



Process Improvement Template

Organizing Our Thoughts for a Process Improvement Project

Studying a process for the purpose of improvement can have several stages that are akin to treating an ill patient. These are: *Observation*, *diagnosis*, *treatment-design*, and *treatment-test*. We can use the template (**Exhibit 1**) to organize our thoughts when studying a process for the purpose of recommending and testing improvement-oriented changes. Each box and the overall layout allows us to express clearly what we believe to be true about the process so that our assumptions can be tested in the course of doing our work because each box corresponds to one of these four steps and contains its own testable hypotheses.¹

Observing the Current Condition: How Work Is Done and Problems That Are Evident

By *observation*, we mean studying a process to understand how it actually operates in practice. We should organize our thoughts using text and diagrams that best reflect the phenomenon that we are trying to represent. Diagrams might include:

- “spaghetti charts” to show the complexity of *pathways* (who supplies what to whom),
- material and information flows to show how *connections* operate (how customers make requests and how suppliers deliver responses),
- time and motion studies to show how individual suppliers perform *work-activities*,
- charts to show distributions, graphs to show the change in a critical performance parameter over time, etc.

In addition to showing how the process operates, we want to identify *problems* (storm clouds in the template) that are encountered by people in the course of using/doing the process. These might be gaps between necessary and actual outcomes or expected and actual outcomes in terms of cost, quality, lead-time, batch-size, or safety; difficulty doing work; uncertainty about how to do work or of what needs to be done, etc.

¹ You’ll probably need a larger piece of paper (i.e., 11x17) to capture meaningful amounts of data.

Professor Steven Spear prepared this note to provide guidance in analyzing and improving business processes.

Copyright © 2001 by the President and Fellows of Harvard College. To order copies or request permission to reproduce materials, call 1-800-545-7685, write Harvard Business School Publishing, Boston, MA 02163, or go to <http://www.hbsp.harvard.edu>. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of Harvard Business School.

The hypothesis in the current condition box is that the textual and diagrammatic description accurately portrays how the process operates. We can test our assumptions by observing the process directly (literally or figuratively) and comparing the process as it actually is performed with the representation in the chart.

Diagnosis: Problems and Root Causes

In the problems and root-causes box of the template, we are trying to *diagnose* the process by understanding the root causes that create the observable symptoms. By medical analogy, we might have a patient with a fever, and we would try to identify the cause of that symptom—i.e., a viral or bacterial infection, poisoning, allergy, etc. In an industrial setting, we might have a plant with large amounts of inventory, and we would want to find out what it was about change-over times, batch-sizes, cycle times, scheduling, etc. that led to such over-abundance of physical product.

The hypotheses in this box are that the conditions or practices that we have identified as root causes actually produce the observable symptoms. We can test these hypotheses by removing the root causes (i.e., cure the infection, reduce batch-sizes) and confirming or refuting that the symptoms have vanished.

Treatment-Design: Root Causes and Countermeasures

This box contains the countermeasures (i.e., the changes in the process, the *treatments* for the problems) that we believe will improve the process.

The hypotheses in this box are that these specific changes will remove each of the specific root causes that we have identified in diagnosing the process. We can test these hypotheses by making the changes and determining if the root causes have been eliminated.

Treatment-Test: Target Condition

This box describes the process as we expect it to operate—without problem symptoms (puffy Spring clouds) once the changes we are “prescribing” are made.

The hypothesis in this box underpins the entire experiment that we have designed.

Current condition (with its symptomatic problems)	+	Countermeasures (to address root causes)	→	Target condition (the asymptotic process, the improved process)
---	---	---	---	---

Important Features of the Problem Solving/Process Improvement Template

- Each box has self-contained, testable hypotheses.
- The document as a whole captures the entire logic of the improvement effort and helps convert an ad hoc, kluge approach into a bona fide experiment.

Each specific problem is linked to a particular (set of) root cause(s).

Each root cause is addressed by a specific countermeasure (even if a single countermeasure removes more than one root cause, there is still a direct link between action (implement the countermeasure) and outcome (removal of the root cause)).

Each countermeasure is linked to a specific symptom/problem that is removed.

For example, we can follow Problem A all the way around the chart from its identification to its expected cure.

Using the Template Iteratively

For a short project, it may be difficult to run our experiment and so test suggestions in actual use. However, in practice, these templates, when used with discipline, are a key tool in tracking the improvement process and capturing learning that occurs through multiple cycles of description, diagnosis, treatment-design, and treatment-test.



























In **Exhibit 2**, for example, the first round of improvement contains the hypothesis that:

Current condition₁ + Countermeasures₁ → Target condition₁

As we begin the second round improvements, the very first steps include:

- “Grasping” the now current condition (i.e., current condition₂ and comparing this actual outcome of experiment₁ with the predicted outcome of experiment₁ (i.e., target condition₁)
- If actual outcome₁ (i.e., current condition₂) does not equal target condition₁, then we are challenged to evaluate the assumptions we imbedded in experiment₁ before we mistakenly imbed the same assumptions in each subsequent step of managing the process.

Exhibit 1 Problem Solving/Process Improvement Template

<u>Background</u> <ul style="list-style-type: none"> • Business • Process • Role of process in business • Other relevant information 	Project name, date of observation, name of observer																								
<u>Current condition and problems</u> <div style="text-align: center;">  <p>Text, pictures, charts, etc. to describe how work is actually done (how the process actually works) based on what we have seen, heard, etc.</p> <div style="display: flex; justify-content: space-around;">   </div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  : an observed problem </div>	<u>Target condition w/o problems</u> <div style="text-align: center;">  <p>Text, pictures, charts, etc. to describe how work <i>will be</i> done (how the process <i>is expected</i> to work) based on the changes we have developed.</p> <div style="display: flex; justify-content: space-around;">   </div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  : the problem removed </div>																								
<u>Problems and root causes</u> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;"><u>Problems</u></td><td style="width: 30%;"></td><td style="width: 30%;"><u>Root Causes</u></td></tr> <tr> <td><u>Symptoms</u></td><td></td><td><u>Causes</u></td></tr> <tr> <td>  Specific Symptom (A) </td><td>→ 5 whys →</td><td> condition for (A) </td></tr> <tr> <td>  Specific Symptom (B) </td><td>→ 5 whys →</td><td> condition for (B) </td></tr> <tr> <td>  Specific Symptom (C) </td><td>→ 5 whys →</td><td> condition for (C) </td></tr> </table>	<u>Problems</u>		<u>Root Causes</u>	<u>Symptoms</u>		<u>Causes</u>	 Specific Symptom (A)	→ 5 whys →	condition for (A)	 Specific Symptom (B)	→ 5 whys →	condition for (B)	 Specific Symptom (C)	→ 5 whys →	condition for (C)	<u>Countermeasures to root causes</u> <p>Specific changes (countermeasures) expected to remove root causes</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">  </td><td style="width: 30%;"> What change to make to remove condition (A) </td><td style="width: 30%;"> How to make change (who, content, sequence, timing, expected outcome) </td></tr> <tr> <td>  </td><td> What change to make to remove condition (A) </td><td> How to make change (who, content, sequence, timing, expected outcome) </td></tr> <tr> <td>  </td><td> What change to make to remove condition (A) </td><td> How to make change (who, content, sequence, timing, expected outcome) </td></tr> </table>		What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)		What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)		What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)
<u>Problems</u>		<u>Root Causes</u>																							
<u>Symptoms</u>		<u>Causes</u>																							
 Specific Symptom (A)	→ 5 whys →	condition for (A)																							
 Specific Symptom (B)	→ 5 whys →	condition for (B)																							
 Specific Symptom (C)	→ 5 whys →	condition for (C)																							
	What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)																							
	What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)																							
	What change to make to remove condition (A)	How to make change (who, content, sequence, timing, expected outcome)																							

Source: Casewriter.

Exhibit 2 Iterative Use of Problem Solving Template

Experiment 1

Background • Business • Role of process in business • Other relevant information		Project name, date of observation, name of observer	
Current condition and problems Text, pictures, charts, etc. to describe how work is actually done (how the process actually works) based on what we have seen, heard, etc. 		Target condition w/o problems Text, pictures, charts, etc. to describe how work <i>will be</i> done (how the process is <i>expected</i> to work) based on the changes we have developed. 	
Problems and root causes Problems Symptoms Specific Symptom (A) → 5 whys → Root Causes Causal condition for (A) Specific Symptom (B) → 5 whys → Causal condition for (B) Specific Symptom (C) → 5 whys → Causal condition for (C)		Countermeasures to root causes Specific changes (countermeasures) expected to remove root causes What change to make to remove condition (A) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (B) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (C) → How to make change (who, content, sequence, timing, expected outcome)	

Compare expected (target) and actual outcome

Experiment 2

Background • Business • Role of process in business • Other relevant information		Project name, date of observation, name of observer	
Current condition and problems Text, pictures, charts, etc. to describe how work is actually done (how the process actually works) based on what we have seen, heard, etc. 		Target condition w/o problems Text, pictures, charts, etc. to describe how work <i>will be</i> done (how the process is <i>expected</i> to work) based on the changes we have developed. 	
Problems and root causes Problems Symptoms Specific Symptom (A) → 5 whys → Root Causes Causal condition for (A) Specific Symptom (B) → 5 whys → Causal condition for (B) Specific Symptom (C) → 5 whys → Causal condition for (C)		Countermeasures to root causes Specific changes (countermeasures) expected to remove root causes What change to make to remove condition (A) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (B) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (C) → How to make change (who, content, sequence, timing, expected outcome)	

Experiment 3

Background • Business • Role of process in business • Other relevant information		Project name, date of observation, name of observer	
Current condition and problems Text, pictures, charts, etc. to describe how work is actually done (how the process actually works) based on what we have seen, heard, etc. 		Target condition w/o problems Text, pictures, charts, etc. to describe how work <i>will be</i> done (how the process is <i>expected</i> to work) based on the changes we have developed. 	
Problems and root causes Problems Symptoms Specific Symptom (A) → 5 whys → Root Causes Causal condition for (A) Specific Symptom (B) → 5 whys → Causal condition for (B) Specific Symptom (C) → 5 whys → Causal condition for (C)		Countermeasures to root causes Specific changes (countermeasures) expected to remove root causes What change to make to remove condition (A) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (B) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (C) → How to make change (who, content, sequence, timing, expected outcome)	

Compare expected (target) and actual outcome

Experiment 4

Background • Business • Role of process in business • Other relevant information		Project name, date of observation, name of observer	
Current condition and problems Text, pictures, charts, etc. to describe how work is actually done (how the process actually works) based on what we have seen, heard, etc. 		Target condition w/o problems Text, pictures, charts, etc. to describe how work <i>will be</i> done (how the process is <i>expected</i> to work) based on the changes we have developed. 	
Problems and root causes Problems Symptoms Specific Symptom (A) → 5 whys → Root Causes Causal condition for (A) Specific Symptom (B) → 5 whys → Causal condition for (B) Specific Symptom (C) → 5 whys → Causal condition for (C)		Countermeasures to root causes Specific changes (countermeasures) expected to remove root causes What change to make to remove condition (A) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (B) → How to make change (who, content, sequence, timing, expected outcome) What change to make to remove condition (C) → How to make change (who, content, sequence, timing, expected outcome)	

Compare expected (target) and actual outcome

Source: Casewriter.