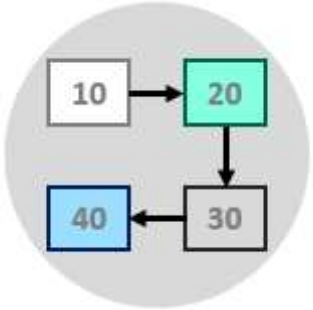
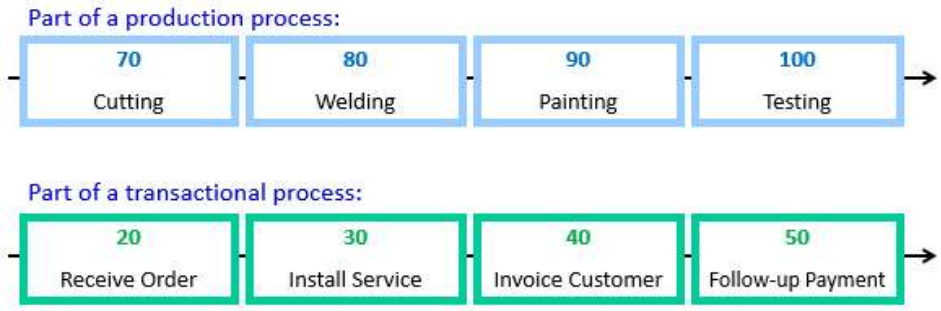
Process Mapping



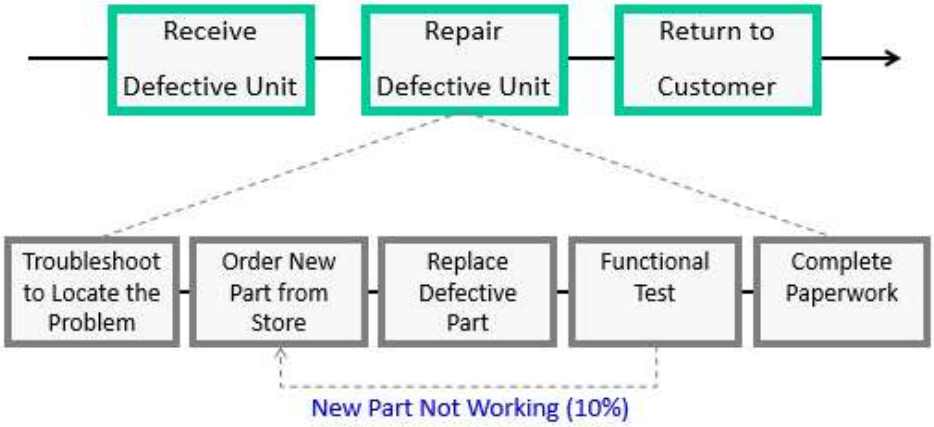
A **Process** is a set of activities that occur in a coordinated manner to achieve a common goal. It takes one or more inputs to create an output that is of value to the internal or external customer. Almost any business operation can be thought of as a process, and managing these processes is key to the success of any organization. Processes can be either production or transactional in nature.

A **Process Map** is a graphical representation that illustrates the chronological sequence of activities in a business process. It represents these activities in a step by step manner to help understanding how a product is made or how a transaction is performed. It provides a mechanism for analyzing and studying processes. Process maps help identify the inefficiencies and the non-value adding activities that may exist, enabling everyone involved with improving the process to agree on the most efficient steps and routes for process improving or re-engineering.

Process maps enhance the understanding of a process and its steps, and thus, help bring clarity to complex processes. They are used to find ways to simplify, streamline, or redesign processes. By understanding and controlling the inputs, it is possible to reduce variation within the process which will lead to continuous process improvement. Process maps also serve as means to document and communicate business processes, and are often found in training, maintenance, technical and quality manuals.



Process maps can be as complex or as simple as required. They can describe processes in different levels of details. They become complex very quickly, and soon you may need to redo the process map for clarity. A useful approach is to have different levels within the map and only detail the area of interest. The following is a process map for receiving and repairing a defective unit after received by a customer. Only one process step has been mapped to a second level. Notice the **rework loop** which occurs when it is discovered (during testing) that the installed part is not working.



Mapping Techniques:

Processes can be mapped using different techniques depending on the objective to be reached. The following are some of the most common techniques used to map processes:

- The **Simple Drawing Process Map** which only uses boxes to represent activities and arrows to represent moving between activities.
- The **Opportunity Process Map** which includes additional information on whether activities are value-adding or non-value adding.
- The **SIPOC Map** which is a high-level summary of the process that lists suppliers, inputs, outputs and customers.
- The **Swimlanes Map** (or the Cross-functional Map) which shows process steps performed by different functions or departments.
- The **Flowchart** which provides a detailed view of the "should-be" process including decision points.
- The **Process Sequence Chart** (or the Flow Process Chart) which is an easy tool to identify the non-value adding steps including the time taken and the distance traveled per step.
- The **Spaghetti Diagram** which depicts patterns of movement of product, material, information and people.

- The **Value Stream Map** which is used to prioritize improvement opportunities by helping identify bottlenecks, delays and waste.

How to Prepare a Process Map:

- Gather the team and make sure that everyone is clear on what process is going to be mapped. Involve operators, supervisors, process experts, engineers, and quality personnel. You may also call in particular situations external customers and/or suppliers.
- Agree on the mapping technique to be used and on the level of detail to be displayed.
- Identify the process boundaries by defining the start and finish points.
- Map the “As-Is” process from beginning to end using the chosen mapping technique.
- List input and output variables at each step, then classify each input variable as controllable, noise or standard operating procedure *(see the next section for details)*.
- Once the process is mapped, it is worth analyzing it to search for opportunities for improvement. Notice how the process is actually performed and specify whether activities are value-adding or non-value-adding. Identify all the areas that hinder the process or add little or no value. It is often helpful to ask questions such as:
  - Are all activities necessary?
  - What is the value of the activity relative to its cost?
  - Are there rework loops where activities are repeated?
  - Could these rework loops be eliminated?

  - What is the cost of the rework in terms of lost time and resources?
  - Are there times when waiting is involved?
  - How can it be reduced?
- Build the “Should-Be” process map that corrects the inefficiencies and waste identified earlier.
- Plan and implement actions to reduce variation and waste.

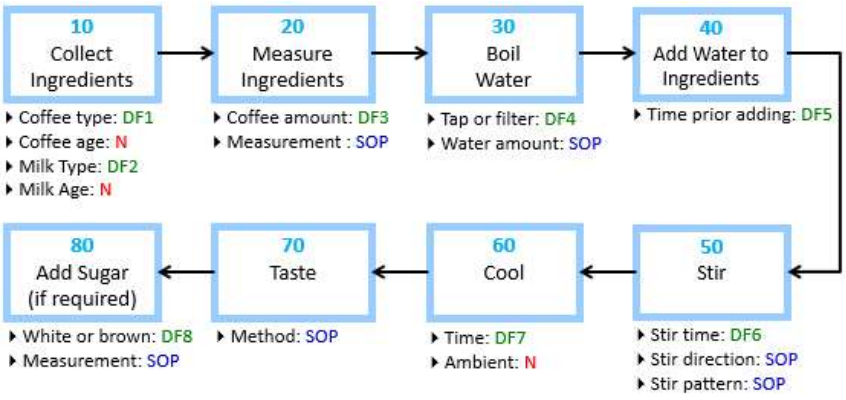
Input and Output Variables:

One of the most common purposes of process mapping is control inputs and monitor outputs to reduce variation in a process. Classifying input variables helps focus on those inputs that are controllable and provides a more detailed look into the process. Input variables are normally classified into three categories:

- **Noise Factors** which are uncontrollable, too costly or preferably not controlled (e.g. environmental factors). It’s good to know how to compensate changes in these factors.
- **Standard Factors** (or SOPs) which are the factors that have been fully standardized and documented (e.g. safety and preventive maintenance factors). It’s useful to record these factors and to know how often they are out of control.
- **Controllable Factors** (or Design Factors) which can be adjusted and controlled (e.g. changing the speed of a machine).

Example:

The following is an example of a process map that details all steps required to make coffee. This example also identifies all possible sources of variation that could influence the performance of the process.



Further Information:

- Continuous improvement would means regular review and optimization of key business processes.
- The preparation of a process map is not a solution in itself, but it often opens up the opportunity to simplify, streamline, or redesign the process.
- Process mapping can provide inputs to other continuous improvement techniques such as: cause and effect analysis, root cause analysis, control plans, capability studies, FMEA, etc.
- Input variables could be found in operation manuals, engineering specifications, or with the experienced operators. Brainstorming sessions are often used to capture these variables.
- A good first step in process mapping is to “walk the process”. While you walk the process, you also take notes and identify the input and output variables.
- What do we think of a process is not necessary what it actually is.

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