Effective TQM Implementation: Critical Issues

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1. ABSTRACT

Quality improvement efforts in the 1980's and continuing into 1990's throughout the world have been fueled by a host of good ideas to make quality integral to the business decision making process.

On the technical front, SPC, JIT, DOE, Taguchi methods, QFD, and TPM philosophies and methodologies have been attempted. On the system front, ISO9000 has been interpreted as a must. On the human front, Total Employee Involvement (TEI), participative management, and quality circles have attracted the attention of many companies. On the motivational front, many quality improvement awards have been instituted.

In spite of widespread interest and massive investment, there are reports of only isolated successes. By and large, quality is not yet integral to all businesses or all activities in any given business. The progress is only in terms of how many people are trained rather than how many inherent quality problems have been recognized and resolved.

The Total Quality Management (TQM) concept has the potential to integrate all the improvement philosophies proposed thus far. However, TQM can end up being diffused like all other improvement philosophies if the TQM concept is not well executed.

The execution difficulties arise from the fact that the TQM is a soft science and as such invites philosophical discussion. The elements of TQM are rather straight forward; but the execution is quite difficult. After finishing initial conceptual journey, many companies falsely believe that TQM is simply a matter of applying common sense.

The purpose of the paper is to illustrate that TQM concepts may be simple but their execution is not. TQM implementers must be aware of the execution options. Some options are very effective where as others sputter after initial eager blips. Without the awareness and analysis of critical implementation issues, it is not possible to make a better choice. This paper provides the breakthrough ideas to get a freedom from *expensive conceptual TQM rut* to *effective TQM implementation.*

2. INTRODUCTION

TQM is a soft science and as such is likely to have a philosophical tone in its discussion. The conceptual journey on a TQM path is rather straightforward; but the TQM execution is quite difficult. At times the concepts appear so simple that one is unlikely to grasp the need for

strategic choices to be made once the TQM conceptual journey is over.

Without leadership from the top, it is not possible to choose between two equally appealing options at the juncture point between TQM concepts and execution. The following briefly describes choices to be made on 15 critical issues at the juncture point along with recommendations for success.

3. CRITICAL ISSUES AND SUPERIOR CHOICES

Issue #1 - Listening to a single versus many quality experts

Any one quality improvement expert does not have all the answers. Each expert offers one unique idea to advance the soft technology of looking at quality-related problems. To solve real-life problems, one has to be able to select, sequence, and synthesize the messages from many different experts to come to a useful conclusion. The gurus of the quality improvement sciences are in three distinct but overlapping categories. In the statistical category are Gauss, Pareto, Shewhart, and Fisher. In the management category are Juran, Crosby, and Feigenbaum. And in the execution category are Deming, Shainin, and Taguchi.

Many companies may choose to listen to only one quality guru, assuming that listening to many might confuse them. Other companies may listen to all of the experts and continuously synthesize ideas to make them applicable to their own operations. The latter is the recommended choice.

We must learn to synthesize good ideas and make them integral to business practices.

Issue #2 - Method focus versus problem focus

In the 1980s, a lot of different improvement concepts have been presented as three-letter acronyms, including SPC, JIT, and QFD. The tendency for many companies is to latch on to these ideas as if they were a panacea for all problems. As soon as a new quality concept or a newly packaged old quality concept has been introduced, it becomes a focus of the company. Management briefings are made, seminars are organized, coordinators are appointed, software programs are generated, off-site meetings are held, paraphernalia is printed, banners are hung, and so on. These activities continue until another quality concept is introduced that seems to have more potential than the previous. And the whole set of activities repeats again.

Nobody in the company is willing to pose a question about the real problems faced by the company. With a problem-solving focus, the question is: "What is the problem?" The nonstrategic question is: "How do I fit my problems into this newly learned method?" The method focus can drain vital resources into nonstrategic activities.

A problem focus is the superior choice. With it, appropriate philosophies and methodologies are applied for the most efficient resolution of the problem.

We must acquire the actual experiences of solving problems rather than search for and focus on methods.

Issue #3 - Focusing on productivity versus focusing on quality improvement

Management has been heavily criticized for being laxed on issues of quality and has been blamed for a failure to integrate quality into business decisions. Management focus is generally directed toward productivity improvement with quality improvement as a by-product. Management, by and large, has not understood that a focus on quality results in productivity improvement as a by-product. Even though management has heard criticism from such a prominent person as Dr. Deming, they have basically ignored it as negativism and have not been able to translate the message into the formation of improvement strategies. Management would rather accept a speedy operation that produces 80% good parts than accept an equally effective slower operation that produces 100% good parts. The choice of speedy operation is under attack by all quality practitioners and yet it has failed to attract top management's attention. For TQM practice to be effective, the focus must be on quality with productivity as a by-product, and not vice versa.

We must redirect our focus from productivity improvement to quality improvement.

Issue #4 - Focus on Japanese strengths versus focus on internal strengths

The focus on quality is attributed to Japanese success in numerous markets. One obvious conclusion then is to copy what they have achieved. The duplication or even outdoing of Japanese results is always a good idea. The path chosen to accomplish quality is the copying of so called Japanese quality methods throughout the world. Actually, there is no such thing as Japanese quality methods. If they appear to be that way, it is the superficial observation of those who have not worked on quality-related problems. Any real improvement is based on sound scientific principles. The reason for not succeeding is a lack of understanding and/or poor execution of these principles. Any company, industry or even a country that is trying to put quality on their agenda must convert these scientific ideas into operational practices appropriate to their culture. Direct duplication of Japanese practices is an inappropriate way to duplicate Japanese successes.

The better approach is to focus on internal strengths in a given cultural setting and go after the duplication of results and not necessarily the duplication of methods.

We must look inward to create an answer to our problems. Looking outward can tell us what results are possible but not necessarily means by which to achieve them.

Issue #5 - Administration-based versus technology-based supplier quality model

The multiplicity of customer-designed supplier quality improvement models can confuse many suppliers. A strategic quality improvement model has to be consistent with the product/process technology. Therefore, a supplier, who is most knowledgeable about the technology, is in a better position to design the quality improvement model. Most customers, however, have a supplier quality improvement model of their own. These models consist of a series of procedures which suppliers must comply to. The suppliers' valuable resources may end up being spent in continuously rearranging and rewriting their procedures to satisfy each set of distinct requirements for their customers. Therefore, the supplier may never find time to focus on creating a strategic quality improvement model consistent with product/process technology.

It is a superior choice to have a technology-consistent supplier-designed quality improvement model.

If suppliers are to be true partners, then their improvement models must be consistent with their technology.

Issue #6 - Automating human tasks versus automating human tendencies

Automation has a high potential of delivering a quality product. However, there are many forms of automation to consider. Robotics replaces human hands. Programmable controls automate the maintenance of process variable ranges. SPC automates the closed-loop signals and the corresponding corrective actions based on the output signal measurements. Companies could end up heavily investing in one form of automation without maintaining a proper balance among all forms of automation. The SPC charting can provide strategic guidance in choosing a form of automation. Based on the frequency and nature of instabilities viewed on SPC chart, one can determine the appropriate balance that is necessary among the different forms of automation.

No single form of automation for improving quality is a strategic choice. SPC-guided automation decisions are recommended.

We must invest our resources to automate human tendencies based on scientific guidance provided by SPC.

Issue #7 - Focus on the system versus focus on quality

The need for quality system such as ISO 9000, is universally recognized. The question is not whether or not to have a quality system, but what is the best way to formulate one. First of all, the elements in quality systems are industry environment dependent. To determine the priority of these system elements, the company's problems must be recognized first. The quality system cannot be independent of problems that it is designed to prevent or solve. Having recognized the problems, solutions must then be developed. It is these solutions that determine what system elements are necessary to hold the solutions in place and prevent reoccurrence of the problems. Thus, the development of the system elements is directly dependent on the company's needs; they should not have any philosophical underpinnings. Eventually, as solutions continue to develop, system elements continue to emerge. The focus on system development without any problem-solving foundation is an extremely soft idea. It is philosophical rather than realistic. Companies showing a preference for developing a quality system such as ISO 9000, might find that the energy and resources required to develop and maintain the quality system are likely to deflect the main objective of improving quality.

We must focus on quality improvements and let quality system emerge based on improvement experiences.

Issue #8 - Use of SPC as an on-line control versus use of SPC for process improvement

Using SPC as an on-line control measure is a form of a process control or process capability maintenance solution. The process is periodically monitored for potential disturbances, and instantaneous action is taken when such disturbances are incipient or immediately after they have occurred. The actions to control and/or eliminate disturbances are assumed to be known, and the mechanisms that make the actions possible are assumed to exist. In this scenario, SPC simply provides a timely signal for actions. Use of SPC only in this form is not a recommended choice because very rarely are the actions needed to curb disturbances known. Even when the actions are known, the mechanisms generally do not exist to control or eliminate the disturbances. In those rare instances when all assumptions for the successful implementation of SPC as an on-line control are met, there are competing technology-based means available to achieve the same objectives. For example, the use of SPC might signal a tool change. It is possible, however, to automate the tool change without control charting the output signal.

On the other hand, the use of SPC as a process improvement tool is a better choice to consider. The SPC chart systematically divides the complex problem into three categories: (1) off-target condition, (2) instability, and (3) variation. Furthermore, using SPC as an improvement tool does not demand an instantaneous response to the problematic conditions but offers the strategy of problem attack, suggesting instability be resolved before other problem conditions.

Companies could end up making major investments in using SPC as an on-line control tool, hoping to control and solve their major problems. An undesirable side effect of this choice is

the falsification of SPC charts to give them an in-control look, so that no one would question the payback on SPC related investments. To prevent such practices, consider the use of SPC as an improvement tool first.

We must use SPC as a process improvement tool. Use of SPC as an online control is only an option in selecting the process maintenance tool.

Issue #9 - Horizontal thinking versus vertical thinking

Horizontal thinking creates the perfection of the sub-step. Decisions are made to perfect one of the steps in the quality improvement process. For example, it is necessary to have reliable measurement hardware and a scheme to measure the product. To buy gages for all operations in the plant with the objective of perfecting the measurement system would require a big investment. Gages measure problems, not solve them. It is better to upgrade a few selected gages rather than invest in upgrading the gages in whole plant.

Vertical thinking, on the other hand, requires the completion of a closed-loop. Vertical thinking requires that all the steps needed in making improvement happen be thought out and applied to a few selected cases. Successful solutions bring handsome returns on problem-solving efforts. A portion of these returns can then be used to upgrade a similar situations in the facility.

We must practice vertical thinking for quality improvement to earn funds necessary to build horizontal schemes.

Issue #10 - Process teaching versus content teaching

It is universally accepted that a massive dose of training is needed to infuse quality-related improvement ideas in all disciplines. How to go about training company employees is often a subject of debate, however. Companies must consider two most popular options in making a choice.

The first preference of teaching general ideas and leaving specific applications to be developed by individuals is stronger in the academic community and understandably so. This is referred to as *process teaching*. Though this preference may be a desirable choice for individuals who naturally progress from school to college to the working environment, it has shown to be ineffective for those already in the working environment. People in the working environment have shown a preference for learning what is immediately applicable to their own problems before being able to generalize the use of quality methodology. This is referred to as *content teaching*. Heavy investment in process teaching may produce quick training statistics but it does not necessarily produce impressive end results. A goal with process teaching may become how many people are trained versus how many problems are solved.

Teaching quality is most likely to be effective if it starts from a content teaching and develops into a process teaching.

Issue #11 - Management lip service versus management commitment

The commitment to quality in many companies is an occasional speech written by public relations expert and delivered by the CEO This gesture is then supported by some budgetary measures to carry on quality activities. Such an approach simply cannot create a TQM environment.

The CEO or president should get personally committed on many TQM fronts. First item is self-education (not articulation) in quality concepts and then speeches about them. Only then should activities begin to steer the company strengths in the right direction and allow restructuring to evolve.

The commitment does not end at that point. To understand the company restructuring process, personal participation in some problem-solving activities is necessary. Every successful or unsuccessful attempt at solving a problem produces at least one lesson in restructuring the organization.

Next navigation becomes an important issue. From the viewpoint of quality discipline, every company has serious problems. Quality principles suggest that it is not possible to work on all problems simultaneously. An important question then becomes which ones need to be worked on. Or even how to formulate a problem definition from many sketchy ideas. Nothing less than navigation by top leadership is necessary to identify and formulate the most significant problems.

Finally, there is the need for a pat on the back. Financial rewards for quality work are generally not integral with present compensation and bonus schemes. A major setback is thus possible if these rewards are not aligned with the introduction of TQM in the organization.

Broader scope of quality commitment must be understood and practiced.

Issue #12 - Soft progress versus hard progress

Quality progress is often described in soft terms (intermediate results) instead of hard terms (end results). Once such a practice is considered acceptable, it almost becomes the norm. For example, many companies will describe their progress in terms of how many employees were trained rather than how many problems have been resolved. Other companies will describe how many teams have been formed rather than how many teams have resolved inherent problems and

have created breakthroughs. The better choice is to require progress reports in hard terms and not in soft terms.

Top management must resist a practice of reporting quality results in soft terms.

Issue #13 - Improvement of manufacturing systems alone versus all other systems that relate to manufacturing

Quality improvement efforts are usually talked about in the manufacturing sense. Business systems that also contribute a fair number of quality-related problems somehow receives scant attention. Measurement indexes have neither been well defined nor any improvement methodologies been extended from manufacturing experiences. Nothing equivalent to rework and scrap is emphasized for problem solving in administrative processes. Most of the problems associated with business processes are handled as incidents rather than considered as the candidates for permanent resolution. To derive the full benefits of TQM efforts, quality improvement ideas should be extended to business processes and not confined to manufacturing alone.

Top management must consider all systems as candidates for improvement.

Issue #14 - Mathematical models versus reality

Mathematical models help us to visualize difficult physical concepts. Mathematical methods conceptualize the most efficient approach to investigative problems. However, to benefit from the mathematical efficiency, an execution or operational realities must be understood as well.

For example, a point outside the plus-or-minus three-sigma limits is a practical definition of instability. However, according to the mathematical model, there is a 0.27% chance that the points may fall outside the three-sigma limits due to common causes or natural reasons. Thus, when an occasional point falls outside the control limits, should it be investigated as instability or ignored as a chance event? The recommended choice is to consider it as instability and investigate the underlying assignable cause.

The blind application of mathematical ideas without operational definitions or interpretations may result in less effective applications.

Top management must challenge the middle management on the application of mathematical ideas.

Issue #15 - Mathematical efficiency of experiments versus execution difficulty of experiments

Recently, emphasis has been given to a family of fractional factorial experiments popularized under the title Taguchi experiments or Taguchi methods. Their mathematical efficiency is not a brand new discovery. It has been known for many years to mathematicians who have been dealing with statistical design of experiments. What is interesting is the assumption under which Taguchi applies fractional factorial ideas and seeks robustness against uncontrollable (noise) factors. What nobody talks about, however, is the execution difficulty of these experiments. It is extremely difficult to arrange fractional factorial experiments for a large number of factors because to seek out the needed extremities of factors is very expensive. No mention is made about dealing with the experimental expenses involved. When such methods are tried in the actual production environment, there is no budget set aside to bear the initial expense of these types of investigations. Once the expense becomes obvious, one is forced to look for an economical method to achieve the same end objectives.

Thus, selection of an improvement methodology is not solely dependent on mathematical efficiency but has to be balanced with execution considerations.

Top management must ask key execution questions at every encounter.

4. CONCLUSION

There is a distinction between conceptual TQM journey and execution TQM journey. Conceptual journey is rather straightforward. The execution journey, however, presents two options on many critical issues. The success of TQM is dependent on the prudent choices.

The discussion of these options on 15 TQM elements must convince us that between two options on each critical issue, the choice of one option is strategically superior than the other. The choices must be made between the two options at the juncture between the end of TQM conceptual journey and the beginning of TQM implementation.

The paper has reasoned in favor of strategically superior choices.