

# Introduction to Continuous Improvement

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## Training Objectives

- Develop an understanding of major continuous improvement methods
- Learn the fundamental concepts of continuous improvement
- Learn two tools that can be used right away for individual or team process improvement
- Build your skills with CI tools

## Course Overview

- Housekeeping and Ground Rules
- Introductions
- Overview of Minnesota Office of Continuous Improvement (MNCI) and Continuous Improvement (CI)
- CI methodologies
- CI fundamentals
- Hands-on practice with two tools that can be used right away in your work
- Apply tools to your work

## Introduction Activity

What is your objective for attending today's training?

How do you approach solving a problem?

## Minnesota Office of Continuous Improvement

- The Minnesota Office of Continuous Improvement (MNCI) was established in 2007 as an initiative within the Department of Administration. It was originally called the “Enterprise Lean Program,” as part of Governor Tim Pawlenty’s “Drive to Excellence” initiative.
  - The program’s first goal was to introduce within MN state government organizational improvement methodologies that were commonly used by leading businesses worldwide.
- MNCI is still part of the Department of Administration and now associated with Governor Dayton’s Better Government for a Better Minnesota initiative.
- MNCI focuses on three improvement areas:
  - ensuring **results** (project management and implementation; project tracking; awards)
  - building **capacity** (offer foundational CI trainings to all state and other public sector employees), and
  - creating **culture** (leadership training; culture assessments) at the enterprise-level.
- Many other agencies have various levels of CI staffing or initiatives in place.
- The Continuous Improvement Advisory Council (CIAC) consists of members from most all cabinet level agencies. They represent more than 30,000 state employees. You can find your agency’s CIAC member listed on our website.

## What is Continuous Improvement?

Continuous Improvement (CI) is an ongoing effort to improve products, services, and processes.

There isn’t just one way to solve a problem! **CI draws from many methods and problem solving tools to help us (figure out how to) work more efficiently and effectively.**

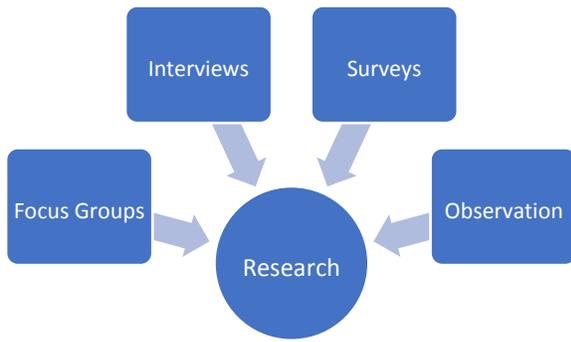
To do this, CI work focuses on customers and data.

**Customer Focus:** Design and improve services based on the customer needs and preferences. Provide what customers need, when they need it, and how they want it. Customers can be internal, external, and end-users.

**Data Driven Decisions:** Base decisions on quantitative analysis as well as qualitative inputs, like anecdote or intuition. We need data AND, not just data. Validate results with data. To understand if the implemented changes were effective, it is important to understand the current state of a situation. When it comes to data, there may be data you already keep track of. In other cases there may be

data that you need to go collect from somewhere new. With that being said, there are many different types of data and ways to collect it:

Data Collection Methods:



Types of Data:

Quantity: how much do we do?

Efficiency: Cost per unit, process time

Quality: How well did we do it?

Effect: Is the customer better off? Did the customer achieve desired results?

## Continuous Improvement Methodologies

There are many strategies and methods to use when approaching a problem. Different methods for process improvement have been developed over time to best meet the needs of an organization, their goals, and desired outcomes. Here are three examples of approaches used in continuous improvement:

- **Lean** is a method that focuses on eliminating waste from a process and uses a foundation of W. Edwards Deming's **Plan-Do-Study-Act (PDSA)** model for improving processes.
- **Six Sigma** is a data-driven approach to eliminate defects and deviation from a process. It uses the linear approach of **Define-Measure-Analyze-Improve-Control (DMAIC)** to identify the root cause of a problem to determine the source of errors.
- **Design Thinking** looks at the customer's perspective from the start to the end of an experience. It uses a divergent approach of **Empathize-Define-Ideate-Prototype-Test**, to design a solution focused towards creating a preferred customer experience.

Regardless of what approach is used to try to solve a problem, there should be a continuous cycle of asking "What is the problem?" "How can we fix it?" "Did our changes work?" and "What adjustments still need to be made?"

The following table displays how Lean, Six Sigma, and Design Thinking all follow a similar pattern of the Scientific Method. Though each was developed for different reasons, they still follow Scientific Method's process, of **forming a question, making a**

hypothesis, predicting the outcome, conducting an experiment, and analyzing the results.

	Scientific Method	Lean	Six Sigma	Human-centered Design
<i>What is the problem?</i>	Form Question	Plan ↓	Define	Empathize
<i>Why is it happening?</i>	Make Hypothesis		Measure	Define
<i>How can we fix it?</i>	Predict Outcome	Do	Improve	
	Conduct Test	Study		Prototype
<i>Did we achieve our goal?</i> <i>What adjustments still need to be made?</i>	Analyze Results	Act	Control	Test

**Additional information on these methodologies:**

Lean	<ul style="list-style-type: none"> <li>• <a href="http://www.lean.org">http://www.lean.org</a></li> <li>• <a href="http://theleanstartup.com/principles">http://theleanstartup.com/principles</a></li> <li>• <a href="https://deming.org/management-system/pdsacycle">https://deming.org/management-system/pdsacycle</a></li> </ul>
Six Sigma	<ul style="list-style-type: none"> <li>• <a href="https://www.isixsigma.com/">https://www.isixsigma.com/</a></li> <li>• <a href="https://www.isixsigma.com/dictionary/dmaic">https://www.isixsigma.com/dictionary/dmaic</a></li> </ul>
Human-Centered Design	<ul style="list-style-type: none"> <li>• <a href="http://dschool.stanford.edu">http://dschool.stanford.edu</a></li> <li>• <a href="https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinkingprocess">https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinkingprocess</a></li> <li>• <a href="http://ideo.org">http://ideo.org</a></li> </ul>

## CI Fundamentals

Fill out the table below for a process that you have in your work.

### Process

- A process is a series of steps or actions taken to achieve a particular end.

### Customers

- A customer is a recipient of or is directly impacted by a service or product.

### People Who Do The Process

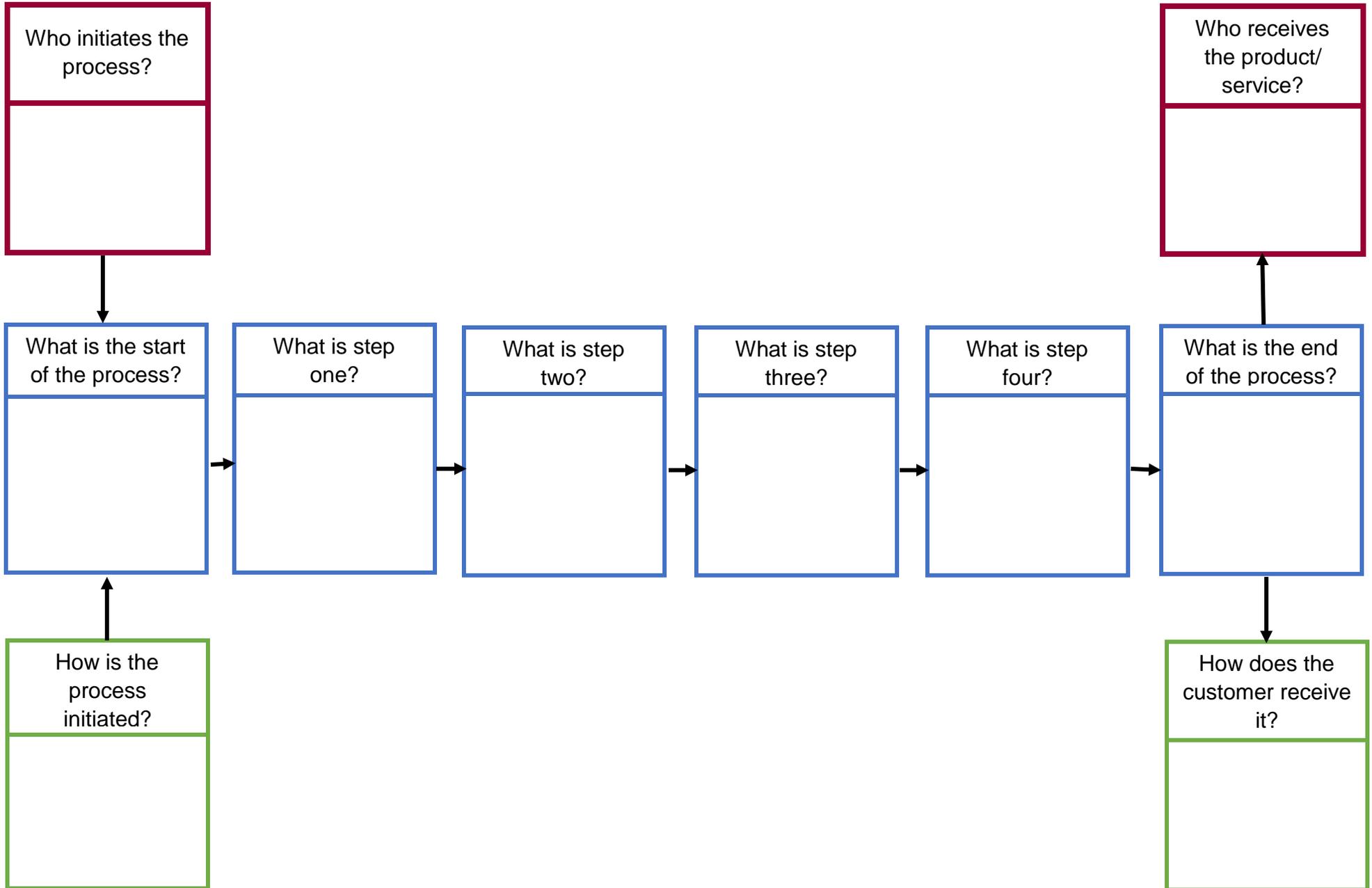
- The people who complete the process steps.

### Process Metrics

- Quantitative and qualitative data to establish a baseline and desired outcome for your improvement efforts.

### Improvement/Project Objectives

- What are you wanting to improve? Efficiency? Quality? Customer satisfaction?



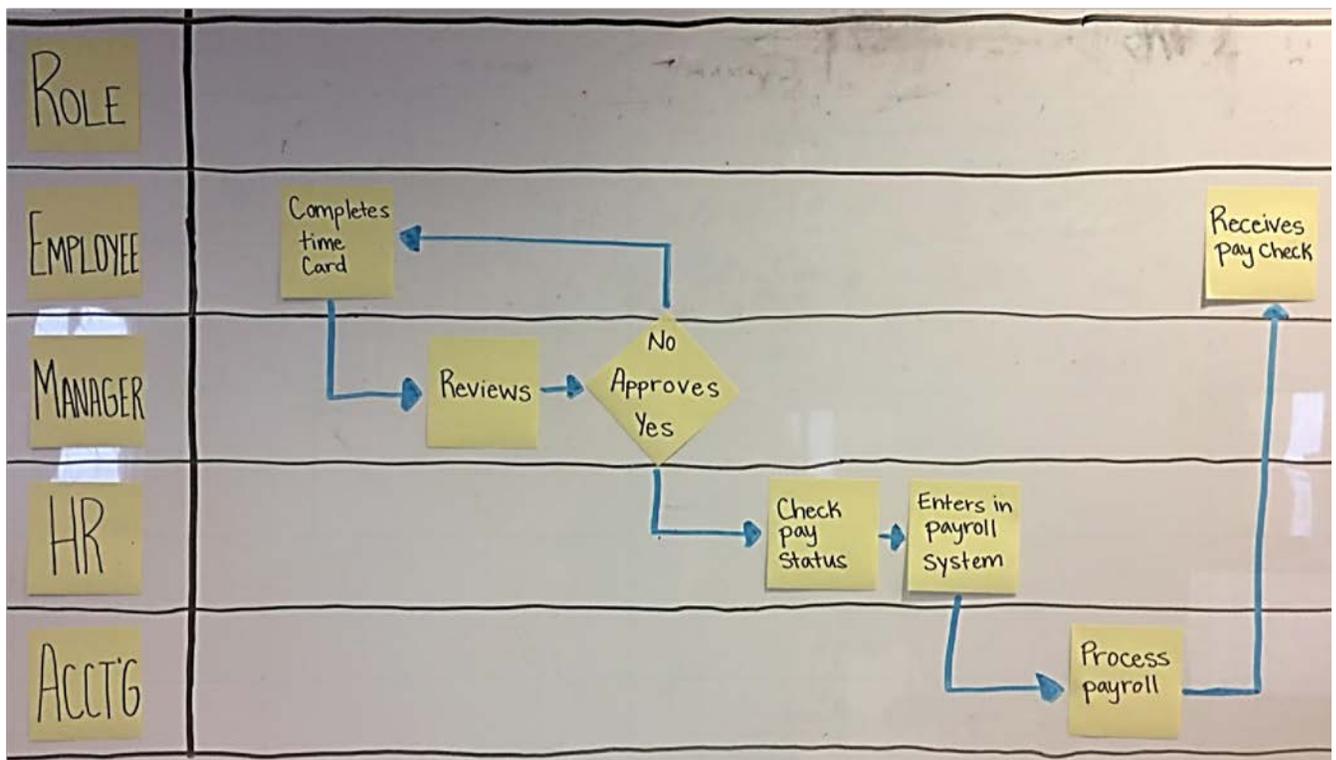
## Tool 1: Process Mapping

Process mapping is a tool that allows you to create a visual representation of a process. It displays the tasks and people/areas involved in a process.

Benefits of creating a process map:

- Visually displays how a current process is happening
- Displays the flow of a work process (helpful when explaining a process to a new employee)
- Identifies how many people/areas are a part of a single process
- Helps to identify where there are unnecessary steps, rework, or confusion in a process.

Here is an example of a workplace process (processing payroll):



For this example, the process begins with an employee completing their time card. The next task is for their manager to review their timecard and make a decision to either approve it or not. If not approved, it would go back to the employee to update as needed. If approved, the next task is for human resources to check their pay status and then enter it into their payroll system. Next, the accounting area would process their payroll, and end with the employee getting paid.

## What is your process?

Brainstorm: What is your current process for going grocery shopping?

As a team, use the following steps to construct a process map:

1. Define the process boundaries. Identify where the process starts and stops.
2. Determine what roles (people/department/area) are part of the process. Write each of them down on individual post-it notes (its fine to add more as you come across them).
3. Draw a column on the left side of the sheet, with a label of “role” at the top. Place each of the roles in that column.
4. Separate each role with their own row (lane). The actions taken by each role will be placed within their specific lane.
5. What is the first step? Write it down on its own post-it note, and place in the appropriate lane.
6. For the process, go through the sequence of steps (giving them each their own post-it) from start to ending point. Place the step in the appropriate role’s lane, moving from left to right across your page. If any additional roles gets added to the process, write them down and give them their own lane.
7. Wait to draw arrows until all pieces have been written down and placed accordingly.
8. If you come to a point where a decision needs to be made, create a post-it with a “yes” and a “no” and place in the role’s lane of who would make the decision. Display with arrows, what the decision would lead to (refer to photo above for example).
9. Study the flow chart. Ask yourself: is there a step or person missing? Are there redundant or confusing activities? Is every step necessary? Is rework happening? If a person didn’t know anything about the process, would they be able to pick up your process map and understand what is happening and why?

## Process Mapping Reflection

What current processes do you have at work that could benefit from being mapped?

What positive and negative outcomes could come about from doing a process map?

## Tool 2: Standard Work

Standard work refers to the agreed-upon way to perform a task or process. Using standard work reduces variation, increases consistency, and focuses on helping employees be successful. Implementing standard work starts by defining the critical elements of any task or process for all workers. Here is the process to develop standard work:

1. Define the start and end of the process.
2. Determine customer and staff requirements.
3. Define the most efficient processes or series of steps to complete the work, and the time needed to complete them.
4. Set quality control checks to minimize and defects and errors.
5. Train the needed supervisors and staff on the new process.
6. Test and validate the standard work.
7. Make adjustments and improvements over time as needed.

**Activity:**

Imagine that you are handing over one of your work processes to a new person. You are now in charge of developing standard work for them to be able to complete this process. For this activity, you will be creating instructions for your partner, which they will need to follow in order to complete your “work process”.

Use the space below to develop standard work for your partner.

Steps to Complete the Process:

Process Steps Continued:

What feedback did your partner provide to you? Were they able to successfully replicate your process?

## What Makes CI Successful

### Culture of CI

An organizational and team culture can either encourage or discourage a culture of continuous improvement. A CI Culture:

- Wants to see problems
- Invest in solving of problems and implementing solutions
- Supports those who identify them
- Works to fix problems without blame
- Includes customers and staff in improvements
- Celebrates fixing problems

### Diversity and Inclusion

A culture of continuous improvement also embodies diversity and inclusion. CI supports the inclusion of staff and customers based on experience with the process and regardless of background. In CI, it's not just a matter of wanting to welcome everyone, but everyone is needed.



**CI is about Equity, not Equality**

## Action Plan

Write down goals that you would like to work on in the next three to six months.  
Choose goals based on:

1. What you want to apply from this class
2. What you would like to learn more about
3. What impact do you feel like this could have on the work you do/organization you work for

Goal 1:

- Action steps:
  
  
  
- Other people or resources needed:
  
  
- Due Date:

Goal 2:

- Action steps:
  
  
  
- Other people or resources needed:
  
  
- Due Date:

Goal 3:

- Action steps:
  
  
  
- Other people or resources needed:
  
  
- Due date:

## Additional CI Concepts and Tools

	What is it?	How does it work?
<b>5S</b>	A method to organize work areas: <ol style="list-style-type: none"> <li>1. Sort (remove what is not needed)</li> <li>2. Set in order (organize needed items)</li> <li>3. Shine (clean work area)</li> <li>4. Standardize (write standards for above steps)</li> <li>5. Sustain (regularly apply the standards)</li> </ol>	Provides a method for eliminating waste that results from a poorly organized work area (e.g., wasting time looking for information/documents).
<b>8 Wastes</b>	Descriptions of non-value added components in our work processes. Wastes include: Defects, Overproduction, Waiting, Non-utilized staff talent, Transportation, Inventory, Motion, and Extra processing	Once you understand the 8 wastes, you are better able to see them in your processes and take actions to remove them.
<b>A3</b>	A one-page document used to understand and solve a problem, or plan and communicate an improvement project. An A3 incorporates PDSA and refers to the paper size (11"x17").	An A3 is a simple tool for planning, communicating, and ensuring your project follows the PDSA methodology.
<b>Batching</b>	Batching is when we wait for a certain amount of items (i.e., batch) or time before performing the next step in the process. In most instances, batching increases wait time for customers, because it holds up work that is ready to move to the next process step.	Batching is effective when there is a high switching cost or set up time between process steps so you "batch" to reduce unit cost such as time needed to access a data system.
<b>Human-centered Design</b>	A creative approach to problem solving. It is a process that starts with the people you are designing for and ends with new solutions that are tailor made to suit your customer's needs.	Human-centered Design uses a holistic approach to look at a customer's experience. Human-centered Design follows a method of: Empathy, Define, Ideate, Prototype, and Test
<b>Journey Map</b>	A journey map catalogs the path of a user, object, or system in order to better understand it and look for design opportunities. By gaining empathy for a person or understanding of one's process through an experience, considering the details of that process can illuminate areas for potential insights.	Creates diagrams that captures multiple observation, e.g. a map of a user's day, a map of a user's experience, or a map of how a product moves through a space (e.g. from manufacturing to store shelf to user's hands). Organize the data in a way that makes sense: a timeline of events, a number of parallel timelines that allows for easy comparison, a series of pictures, or a stack of cards. Then look for patterns and anomalies and question why those themes or events occurred.
<b>Kaizen</b>	Kaizen is a Japanese word that translates to "continuous improvement." It most often refers to an event during which employees rapidly improve a	Kaizen events are typically led by a neutral facilitator over the

	process using CI tools. Kaizen emphasizes the empowerment of all employees to suggest and implement process improvements.	course of one to five days. The facilitator leads a team in: <ol style="list-style-type: none"> <li>1. Mapping an existing process</li> <li>2. Identifying the waste in the process</li> <li>3. Brainstorming improvements</li> <li>4. Mapping out a new, improved process</li> <li>5. Developing an action plan to implement the new process</li> </ol>
<b>Lean</b>	A method, set of tools, and mindset for improving work areas and processes by eliminating waste. Lean strives to create the <i>Ideal Process</i> . The ideal process is: <ul style="list-style-type: none"> <li>• Completed by one person</li> <li>• Completed as soon as the request is made</li> <li>• Completed one at a time (no batching)</li> <li>• Completed without interruption (continuous flow)</li> <li>• Completed with the information provided</li> <li>• Completed correctly the first time – no errors or defects</li> </ul>	<ol style="list-style-type: none"> <li>1. Specifies value from the customer standpoint.</li> <li>2. Eliminates process steps that do not add value.</li> <li>3. Achieves tight sequence between process steps so the product or service flows smoothly toward the customer (one-piece flow).</li> <li>4. Allows customers to pull value from the process versus having the process pushed to them (e.g. customer can order their license online versus having to come to a physical location with limited service hours).</li> <li>5. Follows PDSA until the <i>ideal</i> (no-waste) process is created.</li> </ol>
<b>PDSA</b>	The Lean methodology (Deming Cycle): <ul style="list-style-type: none"> <li>• Plan (establish plan and expected results)</li> <li>• Do (implement plan)</li> <li>• Study/Check (verify results achieved)</li> <li>• Act (review and assess; do it again)</li> </ul>	Applies a scientific approach to making improvements. The iterative process ensure learning is captured and improvements are continuous.
<b>Poka-Yoke</b>	Design error detection and prevention into production processes with the goal of achieving zero defects.	Eliminates errors through design, which saves resources in looking for and fixing errors later in the process.
<b>Process Mapping</b>	A technique to document the sequence and flow of steps in a process.	Helps you see how current work is done, and allows you to identify wastes and value added process steps.

<b>Process Measures</b>	Metrics that tell you how well you are doing and if operations are functioning properly.	Process measures make it possible to set goals, evaluate if strategies are achieving desired results, and communicate results.
<b>Root Cause Analysis</b>	A problem solving approach that resolves the underlying causes of a problem, instead of applying quick fixes to visible symptoms. Some typical root cause analysis tools are the 5 Whys, fishbone diagram, and affinity and relations diagram.	Helps to ensure that a problem is eliminated by applying solutions or corrective measures to the “root cause” of the problem. A common approach is to ask why five times – each time moving a step closer to discovering the true underlying problem.
<b>SIPOC Diagram</b>	A tool used to identify high-level, relevant elements of a process improvement project. SIPOC is an acronym for: Suppliers, Inputs, Process, Outputs, and Customers.	It is a valuable tool for scoping a Kaizen event or a problem solving project.
<b>Six Sigma</b>	An approach for reducing process errors and variation using improvement experts, a structured method, performance measures, and tools. Six Sigma refers to a goal of 3.4 defects per million units produced.	Six Sigma is a great approach for complex improvement projects. Six Sigma follows the DMAIC method: Define, Measure, Analyze, Improve, Control
<b>Standard Work</b>	Documented procedures that capture current best practices (including the sequence and time to complete each task). Standardized work is living documentation of how the work should be done (it continually evolves through Kaizen).	Standardized work helps maintain service quality, provides a baseline for future improvement activities, and allows easier onboarding of staff.
<b>Visual Management</b>	Visual signals to communicate information needed to make business decisions. This mapping can identify wastes or areas requiring future analysis.	Visual management makes the state and condition of processes easily accessible and clear to everyone. The meters and gauges on a car dashboard are a common example.
<b>Voice of the Customer</b>	The needs, expectations, and service preferences of customers.	Helps in the design and delivery of products/services and assessing performance.
<b>WorkOut</b>	A method for managers and teams to identify and prioritize opportunities for improvement. A WorkOut is typically completed in a half-day session led by a neutral facilitator.	During a WorkOut the team: <ul style="list-style-type: none"> <li>1. Defines processes for delivering services</li> <li>2. Identifies process challenges and barriers</li> <li>3. Brainstorms solutions</li> <li>4. Sorts and prioritizes solutions</li> </ul>

## For More Continuous Improvement Training, Resources, and Newsletter:

- CI Homepage: <http://mn.gov/admin/government/continuous-improvement/>
- Additional Resources: <http://mn.gov/admin/continuous-improvement/resources/>
- Additional Training Available: <http://mn.gov/admin/continuous-improvement/skills-development/>
- Sign-up for our CI Newsletter: <http://mn.gov/admin/continuous-improvement/resources/newsletter/>

We offer four standard courses: Introduction to CI, Problem Solving, Process Improvement Measurement, and Human-centered Design in CI. Our training programs equip Minnesota's state government workforce with the problem solving tools of continuous improvement. Courses are offered for public sector employees only and are **free** of charge. Register through the Employee SelfService website.

For state agencies, we also offer direct CI training to your project teams and work units. Contact us at [ci@state.mn.us](mailto:ci@state.mn.us) for details!