

Quality Improvement - Strategies, methodologies and results

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1. Introduction

The paper outlines and discusses strategies and methodologies for the improvement process with examples and experiences of the application in Scandinavian companies. Scandinavian companies have applied a broad spectrum of improvement principles, methodologies and tools during the last 5-8 years with interesting economical results (Hartz 6) (Dahlgaard, Hartz, Edgeman 4).

In the paper will be outlined and discussed important cases giving examples of some of the most significant applications of quality improvement strategies and methodologies. In this way significant improvements principles and methodologies are presented and discussed.

Improvements as a way of life based on self-assessment using a Quality Award Model/Business Excellence Model (BE-Model) are presented and discussed in the first case, Grundfos. Based on the successful improvement-orientated strategy and Total Quality process since 1996 in the Danish factories and head office this case company is now in the process of implementing the improvement concept world wide in their daughter companies, both manufacturing companies and sales companies.

The presentation and discussion of a second case, Danfoss, will be emphasise that fundamental quality improvement strategies and basic quality improvement principles and tools are forming the basis for improvement activities like Six Sigma etc. revitalized within the last few years.

The cases presented will illustrate two rather different strategies (but both very successful) in identifying and implementing improvements: 1) a project-by-project approach for solitary improvements with individual nomination and selection of the object for improvement - an inductive approach; 2) an improvement-orientated self-assessment using a Quality Award Model as an overall diagnostic mean relating the effects (unsatisfactory results) to the causes to be identified in the enablers - a deductive approach.

The European Business Excellence Model (The European Quality Award), The Malcolm Baldrige National Quality Award and similar BE-models (Q-awards) can be applied as important means for a total improvement approach in the company (Anttila, Aune, Hartz, Jönson 1). BE-models applied as means for an overall, strategic improvement approach are presented and discussed in the following.

The development and application of improvement-orientated self-assessment as a top management philosophy will be illustrated by a large Danish industrial concern, Grundfos A/S. The Grundfos group is one of the world’s leading pump manufacturers. Since 1996 Grundfos has worked systematically with the development and implementation of Total Quality and improvement-orientated self-assessment. This type of self-assessment is moreover named diagnostic self-assessment or “right-left” approach in the European BE-model (Conti 2, 3).

TQ and Improvements as A Management Culture
Besides implementing self-assessments for improvement purposes Grundfos A/S has in addition achieved the Danish Quality Award 1999. Grundfos A/S obtained in 2001 to be finalist for the EFQM European Quality Award, Operational Units, and was in October 2003 EFQM Prize Winner in Leadership and Constancy of Purpose.

The company formulated in the late 1990’s the following vision: “Grundfos aims to be the most successful Group in the product development, production and sales of high-quality pumps and pump systems in the world.” Grundfos had in 1996 chosen the European Business Excellence Model as the tool for managing the company under the heading TQ, Total Quality. They decided not to have ‘M’ in TQM in order to symbolize everyone’s active involvement in the TQ-process.

TQ is a culture in Grundfos. TQ implies that the quality way of thinking pervades the whole company. The holistic approach at Grundfos is based on the European Business Excellence Model in combination with the concept of The Learning Organization (Dyhl 5). The most
important target for Grundfos as a TQ-company is to meet customer requirements in an
effective way, entailing continuously growing competitiveness through ever on-going
improvements.

Management Commitment
Since 1996 Grundfos has worked systematically with TQ/BE as the way of managing its busi-
ness. Basis for this process is clear management commitment, visibly stated in a “Goal
Consensus Document”, which hangs as a picture in every department in the company. It
includes the goal of the TQ-process, the cultural values and the system for improvements, i.e.
the EFQM Excellence Model. All managers at Grundfos A/S have signed the Goal Consensus
Document. The formulation of the vision (stated above), the cultural values and system for
improvement were carried out through involvement of the whole organization. Each board
member was responsible for their part of the document and for the formulation process, thus
showing management commitment plus the importance of everyone’s involvement.

Ongoing Self-Assessments, Cross-Functional Assessments and Improvements
Self-assessments are conducted in each department at Grundfos and the company as a whole
according to an improvement annual cycle for assessments and improvements. The objective
of the annual improvement cycle is to identify and carry through improvement projects plus
present a clear picture of the relations between enablers and results.

Grundfos performs two types of internal self-assessment:

• self-assessment within each division or function/department
• cross-functional self-assessment where each division/function/department is assessed
  by a manager from another each division/function/department

Internal Benchmarking
All evaluations and facts discovered during the self-assessments are distributed through the
company intranet in a database with full internal access, thus creating the basis for
benchmarking between divisions/functions/departments, and to identify “best practice” useful
for the learning process.

The Annual Improvement Cycle
The annual improvement cycle in Grundfos involves the following activities.
### Activity Period

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<td>2. Statement of the situation in Grundfos</td>
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**Results and Lessons Learned – A Manager Driven Improvement Process**

The TQ/BE-based improvement process is driven by the head of divisions/functions/Departments. Grundfos has in the TQ-process with success strongly emphasised that the managers:

- participate in the formulation of strategy and establishing objectives for the company as a whole
- are active involved in the fulfilment of the company as a whole
- communicate in own area the vision, mission, strategy and objectives for objectives for the company as a whole
- participate in the establishing of quantitative objectives for key processes within own focus area
- are teachers and coach in own area
- carry out self-assessments in own area
- participate in the implementation of improvement projects in own area and in the company as a whole
- carry out assessments in the areas of other managers

Grundfos has obtained outstanding results by using a BE-model for improvement-orientated self-assessment “The Grundfos TQ-process”. The process has created closer co-operation
between the divisions/functions/departments through a common language and the deployment of strategies and plans.

The heads of divisions/functions/departments have together with the executive board chosen the way of managing the company. The TQ/BE-process has created a common company strategy and objectives and also improved (open) communication on all levels. The internal customer/supplier relations are improved significant. Considerable chances in the content of the managers’ job with much more delegation of responsibility and less follow-up.

The self-assessment within areas and cross-functional assessments are forming the basis for the many improvement projects, which are initiated all over the company. And finally, the TQ/BE-process has resulted in obtaining very satisfactory economical results.

Based on the successful BE/TQ-process at the Grundfos Headquarter in Bjerringbro and at the other Danish factories it has been decided to implement the process in all Grundfos companies worldwide. This BE/TQ deployment process has started with pilot activities and is continuing in about 35 countries in the roughly 50 Grundfos companies including both the manufacturing companies and the sales offices.

3. Quality Improvement - A Universal Sequence: The Danfoss Case

The series of activities in an improvement process can be considered as a universal sequence for quality improvement. The largest Danish industrial concern, Danfoss A/S, and other Danish companies very successful introduced and applied this concept for quality improvements during the 1980’s and 1990’s.

The concept was formulated by J. M. Juran and communicated in among others Juran’s Quality Control Handbook (Juran 7) and widely spread as a improvement (a breakthrough) concept by the publication of the videocassette series Juran on Quality Improvement with workbooks, leaders’ manuals etc.

Danfoss followed a strict top-down approach in training the employees in improvement process. The videocassette based training included application of the universal sequence and principles on a selected improvement project.
For each Danfoss Division (Main Product Group) the improvement process started on the top management level. When the top management group had carried out an improvement project through the 16 video sessions new improvement teams were formed on the next management level and so the top-down continued to the shop floor level.

To have the improvement training projects running at all levels in the organization including the shop floor Danfoss on an early stage decided to translate the spoken English language on the videocassette and the workbooks into the Danish language for their factories in Denmark and into German language for their factories in Germany.

In the Danfoss way of conducting the improvement projects each of the established improvement teams were allocated a sponsor. This sponsor was a person from an improvement team, that had just finish the improvement training/application itself and in this way the sponsor normally was a leader from the overlying level.

**The Universal Sequence for Improvement Includes:**

- Proof of the need
- Project identification
- Organizing for improvement
- The diagnostic journey
- The remedial journey
- Motivation for quality
- Holding the gains.

In this improvement concept is strongly emphasized that:

- All breakthrough (improvement) is achieved project by project, and in no other way - participation in a project significant increases the likelihood that the participants will act on the findings.

The practical experiences in the companies from applying the improvement sequence show the importance of emphasising the distinction between the two different journeys: the diagnostic journey and the remedial journey.

The different scope and different content of the two journeys should be clear communicated:
The diagnostic journey - to identify the causes.
To come from symptom to cause: analysis of the symptoms, formulation of theories as to the causes, testing the theories and ending with determination of the causes. In the testing of theories it can be relevant to distinguish between management-controllable problems and operator-controllable problems (the premises for operator-controllability: means for 1. knowing what supposed to do; 2. knowing what actually doing; 3. regulating the process).

The remedial journey - to remove the causes.
To come from cause to remedy: developing the remedies (based on the knowledge of the causes), choosing among alternative remedies, proof of the remedies under operating conditions, dealing with resistance to change and establishing controls at the new level.

Lessons Learned
By applying the two different journeys people are trained to separate the diagnosis of a problem from the remedy of the problem. They understand that it is not wise to jump from a problem (a symptom) direct to a remedy. No remedy without having determined the causes on beforehand: diagnoses must precede remedy.

The experiences at Danfoss and other Danish companies in the practical application of the universal sequence of activities for improvement have been very positive. The improvement projects have resulted in a large number of implemented improvements and beneficial changes.

The projects also have given a significant increase of the quality involvement of the employees resulting in an important increase in the quality commitment and motivation for people at all levels in the organization.

Conducting improvement projects or processes also involves the use of a number of tools. In Danish industry most of the well known tools have been successfully applied.

Tools for Improvements
Danfoss and other Danish companies have experiences in the application of the well-known improvement tools as “The seven basic QC tools” and other improvement techniques. They have with success applied many of the following tools:
Concluding Remarks on Universal Sequence and Basic Improvement Tools

The application in Denmark of the basic improvement tools has been broad and not only in relation to the concept Universal Sequence for Improvement. The brief presentation above of improvement projects at Danfoss and other Danish companies emphasis how the Juran improvement concept focusing on the Two Journeys significant has influenced the quality improvement practice in Denmark. In this way basic improvement principles and methodologies are presented in a historical perspective.

The presentation and discussions show that the fundamental quality improvement principles and tools applied during the past 20-30 years or more are forming the basis for recent/revitalized improvement trends like Six Sigma/Black Belt etc. within the last few years. These concepts and other concepts are usually based on the basic improvement tools and principles like a (universal) sequence of steps (activities), clear distinction between the diagnostic process/activities and remedial process/activities as discussed.

4. Conclusion

Concluding can be stated that companies obtaining very satisfactory results from conducting quality improvements typical have both a carefully chosen improvement strategy and an improvement methodology, which are implemented in a manner tailored to the characteristics of the company and with really top management commitment.

The two improvement philosophies with the illustrating cases presented above are representing two rather different approaches in identifying and selecting potential improvements. The project-by-project approach is typical solving numerous problems and implementing a lot of improvements on the operational and tactical levels in the company.
The improvement-orientated self-assessment is a more deductive approach using a Quality Award/Business Excellence-model as an overall diagnostic mean relating the (unsatisfactory) results to the causes to be identified in the enablers. This improvement principle have to decided on the strategic level and then being deployed as a way of life on both the strategic, tactical and operational levels.

According to both management theory and company experiences are the strategic part of quality management and improvement processes of the utmost importance for the future developments.

References


