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Adapting Deming’s Philosophy: An Evaluative Model

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Introduction

No management issue since the Scientific Management Movement of Frederick Taylor in 1907 has had the impact of the quality movement. It is generally agreed among US executives that quality in products and services is essential to maintain and improve competitiveness in international markets[1]. Quality expert J.M. Juran calls the movement a major phenomenon in this age[2].

The purpose of this article is to develop a method of determining a Company Quality Profile (CQP) utilizing size concepts based on W. Edwards Deming’s philosophy. The authors evaluated the CQP in an exploratory field study in a high technology consumer products manufacturing plant which is part of a Fortune 500 corporation. This profile may be used by companies to determine their current quality position, to assign responsibilities, and to monitor quality and productivity improvement programmes. The CQP can also be used in making cross sectional and longitudinal comparisons when conducting research into quality, productivity, and competitiveness issues. An earlier version was presented at the Southern Management Association Meeting in 1989.

Theoretical Framework

W. Edwards Deming is credited with institutionalizing a system of strategic manufacturing which is responsible for the formidable Japanese presence in the world market. Deming stressed the necessity of top management involvement, attention to the customers’ needs, the involvement of all employees in the process of continual improvement, and the need to pay close attention to the entire manufacturing process as keys to corporate success[3, 4, 5]. He intimated that 85 per cent of the causes for poor quality production rested with management, and not with workers[6].

The philosophy of strategic manufacturing goes far beyond the use of statistical methods. The concept encompasses all parts of the organization as well as constituencies outside the organization. Deming advocates creating an outstanding product at lower cost which will provide real growth for the organization. President Bush reflects Deming’s philosophy when he says “…competitiveness (does not) mean protectionism …(but) trying to improve quality and productivity at home”[7].

This philosophy expands the definition of the organization’s process from the traditional manpower, methods, materials and machines to include suppliers, customers, investors and the community [8,9]. The customer is the most important part of this extended process.

The 14 points comprising Deming’s philosophy are designed to improve all aspects of manufacturing. These points comprise a systems approach to improving the competitive position of United States manufactured goods in the world market. The CQP developed in this study provides the framework for the implementation of Deming’s philosophy.

Establishing a Company Quality Profile

Deming’s 14 points are the underlying dimensions of the six basic concepts which comprised the CQP (see Figure 1). Profiling the company using six concepts provides a more convenient and operable means of evaluation than profiling using the 14 points directly. This is due to the overlap which exists among the 14 points. The six concepts comprising the company quality profile exhibit less overlap and represent more discrete dimensions of
the company’s quality position. In addition, the six concepts provide a basis for assigning responsibility for major portions of the improvement process to functional areas within the organization.

**Concept 1: Company’s Strategy**

*Point 1.* Create constancy of purpose
*Point 2.* Adopt the new philosophy
*Point 14.* Involve everybody in accomplishing the transformation.

This concept addresses American managers’ obsession with short-term performance. To compete, organizations must adopt an operating philosophy which stresses long-term goals. These provide a sense of purpose and a framework within which managers can operate.

Concept 1 provides a path for establishing a strategy to increase quality while simultaneously lowering costs and increasing productivity. Implementation requires first a dissatisfaction with past performance. The management team must then make a long-term commitment to the plan of action required to carry out the quality mission. They must create a structure and an atmosphere conducive to the implementation of the philosophy of continual improvement. Then everyone in the organization must become involved with the change process.

**Concept 2: Human Resource Management**

*Point 8.* Drive out fear
*Point 9.* Break down organizational barriers
*Point 12.* Facilitate pride of workmanship.

American companies too frequently treat their employees as mere factors of production. Managers in such companies see no purpose in communicating company goals to employees or in listening to ideas from employees. As a result, many employees do not understand how to do their jobs or what constitutes good performance. They feel powerless, because management has control over them. They are afraid to point out problems because they might be blamed. Such fear creates appalling economic loss.

Concept 2 emphasizes the importance of the employee as the company’s greatest asset. Elimination of fear must begin at the top of the organization. Employees must be given the necessary knowledge and tools to do their jobs properly. They must understand the organization’s goals. The organization’s climate must encourage openness and reward positive action which exposes problems so that they may be understood and corrected.

**Concept 3: Measurement of Results**

*Point 10.* Eliminate arbitrary numerical goals
*Point 11.* Use statistical methods for continuing improvement.

Setting numerical goals, and using posters and slogans in an effort to motivate workers actually generate frustration if management fails to provide the means for achievement. Concept 3 provides an alternative to numerical goals for effecting continual improvement.

Control charts and other statistical methods provide a replacement for numerical goals. Progress can be easily seen as assignable causes are eliminated and normal variation is minimized. By being able to see the fruits of their efforts quickly, workers will be motivated to work for further improvement.

**Concept 4: Training and Supervision**

*Point 6.* Institute modern methods of training
*Point 7.* Focus on supervision
*Point 13.* Institute education and training.

New employees must be oriented to the company’s philosophy of commitment to never-ending improvement, informed of the company’s goals, and made to feel a part of the team. Initial training is very important; for it is easier to train an employee properly than to erase the effect of improper training. Workers who receive only on-the-job training cannot be relied on for top performance.

Bennis[10] says that American organizations are over-managed and under-led. Supervisors should use statistical tools to determine individual employees’ training needs. By responding properly to these needs the supervisor can help workers do a better job.

Concept 4 requires an entirely different perspective on the part of both managers and workers. Management must develop a long-term perspective towards training and
supervision. Extensive education and training is required at every level in the organization if this concept is to be successfully adopted.

**Concept 5: Quality Assurance**

**Point 3.** Replace mass inspection with statistical monitoring

**Point 5.** Constant improvement.

Quality cannot be inspected into a product; it must be built into the product. Deming contends that mass inspection is managing for failure by focusing on the negative without offering any means of improvement[11, 12]. Concept 5 directs effort towards the long-term goal of continuous process improvement rather than towards the short-term goal of detection and correction.

Statistical Quality Control (SQC) provides a means for analysing the process, continually improving the process, and controlling product quality through control of the process. SQC involves everyone in the process of improvement and defect prevention. SQC eliminates the waste of unnecessary inspection and defect correction thereby reducing costs and increasing competitiveness.

**Concept 6: Purchasing Policies**

**Point 4.** Stop awarding business on basis of price.

Purchasing the lowest priced material is frequently synonymous with purchasing the lowest quality material. To make the purchasing decision on the basis of price alone is another example of short-term thinking. Lower quality materials result in production problems and increased defects in manufacturing.

Concept 6 emphasizes the need to understand the operational problems encountered in using purchased materials in order to make better purchasing decisions. Purchasing departments frequently use multiple sourcing as a way to play one supplier against another in order to obtain a lower price and to prevent disastrous interruption of materials from vendors.

The single source environment is conducive to pursuing continual quality improvement. Working with vendors to improve quality requires a relationship of openness and trust-with-statistics as the common language.

**Evaluating the Company Quality Profile**

A field study was conducted in a high technology consumer products manufacturing plant to evaluate the operational aspects of the CQP.

**Description of the Company**

The company is a diversified consumer products corporation with manufacturing facilities located worldwide. The plants comprising the manufacturing division of this company are provided with considerable autonomy. All operations, with the exception of accounting, are decentralized. There are no corporate level staff units with functional authority over plant operations. The plant general managers are encouraged to operate their plants as if they owned them. This philosophy places the responsibility for determining the plant's approach to quality at the plant level. Only general strategic guidance is provided from the corporate level.

**Methodology**

Structured interviews were conducted over a two-month period with the plant's general manager, quality control manager, and senior process control engineer. Follow-up interviews were conducted with these same individuals three months later. Unstructured interviews were also conducted with other management and non-management personnel during periods of observation on the manufacturing floor.

The principal instrument used to develop the self-rated quality profile for the company was a questionnaire administered to the quality control manager and to the process control engineer. This questionnaire consists of six parts - one for each of the six concepts. Each part contains five statements derived from Deming's points which underlie the concept represented by that part. Responses were recorded on a five-point Likert scale from strongly disagree to strongly agree. The responses were coded so that a rating of five would indicate complete agreement and compliance with the concept.

**Data Analysis**

To determine the company's self-rated quality profile, the mean response was calculated for each concept. The responses were recorded on a star plot which comprises the quality profile for the company. The star plot provides a convenient means for presenting all six concepts on one diagram. A company which has fully implemented the six concepts would have a profile consisting of all fives.

**Discussion of Results**

Figure 2 shows the quality profile for the company under study. This profile was constructed from the responses of the senior process control engineer at this plant. The profile indicates that from the perspective of this key quality professional, there is no diametric opposition within the company to the six concepts comprising Deming's 14 points. The profile also indicates that the plant has failed to adopt any of the six concepts fully.
This is consistent with the findings developed during the interview and observation portion of the study.

**Concept 1: Company’s Strategy**

The interviews and discussion with top and middle managers within the plant indicated a sincere desire to improve the quality of the operation and the products. The focus, however, appeared to be more on the immediate financial impacts of these improvements than on the long-term benefits which Deming stresses. These observations were consistent with the self rating of 3.7 on this concept.

**Concept 2: Human Resource Management**

Interviews with top managers indicated their desire for more teamwork within the plant. Decision making within the plant tended to be largely centralized. There was no regular opportunity for hourly employees to convey their ideas and opinions to top management. There were no quality circles for autonomous work groups in this plant. There was, however, considerable informal interaction between middle management and the hourly employees. These managers practiced “management by walking around”.

Two dimensions (Deming’s points 8 and 12) of this concept seemed to be particularly ignored at this plant. Objective control systems such as labor efficiency reports and annual performance reviews were widely used. These observations were consistent with concept two receiving the lowest rating (3.1) on the company quality profile.

**Concept 3: Measurement of Results**

Display boards were posted in each area of the plant indicating the daily and weekly quotas and actual performance relative to those quotas. Interviews with management, operating and engineering personnel indicated that achieving these productivity standards was a matter of great importance to management. These same personnel also indicated that continuous effort is made to improve the methods and tools provided to the operating personnel to achieve these goals. These findings appeared to support a somewhat lower rating on this concept than the 3.7 self-rating.

**Concept 4: Training and Supervision**

Interviews with the plant’s quality management personnel indicated that almost all training within the plant was on-the-job. No training in statistical methods was provided to operators and line managers. Engineering and quality control were relied upon to handle most problem definition and resolution within the process. These observations appeared to support a somewhat lower rating than the 3.5 self-rating for this concept.

**Concept 5: Quality Assurance**

While some statistical process control techniques were used to monitor the production processes, the primary quality control tools were mass inspection and lot auditing. Statistical methods were used by process control engineering to evaluate processes and determine ways they might be improved. However, the only employees trained in the use of these procedures were in the quality and process control departments. Management was concerned with improving both quality and productivity but does not yet appear to understand the role that statistical methods can play in that process. This suggested that the self-rating of 3.7 on this concept is too high.

**Concept 6: Purchasing Policies**

Interviews with purchasing personnel indicated that price, given a certain minimal level of quality, was the foremost criterion for selecting vendors. There was a desire to have alternate vendors for as many materials as possible to ensure constancy of supply and to provide bargaining leverage. There was a standard system of providing feedback to suppliers concerning the quality of their materials. Plant personnel often visited vendors to help in problem definition and resolution. These findings suggested that the self-rating of 3.5 on this concept was too high.

**Conclusion**

The self-rated CQP based on Deming’s 14 points is useful in determining a company’s view of itself. Coupled with an independent field evaluation of the company the CQP
can provide a single point estimate of the company’s position relative to Deming’s standards. The self-rated CQP validated by an independent field evaluation can be useful in making both longitudinal and cross-sectional comparisons.

The plant in which this exploratory field study was conducted appears to be at a crossroads. While aware of the dimensions underlying the CQP and moving towards their implementation, they also have retained some practices which are inconsistent with some of the dimensions. These practices include the use of centralized decision making, the use of only on-the-job training, the use of quotas, and regular individual measurement and performance evaluation. While making some use of statistical methods to improve productivity and quality, knowledge of these methods is not widespread within the company. The increased awareness of their company’s profile on these six concepts could assist management in their attempts to implement the Deming philosophy further.

Further research is needed in the validation of the application of these six concepts to the evaluation of a company’s quality state. Longitudinal field studies must be conducted to determine if knowledge of a company’s current quality profile is beneficial in improving that company’s quality performance.

References

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