



Continuous Improvement: Specific Techniques

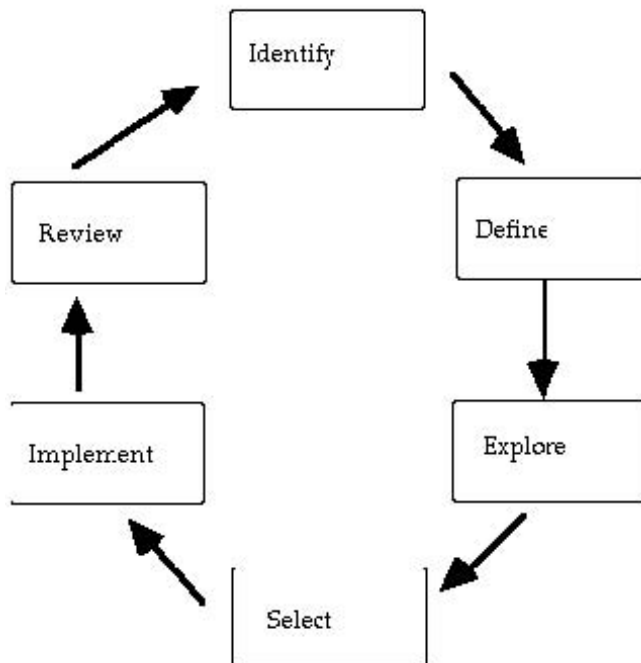
CI involves an extended journey, gradually building up skills and capabilities within the organisation to find and solve problems. Not surprisingly there are many different techniques which can help enable the process, and for a full account of them you should look at the further information sources. What follows here are some brief explanations of basic tools.

Specifically we will look at:

- problem-solving cycle;
- brainstorming;
- cause and effect diagrams;
- checksheets;
- flow diagrams;
- and an outline of policy deployment.

Problem-Solving Cycle

At its simplest, we can see continuous improvement as involving a cycle of problem-finding and solving, like this:



In the first stage — identify — the organization recognizes that there is a problem to solve. This may be an emergency or it may be a minor difficulty which has been nagging away for some time; it may not even be a 'problem' but an experiment, an attempt to find out a new way of doing something.

Whatever the initial stimulus, finding a problem then triggers the next stage which is to define it more clearly. Here the issue is often to separate out the apparent problem (which may only be a symptom) from the underlying problem to be solved. Defining it also puts



some boundaries around the problem; it may be necessary to break a big problem down into smaller sub-problems which can be tackled — ‘eating the elephant a spoonful at a time’. It can also clarify who ‘owns’ the problem — and thus who ought to be involved in its solution, if the solution is to stick for the longer-term.

Having analysed the nature of the problem, the next stage is to explore ways of solving it. There may be a single correct answer, as in crossword puzzles or simple arithmetic — but it is much more likely to be an open-ended problem for which there may be a number of possible solutions. The challenge at this stage is to explore as widely as possible — perhaps through the use of brainstorming or other group tools — to generate as many potential solutions as possible.

Next comes the selection of the most promising solutions to try out — essentially the reverse of the previous stage since this involves trying to close down and focus from a wide range of options. The selected option is then put into practice — and the results, successful or otherwise, reviewed. On the basis of this evaluation, the problem may be solved, or it may need another trip around the loop. It may even be the case that solving one problem brings another to light.

In terms of learning, this is essentially a model for experimenting and evaluating. We gain knowledge at various steps in the process — for example, about the boundaries of the problem in defining it, or about potential solutions in exploring it or about what works and what doesn’t work in implementing it. The point is that if we capture this learning it puts us in a much better position to meet the next problem; if it is a repeat, we already know how to solve it. If it is similar, we have a set of possible solutions which would be worth trying. And if it is completely new, we still have the experience of a structured approach to problem solving.

Brainstorming

Brainstorming is the rapid pooling of all and any ideas that a group of people can come up with before any discussion or judgement takes place. Every idea is recorded no matter how bizarre or irrational.

How to Brainstorm

1. Keep a relaxed atmosphere. Meetings should be disciplined but informal. If possible, choose an informal venue.
2. Get the right size of team. The technique seems to work best with groups of 5 to 7 people.
3. Choose a leader. The leader checks that everyone understands what is going on and why.
4. Define the problem clearly.
5. Generate as many ideas as possible.
6. Do not allow any evaluation and discussion.
7. Give everyone equal opportunity to contribute.
8. Write down EVERY idea — clearly and where everyone can see them.
9. When all the ideas are listed, review them for clarification, making sure everyone understands each item. At this point you can eliminate duplications and remove ideas the group feels are no longer appropriate.



10. Allow ideas to incubate. Brainstorm in sessions with perhaps a few days in between. This gives time for the team to let the ideas turn over in their mind, which often results in new ideas at a later session.

Approaches to Brainstorming

One-at-a-time

A member of the group offers one idea and the session continues this way until everyone has had a chance to add to the list.

Open Door or Freewheeling

Anyone who has a contribution speaks whenever he or she wants.

Write-it down

Ideas are written down rather than stated out loud, but everyone must be able to see each idea listed.

Cause and effect diagram

Also called the 'Fishbone Diagram', this participatory exercise explores the links between the effects and the possible causes of an issue. This tool encourages a group setting for problem —solving and demonstrates that problems can have a number of causes.

What is it?

Cause and effect analysis is a technique for identifying the possible causes of a problem or effect. The technique uses a Cause and Effect Diagram to record the possible causes as they are suggested.

When should you use it?

Use this tool when you want to establish the cause of an effect. The effect may be either a problem or a desirable effect — when something desirable has happened it is useful to find out what caused it so you can make it happen again.

Constructing a Cause and Effect Diagram

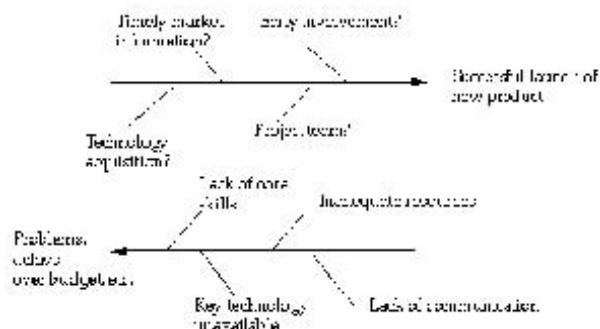
1. Establish what the problem, or effect, is. It must be stated in clear and concise terms, agreed by everyone.
2. Write the effect (problem) in a box on the right and draw a long line pointing to the box.
3. Decide the major categories of causes. This may be done in several ways:
 - Brainstorming.
 - Using standard categories such as the 4Ms (Machines, Materials, Methods, Manpower) or PEMPEM (Plant, Equipment, Materials, People, Environment, Methods).
 - When the effect results from a recognisable process or set of activities, the major steps in the process can be used.
4. Write the major categories in boxes parallel to, and some distance from, the main line. Connect them to the main line with slanting arrows.
5. Brainstorm for possible causes.
 - Add the causes to the diagram clustered around the major causes they influence. Divide and sub-divide the causes to show how they interact, and



draw links between causes that are related. If the diagram becomes too crowded, move one or more categories to a new sheet of paper.

6. Evaluate and analyse the possible causes.
7. Decide and act.
 - This will probably involve using other tools. For example, in order to verify some of the possible causes identified you may need to collect data (using checksheets) and analyse it (Pareto Analysis, graphs, etc.).

Example of a cause and effect diagram



Checksheets

What is it?

A Checksheet is a tool for recording and organising data.

There are three kinds of Checksheets:

1. Recording Checksheet :
 - Counts how many times something happens in pre-specified categories
2. Checklist Checksheet:
 - A list of items to be addressed in some predetermined manner e.g. an inspection sequence that prevents steps or procedures from being left out.
3. Location Checksheet:
 - Records the relative or specific locations of defects, injuries, accidents etc ... Usually it is a picture or map of the item/area under consideration on which the location of the defect etc. is marked with a dot or a cross.

Why use it?

Checksheets will help you to gather and classify data. Checksheets ensures that everyone collects comparable data in the same form, and in a format that allows easy analysis.

Constructing a Checksheet

1. Decide what data you need to collect.
2. Decide how often the events will be observed (the frequency) and over what total period (the duration).
3. Design a draft Checksheet. Put the items to be monitored on the left and the time periods across the top. Allow space for totals on the right for each item being observed and along the bottom for the observation periods. Label the Checksheets clearly.



4. Test the draft Checksheet by getting someone who did not help design it to use it.
5. Make any revisions that are necessary as a result of step 4.
6. Distribute the Checksheets to the people collecting the data and explain how to use them.
7. Act on the data collected.

Flow Charting

What is it?

A flowchart is a diagram illustrating the activities in a process.

Why use it?

A flowchart can tell you a lot about a process and the activities involved eg Are all the activities really necessary? What controls are in place?

Flowcharts are a useful tool to use when improving a process, especially when you are planning to collect data or to implement a solution. They can also be used to document a new process or to compare an existing process with an 'ideal' process.

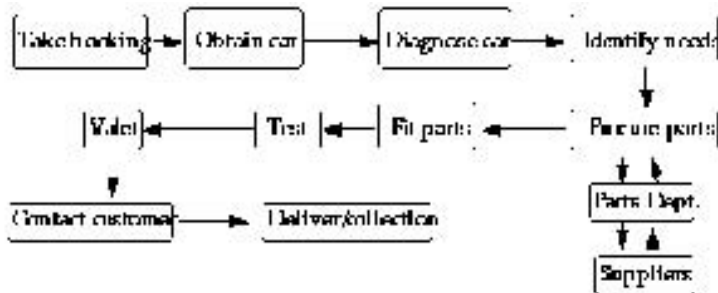
Flowcharts are a good communication tool — by using standard symbols everyone will have the same understanding of the process.

Constructing a flowchart

1. Decide what level of detail the flowchart is to represent.
This will depend on the purpose for constructing the flowchart. On a higher level flowchart several tasks which make up an activity will be shown as one activity whereas on a lower level flowchart each task will be shown separately.
2. List the activities in the process.
3. Draw the flowchart (sometimes this is done using standard symbols — for example:

Stretched circle	<i>Start or end of process</i>
Rectangle	<i>Step or activity in the process</i>
Diamond	<i>Decision point</i>
Arrow	<i>Direction of flow</i>

This flow chart looks at the process of servicing a car:



Measures: Overall time
Quality of car service
Cost

Delay
Quality of customer service
Clarity of information



Policy deployment

As the name suggests the basic concept in policy deployment is the development of mechanisms for breaking overall strategic objectives of the business down into small units, each of which can provide the target for groups or individuals in their CI activities over a sustained period. For example, in Nissan Cars the overall strategic target is cascaded down through the organisation via the appraisal process, where everyone has the chance to discuss and agree to certain objectives over the coming year, including a range of targets for their own CI activities. This process — which is essentially ‘management by objectives’ — is a two-way one but the outcome is agreed targets and a commitment on the part of the employee to achieving them, a recognition that this is what will be used to assess performance over the coming year, and an understanding that achievement will be related to rewards.

Its value in CI is to provide a focus and targeting process which moves on from simply improving things on a project by project basis. In policy deployment targets are linked to strategic objectives and local activities mesh together to contribute to meeting these. For example, if the overall target includes an objective to become competitive by reducing customer lead-time by 25%, then policy deployment would ask, for each area, how they could cut 25% of time out of their overall operations. In turn this would cascade down to the individual units within the area, and down to the individual teams, with the same question. Each individual team will then use CI tools to explore the sources of wasted time, and the kinds of thing which might cut it down — and on a project by project basis they would chip away at the time taken within their area. In aggregate form this would result in major savings.

Two key features are important here — the use of ‘stretch’ targets which give impetus, and the use of monitoring and measurement against these targets as a way of guiding the process and maintaining momentum. In addition there is a strong component of ‘know why’ as well as know-how — in other words, there is an attempt to explain the rationale behind the strategy and how improvements in a particular area contribute to it. For example, in a chemical plant working towards the target of ‘zero breakdowns’ each machine has detailed operating and maintaining instructions attached. These have been developed through CI activity and include not only the new operating procedures but also a section on why these steps are important. There is thus an element of organisational learning, of turning tacit into formal knowledge. Similar functions are performed by the storyboards which characterise progress along the road to meeting strategic targets.

Policy deployment is concerned with strategic objectives so the timescales for typical ‘campaigns’ are long. For example, in Japan the ‘mid-term plan is the key driver in firms, and this represents a clear statement of objectives and targets over the next 3 years.