

## **Pareto Principle: Quality Tools**

### **Description**

Vilfredo Pareto was a 19th century economist who studied the distribution of wealth and income in Italy at that time. What his research uncovered was that most of the wealth was held by a relative few citizens while the great majority of the population lived in poverty. Pareto developed logarithmic mathematical models to describe this nonuniform distribution of wealth, and the mathematician M.O. Lorenz developed graphs to illustrate it.

While his discovery did not serve to redistribute the wealth more equitably, Pareto's research in essence created a template for measuring cause and effect. When Dr. Joseph Juran sought a short-hand term to describe how relatively few causes often account for a great majority of effects, he remembered Pareto's discovery and dubbed this phenomenon the Pareto principle.

This principle can be applied to a wide variety of situations in both the business world and the real world. By plotting the number of instances attributable to a specific cause against the number of total instances, you can determine the primary culprits—the “vital few,” as Dr. Juran called them—responsible for the majority of the effects.

For instance, if you look at mortality tables, you'll see that a few diseases, cancer, heart disease, and the like, account for most deaths.

Sales analysis in many organizations will show that the top 10 percent of customers are responsible for more than half of a company's sales revenue.

A quality improvement team studying late deliveries might very well find that 81 percent of the delays were attributable to the worst 6 percent of the vendors.

The benefits to having this information are obvious. By determining the major causes of a particular situation, Pareto analysis can help an organization prioritize its efforts, directing its attention to those areas where the most significant gains can be made.

Some companies have realized a secondary benefit of Pareto analysis. By identifying and measuring all of the causes for deficiencies or dissatisfaction in a particular process or product, quality teams bring attention to the less significant flaws as well, and employees often find solutions for them. As the saying goes, “What gets measured gets managed.”

Vilfredo Pareto's research didn't change the economic realities of the rich and poor, but it did lead to a wealth of information that can be directed toward correcting deficiencies in your business process. After all, knowledge is power, if you know how to use it properly.

### **Learning Points**

A founding tenet of quality management is that if you can measure it, you can manage it. Pareto analysis offers quality improvement teams a tool with which to measure the various causes of certain situations. More importantly, Pareto analysis creates a comparative measurement of those causes, helping a quality improvement team to determine where to focus its efforts so as to gain the greatest improvement with the least time and money spent.

## Discussion Questions

**Question:** What is the essence of the Pareto principle?

**Answer:** The Pareto principle states that in any group of factors contributing to a common effect, a relative few of the contributors account for the bulk of the effect.

**Question:** What are the benefits of Pareto analysis?

**Answer:** By determining the leading causes of a particular effect, Pareto analysis allows organizations to focus on those specific causes in their improvement efforts. Eliminating the major causes—the vital few—of a situation will greatly reduce the number of unwanted effects. Once the major causes have been remedied, an organization can then systematically work on eliminating the lesser causes and eradicating the problem entirely.

**Question:** Can you recall any instances in your life where the Pareto principle holds true?

**Answer:** Responses will vary. Examples of the Pareto principle might include: household expenses (most of the monthly budget might be spent on rent or mortgage), traffic delays (most snarls are encountered during rush hours), and dietary considerations (most of the calories consumed can be found in desserts, perhaps).

**Question:** How does Pareto analysis differ from, say, brainstorming theories of causes?

**Answer:** Pareto analysis brings factual data to bear on the theories created by brainstorming causes for an effect. While improvement team members often brainstorm causes based on their personal experiences, Pareto analysis helps the team to quantify the causes based upon how often they occur. If a cause occurs once, it will show up in the “useful many” category, while an oft-recurring cause will become part of the “vital few.”

**Question:** What applications can you find for Pareto analysis in solving problems?

**Answer:** There are several applications for Pareto analysis when solving problems, including:

- prioritizing problems, because it highlights the vital few problems where the return on investment (time, money, etc.) will be highest
- analyzing symptoms, because it helps to determine the vital few components of the symptom
- identifying root causes, because it points out the major causes of a problem with multiple causes
- proving the effectiveness of a remedy (by reapplying Pareto analysis to a remedied situation, the new results will show how a quality improvement team has made gains in certain areas)

**Question:** Should opinions ever come into play in Pareto analysis?

**Answer:** Opinions only count in Pareto analysis when they come from customers. A Pareto analysis of a customer survey can serve to identify those areas in an organization where customers see room for improvement.