Continuous Improvement Tools

**Introduction**

Total Quality Management ([TQM](http://logistics.about.com/od/qualityinthesupplychain/a/TQM.htm)) is a popular approach to quality in a business that seeks to improve quality and performance which will meet or exceed customer expectations. This can be achieved by integrating the quality functions and key processes throughout the company. One core component to TQM is the principle of continuous improvement. There are a number of tools available to ensure that continuous improvement is successful, including process mapping, root cause analysis, and the plan do check act (PDCA) cycle.

**Process Mapping**

Any continuous improvement effort has to begin with an accurate understanding of the process that has been identified for improvement. The process can be in any part of a company’s business, but must be able to be mapped to identify the flows that make up the process. For example, in the supply chain a business process could be the manufacturer of a finished good, the purchase of goods from a vendor, or the service of an item sold to a [customers](http://sbinfocanada.about.com/od/customerservice/a/custservrules.htm).

The mapping of any of these processes involves identifying and documenting the physical flow as well as the information flow. The process mapping will show graphically the flows in the process from start to finish, which will include activities, personnel, and the outcomes. The benefit that the process map gives to providing continuous improvement is that it defines the scope of the process, the interface with other processes, and a starting point from which improvement can be measured against.

**Root Cause Analysis**

Root cause analysis is the manner in which a business will determine the root cause of a problem, incident, or quality concern. This is achieved by analysis, data gathering, and finally validation that the root cause has been identified.

There are three phases which make up a root cause analysis process.

1. Open Phase – This initial phase allows participants to brainstorm the issue to identify as many possible root causes. In this phase the team can create a cause and effect diagram which can be useful during brainstorming sessions. As part of this process, the team can identify their possible causes with one of five areas listed on the cause and effect diagram. Those cause categories are manpower, methods, materials, machines, and measurements. The team can then organize their ideas for the root cause around those categories.
2. Narrow Phase – In this phase the team reduces down the number of possible root causes to a number that can be focused on. Each of the possible root causes identified in the open phase are discussed by the team in more depth to determine if they should be kept.
3. Closed Phase – In this final stage the team must come to a consensus on a root cause. This will involve validating the root cause based on evidence, whether that is using measureable data or subjective evidence from interviews with staff, customers or vendors. The analysis of measureable data can be performed using a number of statistical methods such as a [scatter plot diagram](http://statistics.about.com/od/HelpandTutorials/a/What-Is-Correlation.htm), check sheets to identify the frequency of an event, or using a [pareto chart](http://management.about.com/cs/generalmanagement/a/Pareto081202_2.htm).

**Plan-Do-Check-Act (PDCA) Cycle**

The PDCA cycle was developed by W. Edwards Demming, the architect of TQM. He created a simple approach for carrying out change. The PDCA cycle consists of four phases; plan, do, check, and act.

* Plan – The planning stage usually begins after a company has been through a root cause analysis and identified an issue or problem that needs to be addressed. The business will then plan how the improvements need to be achieved.
* Do – Following the planning stage, the business will then proceed with the changes that have been planned in order to address the issue identified in the root cause analysis. This may be as simple as purchasing a new piece of equipment for a production line, or complex such as changing the way in which vendors are evaluated.
* Check – After the business has followed the plan and made changes to address the issue or problem, the check phase should be used to validate that the changes made have had the required results. If the check phase does not validate that issue has been resolved, then the business will need to start the PDCA cycle again at the plan stage and develop a new plan to achieve the necessary results.
* Act – The final phase of the PDCA cycle requires that once the issue has been resolved, the business should incorporate the changes into their standard operating procedures and if necessary, roll out the changes to other parts of the business.