Problem Solving with A3

กิตติพงศ์ เตมียะประดิษฐ์

TYPES OF SOLUTIONS

- **Mop-It** (Temporary)

- **Stop-It** (Permanent/Sustainable)
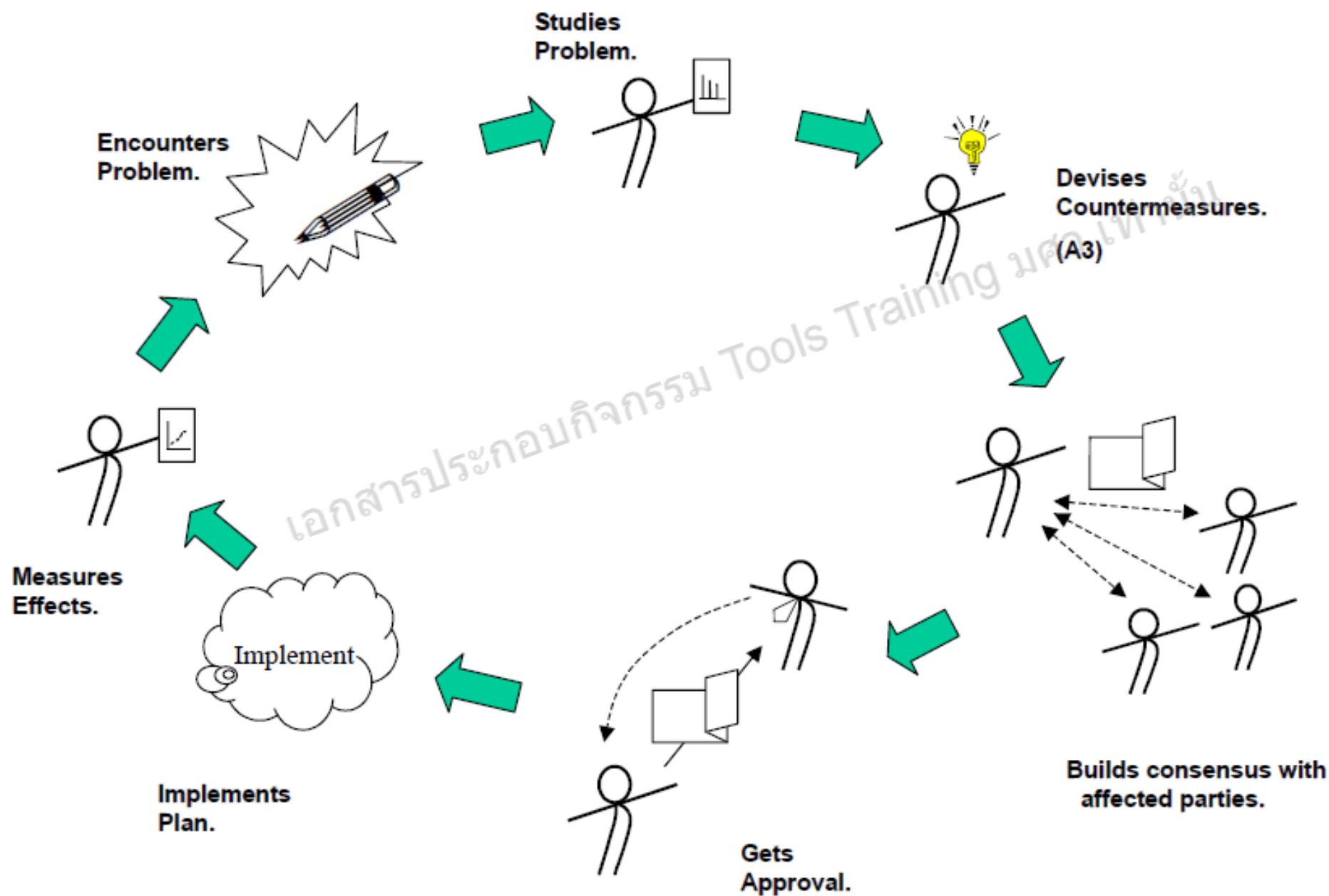
Toyota's Secret: The A3 Report

John Shook

How Toyota solves problems, creates plans, and gets new things done while developing an organization of thinking problem-solvers.

Target State for A3 Problem-Solving

Studies Problem.

Encounters Problem.

Devises Countermeasures.

(A3)

เอกสารประกอบกิจกรรม Tools Training มศอ.เทาลั้น

Measures Effects.

Builds consensus with affected parties.

Implement

Implements Plan.

Gets Approval.

Target State for A3 Problem-Solving
(see attached figure)

Encounters Problem
- Something about the way work happens now is not IDEAL.

Studies Problem
- Observe the work in its actual context.
- Document the current condition.
- Validate observations.
- Quantify the extent of the problem.
- Perform cause analysis: is work properly specified? Are connections clear, direct, yes/no? Are pathways simple, direct, and uninterrupted?
- *Write the left-hand half of the A3.*

Devises Countermeasures
- Generate ideas to move the organization closer to IDEAL.
- Design specific countermeasures that i) specify the work, ii) create better connections, and/or iii) simplify pathway.
- Involve the people affected by the change; get their ideas, their reservations.
- Envision and document a target condition.
- Devise an implementation plan: what, who, when, and desired outcome.
- Predict the results of implementation *quantitatively*.
- Decide on a follow-up plan.
- *Write the right-hand half of the A3.*

Builds consensus with affected parties
- Build consensus with ALL people affected by the implementation or target condition.
- May involve studying problem further or reworking the target condition.

Gets approval
- The appropriate authority verifies that problem has been sufficiently studied.
- The authority verifies that all affected parties are "on board" with the proposal.
- Appropriate authority approves the change and implementation.

Implements plan
- Each person listed in implementation carries out his/her assignment by the deadline.

Measures effects
- On the date specified in the follow-up plan, measure the results of implementation and document.
- If results differ from predicted, research why.
- *On to the next problem!*

The A3 Report

THEME: "What are we trying to do?"

To:_____
By: _____
Date:_____

Background

- Background of the problem
- Context required for full understanding
- Importance of the problem

Current Condition

- Diagram of current situation (or process).
- Highlight problem(s) with storm bursts.
- What about the system is not IDEAL.
- Extent of the problem(s), i.e., measures.

Cause Analysis

- List problem(s)
- Most likely direct (or root) cause:

Why? Why? Why? Why? Why?

Target Condition

- Diagram of proposed new process
- Countermeasures noted as fluffy clouds
- Measurable targets (quantity, time)

Implementation Plan

What?	Who?	When?	Where?
Actions to be taken	Responsible person	Times, Dates	

Cost:

Follow-Up

Plan	Actual Results
- How will you check the effects? - When will you check them?	- In red ink/pencil. - Date check done. - Results, compare to predicted.

Create Robust Process for Translating Documents

I. Background

New domestic plant expansion has massive technical requirements that must be translated from Japanese documents to English. The size and complexity of the project are creating errors and delays.

II. Current Conditions

Cost overruns, delays, and errors due to:
- Sheer volume of documents.
- Multiple and varied vendors (pricing, quality, ease).
- Involvement of various departments and working styles.

III. Goals/Targets

- Simplify and standardize the process.
- Reduce costs by 10%.

IV. Analysis

- Challenge of translating from Japanese to English.
- Multiple varied vendors create a complex, nonstandard process.
- Overall improvement can be defined by reduction in cost overruns.

V. Proposed Countermeasures

Simplify and improve process performance by choosing one vendor based on competitive bid process.

VI. Plan

Evaluate current vendor.

Identify new vendor candidates.

Develop bid package, distribute, and choose winning bid.

VII. Followup

Monitor cost to proposal.

Review performance at end of one-year contract.

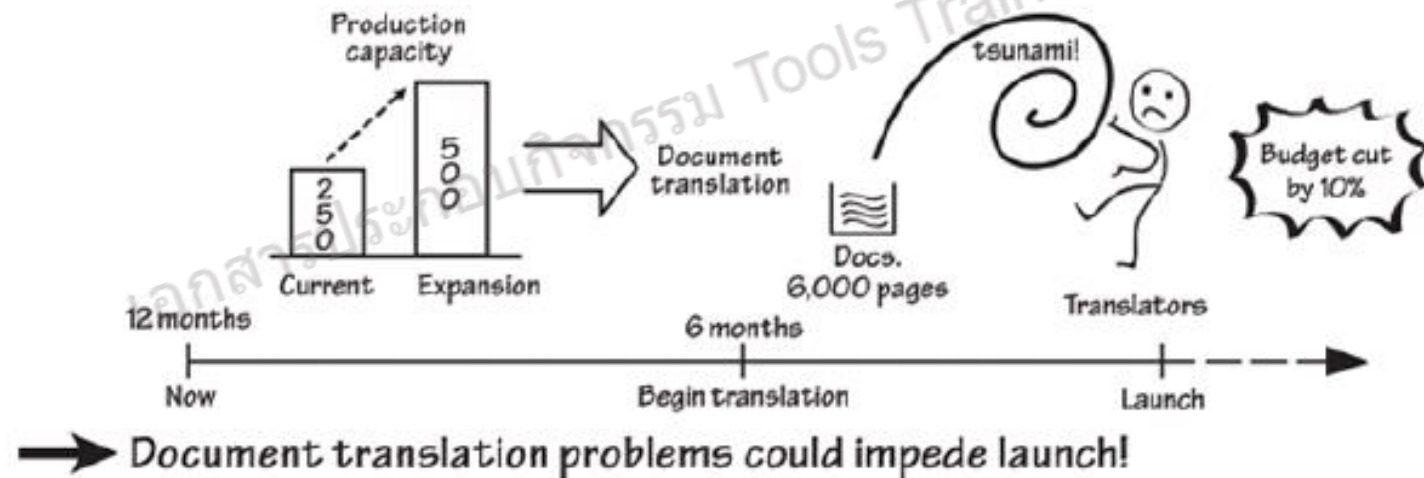Put contract up for bid again if performance goals are not met.

Support Launch Objectives with Accurate, Timely Document Translation

One way to describe the A3 is as "standardized storytelling," which refers to the ability of A3s to communicate both facts and meaning in a commonly understood format. Like any narrative tale, an A3 tells a complete story, with a beginning, a middle and an end, which can be traced from the upper left-hand side to the lower right side. Because readers are familiar with the format, they can focus easily on the matter contained. It becomes the basis for reaching a shared understanding.

I. Background

Acme plant to double capacity. <u>Much document translation required</u>

- <u>Poor English translations</u> of Japanese documents caused many <u>problems</u> at original plant startup.
- Expansion plans call for aggressive launch timeline and cost reduction.

Document translation problems could impede launch!
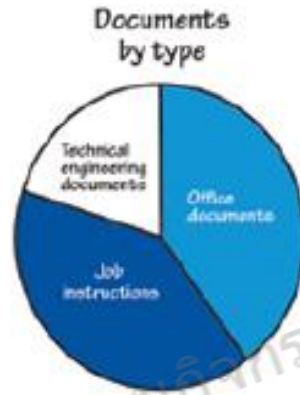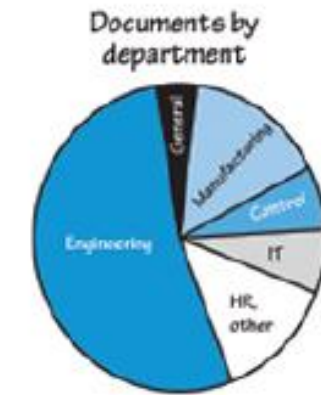
II. Current Conditions

Despite the specific categories used in this A3, there's no one fixed, absolute, correct template. Regardless of the setting or use, it's always the underlying thinking that matters. Every A3 is no more than a visual manifestation of a problem-solving thought process involving continual dialogue between the owner of an issue and others in an organization.

Current conditions are always based on facts derived from the *gemba* — the place where the work takes place. Real facts about the real work are derived from careful investigation on the part of the author.

II. Current Conditions

Documents by department

Documents by type

Current-state map

Problems:
Cost = 10% over budget
Delivery = Over 50% late; long, variable lead times
Quality = Much rework > 50%; many errors reach customer
Overall = 😞

Lead time = 5 to 60 days

A3s employ visual methods to share information and thinking. This helps condense key facts into meaningful visual shorthand — storytelling tools that help pack a great deal of data into an elegant presentation.

III. Goals/Targets

Defining the

Defining the problem simply and powerfully represents the most important part of any A3. Effective A3s persuade others by capturing the right story with facts (not abstractions) and communicating the meaning effectively.

III. Goals/Targets

Quality	- 0 defects at launch - Rework less than 10%

Delivery	- 100% on-time
	    Level weekly volume (heijunka)
	    Consistent short lead time with predictable delivery

Cost	- 10% decrease — Rework down; overtime down

IV. Analysis

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IV. Analysis

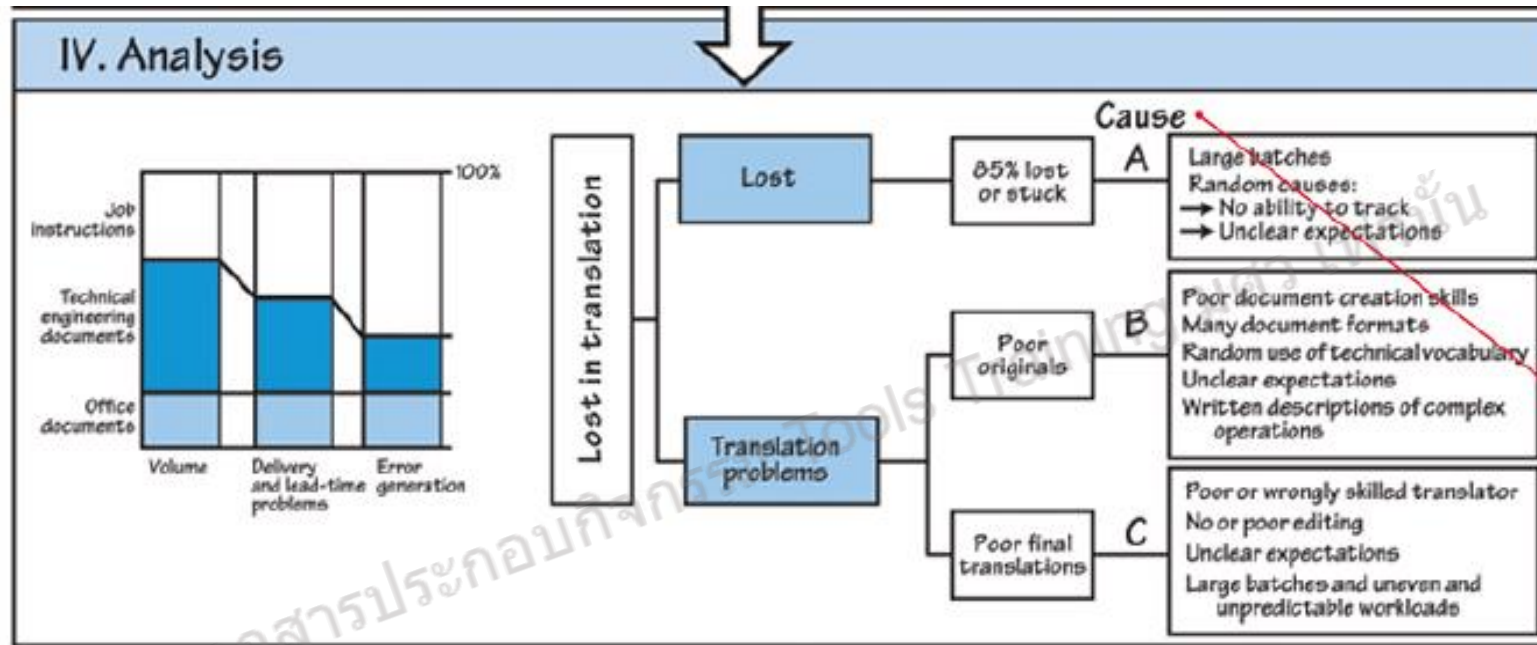|	Cause	
Lost → 85% lost or stuck	A	Large batches Random causes: → No ability to track → Unclear expectations
Translation problems → Poor originals	B	Poor document creation skills Many document formats Random use of technical vocabulary Unclear expectations Written descriptions of complex operations
Translation problems → Poor final translations	C	Poor or wrongly skilled translator No or poor editing Unclear expectations Large batches and uneven and unpredictable workloads

Bar chart labeled "Lost in translation" with axes: Job instructions, Technical engineering documents, Office documents (0–100%) versus Volume, Delivery and lead-time problems, Error generation.

A problem is something that presents itself as a barrier to the organization achieving its goal. Articulating this problem requires the author to identify the gap between current state and the desired performance at any given time. The root cause or reason the gap exists is identified through examining the way the work is currently being performed and asking why the problem occurs. If the root cause is clearly defined, effective countermeasures can more easily be developed.

A3 proposals typically use the word "countermeasure" rather than "solution." Countermeasure refers to the way that proposed actions are directly addressed to existing conditions. More importantly, the wording recognizes that even apparent "solutions" inevitably create new pr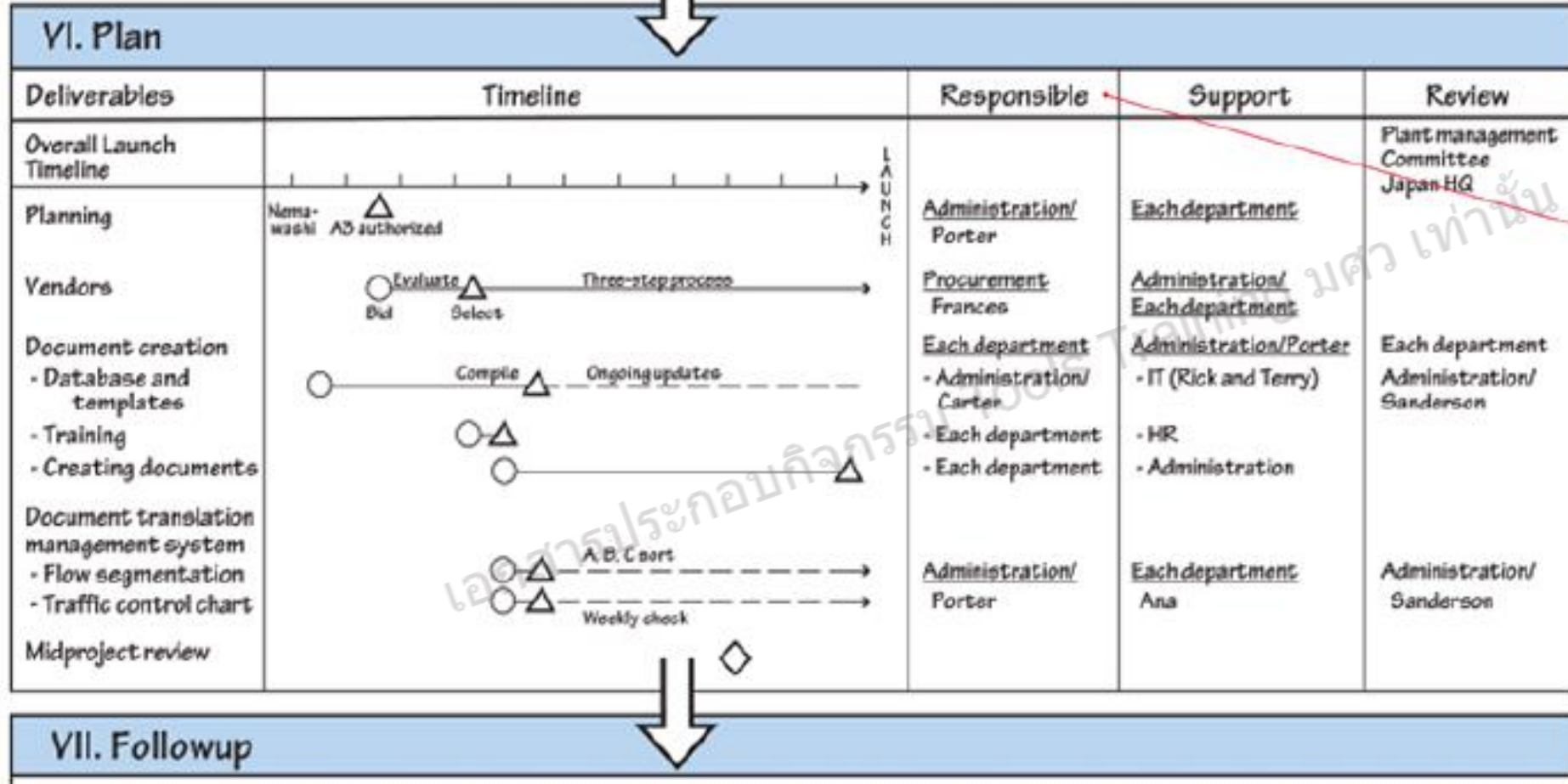oblems. Once a countermeasure is in place, it will create a new situation, with its own set of problems that will require their own countermeasures.

All A3s include the initials or names of the author and manager. The value of the A3 process to the manager cannot be overemphasized. The manager now has a tool to mentor and establish alignment. The individual now has the means to propose answers to problems that he/she owns, to create authorization to act and to manufacture the authorization needed to see the proposal carried out.

| | | | | KS 8/8/08 | DP 8/7/08 |

V. Proposed Countermeasures

Cause	Countermeasure	Description	Benefit	Responsible/support
A	Central document-flow tracking process	Overall process ownership established Document flow and timing management - Timing control chart; weekly check - Segmentation by document type	Delivery Quality Cost	Porter - Each department - Vendors
B	Standard vocabulary database and templates	Standard terms for processes, equipment tools, work flow across job sites Create standard templates and include photos and videos Gathered from each department, input into database for use by internal document creators and translators	Quality	Administration IT Each department
C	Standard vendor three-step process	Step ① Translation by topic specialist Step ② Rewrite by native English speaker Step ③ Check by highly skilled bilingual	Quality Delivery	Administration - Each vendor - Procurement

The A3s process explores a set of potential countermeasures rather than just one solution. By examining a range of potential choices, individuals uncover a broader and more meaningful basis for dialogue, analysis and agreement.

Note that effective countermeasures can be produced only by speaking with everyone who touches the work. And so producing a viable plan requires meaningful input from everyone.

Target-state map

Acme Administration
IT
Mfg.
Engineering
ABC sort
Weekly process check
Daily
Vendor specific
V_1 V_2 V_3
Vendors
1-2 days
$T_1 - T_{10}$
Translators
1-5 days
Lead time 1-2 weeks
Questions / Clarifications

Timing and workload schedule
Original startup actual
39 weeks out
Expansion proposal
32 weeks out
Volume
Launch

VI. Plan

VI. Plan

Deliverables	Timeline	Responsible	Support	Review
Overall Launch Timeline				Plant management Committee Japan HQ
Planning	Nema-washi △ A3 authorized	Administration/ Porter	Each department	
Vendors	○ Evaluate △ Three-step process Bid Select	Procurement Frances	Administration/ Each department	
Document creation - Database and templates - Training - Creating documents	○ Compile △ Ongoing updates ○△ ○ △	Each department - Administration/ Carter - Each department - Each department	Administration/Porter - IT (Rick and Terry) - HR - Administration	Each department Administration/ Sanderson
Document translation management system - Flow segmentation - Traffic control chart	△ A.B.C sort ○△ Weekly check	Administration/ Porter	Each department Ana	Administration/ Sanderson
Midproject review	◇			

VII. Followup

Producing a realistic plan through the A3 process shifts the basis of decision making from formal authority to ownership of the problem itself. By developing a mastery of the issue at hand and involving the players in the process, the A3 author earns the authority to propose and move forward an effective plan.

VII. Followup

Midterm review	Ensure ongoing collaboration
Prelaunch review	Monitor system weekly. All metrics, especially quality and delivery

Every action plan includes a schedule for *hansei*, or reflection, to identify problems, develop new countermeasures and communicate improvements to the rest of the organization. A3s are part of a learning cycle of continuous improvement — which is why a key Toyota saying is, "No problem is a problem."

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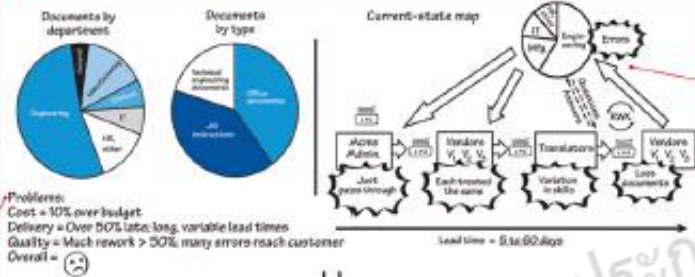
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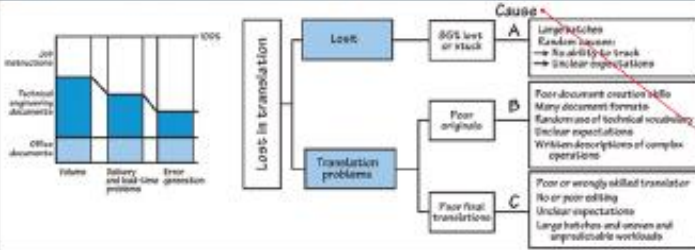
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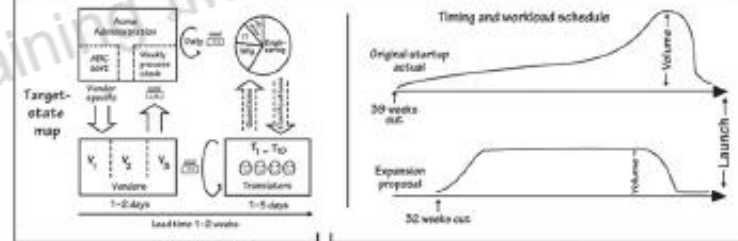Cost — - 10% decrease — Rework down; overtime down

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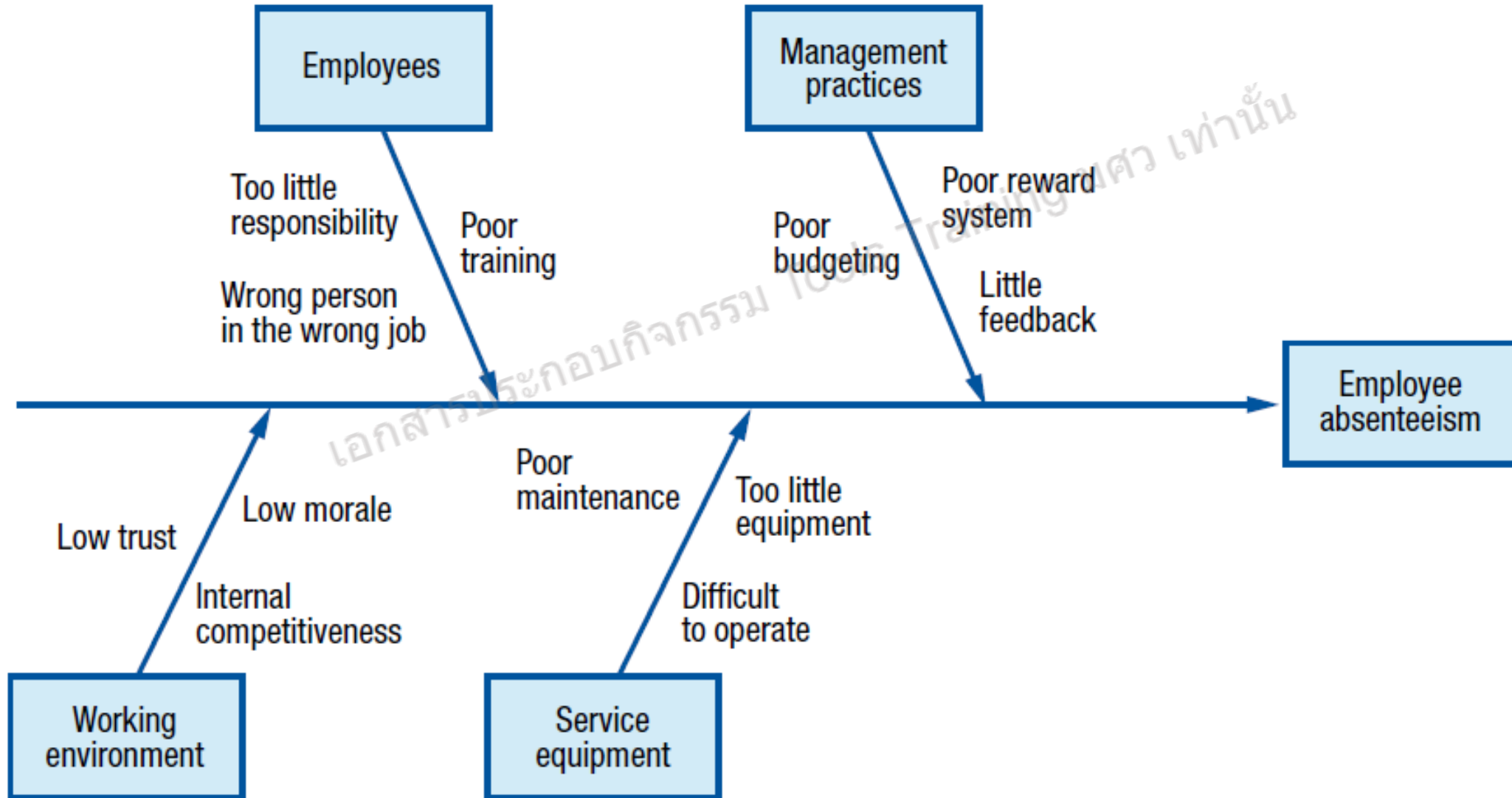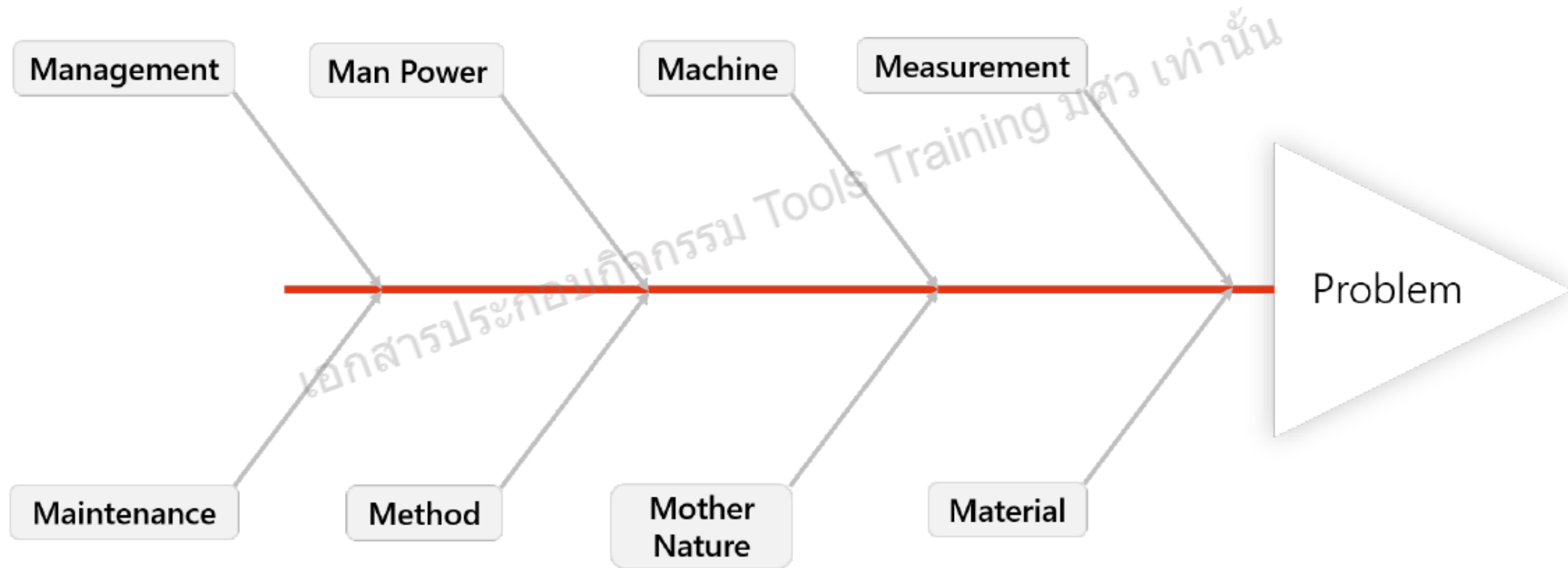Prelaunch review — Monitor system weekly. All metrics, especially quality and delivery

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Fishbone Diagram Example

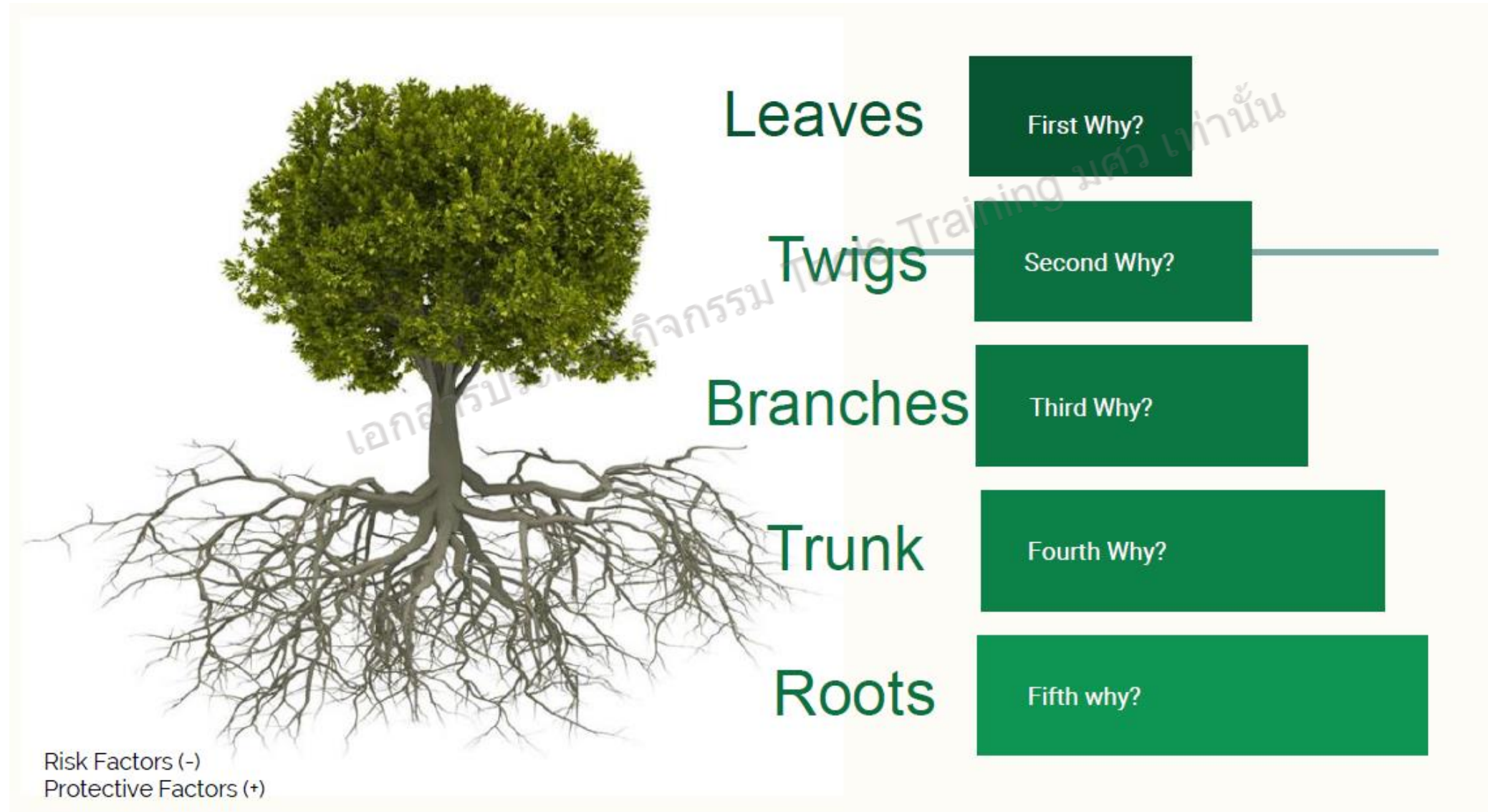# Fishbone Diagram – 8P of Product Marketing

- Product (or service)
- Price
- Place
- Promotion
- People (personnel)
- Process
- Physical evidence
- Performance

Fishbone Diagram - 4S of Service Industries

- Surroundings
- Suppliers
- Systems
- Skill

5 Whys and Tree Analogy

Root Causes Have Root Causes

It's not a matter of asking 5 Whys
You must keep asking until you reach the end of the chain or action and condition

5 Whys Example

Dissatisfied web site customers

Why?   Lacking functionality

    Why?   Poor customer communication

        Why?   Too much time pressure

            Why?   Too many projects

Fix the root cause, not the symptoms

Priority in Correcting the Root Causes

Priority = Easiness x
          Important x
          Urgency

Is & Is Not Analysis

5W 2H

Question	Example IS Question	Example IS NOT Question	Example Answer
Who?	Who is affected by the problem?	Who is not affected by the problem?	Customer A has a problem with the product. Customers B and C do not have a problem even though they receive the same product.
What?	What products are involved in the problem?	What products could also be involved in the problem but are not?	Product 123 is rusting prior to customer assembly. Products 234 and 345 use the same process, but they are not rusting.
Why?	Why is this a problem? Is the process where the problem occurred stable?	Why is it not a problem?	The surface rust is a problem since it affects the salability of the final product.
Where?	Where was the problem observed?	Where could the problem be observed but is not?	Product 123 is rusting at the base. The main body and top of the product are not rusting. The only customer site that is experiencing this problem is in Georgia.

5W 2H

Question	Example IS Question	Example IS NOT Question	Example Answer
When?	When was the problem first noticed?	When could the problem have been noticed but was not?	The problem was first noticed in March. We've been sending product 123 to Customer A since November with no reported problems.
How Much/ Many?	Quantity of problem? How much is the problem causing in dollars, people, and time?	How many could have had the problem but weren't? How big could the problem be but is not?	An average of 20-30% of the total units sent to the customer were reported as defective due to rusting. All other units showed no traces of rust.
How Often?	What is the trend (continuous, random, cyclical)? Has the problem occurred previously?	What could the trend be but is not?	The problem has consistently occurred since March. The level of rejects rose to 40% during the first week of April and dropped to 5% during the second week of May.