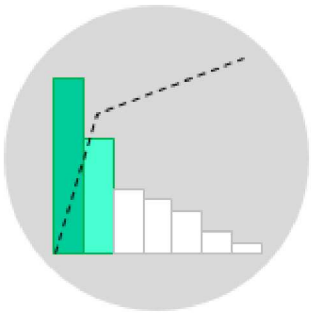
Pareto Analysis



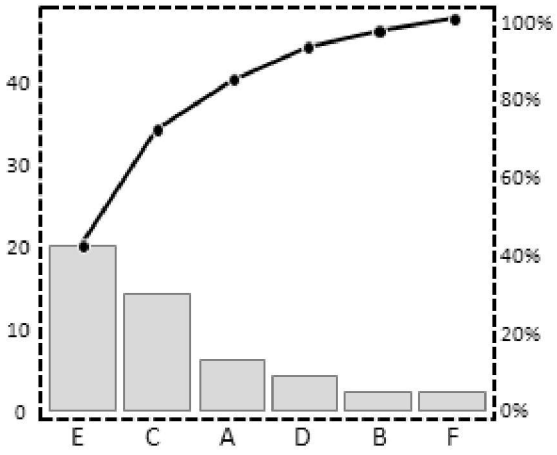
There are many situations where you are asked to decide which problems or causes of a problem should be tackled first. The **Pareto Principle**, which is also referred to as the 80-20 rule, states that roughly 80 percent of the problems or effects come from 20 percent of the causes. It describes a statistical phenomenon that a small number of high values contribute more to the total than a high number of low values. The focus of the **Pareto Analysis** is to identify the “vital few” from the “trivial many” and make it possible to attack the 80 percent of the problems to obtain the maximum benefits.

The exact percentages may vary in each situation, however, most of the activity is caused by relatively few of its factors. For example, 20 percent of car drivers cause 80 percent of the accidents, 20 percent of workers do 80 percent of the work, 20 percent of a company’s clients are responsible for 80 percent of its revenue, and 20 percent of the time spent on a task leads to 80 percent of the results. Similarly, 80 percent of the customer complaints come from 20 percent of customers, and

80 percent of the wealth belongs to 20 percent of the population.

The Pareto Principle is a great tool that can help to focus on what really matters. It is used when we have many problems or projects and we want to focus on the most significant ones. It helps prioritize the improvement opportunities that bring the most value to the business and allows to reach a consensus about what needs to be addressed first. It is also used during continuous improvement projects to focus on the causes that contribute most to a particular effect and leads to prioritizing the potential causes of the problems being investigated.

The Pareto Chart:



A **Pareto Chart** is a frequency bar chart where the most frequent activities are placed in order from left to right. It normally plots the frequencies of categorical data (such as defects and errors). The horizontal axis represents the types of activities (issues, problems or causes of problems) while the vertical axis represents the frequencies of those activities and the height of the bars normally reflects the number of occurrences for each one.

By arranging the bars from largest to smallest, the vital few activities can be easily addressed to have greater attention. If there are a lot of small or infrequent factors, consider adding

them together into an “other” category. You may optionally have a cumulative line above the bars so that the cumulative percentages can be read from the right vertical axis.

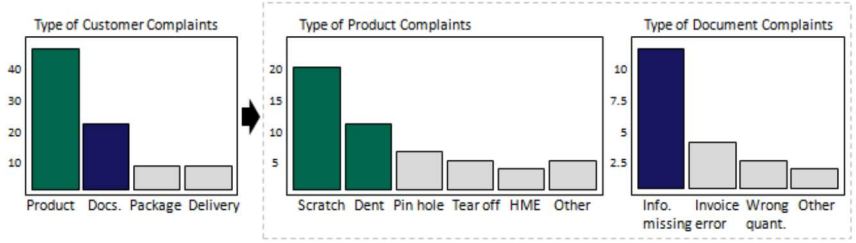
If the resulted Pareto chart clearly illustrates a Pareto pattern, this suggests that only few causes account for about 80% of the problem. This means that there is a **Pareto effect** and we can focus our efforts on these few causes to obtain the maximum benefits compared to tackling all the causes. However, if no Pareto pattern is found, we cannot say that some factors are more important than others.

How to Construct a Pareto Chart:

- Define the problem and identify the possible causes of the problem (using brainstorming or similar technique).
- Decide the measurement method to be used for comparison (frequency, impact or cost).
- Collect then record the data.
- Calculate the frequencies of the identified causes.
- Draw a vertical bar for each cause or cause group.
- Sort them by frequency in descending order.
- Calculate then draw the cumulative percentage line.
- If you observe a Pareto effect, focus your improvement efforts on those categories whose vertical bars account for most (about 80%) of the effect. These causes are likely to have the greatest impact on the process output.

Example:

A factory team has prepared the following Pareto charts to address the rising number of customer complaints in a way management can understand. The chart on the left was further analyzed, and the results suggest that they can solve the majority of the problem by concentrating on the vital few.



Further Information

- The Pareto Principle was named after the Italian economist Vilfredo Pareto, who observed that eighty percent of property in Italy was owned by twenty percent of the population.
- Someone should be thinking of the Pareto Principle and apply it to his business and life. He should be asking himself questions such as: what are the critical few wants and needs of the consumer, and what are the critical few measures that indicate the true performance.
- When possible, construct two Pareto charts for your data, one that uses data frequency and another that uses other attributes such as the time required to fix the problem or the cost. You may end up targeting both the most frequent problems and the ones with the greatest impact.

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