Causal Analysis & Resolution (CAR) at Level 1

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SEI Authorized
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The mission of Cooliemon, LLC is:

"helping organizations achieve excellence through process improvement"

Our goal is to focus your process improvement efforts to:

- improve quality and productivity
- reduce operating costs

  (i.e., reduce rework, waste and duplicate effort)
- capture the market with high quality products and services
- help you become the industry standard by which your competitors measure themselves

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Causal Analysis and Resolution

Purpose:

To identify causes of defects and other problems and take action to prevent them from occurring in the future. *— CMMI V1.1*

SG 1: Determine Causes of Defects

Root causes of defects and other problems are systematically determined.

SG 2: Address Causes of Defects

Root causes of defects and other problems are systematically addressed to prevent their future occurrence.

SG = Specific Goal

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Objectives

Describe how CAR can be used to build Senior Management commitment for Quality.

Overview of Juran's Quality Improvement Process - a practical example of the CAR a CMMI® Process Area (PA).

When to use Quality Tools *(e.g., Pareto, Cause & Effect diagrams, Brainstorming, etc.)*

Answer any of your questions.

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Agenda

Proof of the Need

Selecting a Strategy, Problem & PAT

Determine Causes of Defects

Address Causes of Defects

Holding The Gains

Summary

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Proof of the Need

The cost of poor quality (COPQ):

- **"COPQ is the sum of all costs that would disappear if there were no quality problems."** *- Juran*

- **"You can easily spend 15 - 20% of your sales dollars on the COPQ."** *- Crosby*

- **"In most companies the costs of poor quality runs at 20 - 40%."** *- Juran*

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List Potential Problems

Compile a list of improvement opportunities.
Example sources:

- **Accounting data on COPQ**
- **Benchmarking reports**
- **External customer complaints**
- **Internal customer complaints**
- **Process improvement suggestions**
- **Surveys**
- **Simply talk to people**
- **etc.**

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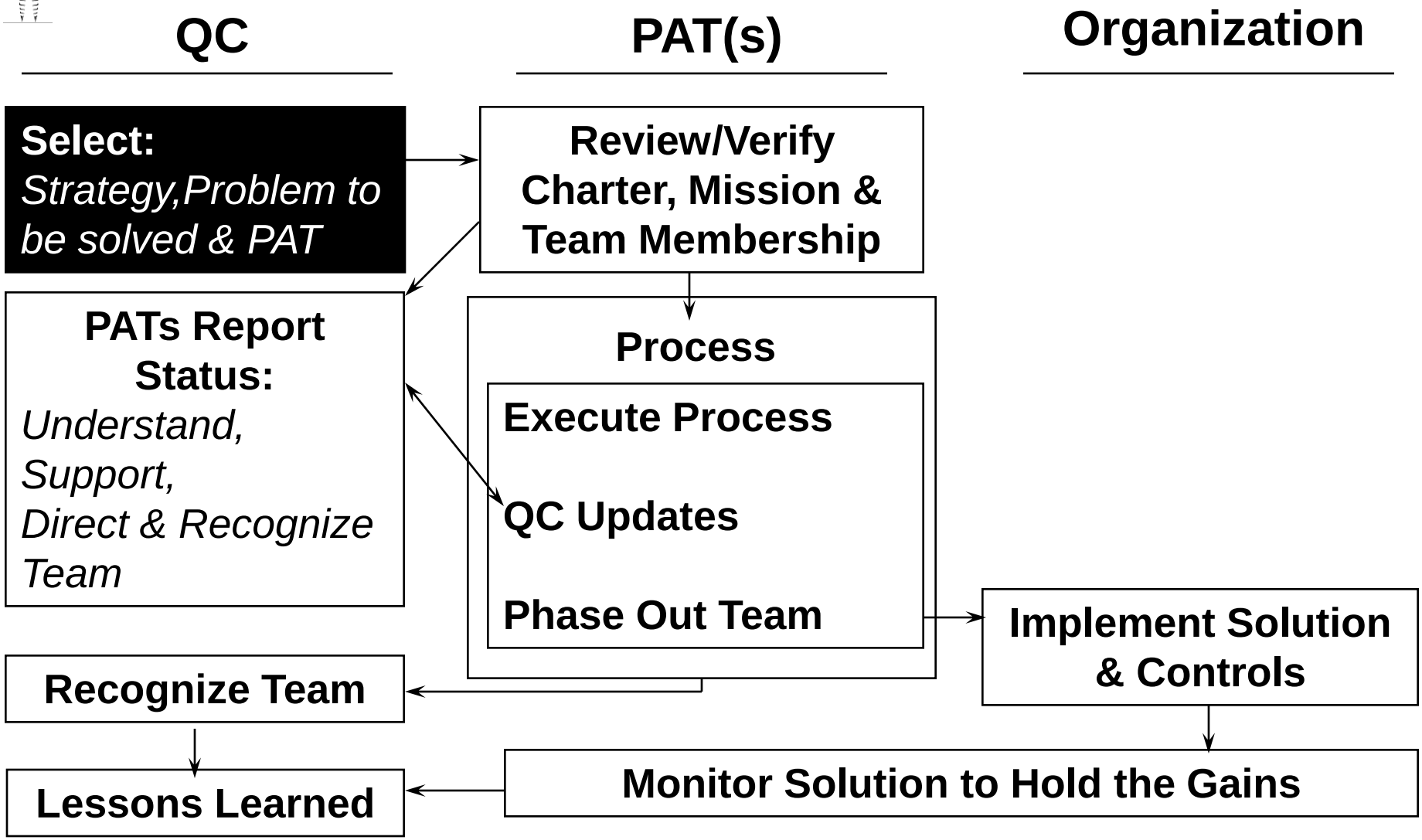
CAR Roadmap



- Adapted from Juran, "Leadership for Quality", 1989

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Juran's Quality Improvement Process

Discover Root Causes *(Diagnostic Journey):*

1. **analyze the symptoms**
2. **formulate theories**
3. **test theories**
4. **identify root causes**

Develop Solutions & Controls *(Remedial Journey):*

5. **consider alternative solutions**
6. **design solutions and controls**
7. **address resistance to change**
8. **implement solutions and controls**

Holding the gains

9. **design effective quality controls**
10. **audit the controls**

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Selecting a Problem to Solve

Selection Criteria to be considered:

- **Chronic** *(a continuing problem)*
- **Vital Few** *(significant impact on company)*
- **Size** *(manageable problem <12 months)*
- **Measurable** *(impact must be measured)*
- **Urgency** *(how urgent is the problem to the organization?)*
- **Risk** *(what are the risks?)*
- **Resistance to Change** *(how high is resistance to change?)*

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Example: Selection Criteria

	PROBLEM	A	B	C
CRITERIA	**SCALE**			
Strategic Goal Points = 25	5 = Most Supportive 1 = Least Supportive			
Return on Investment (ROI) Points = 20	5 = Most Significant 1 = Least Significant			
Frequency of Occurrence Points = 15	5 = Most Chronic 1 = Least Chronic			
Urgency Points = 15	5 = Most Urgent 1 = Least Urgent			
Measure of Potential Impact Points = 8	5 = Most Impact 1 = Least Impact			
Risk Management Points = 7	5 = Least Risk 1 = Most Risk			
Size Points = 5	5 = Most Manageable 1 = Least Manageable			
Change Management Points = 5	5 = Least Resistance 1 = Most Resistance			

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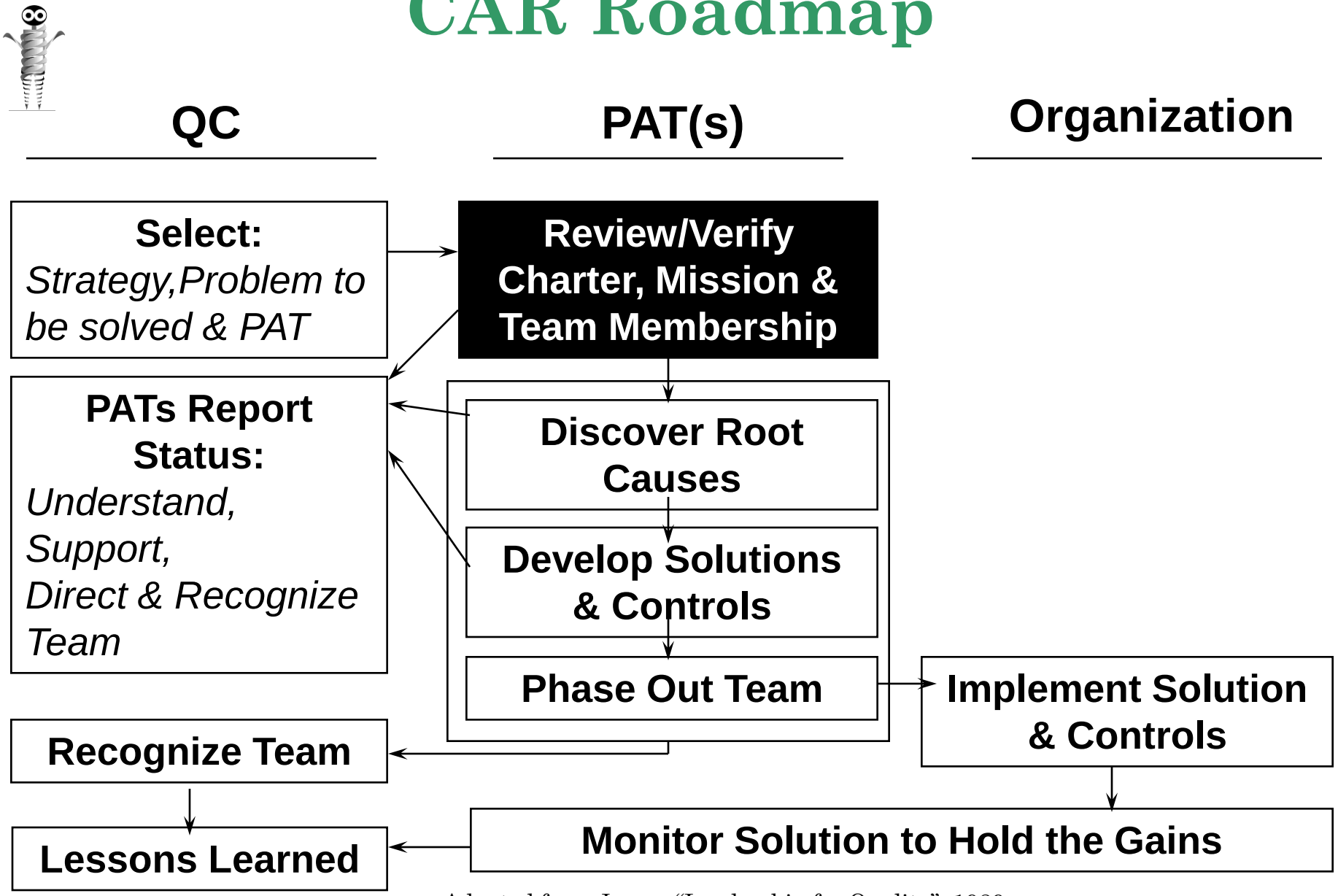
CAR Roadmap



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Team Charters

Charters can include the following information:

- **name of team**
- **mission statement and desired results**
- **activities and functions**
- **deliverables**
- **authorization (QC - signatures)**
- **team members**
- **estimated return on investment**
- **start date and end date**
- **team ground-rules**

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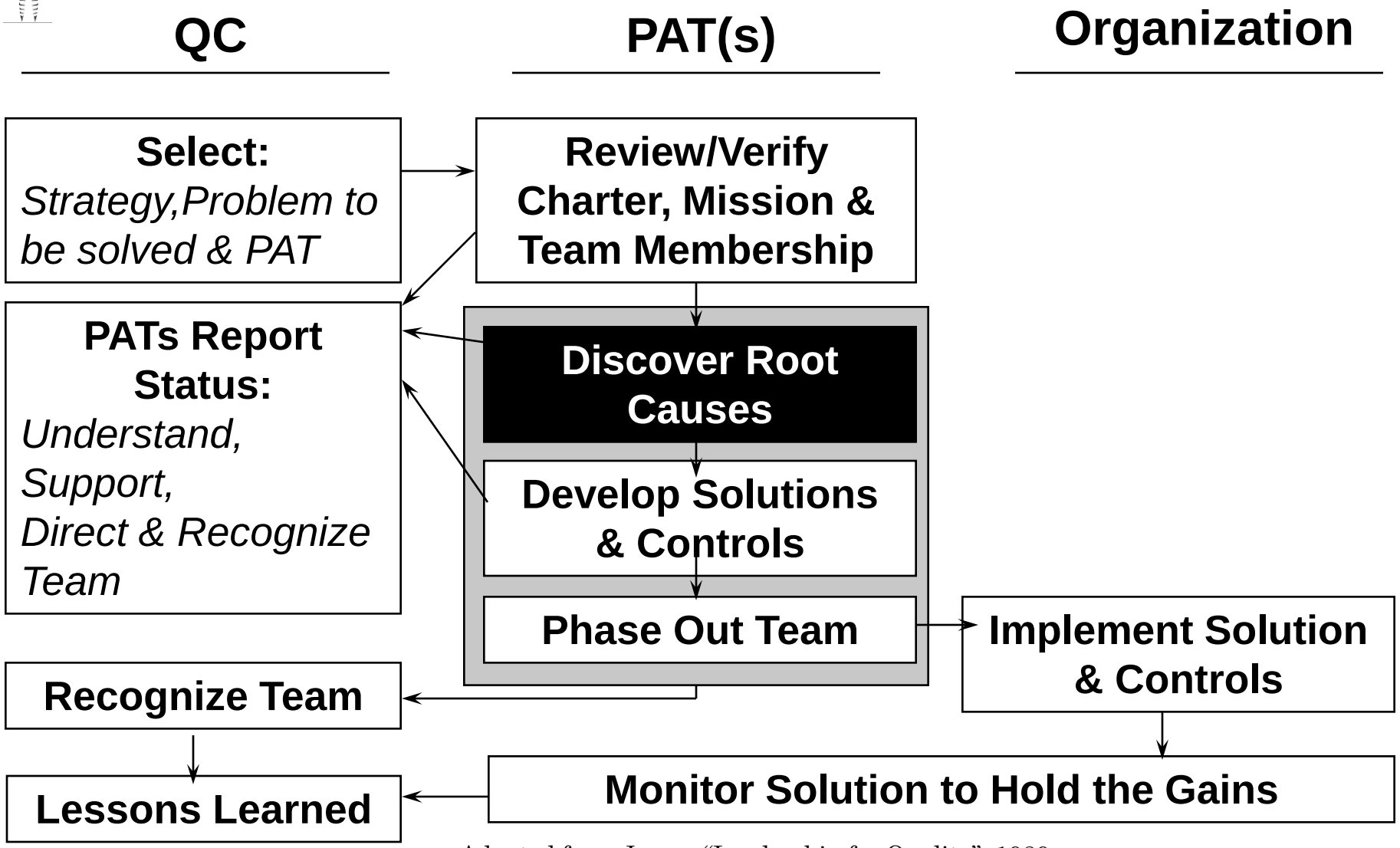

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Holding the gains:

9. design effective quality controls
10. audit the controls

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Discover Root Causes - 1

Definitions:

Symptom: *A symptom is the outward observable evidence of a problem.* — *Juran Institute, Inc.*

Root Cause: *A root cause is the source of the problem, which, when removed, will sharply reduce or eliminate the deficiency.* — *Juran Institute, Inc.*

A root cause is an antecedent source of a defect such that if it is removed, the defect is decreased or removed itself. — *CMMI V1.02*

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Discover Root Causes - 2

1. Analyze the Symptoms: *understand fully the nature and extent of the problem to be solved.*

Tools: Flow Diagram, Data Collection, Pareto Analysis

2. Formulate Theories: *a PAT should speculate about the cause of the problem versus jumping to a solution.*

Tools: Brainstorming, Cause-Effect

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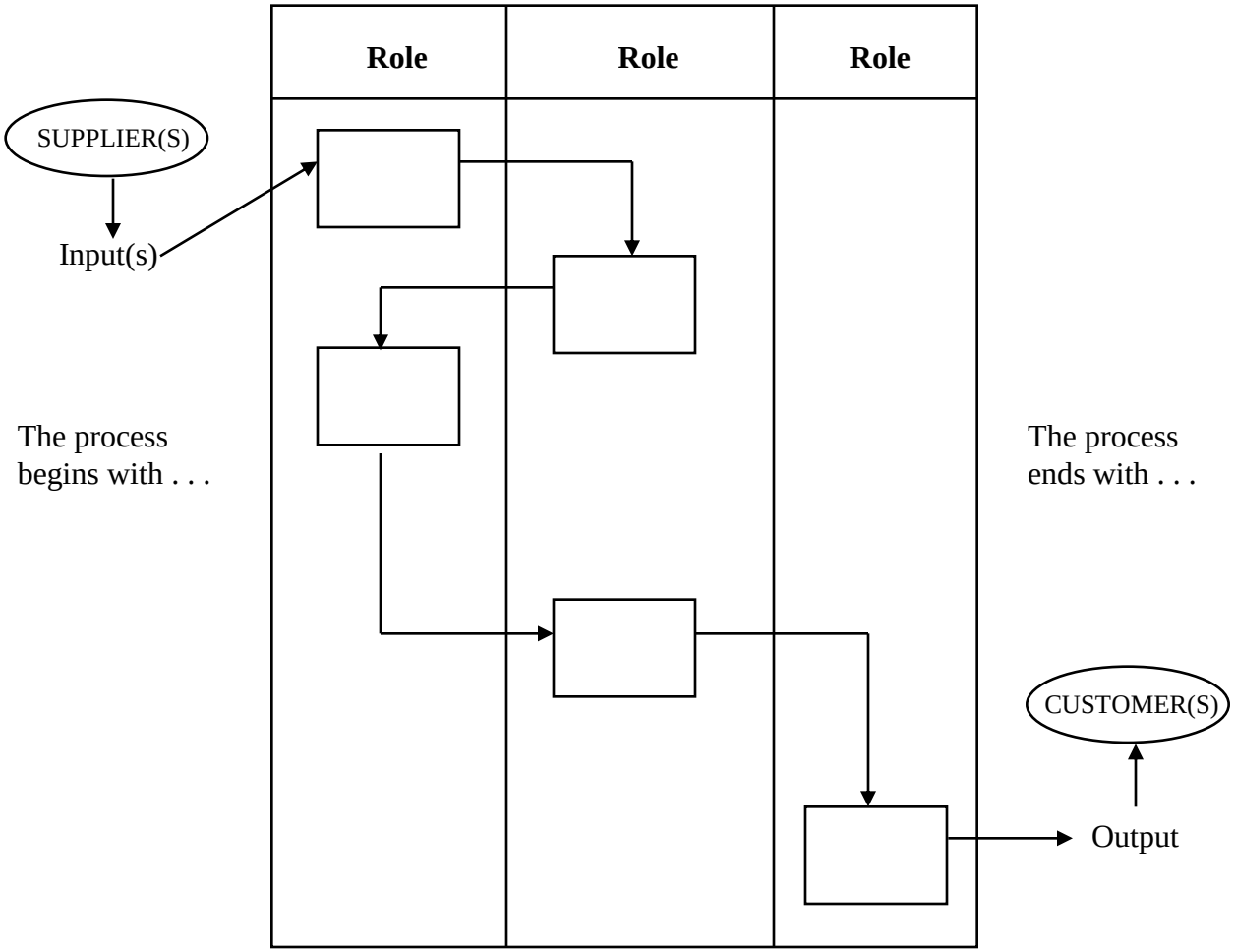
Example: Flow/Block Diagram

Purpose:



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Discover Root Causes - 3

3. Test Theories: *Before accepting any theory as true, a PAT should systematically test it with data.*

Tools: Data Collection, Graph/Charts, Histogram, Pareto Analysis, Scatter Diagram, Stratification

4. Identify Root Cause(s): *Does the data help determine the root cause of the problem?*

Tools: Data Collection, Graph/Charts, Histogram, Pareto Analysis, Scatter Diagram, Stratification

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Example: Data Collection

1. Formulate good questions
2. Consider appropriate data analysis tool
3. Define data collection points
4. Select unbiased collector
5. Understand data collectors & their environment
6. Design data collection forms
7. Document instructions
8. Pilot/test forms and instructions
9. Train data collectors
10. Audit the collection process & validate results

• Adapted from Juran Institute, Inc.

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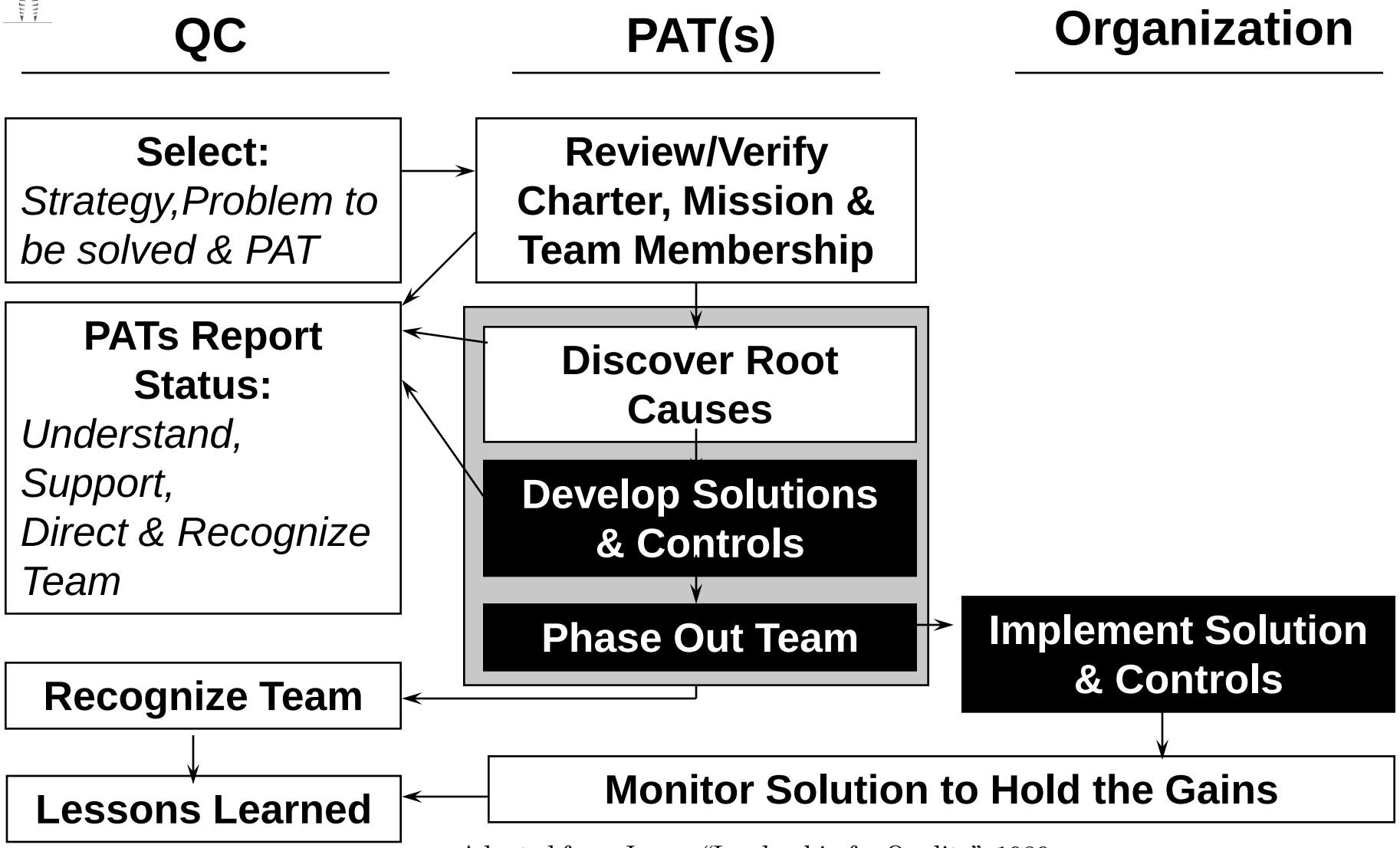

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Develop Solutions & Controls - 1

5. Consider Alternative Solutions: *identify possible remedies and evaluate each alternative solution in terms of impact on the problem.*

Tools: Brainstorming, Data Collection, Selection Matrix

6. Design Solutions & Controls: *design the remedy which will entail documentation of the solution (e.g., process, procedures, standards) and controls.*

Tools: Control Spreadsheet, Control Chart

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Example: Control Spreadsheet

Control Variable	How Measured	Where Measured	Standard	Who Analyzes	Who Acts	What is done

- Juran Institute

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Develop Solutions & Controls - 2

7. Address Resistance to Change: *identify likely sources of resistance (barriers) and support (aids). Identify counter measures to the vital few barriers.*

Tools: Barriers/Aids, Brainstorming

8. Implement Solutions & Controls: *implementing a change includes: developing a plan - involving relevant stakeholders, training and explaining "why" the change.*

Tools: Planning Matrix, Tree Diagram

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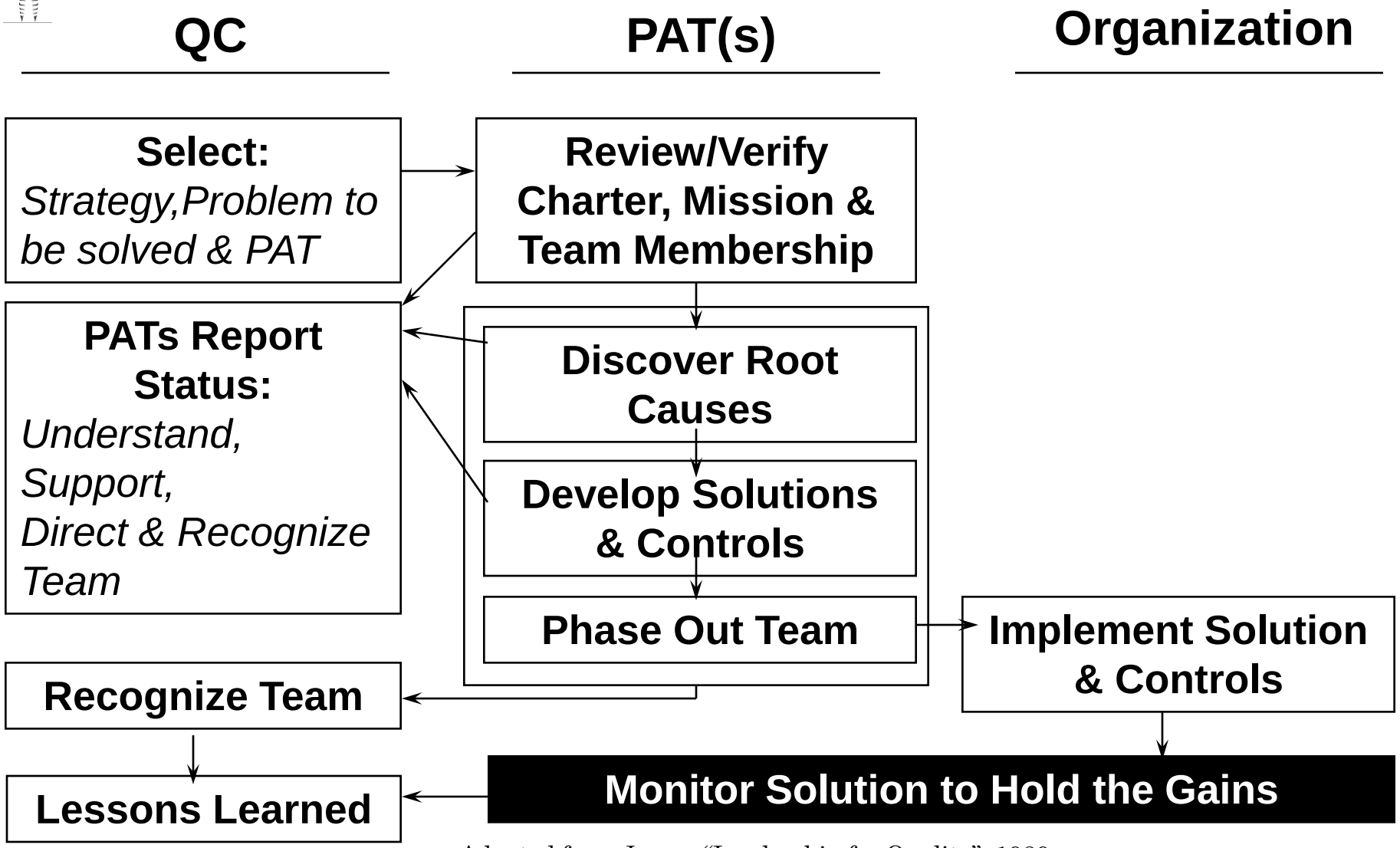

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Holding the Gains

<u>9. Design Effective Quality Controls:</u> *determine how actual performance will be compared to the standard (i.e., record data) in order to evaluate the effect of the change.*

<u>Tools</u>: Control Chart, Control Spreadsheet, Flow Diagram

<u>10. Audit The Controls:</u> *develop systems for reporting results.*

<u>Tools</u>: Control Chart, Control Spreadsheet, Data Collection, Graphs/Charts, Pareto, Stop Light Charts

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Summary

The Language of Senior Management is $money$ - CAR can be used to "grab" management's attention.

A practical example of CAR Process Area is the Jurans Quality Improvement Process:

- ***Discover Root Causes*** *(CAR SG 1)*
- ***Develop Solution & Controls*** *(CAR SG 2)*
- ***Holding the Gains*** *(CAR SG 2)*

Look for "low hanging fruit" for the first few problems to solve.

Know when to use the appropriate tool in the Quality Improvement journey.

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Questions?

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One to Grow On

"The competitor to be feared is one who never bothers about you at all, but goes on making his own business better all the time."

(Henry Ford, Sr.)

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