
Management and planning tools

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Abstract

There are now many tools to assist in developing increased overall quality and supporting total quality management. These management tools are now recognized as valuable – often essential. Other tools which are now being integrated include quality function deployment (QFD), Hoshin Planning, and design of experiments (DOE). The key to product improvement and customer satisfaction lies in problem solving with facts. These management tools are essential to support these goals.

TQM, the Deming philosophy, statistical process control (SPC), continuous quality and productivity improvement and customer satisfaction are now major considerations for management in general and are no longer just tools used by quality department personnel.

The basic philosophy related to the concept that improving quality by removing the causes of problems in the system inevitably leads to improved productivity. It presumes and also requires that the person performing the work is the most knowledgeable about that work. It also implicitly offers that a structured problem-solving process produces better solutions than unstructured approaches.

Typically, quality improvement relied on problem identification, and problem analysis. The tools used have become familiar to many professionals and include:

- flowcharts;
- check sheets;
- brainstorming;
- nominal group technique;
- pareto charts;
- cause and effect diagrams;
- run charts;
- stratification;
- histograms;
- scatter diagrams;
- control charts;
- process capability indices;
- force field analyses.

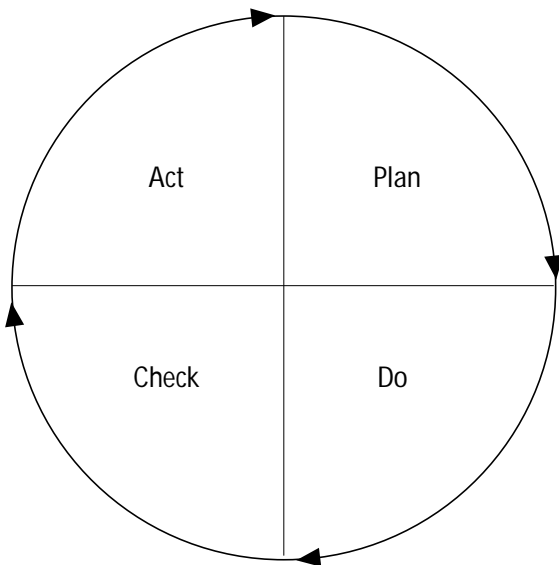
For definitions and explanations of these, I recommend *The Memory Jogger*[1].

Our sharing deals with “the seven Management and Planning Tools” as developed by GOAL/QPC. These tools do not replace the basic statistical techniques listed earlier. These tools are therefore provided as key supplemental tools. The professional will find that these two sets of tools are complementary.

In the 1950s, Deming developed the plan-do-check (study) -act cycle (see Figure 1). It graphically describes the action steps which we all use to manage our lives and operations.

- We plan what we want to accomplish over a period of time and what we are going to do to get there.
- We do something which furthers these goals and strategies developed above.
- We check/study the results of our actions to assure that there is a close fit between what we planned to accomplish and what was actually achieved.

Figure 1 Deming's plan-do-check/study-act cycle



- We act by making appropriate changes that are needed to achieve the initial goals more closely or by developing procedures to ensure compliance/ continuance of those plans that were successful.

Problems in implementing the Deming cycle

Effective application of the plan-do-check/study-act cycle has been limited in US firms by several major factors.

- Planning and evaluation functions, since the time of F. Taylor, have been separated from the “doers”. Technical specialists developed the job plan, while the unskilled workforce actually executed the plan. Eventually, strict departmentalization developed based on job functions.
- Planning has often been unplanned and often relegated to the “seat-of-the-pants approach”. Planning has too often been “recognized” as being too theoretical to be practical or too detailed and mundane.
- Many recognize that there has been a lack of available tools which make planning both simple and timely.

Who uses the management planning tools?

These tools have proved useful to managers of virtually any level in a firm. They have proved to be particularly helpful to middle- to upper level managers, according to GOAL. These tools are apparently more acceptable at these levels as they “fill a void” left by the basic

statistical tools referenced initially, since they have disadvantages or limitations to many middle- to upper level managers.

Explanation of each tool

The following are detailed explanations for each of the management tools and are provided as supportive materials by GOAL/QPC; these are summaries of materials in *Memory Jogger Plus+*[2].

Seven management and planning tools

These tools provide managers, professionals and workers with tools needed to make planning an effective and satisfying process. These tools also break down Taylor-type barriers by allowing more individuals to contribute to the planning process.

One needs to understand that these tools have their roots in the work of Japanese TQM leaders. The Japanese effort was conducted by a committee of the Society for QC Technique Development; between 1972-1979, this committee refined and tested these individual tools and the overall cycle.

These seven tools are:

- (1) affinity diagram;
- (2) interrelationship “digraph”;
- (3) tree diagram;
- (4) prioritization matrices;
- (5) matrix diagram;
- (6) process decision program chart (PDPC);
- (7) activity network diagram.

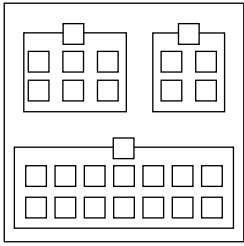
Figure 2 summaries are provided (copied directly from *Memory Jogger Plus+*[2].

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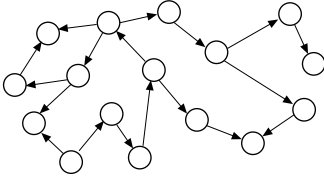
The purpose of the seven management planning tools is to convert apparent chaos into a workable, implementable action plan. The tools thus provide mainstream managers with a systematic approach to innovation requiring the conversion of raw creativity into real change.

Genius is normally defined as the ability to recognize patterns unseen by others. The seven management planning tools allow a team to make these patterns visible. They

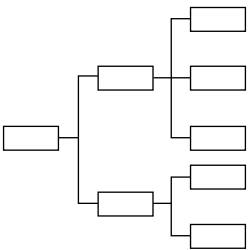
Figure 2 Tool descriptions



Affinity diagram: This tool gathers large amounts of language data (ideas, opinions, issues, etc.) and organizes it into groupings based on the natural relationship between each item. It is largely a creative rather than a logical process.



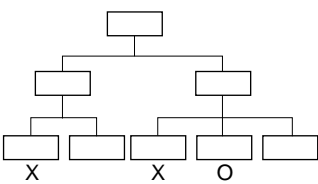
Interrelationship digraph (I.D.): This tool takes complex, multivariable problems or desired outcomes and explores and displays all of the interrelated factors involved. It graphically shows the logical (and often causal) relationships between factors.



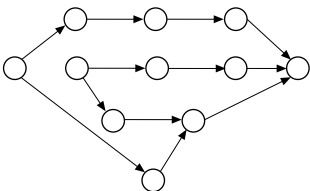
Tree diagram: This tool systematically maps out in increasing detail the full range of paths and tasks that need to be accomplished in order to achieve a primary goal and every related subgoal. Graphically, it resembles an organization chart or family tree.

	a	b	c	d	e	f	g	h
1								
2								
3								
4								
5								
6								

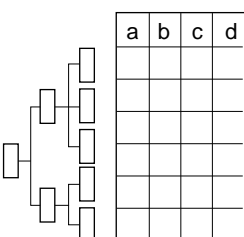
Matrix diagram: This versatile tool shows the connection (or correlation) between each idea/issue in one or more other groups of items. At each intersecting point between a vertical set of items and horizontal set of items a relationship is indicated as being either present or absent. In its most common use the matrix diagram takes the necessary tasks (often from the tree diagram) and graphically displays their relationships with people, functions or other tasks. This is frequently used to determine who has responsibility for the different parts of an implementation plan.



Process decision programme chart (PDPC): This tool maps out every conceivable event and contingency that can occur when moving from a problem statement to the possible solutions. This is used to plan each possible chain of events that needs to happen when the problem or goal is an unfamiliar one.



Activity network diagram: This tool is used to plan the most appropriate schedule for any complex task and all of its related subtasks. It projects likely completion time and monitors all subtasks for adherence to the necessary schedule. This is used when the task at hand is a familiar one with subtasks that are of a known duration.



Prioritization matrices: These tools take tasks, issues, or possible actions and prioritize them based on known, weighted criteria. They utilize a combination of tree and matrix diagram techniques, thus narrowing down options to those that are the most desirable or effective.

therefore make “emergent” thinking possible rather than traditional pigeonholing.

Myron Tribus, one of America’s leading quality experts, believes that the seven management planning tools provide a structure for handling ideas in much the same way that mathematics allows for the handling of numbers.

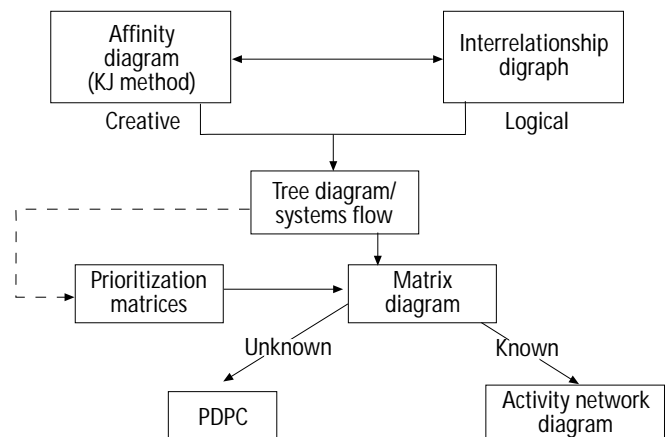
Many leading Japanese companies have begun to include seven management planning tools in their quality circle training. This indicates another example of “despecialization”, in which knowledge and ability is dispersed through the organization.

Many of the tools make a unique contribution to consensus. For the first time, you actually know that consensus has been reached through a physical process. For example, when doing an affinity diagram, consensus is reached when no one feels compelled to move a card. In an ID each team decision builds up to a cumulative consensus which emerges based on the clustering of arrows.

How the tools flow together

These techniques can become very powerful by combining them into a cycle of activity in which the output of one technique becomes an input into the next technique. For example, each of the basic statistical tools (e.g. pareto chart) can be used individually. The real power develops when a pareto chart provides the focus for a cause and effect diagram which then in turn provides the focus for control charts. The same approach applies to these seven management tools. Each of the

Figure 3 Management and planning tools: typical flow



techniques can be used alone very effectively; however, the full effect is achieved when they are used together to move away from a chaotic situation to an implementable action plan for improvement.

Figure 3 is simply a “typical” flow to demonstrate how the tools usually flow and is provided directly again from *Memory Jogger Plus+* [2].

In the end, the planning path depends on the team’s need. The key is to control the process to fit the task; “don’t force the task into a neat, inappropriate model”.

References

- 1 *The Memory Jogger*, GOAL/QPC, Methuen, MA, 1988.
- 2 Brassard, M., *Memory Jogger Plus+*, GOAL/QPC, Methuen, MA, 1989.

Further reading

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