delivery of project product that meet the principle of “fitness for use” rather than a mere conformance to certain specifications [5]. It is a repetitive cycle of measuring quality, updating processes, measuring, updating processes until the desired quality is achieved. According to him, project quality management is not all about procuring really expensive inputs, rather it is more about ensuring that all the project activities necessary to design, plan, and implement a project are effective and efficient with respect to the purpose of its objective and performance [2].

Philip Crosby in his attempt to define quality management introduced the concept of “quality is free” alias zero defect [4]. This explains various management processes that ensure the achievement of hundred percent quality at the initial time, in order words, no level of defect even at its slightest form should be acceptable. He maintained that quality should be continually monitored and improved to ensure a complete prevention of defects and deviations.

Kaoru Ishikawa stressed that project quality could only be well managed at the participation of internal customers (project management team and project team) in the entire quality control process, rather than just focusing on the products quality control [4]. This means that the level of employee’s quality, including their qualifications, skillfulness, resourcefulness, and so forth eventually determines the quality of the project product and –process.

Many other researchers simply wrote that project quality management is the application of processes and procedures that will ensure that a project will meet the

needs for which it was undertaken, few argued that it involves all the processes that make certain that a set of inherent characteristics of project product fulfill a set of standard requirement (ISO 9000) [2].

This variety of approaches needs to be generalized for better understanding. That is why we grouped project quality management definitions by different authors by three main features: process of ensuring that the properties or characteristics (functionality, reliability, durability, and so forth) of a given project meet the intended need of the customers; act or ability to undertake some actions, processes and procedures that assure the satisfaction of the customer's stated and implied requirements; and application of processes and procedures that will ensure the project will meet the needs for which it was undertaken. A recap of different project quality management definitions is represented in table 1 below.

If to analyze the table 1, one can see that quality management means different things for different authors. To some authors, it means processes that ensure the conformance of the product attribute to certain standard, requirements and specifications, whereas for others it spells out the creation and implementation of policies and processes that ensure that the project product is fit for the intended use, as well as the continuous improvement of procedures and people to meet the specified needs [12].

Table 1
Generalized classification of basic project quality management concepts

No	Basic project quality management concepts	Generalized groups of approaches to understanding project quality management
1	PQM involves the creation of processes and procedures and resources for employees to produce quality product (Edward Deming)	Process of ensuring that the properties or characteristics (functionality, reliability, durability, and so forth) of a given project meet the intended need of the customers
2	Refers to management processes that ensure hundred percent quality attainment at the first time (Philip Crosby)	
3	Relates to processes that ensure that a set of inherent characteristics of project product fulfill a set of standard requirement (ISO 9000)	
4	Includes Involvement of internal customers (project management team and project team) in the entire quality control process, rather than just focusing on the products quality control (Kaoru Ishikawa)	Act or ability to undertake some actions, processes and procedures that assure the satisfaction of the customer's stated and implied requirements
5	Processes that ensure the production and delivery of project product that meet the principle of "fitness for use" rather than a mere conformance to certain specifications (Joseph Juran)	
6	Relates to continuous improvement of procedures and people (Kaizan)	Application of processes and procedures that will ensure the project will meet the needs for which it was undertaken

Those three groups of approaches add better understanding when dealing with the issue of quality management of project.

It is no secret that one of the core principles of project quality management is the ability to at least meet or better still exceed the customer's specified requirements and expectations. To achieve this project management team must endeavor to establish a

profound communication and relationship with the stakeholders, especially the project sponsor and consumer, in order to understand what quality means to each of them, as quality is based on the individual's value system. One of the major reasons for poor project quality is that project team mostly only pay attention to the realization of the written requirements, ignoring to anticipate, understand and communicate the unspecified needs and expectations of the project beneficiaries [2].

Judging by the popular saying "what cannot be measured cannot be managed", we can draw to a close that quality measurement is an inseparable component of project quality management. Nevertheless, determining the best approaches for measuring quality is a big puzzle that is yet to be solved in project management. The reason for this is because of the subjective nature of quality at large.

Another very important point of consideration when dealing with the issue of quality management of project is how to know whether or not a project is of considerable quality, that is to say, how to measure the quality of a project. However, it is worthwhile to note that only consumers of project product can determine whether or not the product is of good quality. All the quality methods are simply a means to an end, to ensure that the whole project process and product meet the customer's desired needs.

Over the years, different quality gurus such as Walter A. Shewart, Edwards Deming, Joseph M. Juran, Armand Feigenbanm, Philip B. Crosby, etc. have identified a number of methods for measuring and managing project quality. Some researchers consider the best measure of project quality to be **documentation**, arguing that once a project manager and its management team succeeds in keeping a profound record of all the processes involved in project management, every other thing, including the project quality is automatically taken care of. Here it is assumed that project quality is attained by simply documenting everything (obviously good or bad practices), and continuously following those practices. For this group the general belief is that if only a little documentation is good, then overmuch is achieved in terms of quality [1]. Others challenged this notion, arguing that the best measure of project quality is **leadership**. According to them the level of project quality is highly, if not wholly dependent on the kind of leadership in the project performing organization. If the leaders of a project management team are not competent, motivated, expertise, and so forth, the quality of the project will be terribly affected.

Dr Martina Huemann, an assistant professor in Vienna University of Economics and Business Administration pointed out seven quality management methods used in project-oriented companies. These methods are as follows:

Accreditation - an evaluation by external body of a project product and process to ensure the compliance to the stipulated and public known standards.

Audit and Review - systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria (policies, procedures, or requirements) are fulfilled [3].

Benchmarking - process of evaluating and comparing the project performances and practices of one organization with another with the aim of understanding the difference and improving performance by learning from best practices.

Certification - procedure in which a neutral third party certifies that a product a process or a service meets the specified standards [3].

Coaching and Consulting - process of providing the project management team and the project team with the necessary skills needed for the implementation and improvement of quality project.

Evaluation - systematic appraisal of the value of management processes, technical processes, and performance criteria.

Excellence model - models such as Deming Prize European Quality Award, Malcolm Baldrige National Quality Award, International Project Management Award, etc. that provide a framework to appraise an organization to determine its degree of excellence in the application of project practices.

Though all these methods and many others might undoubtedly work well in some repetitious processes such as abating defects in manufacturing, streamlining supply-chain management, improving employee and customer relations, etcetera, the point of controversy is whether they are practically applicable to project quality management. To determine their viability, we will compare the essence of various measures of project quality considered by different authors with general quality management.

Goal of the article. Thus in this research we will analyze the different project quality management tools used by different quality experts with the aim to find out why the tools are not producing desired results, and possibly suggesting ways to improve them to ensure better project quality management.

Methodology. We will maintain the quantitative and qualitative analyses of most of the popular quality management methods, while simultaneously trying to substantiate the possibility and expediency to use them in project management activity within the project quality management objective. Results of such analyses will show us further way of the research.

MAIN FINDINGS

Basic findings of the research. Having searched and studied numerous sources in literature and Internet we selected a range of the quality management methods by the frequency of their appearance as a response to our informational inquiry. They are as follows with their appropriate codes and ideas:

- 1) SS - measurement of product variations [3];
- 2) M - corporate endeavor to ensure the attainment of high quality [8];
- 3) QMT - detecting, measuring and controlling requirement variation [8];
- 4) I - keeping defects out of the hands of the customers conformance to specified requirements [3];
- 5) COF - cost of preventing defects is far less than the cost of its correction [4];
- 6) K - continuous improvement [2];
- 7) CBA - quality issues should be identified & solved from the source [6];
- 8) DOE - focus quality efforts on the early (design) stage [5];
- 9) BQT - improvement of business processes [8];
- 10) B - studying the practices of other organizations with the aim of comparison [3];
- 11) QA - implementation of best practice conformance to specified requirements [2];
- 12) DC - continuous improvement [10];
- 13) 6s - improvement of business processes [9];
- 14) Ce - compliance with standards [8];
- 15) L - quality control and improvement is the leadership responsibility [8].

These 15 methods were defined and described in 10 basic papers that we selected as bases for our research. Relying on information from those 10 papers of other researches we classified all the 15 methods into two groups: traditionally implemented for the purposes of the project product (left side of the table 2) and the project processes quality management (right side of the table 2).

From the table 2 one can notice that most of the researchers considered in this work accent virtually the same methods for project quality management. For instance, majority of the researchers emphasized the use of inspection, certification, statistical sampling, etc. as good methods for managing project quality. This notion is, however, not thoroughly correct. Taking inspection as an example, one can easily argue that

inspecting project product and process does not guarantee good quality management, as errors which might be impossible to detect and or correct might have occurred before the inspection is conducted. In this end, it is wise to ask what the very essence of using this method is if one might not be able to detect or correct defects after all. Inspection is not a very good way of managing project quality, as it gives room for defects any ways. The best project quality management should otherwise strive as much as possible to prevent variation from specified quality requirement, rather than to inspect quality after performance.

Moreover, quality is a qualitative attribute and as such is not appropriate to use qualitative approaches or methods such as statistical sampling for its measurement as a result of its high propensity for under- or over-representation of a sample. Statistical sampling is not the best valuation method for project quality, as the selected sample might not be the best representation of the whole system, and additionally, can be manipulated by the appraisers to increase the likeliness of achieving a desired upshot in lieu of producing a genuine representation of the outcome. It is not a fitting method for analyzing and understanding in-depth issues, identifying ways to solve recognized problems, as well as evaluating customer's opinions and needs regarding their level of satisfaction with the project quality.

Just as project management is significantly different from general management, so is adopting quality management techniques and methods inappropriate for project quality management. Project involves the creation of one-time, unique product and process, and is characterized by resources and time constraint, whereas other management types involve iterative processes. This simply means that what works for management might not work for project management. Adopting the techniques, methods and approaches that guarantee high quality management say in production for instance, would not necessarily guarantee good quality management of a project.

One of the main challenges we are faced with, especially when dealing with the issue of quality in project management is the anthological challenge, the inability to separate the real meaning of project quality management from total quality management. It is true that nearly all the authors on this subject emphasized in their works the unique nature of project management in contrast to other management processes; however, this uniqueness seems to be watered down when it comes to project quality management. This shouldn't be so.

Project quality management should be treated distinctively different from total quality management. From table one above; it is clear that most of the methods though working well in the TQM, are not applicable in project quality management. Take as an example the use of "best practice" in project management, substantial number of researchers has accentuated the importance of the use of best practice in not just TQM, but in PQM as well. Now defining best practice as a standard way or a set of working method or procedures that has consistently shown results better than those achieved with other means, and that is used as a benchmark, the question then will be why and where do we take the best practice from, if project it is basically about creating NEW product and processes?

Another good point of consideration is the use of design of experiments, benchmarking, statistical sampling, ISO standards and accreditation, etc. which talk about focusing quality efforts on the early (design) stage, using certain standards, project process or product as appoint of reference against which project qualities can be assessed and so on. As already mentioned afore, the characteristic nature of project does not allow for the successful use of these methods in reality.

Table 2

Juxtaposition of project quality management methods with total quality management methods

PQM groups Methods Method's main idea	APPLYING OF THE TRADITIONAL QUALITY MANAGEMENT METHODS FOR PROJECT PROCESS quality management										APPLYING OF THE TRADITIONAL QUALITY MANAGEMENT METHODS FOR PROJECT PRODUCT quality management												
	SS	M	QMT	I	COF	K	Sources	CBA	COF	DOE	BQT	B	SS	M	QMT	QA	DC	I	6s	K	Ce	L	
project	✓	✓	✓	✓	✓	✓	[1]	Quality issues should be identified & solved from the source	Cost of preventing defects is far less than the cost of is correction. Quality	Focus quality efforts on the early (design) stage	Improvement of business processes	Studying the practices of other organizations with the	Management is responsible for quality	Corporate endeavor to ensure the attainment of high quality	Detecting, measuring and controlling requirement variation	Implementation of best practice to conformace to	Continuous improvement	Keeping defects out of the hands of the customers	Improve ment of business processes	Continuous improvement	Compliance with standards	Quality control and leadership improvement is the responsibility	
	✓	✓	✓	✓	✓	✓	[9]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[10]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[2]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[5]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[11]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[8]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[3]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[15]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	[7]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Percentage of use	0.6	0.2	0.4	0.6	0.4	0.3		0.3	0.4	0.1	0.1	0.4	0.6	0.2	0.4	0.7	0.9	0.6	0.1	0.3	0.3	0.2
Practicability of methods	+	+	+	-	+	+		+	+-	-	+-	-	+-	+	+	+-	+	+	+-	+	-	-	
Expert assessment	0.5	0.8	0.5	0.25	0.9	0.9		0.7	0.6	0.15	0.7	0.2	0.5	0.8	0.5	0.4	0.9	0.25	0.6	0.8	0.1	0.2	

* - Expert assessment were based on parameter of the method's applicability, qualitative mark varied according to scale from “+” (Very) through “+-” (viable) and “-+” (Somewhat viable) till “-” (Not viable); and quantitative mark varied within appropriate diapasons from [1 -0.8] for “+” through [0.8 – 0.5] for “+-”, [0.5 – 0.2] for “-+” and [0.2 – 0] for “-”.

In order to evidently expound the author's findings on the most popular project quality management methods currently in use, and the most and or less efficient and effective of them in terms their viability, we will use a statistical measure, well known as correlation coefficient to determine the strength of the association between the share of usage of the identified project quality management tools and the experts' viability assessment. In other words, this statistical method will be used to verify if all these highly celebrated quality tools are actually useful for measuring and managing project quality.

Note that for the purpose of this analysis, as shown in table 2 above, the author conducted an expert interview, whereby five renowned quality experts in project management were asked to scale the various project quality methods based on their practicability level. The results of the interview are presented in table 4.1 (bottom part of the table - expert assessment of the quality management methods viability for the project management activity). As we mentioned before, experts used qualitative marks varying from "+" (Very) through "+-" (viable) and "-+" (Somewhat viable) till "-" (Not viable); and quantitative marks varying within appropriate diapasons from [1 -0.8) for "+" through [0.8 - 0.5) for "+-", [0.5 - 0.2) for "-+" and [0.2 - 0) for "-" in order to assess the method's applicability.

The results of the correlation analysis of experts' answers are represented in table 3 below.

DISCUSSIONS

Analysis and generalization of the results. Discussing the table 3 data we can make the analysis of the strength of association between the actual applicable project quality management methods and experts' recommendable ones.

The second column of the table 3 represents the various methods that are currently used for managing project quality, while the third column shows the actual applicable project quality management methods. This was defined by calculating the share of quality methods used by different authors in different articles.

The fourth column shows the experts rating of the workability of the identified methods. Each figure represents the average value of the experts' workability evaluation.

Computing the degree of correlation between the third and fourth column, we can conclude that there is no correlation between the methods that are presently in use and what the experts consider practicable.

Further calculation of the correlation of some of the methods the experts consider relatively viable (methods with more than 0.6 point) shows that the strength of the relationship between them is very weak, thus we can conclude that there is no correlation between what is used and what according to the experts could most likely be successfully used.

Though the correlation coefficient had its highest point in the eleventh and thirteenth column where the correlation coefficient is 0.52 and 0.59 respectively, yet we can see that their degree of correlation is loose, hence there is no strong relationship between the so called good project quality management methods by many quality gurus and what could actually work well in reality. The strength of relationship between the methods got even much weaker when the experts' assessment point increased. In the fifteenth and seventeenth column which shows the level of correlation between the methods with more than 0.75 points, the correlation coefficients reduced to 0.48 and 0.38 respectively. **This by interpretation means that there is little relationship between the presently considered good project quality methods and what in reality could be used to ensure high project quality management.**

A graphical representation of the data from the table 4.2 supports our conclusions (fig. 1).

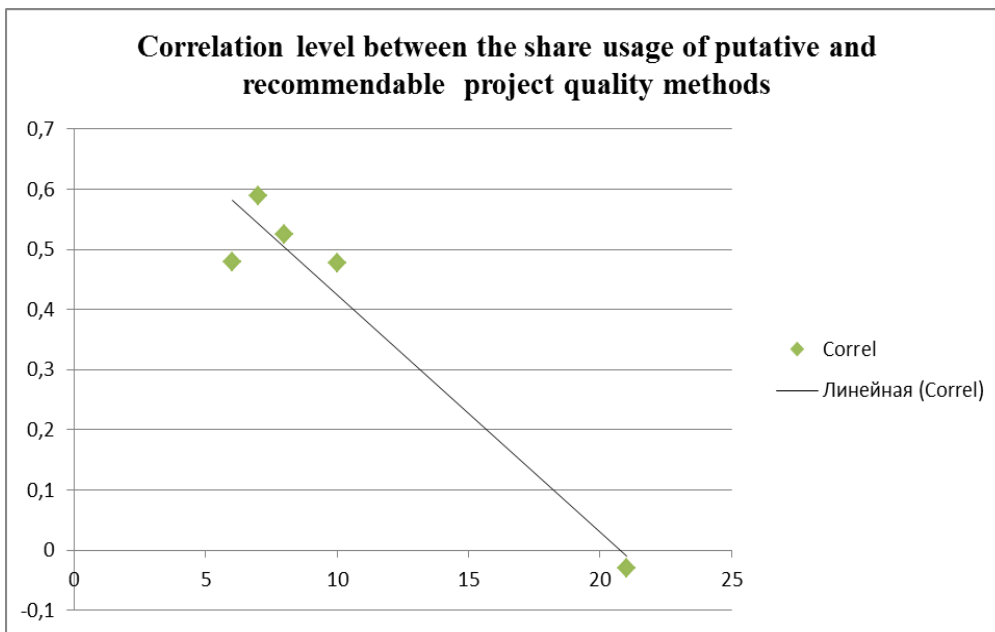


Fig. 1. Correlation between the share usage and experts assessment of project quality management methods

Conclusion and prospects of further researches. In summary, we can doubtlessly say based on the results of the correlation analysis that the rate at which researchers and most quality gurus emphasized most of the project quality management methods and the rate of their practicability do not correlate. Hence we can draw to conclusion that nearly all the tools that are currently been used for project quality management are in reality neither effective nor efficient. To resolve this issue project managers and quality experts should endeavor to adjust the prevalent approaches, as well as find new approaches to managing project quality.

More so to rise to the challenge of anthology in this sphere, project managers ought to conceptually and really consider and treat PQM as completely different from general management.

Based on this point of view, we will propose a range of baselines, which include the following:

PQM should be considered as an inherent part of project management, which consequently, will enable the project manager and the entire management team have a different perception and attitude toward quality management in project. This by implication will enable them to incorporate project quality management into all the phases of project management: inception, development, implementation and operation phase, meticulously identifying, discussing and analyzing quality definition, quality criteria and measures at every phase. This is made evident in the fact that what constitutes quality requirement, as well as its criteria varies depending on the phase.

A viable PQM must embrace all the phases of PM, taking into consideration all the processes and activities, including project product creation processes and managerial processes, through the project products delivery, closure of contract and even product exploitation. For the purpose to reflect this baseline we developed a

model of the project quality management activity as an entity of particular types of managerial activity during the project life circle (see fig. 4.1).

Furthermore practicable PQM involves the participation of all the interested parties from the project manager to the project management team, to the various stakeholders, including the customers. All the interested individuals as already mentioned contribute in one way or the other in the definition of quality, its requirements and evaluation criteria, and also its validation.

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Рецензент статті
д.т.н., проф. Медведєва О.М.

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