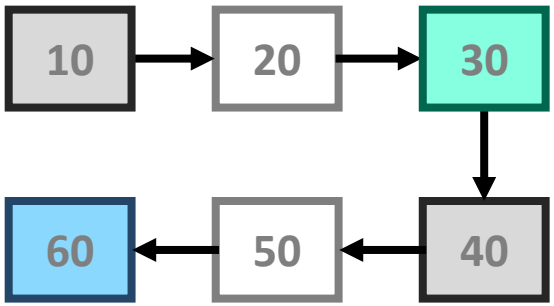
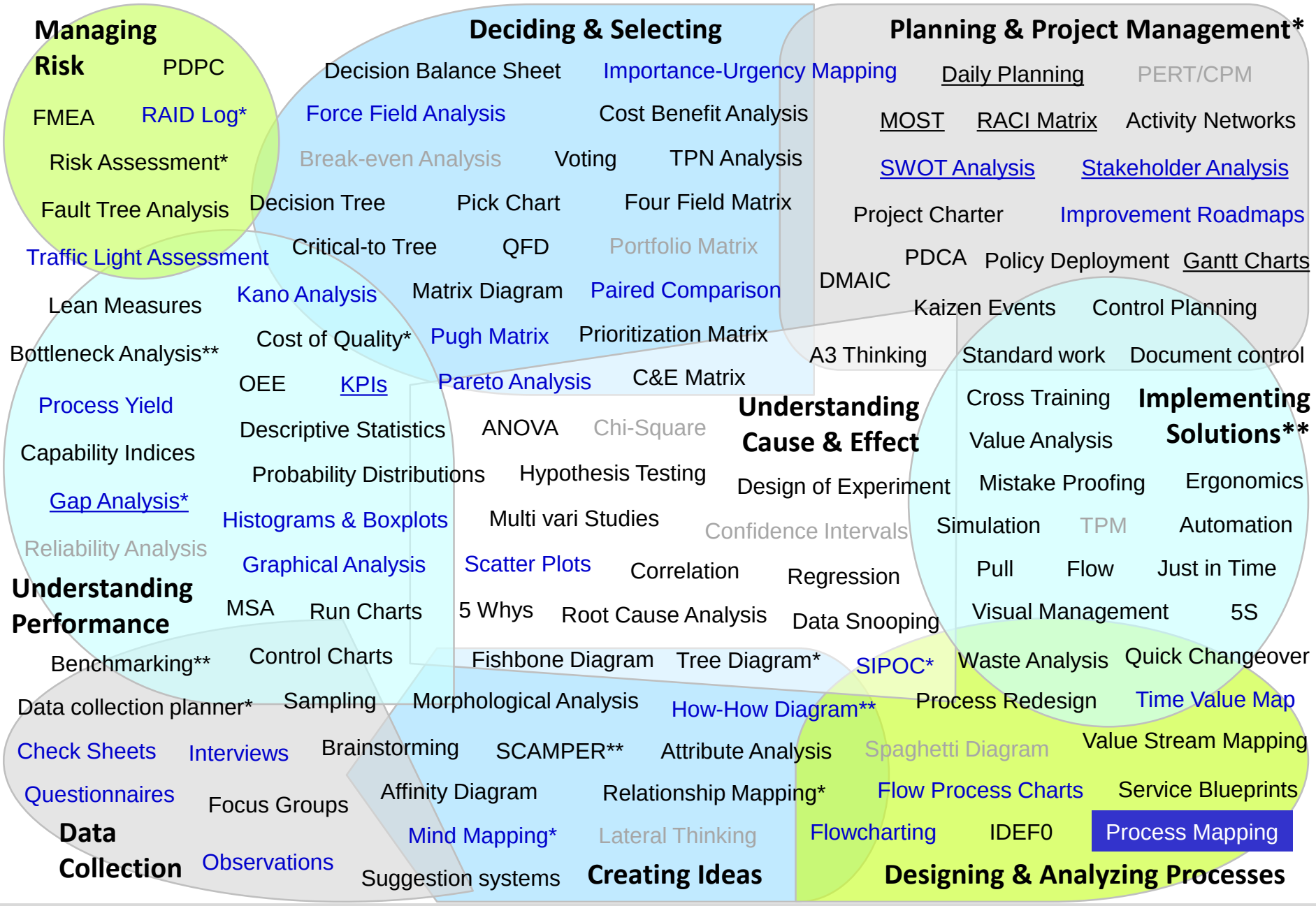
Continuous Improvement Toolkit

Process Mapping



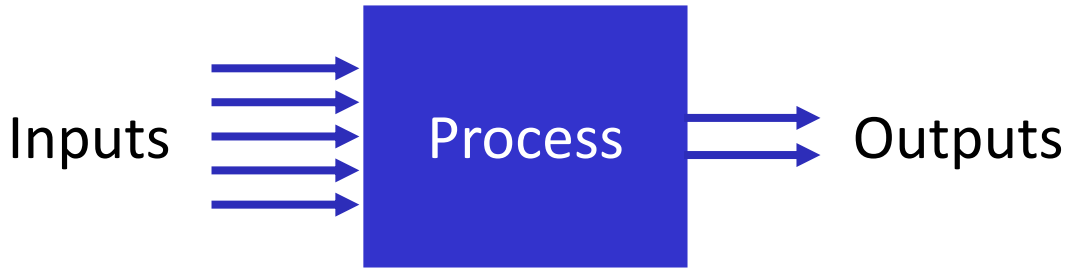
The Continuous Improvement Map



- Process Mapping

A Process:

- 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 customer.
- Almost any business operation can be thought of as a process.
- Managing processes is key to the success of any organization.
- Processes can be either production or transactional in nature.



- Process Mapping

Example:

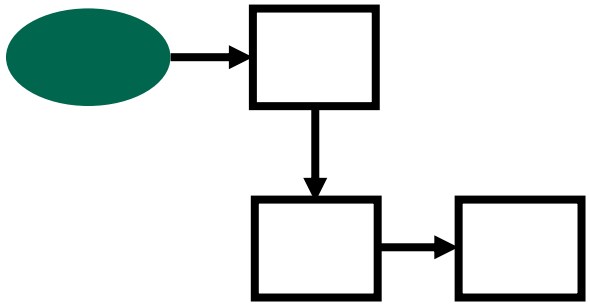
$$Y = f(x_1, x_2, \ldots, x_k)$$

Any Output (Y) is a function of singular or multiple Inputs (X's)

- Process Mapping

A Process Map:

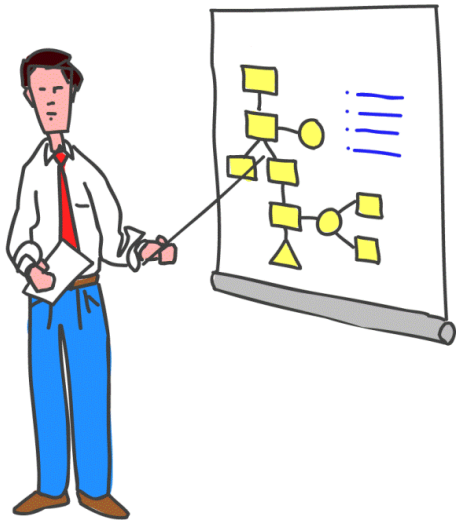
- A graphical representation.
- Illustrates the chronological sequence of activities of a process.
- Represents activities in a step by step manner.
- Provides a mechanism for analyzing and studying processes.
- Helps identifying the inefficiencies and the non-value adding activities.
- Enable the team to agree on the most efficient steps and routes for process improving or re-engineering.



- Process Mapping

Benefits:

- Enhances the understanding of a process and its steps.
- Helps bring clarity to complex processes.
- Helps simplify, streamline, or redesign processes.
- By understanding and controlling the inputs, it is possible to reduce variation within the process.
- Serves as means to document and communicate business processes.

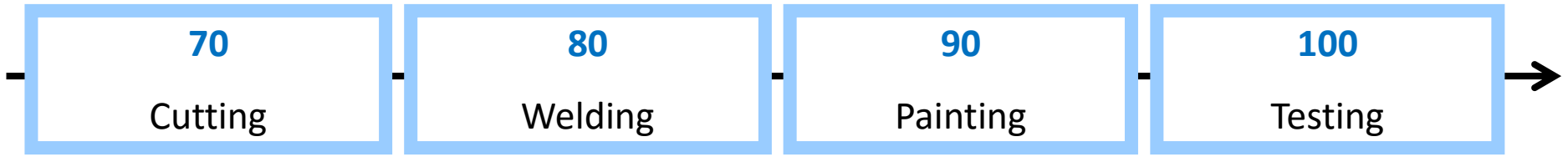


Often found in training, maintenance, technical and quality manuals

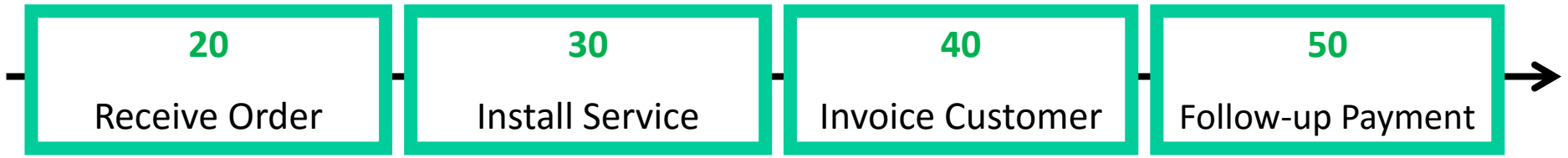
- Process Mapping

Examples:

Part of a production process:

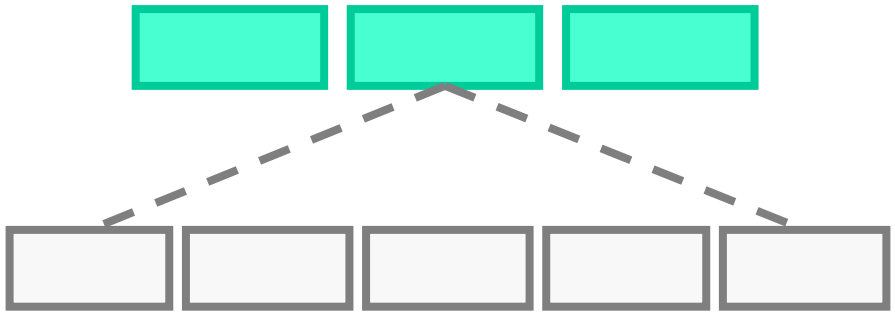


Part of a transactional process:



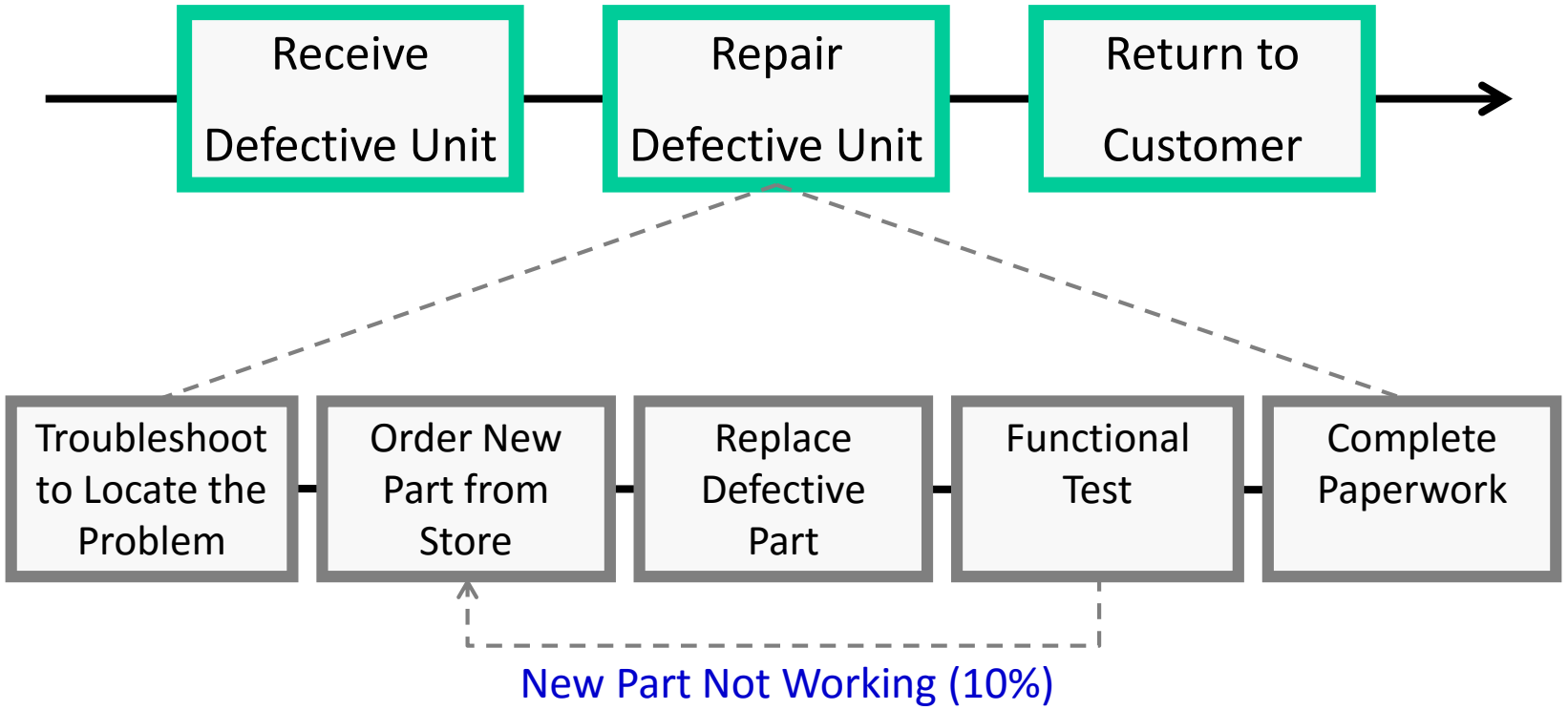
- Process Mapping

- 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.
- Soon you may need to redo the map for clarity.
- A useful approach is to have different levels within the map and only detail the area of interest.



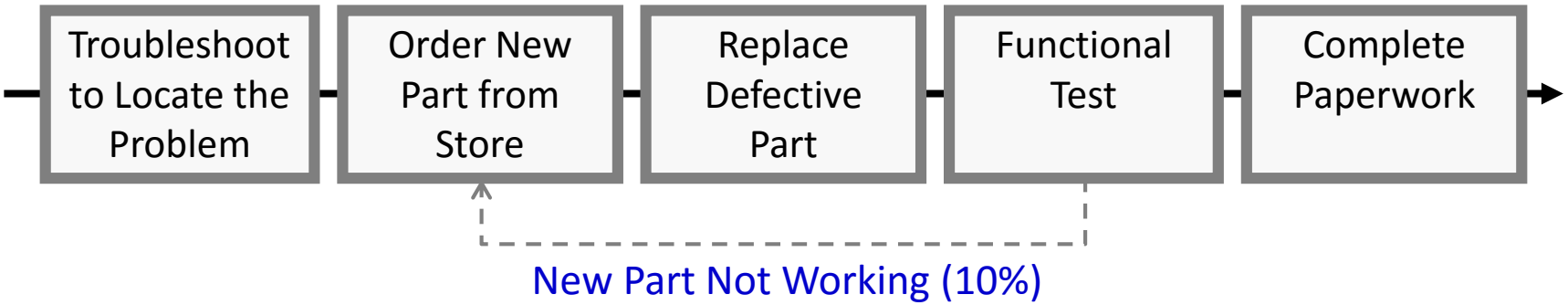
- Process Mapping

Example - Repairing a Defective Unit:



- Process Mapping

- Notice the **rework loop** which occurs when it is discovered (during testing) that the installed part is not working.

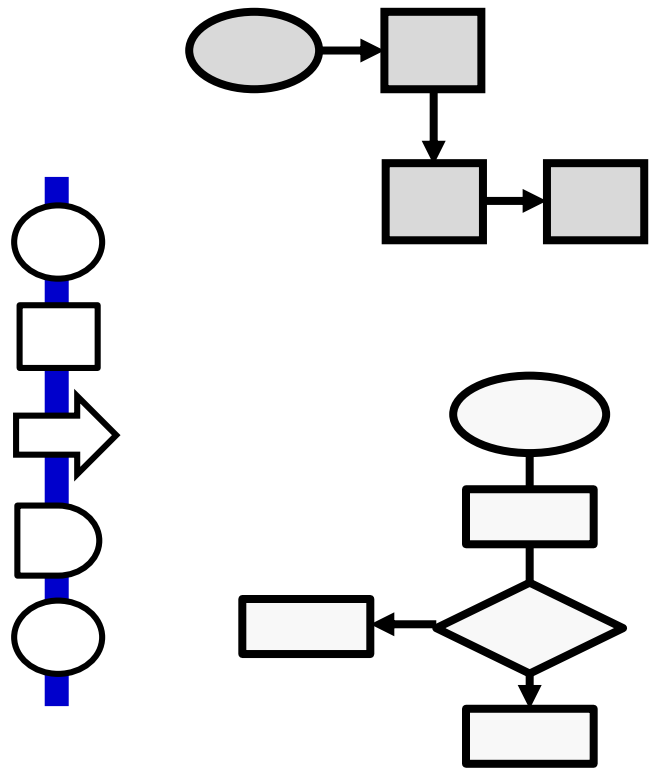


Will there be other rework loops or delays in this process?

- Process Mapping

Mapping Techniques:

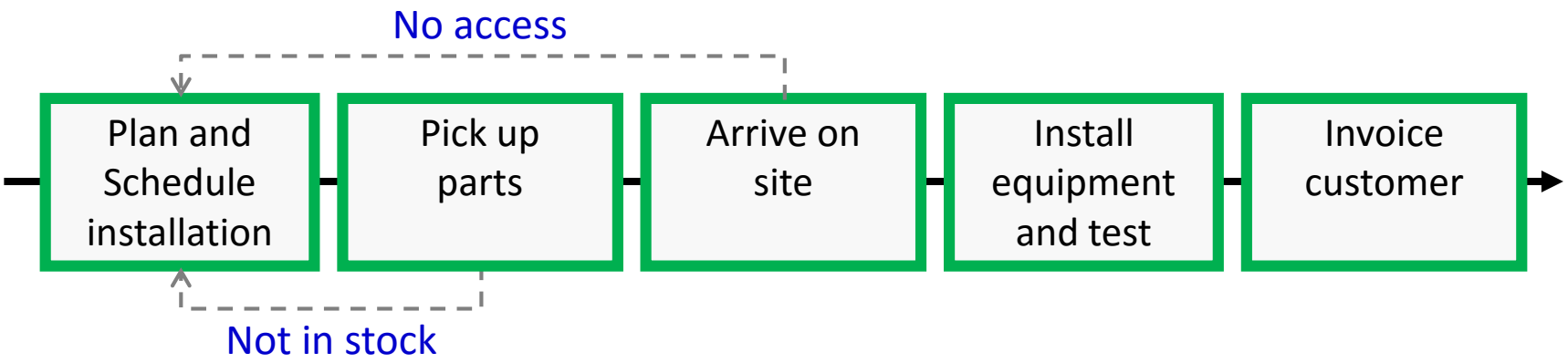
- Simple Drawing Process Map.
- Opportunity Process Map.
- SIPOC Map.
- Flowchart.
- Swimlanes Map.
- Flow Process Chart.
- Spaghetti Diagram.
- Value Stream Map.



- Process Mapping

Mapping Techniques:

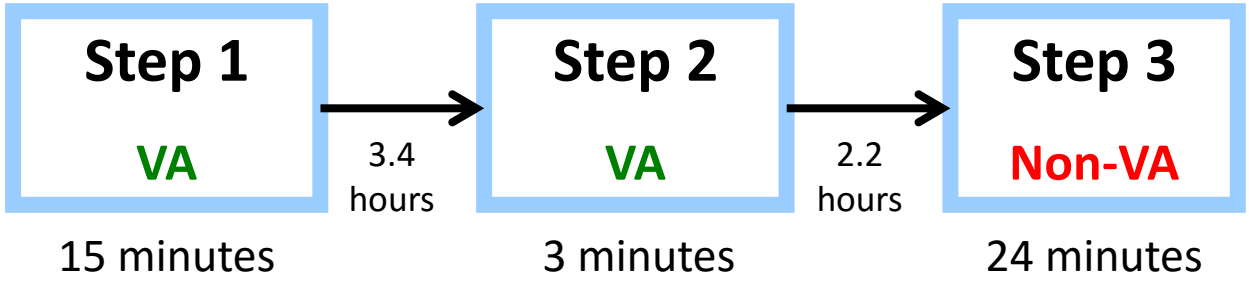
- **Simple Drawing Process Map:**
  - Only uses boxes to represent activities and arrows to represent moving between activities.



- Process Mapping

Mapping Techniques:

- **Opportunity Process Map:**
  - Includes additional information on whether activities are value-adding or non-value adding.



- Process Mapping

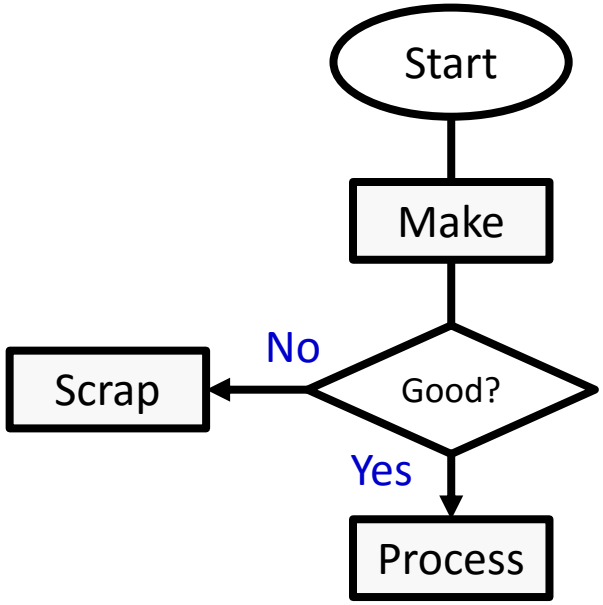
Mapping Techniques:

- **SIPOC Map:**
  - A high-level summary of the process that lists suppliers, inputs, outputs and customers.

- Process Mapping

Mapping Techniques:

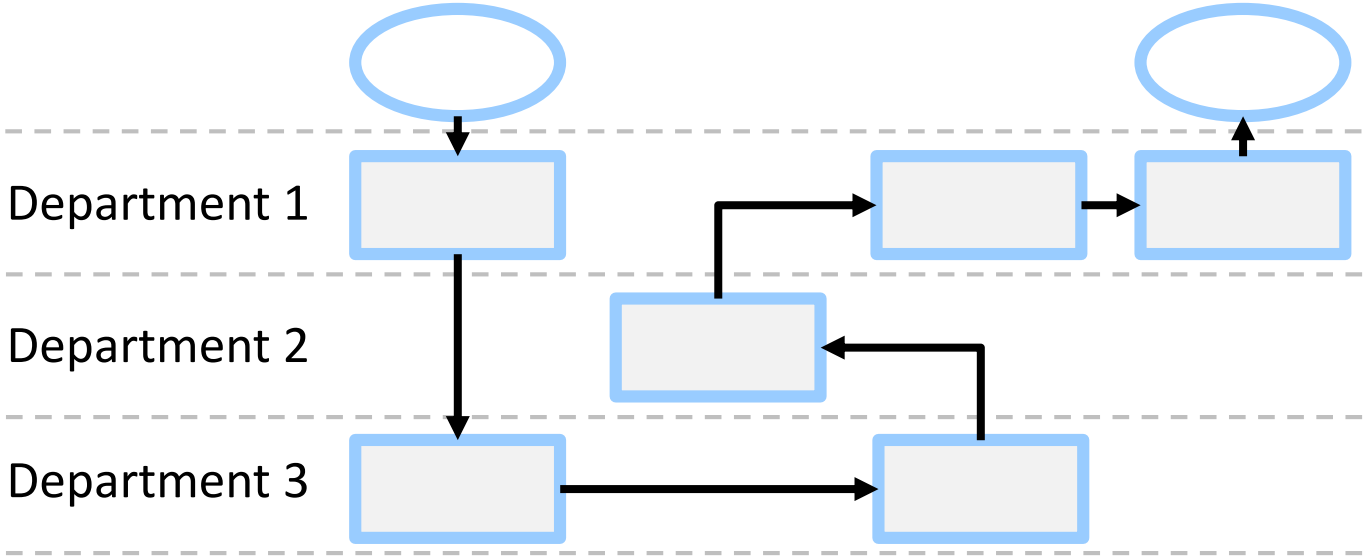
- **Flowchart:**
  - Provides a detailed view of the “should-be” process including decision points.



- Process Mapping

Mapping Techniques:

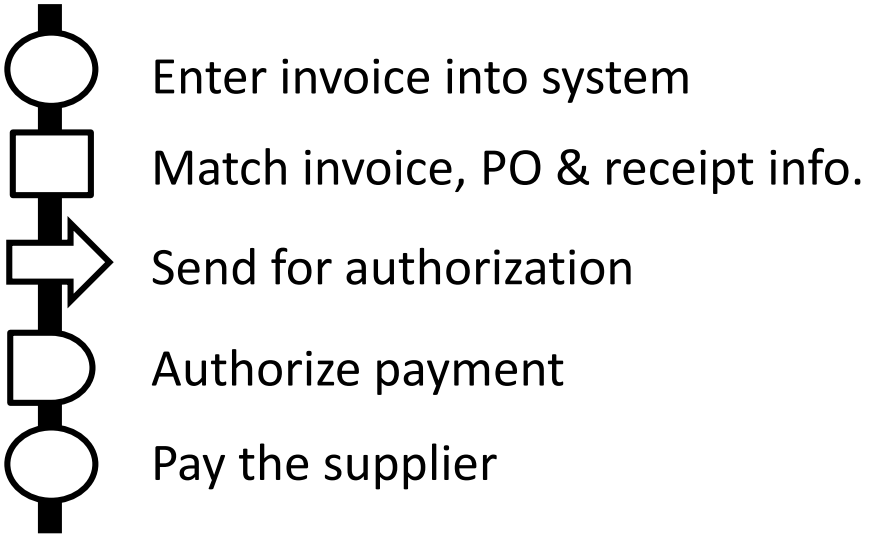
- **Swimlanes Map:**
  - Shows process steps performed by different functions or departments.



- Process Mapping

Mapping Techniques:

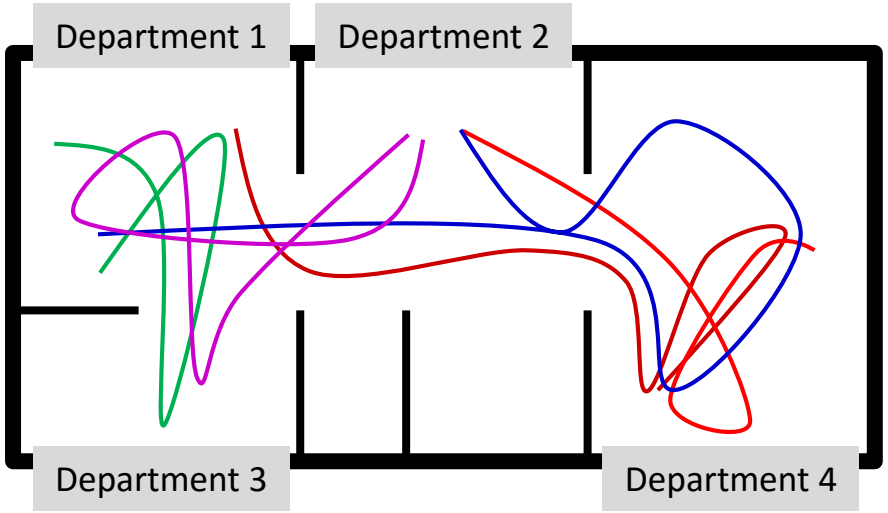
- **Flow Process Chart:**
  - An easy tool to identify the non-value adding steps including the time taken and the distance traveled per step.



- Process Mapping

Mapping Techniques:

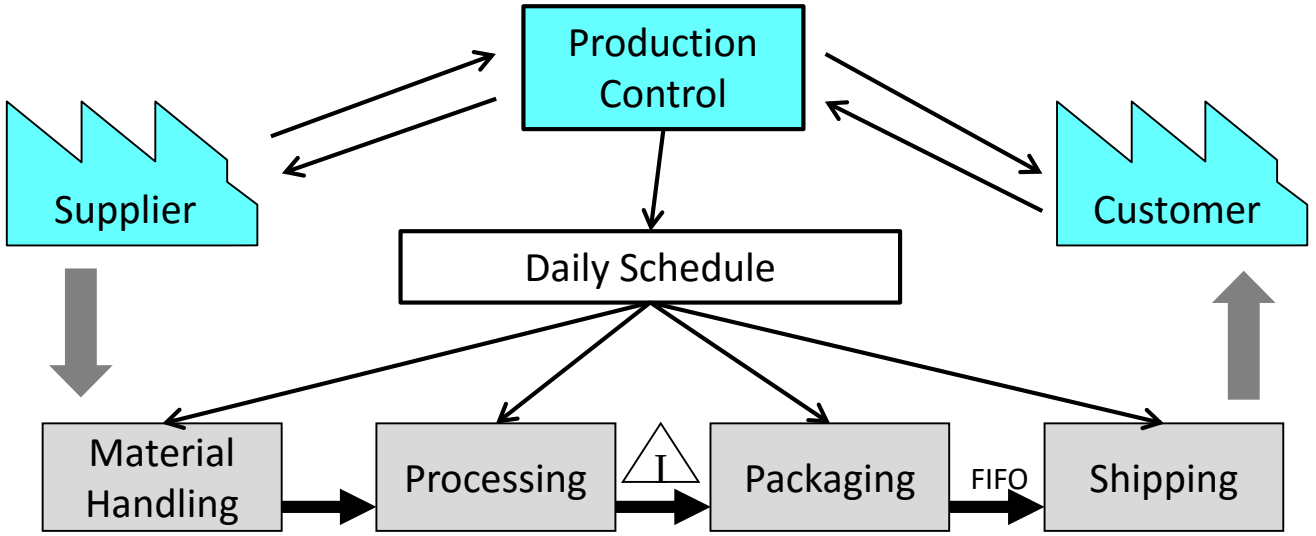
- **Spaghetti Diagram:**
  - Depicts patterns of movement of product, material, information and people.



- Process Mapping

Mapping Techniques:

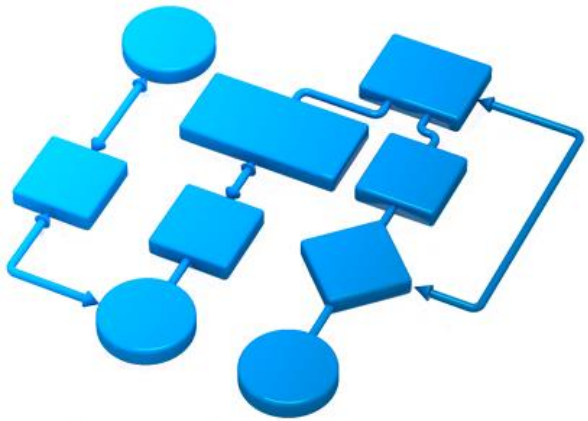
- **Value Stream Map:**
  - Used to prioritize improvement opportunities by helping identify bottlenecks, delays and waste.



- Process Mapping

How to Prepare a Process Map:

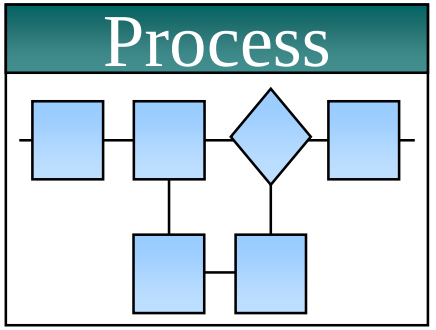
- Gather the team. Involve:
  - Operators.
  - Supervisors.
  - Process experts.
  - Engineers.
  - Quality personnel.
  - You may also call in particular situations external customers and/or suppliers.



- Make sure that everyone is clear on what process is going to be mapped.

- Process Mapping

How to Prepare a Process Map:



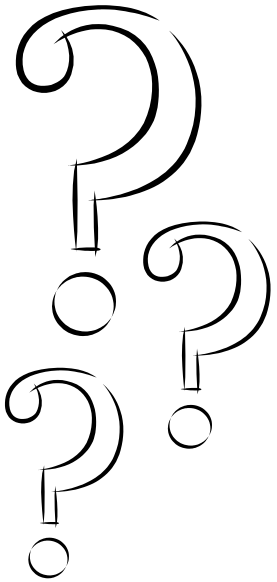
- Agree on the mapping technique to be used.
- Agree on the level of detail to be displayed.
- Identify the process boundaries.
- Map the '**As-Is**' process from beginning to end.
- List input and output variables at each step.
- Classify each input variable as controllable, noise or standard operating procedure.
  - This helps focus on those inputs that are controllable.

The goal is to find as many sources of variation

- Process Mapping

How to Prepare a Process Map:

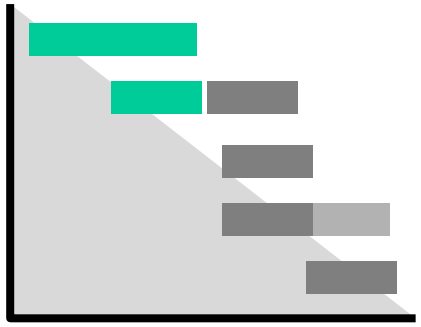
- Notice how the process is actually performed.
- Identify all the areas that hinder the process or add little or no value. **Ask questions such as:**
  - Are all activities necessary?
  - What is the value of the activity relative to its cost?
  - Are there rework loops where activities are repeated?
  - 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?



- Process Mapping

How to Prepare a Process Map:

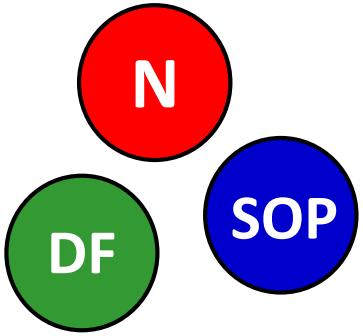
- Build the '**Should-Be**' process map that corrects the inefficiencies and waste identified earlier.
- Plan and implement actions to reduce variation and waste.



- Process Mapping

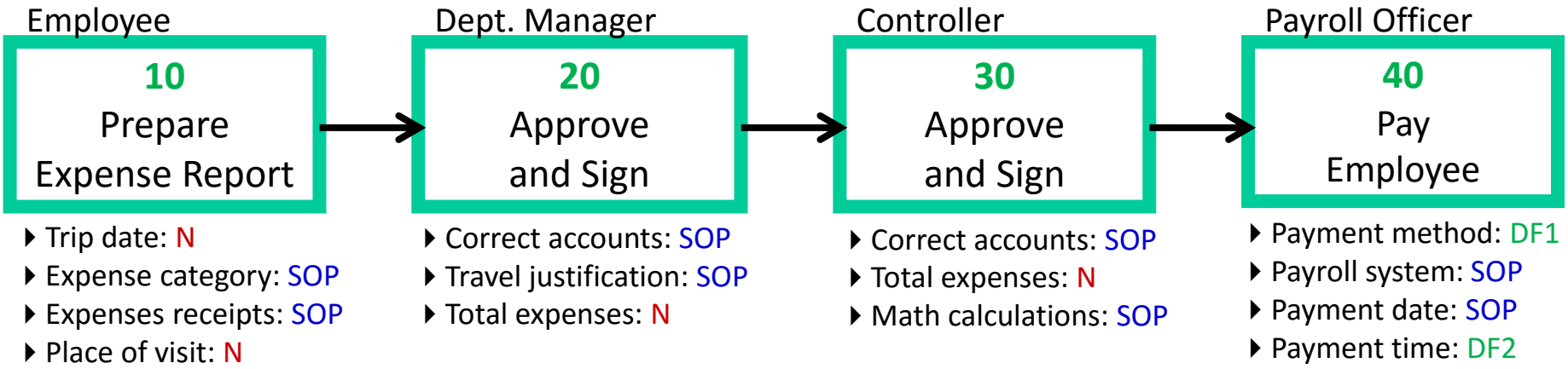
Input Variables are Classified into Three Categories:

- **Noise Factors**:
  - Uncontrollable, too costly or preferably not controlled.
  - It's good to know how to compensate changes in these factors.
  - **Examples**: environmental factors.
- **Standard Factors** (or SOPs):
  - They have been fully standardized and documented.
  - Record and know how often they are out of control.
  - **Examples**: safety and preventive maintenance factors.
- **Design Factors** (or Controllable Factors):
  - They can be adjusted and controlled.
  - **Example**: changing the speed of a machine.



- Process Mapping

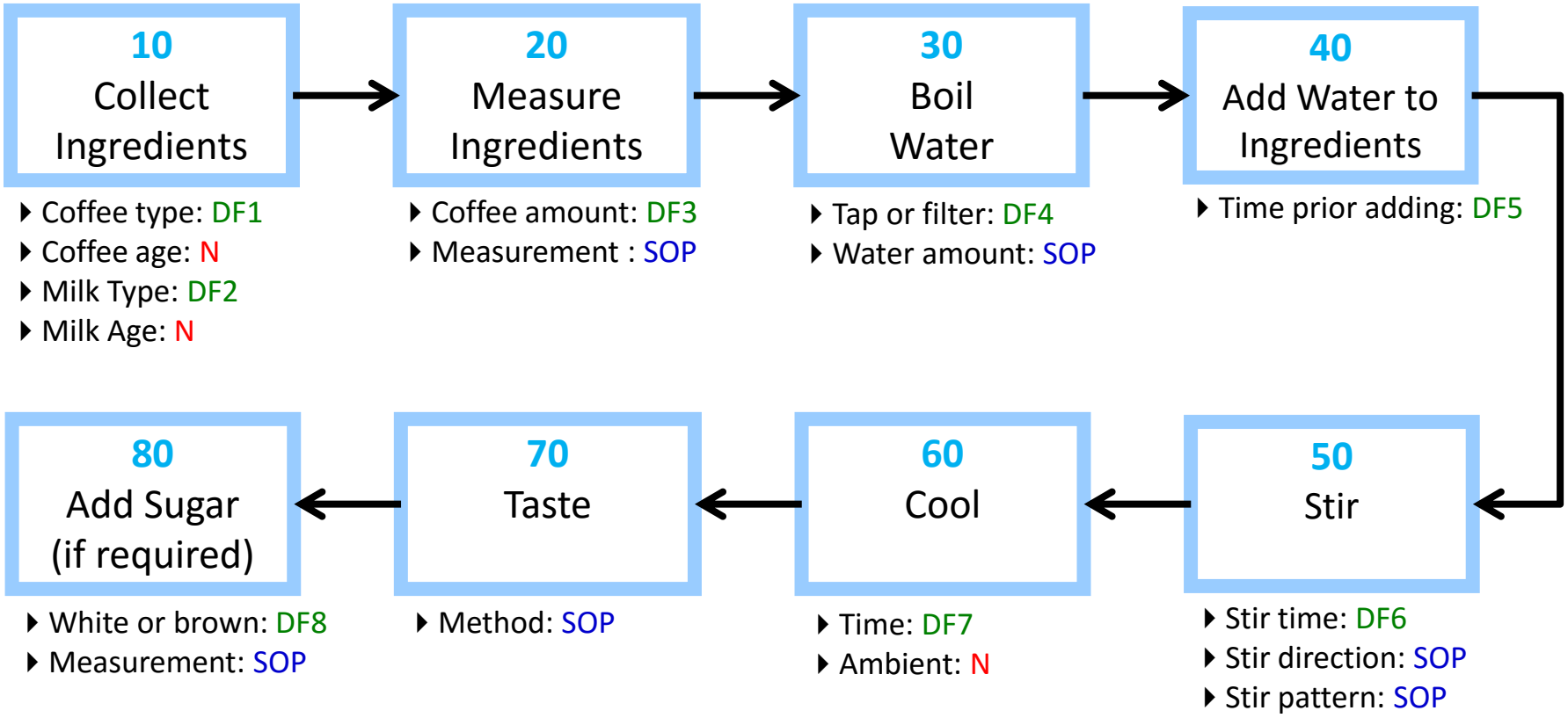
Example – Process an Expense Report:



How many controllable sources of variation do we have here that could have an influence on the performance of the process

- Process Mapping

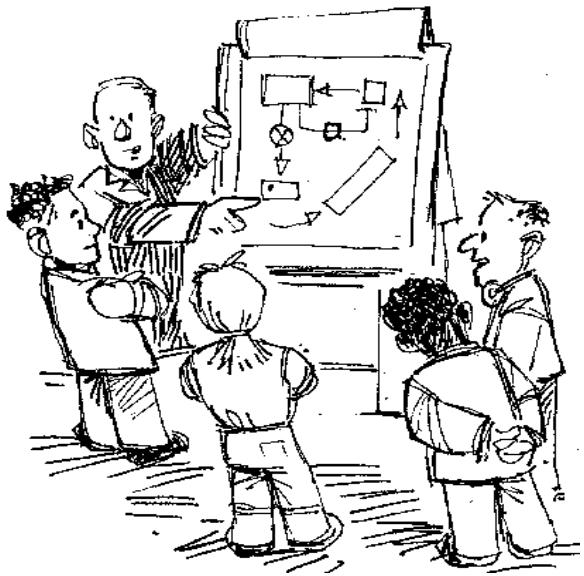
Example – Making Coffee:



- Process Mapping

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 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.



- Process Mapping

Further Information:

- **Input variables could be found in:**
  - Operation manuals.
  - Engineering specifications.
  - 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.

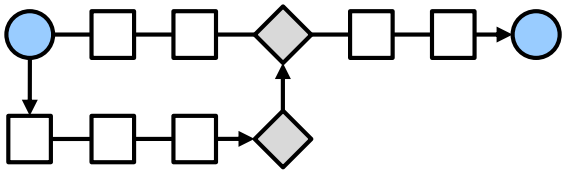
Gemba walks is the action of going to see the actual process, understand it, ask questions, and learn

- Process Mapping

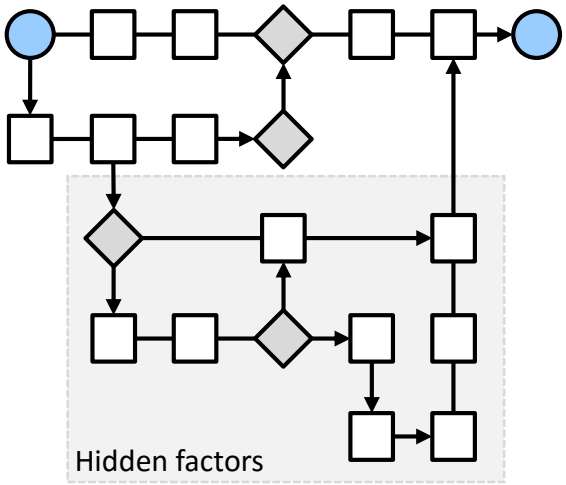
Further Information:

- What do we think of a process is not necessary what it actually is.

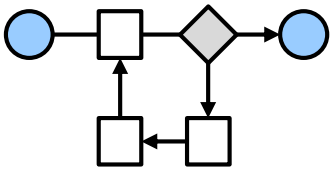
What you think it is…



What it actually is…



What you would like it to be…



-- Process Mapping

Common Process Problems:

- Errors and rework.
- Unnecessary activities and duplication.
- Bottlenecks.
- Long cycle times and excessive delays.
- Missing and unclear steps.
- Too many inspections or checks.
- Complex procedures.
- Departure from procedure.
- Dead ends.
- Costly steps.
- Non-value adding steps.

- Process Mapping

Example – Can Making Process Map: