

Introduction

The matrix diagram is one of seven 'new' quality tools that have importance to the manufacturing world. The other seven tools include: the affinity diagram, the interrelationship diagram, the tree diagram, the prioritization matrix, the process decision program chart, and the activity network diagram. The new quality tools were extremely beneficial for the problem solving process. The matrix diagram in particular is used to portray the actions required for a process or product improvement. Even though the matrix diagram shows importance and ease, it is the least commonly used tool (Vail 9).

History

These new tools were developed to rid the problems that occurred with the complexity of the seven traditional tools, such as: Flowcharting, Cause and Effect Diagrams, Pareto Analysis, Control Charts, Scatter Diagrams, Check sheets, and Histograms. With the dedication of the Japanese, continuous improvement had helped them come to some conclusions about the traditional seven quality tools. The Japanese realized the new seven quality tools were the most effective, which entered them into the second wave of quality (Vail 8). In effect, the new quality management tools were used mainly for the qualitative problems in nature and were also used by the middle and upper management (Swift 234).

The corrective action began on April 26, 1972. This took place when the Japanese Society of Quality Control Technique Development had their first meeting. They discussed operations research, value engineering, diverse creativity techniques, and other company issues dealing with quality control. The Japanese society searched to prove these techniques which techniques were the most effective. They concluded with the "Seven New QC Tools." In 1988, the seven tools of Shigem Mizuno were introduced to the United States with a book entitled Management for Quality Improvement: The New Seven QC Tools (Swift 233).

Definition

Of the new seven quality tools, the simplest diagram to create is the matrix diagram or sometimes called Quality Function Deployment (QFD) (Lengnick-Hall 6). It is used to arrange large quantities of data relating to two or more product and process problems. (Gitlow 103). The matrix diagram helps fill

the unexplained information relating to the problem. According to an Internet article, it is used for three reasons:

1. Assigning tasks to complete a project.
2. Make comparisons between two different competing alternatives.
3. Prioritize combinations of new and old activities that maximized the number of total objectives met (Matrix, 1).

Shapes and Uses

The diagram can be shaped in a few different ways: L shaped, T shaped, X-shaped, C-shaped, or three-dimensional, inverted Y-shaped. Each shape has its own purpose. The L-shaped matrix is the most commonly used matrix diagram, along with the T-shaped diagram. The L-shaped matrix is used to show the interrelationships between two product or process variables in a matrix format. The matrix format consisted of an uncomplicated two-dimensional chart consisting of rows and columns. The columns are a representation of subcategories of one variable, while the rows represent the subcategories of the second variable. “The outcome of the matrix signifies the possibilities of correlations between the subcategories (Gitlow 103).” Here is an example.

My parents work in an environmental chemistry laboratory and they want to assign their employees to several tasks. Their goal is to rid the confusion with distributing tasks to be done. The problem with their organization is work is not distributed properly. One job had multiple employees, while another job was neglected. My dad will develop an L-shaped matrix diagram to organize and solve the current problem.

The diagram on the next page reads as follows:

Across the horizontal axis in the rows above are the names of current workers. The vertical axes in the columns are the tasks needed to be accomplished daily. It seems that some of his employees are not doing what is required of them based on confusion. This diagram will lay out their duties in a simple format. The legend explains the assignment of the employees, perhaps based on the abilities and talents of each individual.

	Elham	Anne	Betty	Marshall
Clean Chemical dishes	*	^		^
Research of current assignment	*	*		*
Computer programmer	#		*	*
Inspector of Laboratory		*	*	^
Clean Front Office	^	#		
Helper in Lab Tests	*			
Secretary (answer telephones)	^	^		#
Primary responsibility	*			
Secondary Responsibility	^			
Communication needed	#			

The T-shaped matrix is used to show the relationship between two different factors and how it relates to a third factor. It shows a combination between two L-shaped matrix diagrams. A common application of the T-shaped matrix is to pinpoint training requirements (Gitlow 103). The shape is helpful to know when exploring the relationship of two criterions.

Matrix Development Process

To construct a matrix diagram, it can be done in the following order:

1. Select the problem
2. Form a team with 4-5 people. The team should identify the problems existing.
3. Choose a facilitator for the coordination of the team's activities
4. Determine the product or process variables to be studied
5. Decide on the matrix shape based on the task
6. Place the information in the matrix
7. Draw the lines of the matrix
8. Determine the symbols to be utilized. Include a legend also for the symbol definitions

Example: * Primary Responsibility

^ Secondary Responsibility

Communication needed (Swift 241)

9. Enter symbols into the correct cells

10. Analyze (Gitlow 104-110)

When the last step has taken place, studying and understanding the relationships are important for the decision process. It is also essential to fill the gaps between the product and the process, which will finally use the information to resolve the problem. This will help clarify the relationship between the factors involved.

In conclusion, the matrix diagram is an essential tool for identifying the relationship between two pairs. The matrix diagram is increasingly being used in the United States (Vail 18). It is an excellent organization device that pinpoints gaps in a firm's performance, which will aid the firm's process and development. By understanding the basic steps to the matrix diagram, you will find the ease, but importance. It has been proven since the 1980's that the matrixes diagram are essential and proven most effective (Swift 234).

For more information, you can search these websites:

<http://www.usbr.gov/guide/toolbox/matrixdi.htm>

<http://www.sytsma.com/tqmtools/matrix.html>

<http://www.nirex.co.uk/publicn/peerrev/fepcnstr.htm>

The Matrix Diagram

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Mini-tutorial

Operations Management 380

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