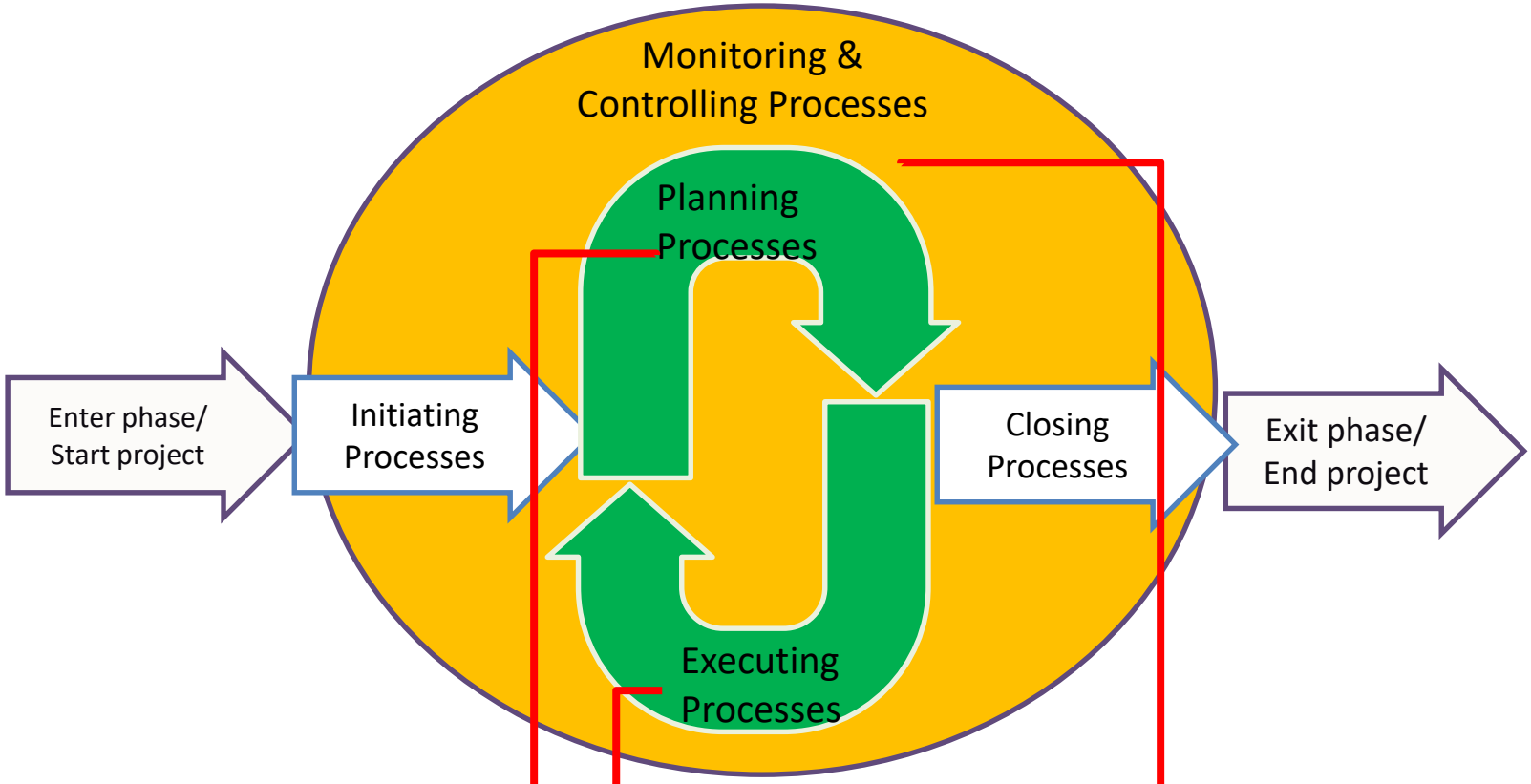
#8 Project Quality

PMBOK 5 Ed. – DEI-



Knowledge Area	Process				
	Initiating	Planning	Executing	Monitoring & Contol	Closing
Quality		Quality Planning	Perform Quality - Assurance	Perform Quality - Control	

Project Quality Management

- **Quality is degree to which the project fulfills requirements**

Project Quality Management

Creating and following **policies and procedures** to ensure that a project **meet the defined needs** (from the customer's perspective)

Quality vs. Grade

- **Quality**: the degree to which a set of inherent **characteristics fulfill requirements**
- **Grade**: a category assigned to product or service having **the same functional use but different technical characteristics**

Quality Concepts

Gold Plating

Giving the customer extras →not recommended

Quality Concepts

Just In Time

just when they are needed or just before they are needed.

It forces attention on quality practices.

Quality Concepts

Customer Satisfaction

Match the desired expectation, give value added and economical value as well

Quality Concepts

TQM → Total Quality Management

Company & their employees **focus on finding ways to continuous improve the quality** of their business practices & products

Project Quality Management

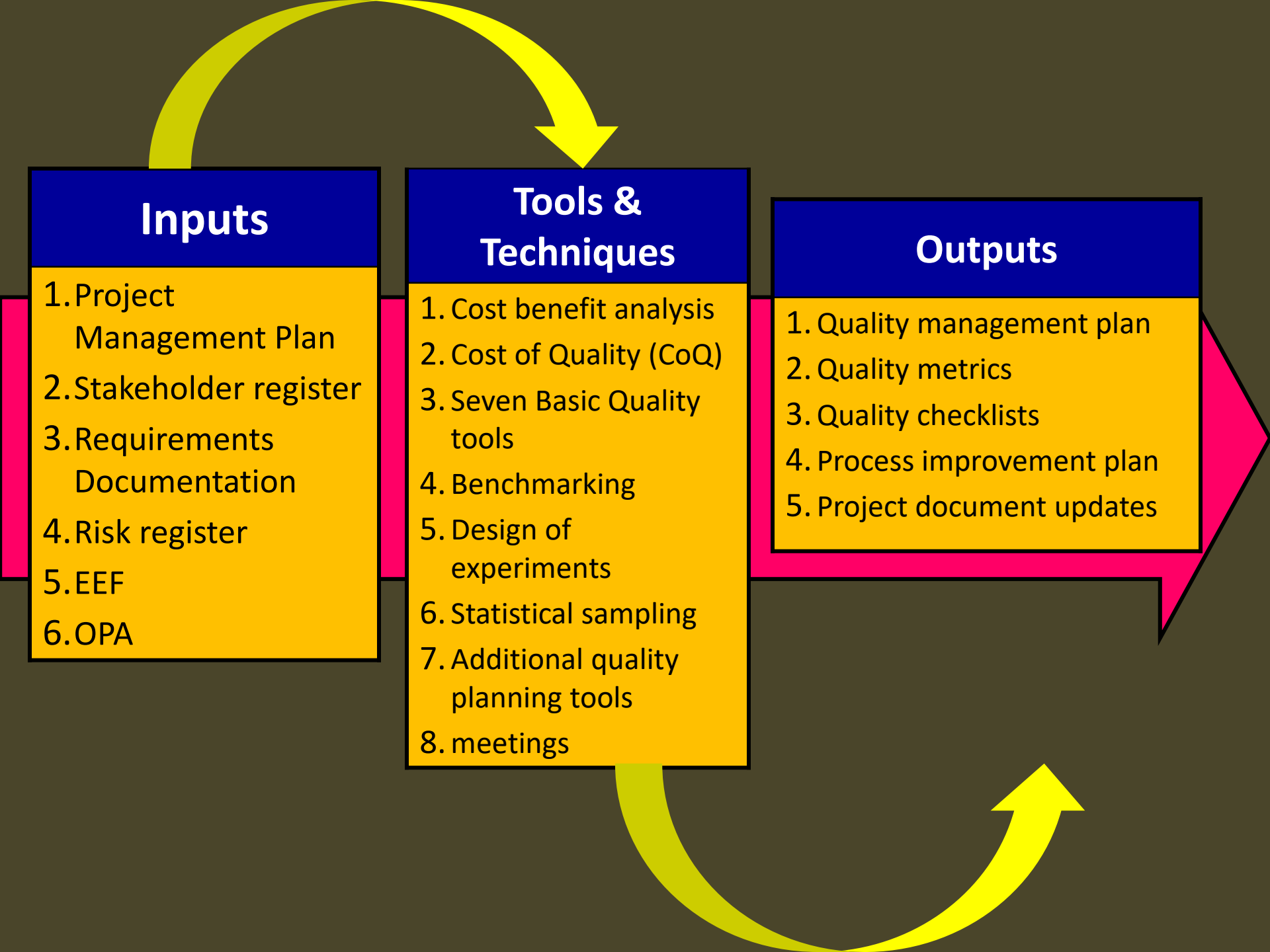
Plan Quality

Quality Assurance

Quality Control

Plan Quality

- **Identifying requirement and/or standards**
- **documenting** how the project will demonstrate compliance.
  - *What is quality? How will we ensure it?*


Inputs
1. Project Management Plan
2. Stakeholder register
3. Requirements Documentation
4. Risk register
5. EEF
6. OPA
Tools & Techniques
1. Cost benefit analysis
2. Cost of Quality (CoQ)
3. Seven Basic Quality tools
4. Benchmarking
5. Design of experiments
6. Statistical sampling
7. Additional quality planning tools
8. meetings
Outputs
1. Quality management plan
2. Quality metrics
3. Quality checklists
4. Process improvement plan
5. Project document updates

Cost benefit analysis

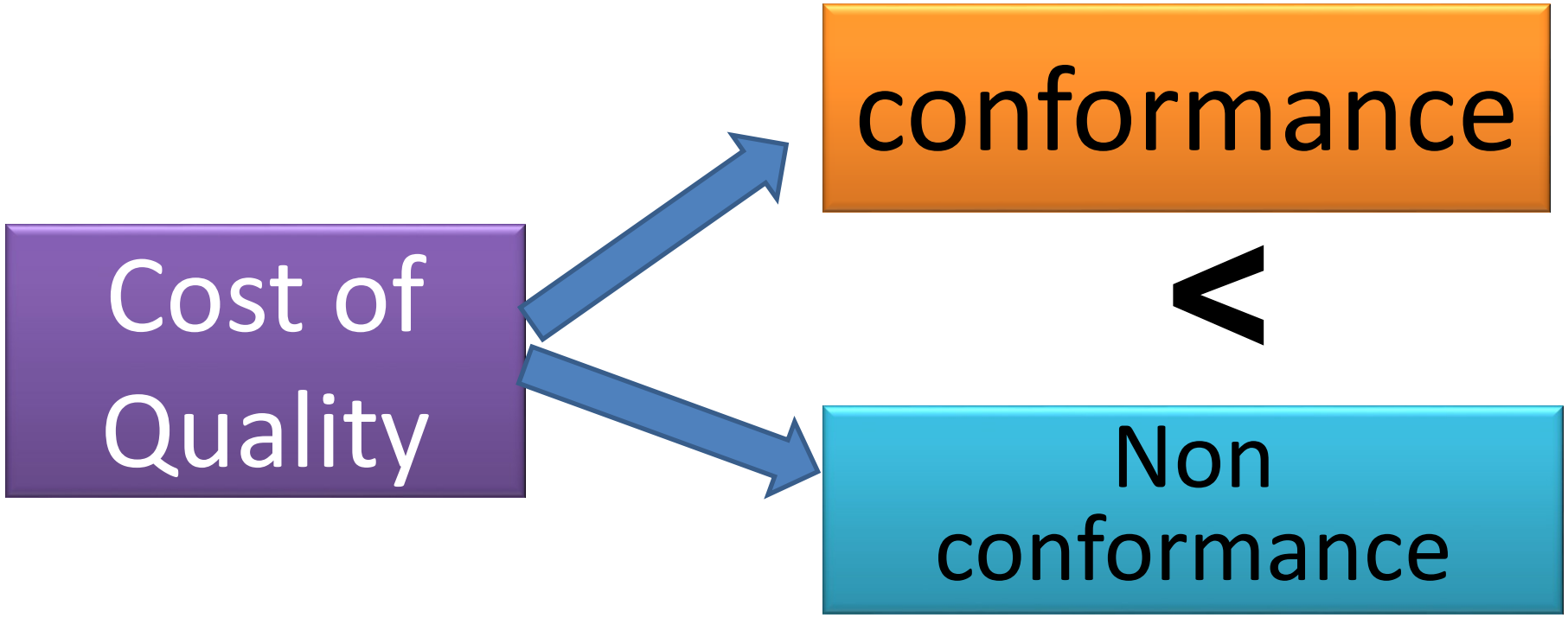
"Weight the **benefits versus the cost** of meeting quality requirements"

Design of Experiments (DOE)

- Use **experimentation to statistically** determine what variable will improve quality
- Systematically **changing all of the important factors**, rather than changing the factors one at a time”

Statistical Sampling

"We need it since studying entire **population would take too long, too much cost**, be too destructive"


conformance
Cost of Quality
<
Non conformance

Conformance

Money spent during the project to avoid failure. Prevention cost & Appraisal cost

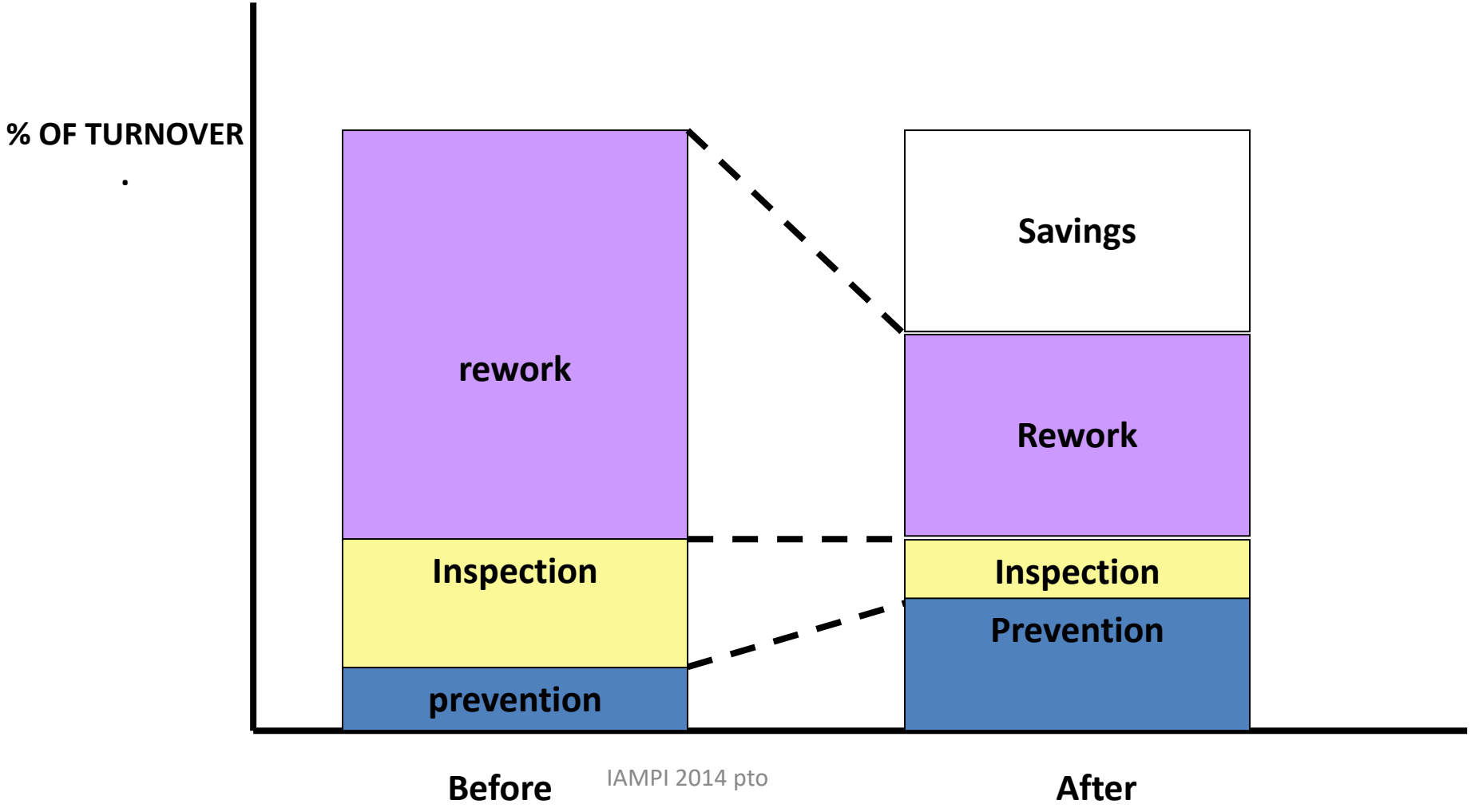
Non-Conformance

Money spent during and after the project because of failure. internal cost & external cost

Cost of Quality

Cost of Conformance	Cost of Nonconformance
Quality training	Rework/Repair
Quality audit	Scrap
Studies, Surveys	Inventory cost
Effort to ensure everyone knows the process to use to complete their work	Warranty cost
Quality staff	Lost business

Cost of Quality Before and After Quality Initiative :



Quality tools

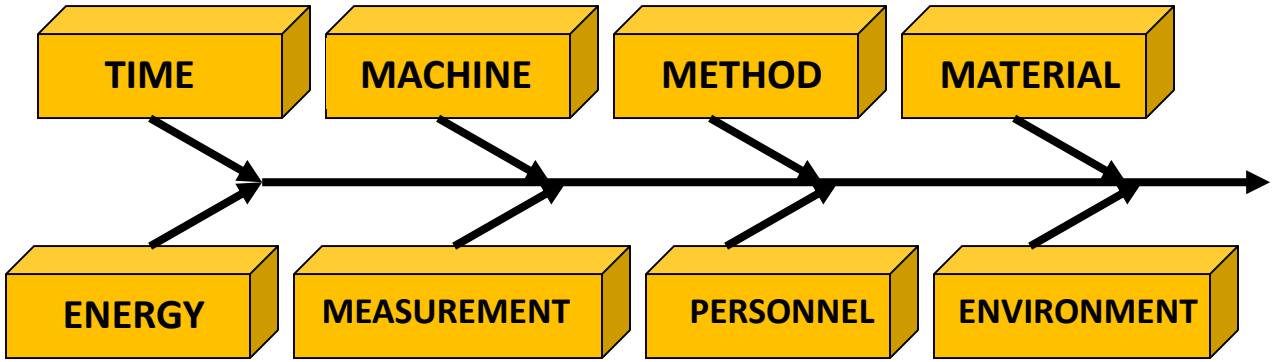
- Ishikawa
- checksheet
- Scatter
- Histogram
- Pareto
- Flow chart
- Run chart

Ishikawa

Cause and Effect (Ishikawa) Diagram:

(Cause and Effect analysis)

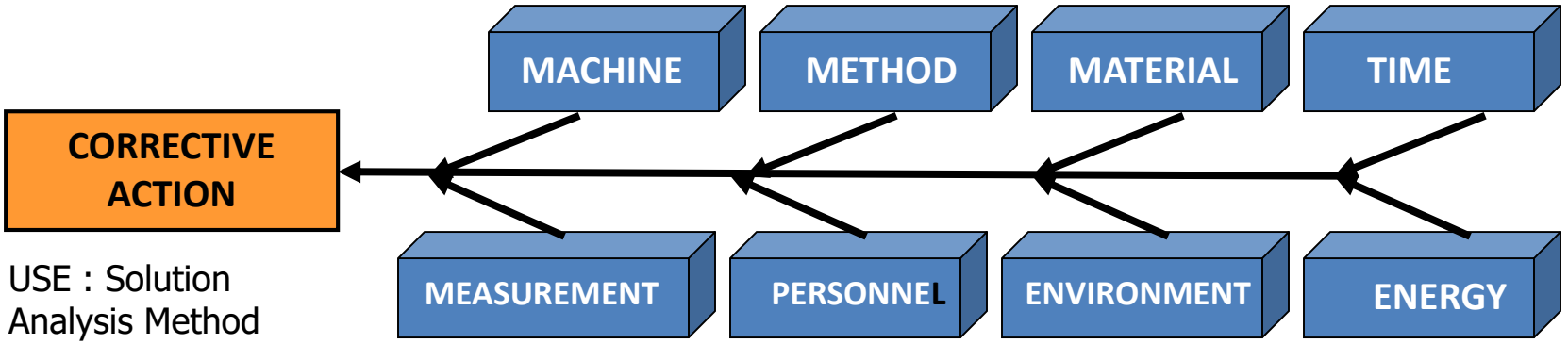
USE :
Random Method
Systematic Method
Process Analysis Method



POTENTIAL CAUSE

EFFECT

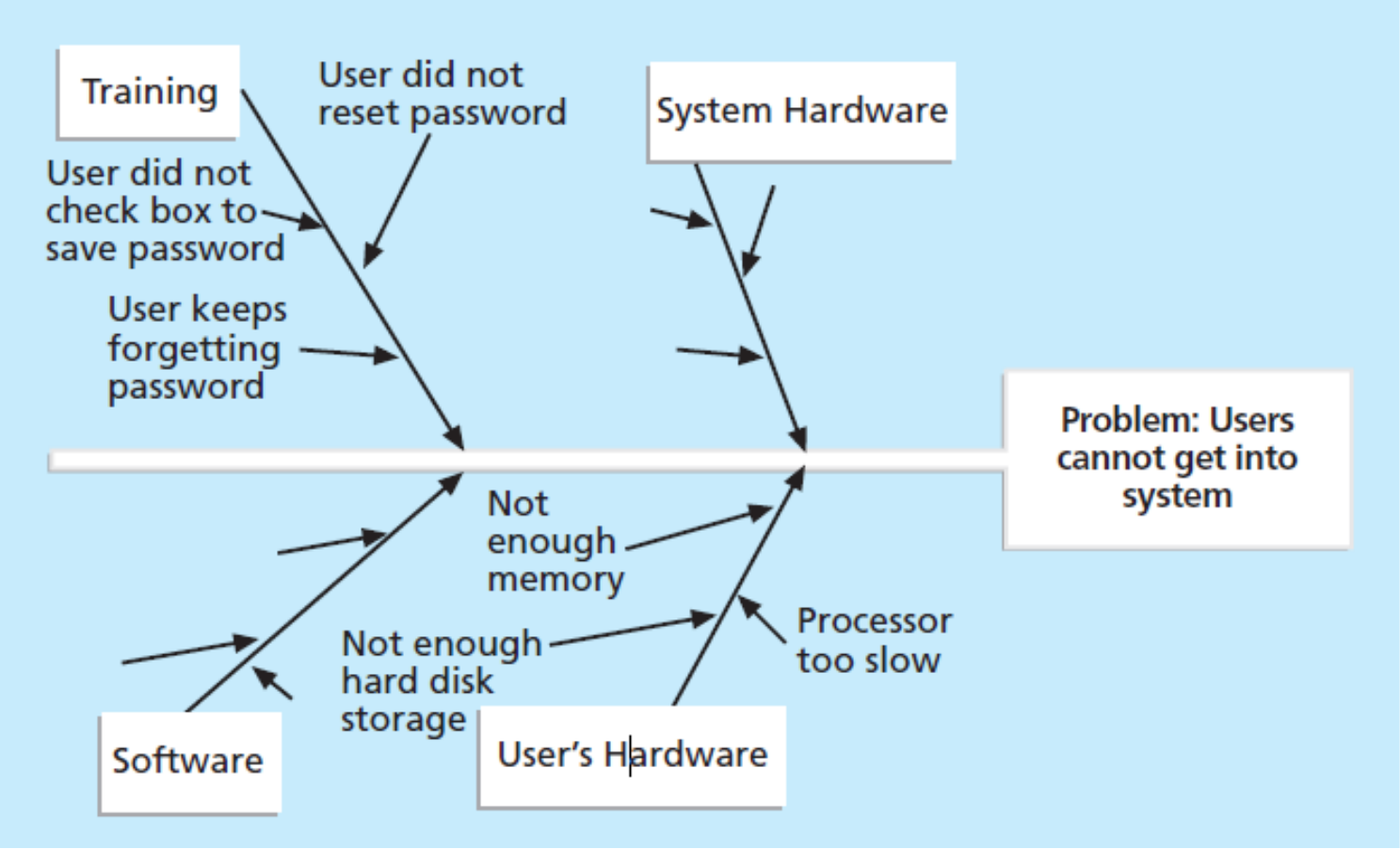
Always ask : Who? What? Where? When? Why? How?



USE : Solution Analysis Method

Ishikawa exmple

- Ihikawa/Fishbone chart/ cause effect diagram/ 5 whys,



Checksheet

- **Checksheet** → collect and analyze data.

System Complaints

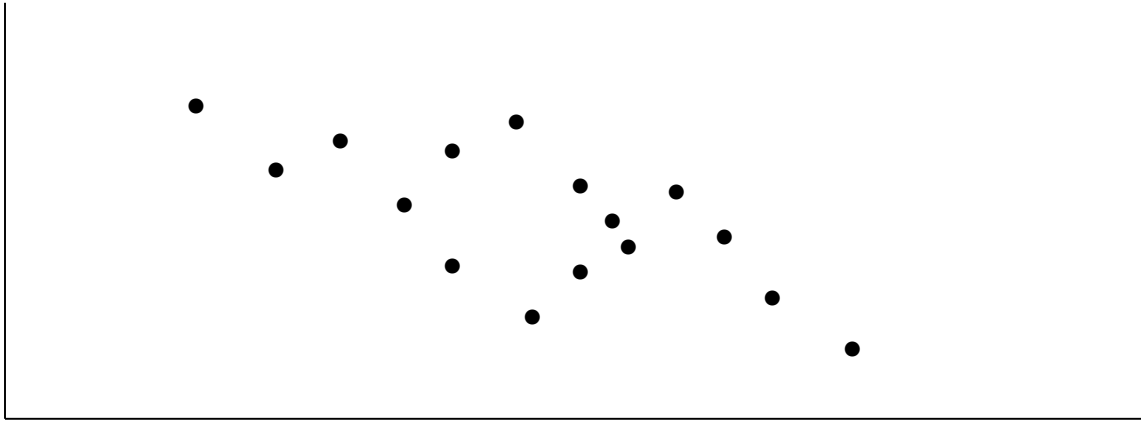
Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Email	𝍸	𝍸	𝍸	𝍸	𝍸		𝍸	12
Text	𝍸 𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	29
Phone call	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸		8
Total	11	10	8	6	7	3	4	49

Scatter Diagram

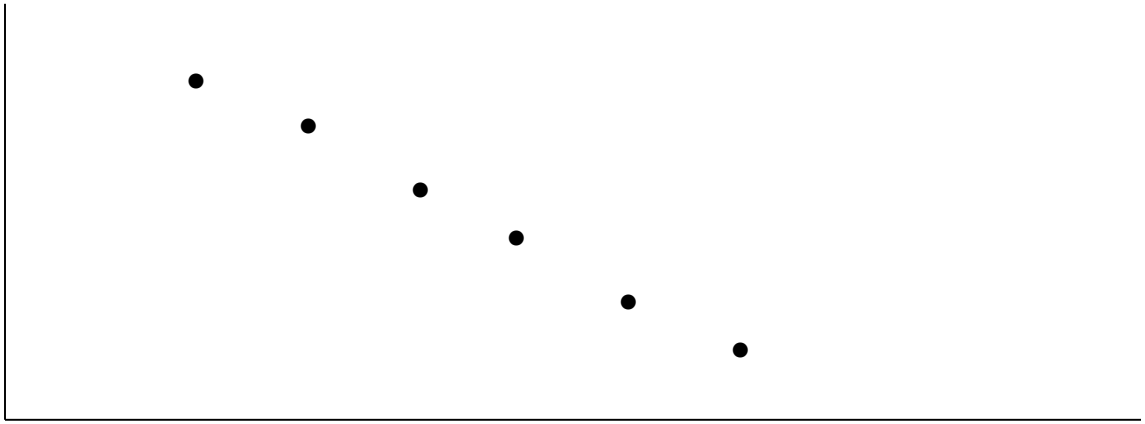
Scatter diagram/Regression Analyis→

•if there is a relationship between two variables, diagonal line

Scatter Diagram



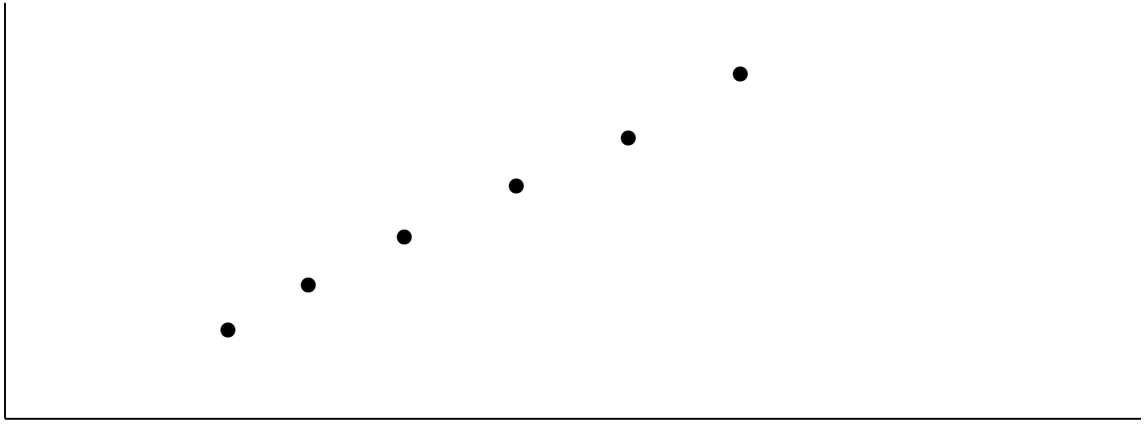
SCATTER DIAGRAM (Low to Moderate Negative)



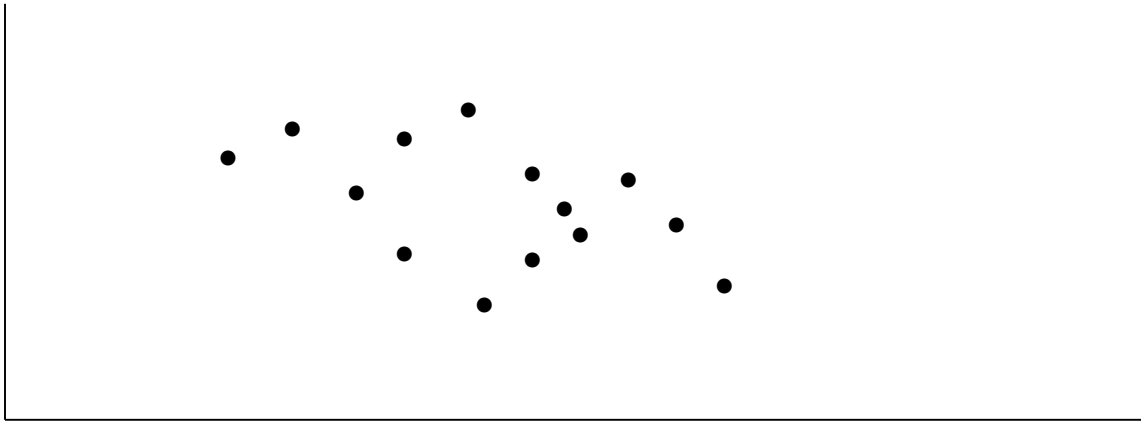
SCATTER DIAGRAM (Highly Negative)

Scatter Diagram

Scatter Diagram :



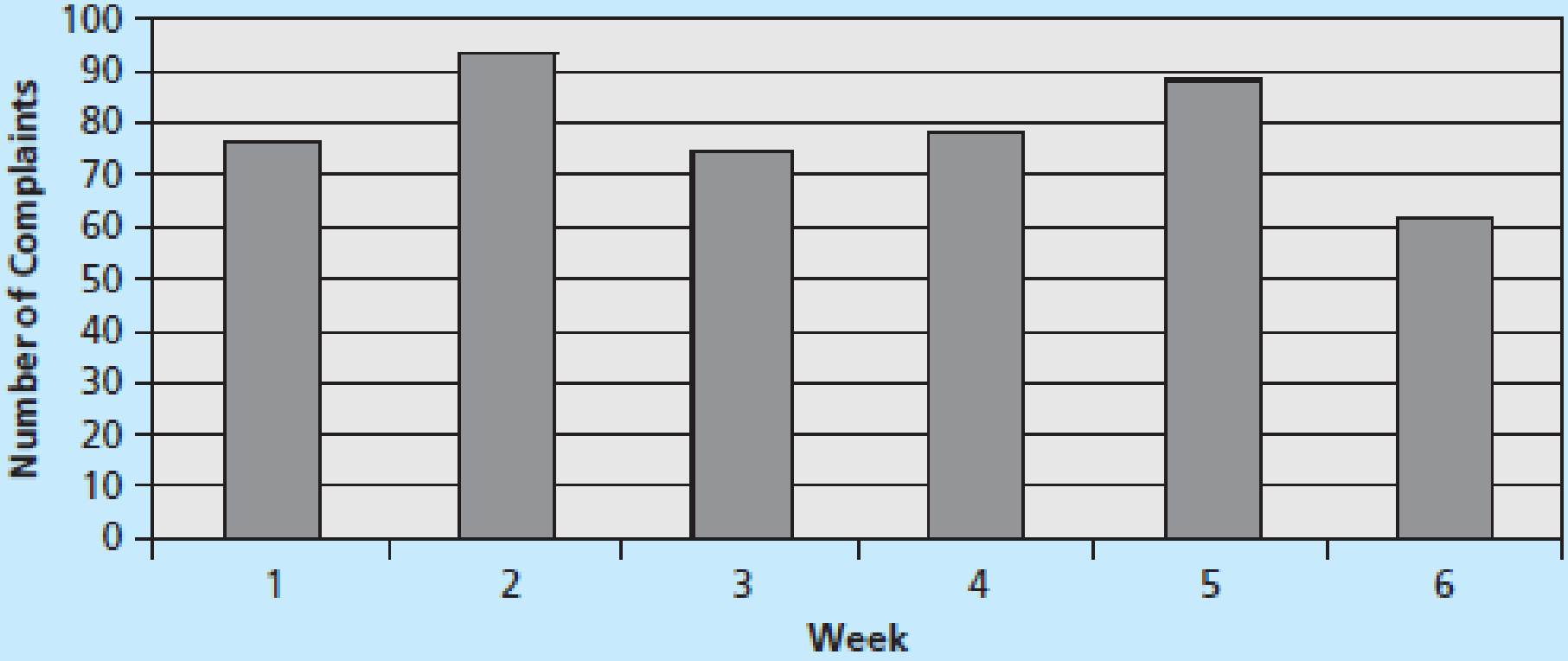
SCATTER DIAGRAM (Highly positive)



SCATTER DIAGRAM (Zero Correlation)

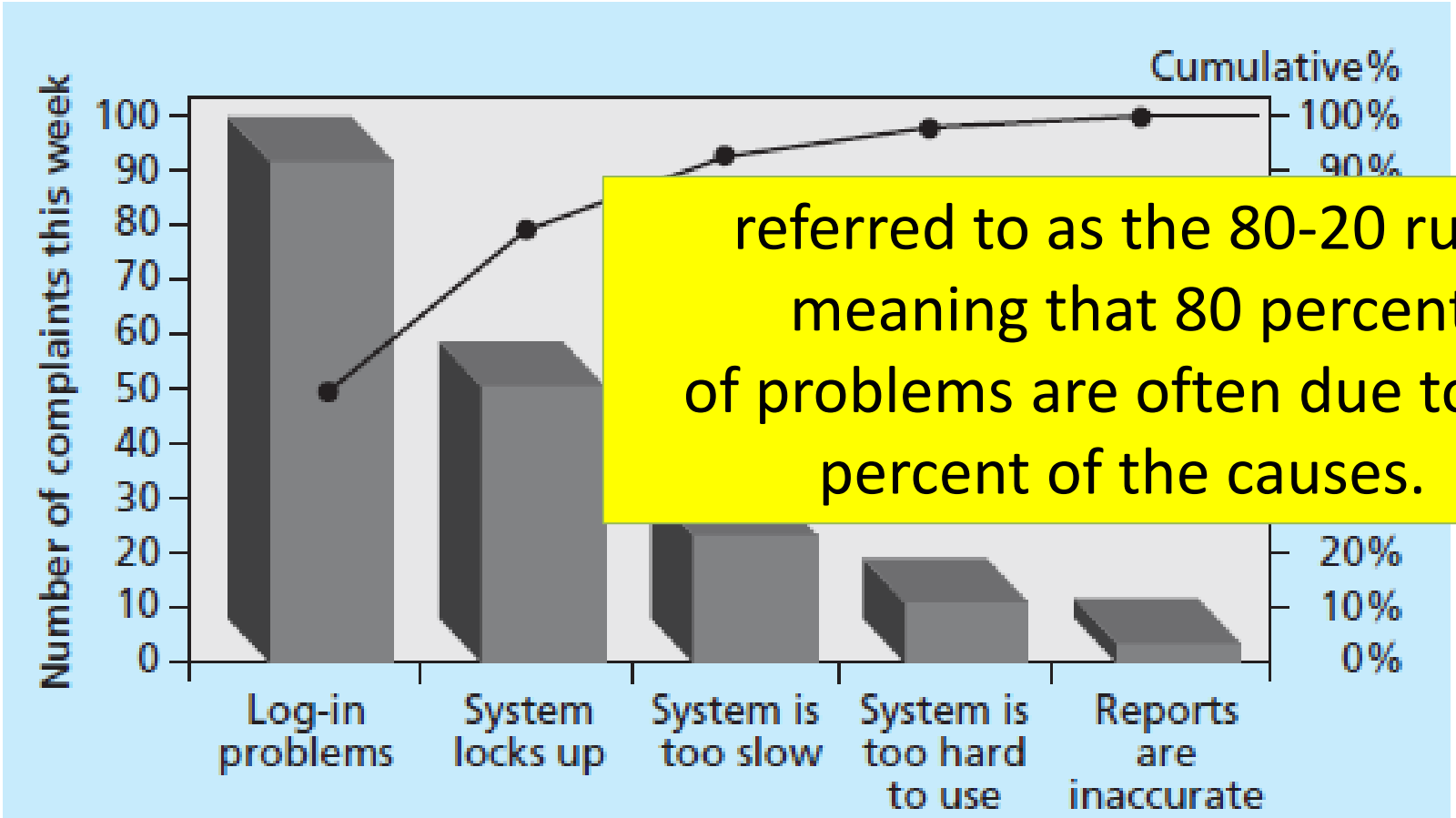
Histogram

- **Histogram→** a bar graph of a distribution of variables.



Pareto

Pareto→ a histogram that can help you identify and prioritize problem areas. 80/20



referred to as the 80-20 rule meaning that 80 percent of problems are often due to 20 percent of the causes.

Pareto example

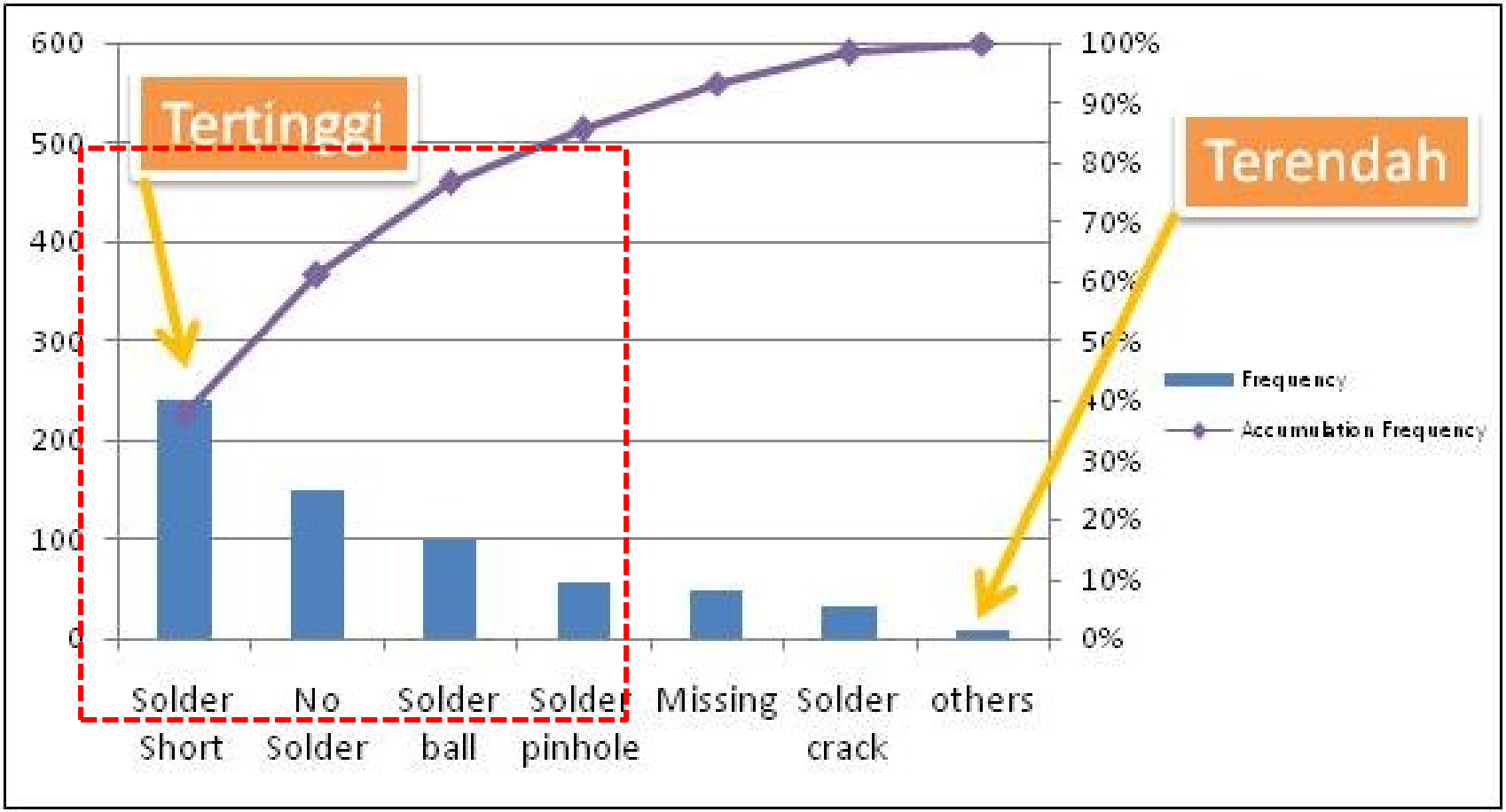
Monthly Line Rejection (Sept 2012)

Reject Item	Frequency	Percentage from Total
Solder Short	222	33%
No Solder	198	30%
Missing	49	7%
Solder crack	33	5%
Solder pinhole	57	9%
Solder ball	99	15%
others	10	1%
Total	668	100%

Monthly Line Rejection (Sept 2012)

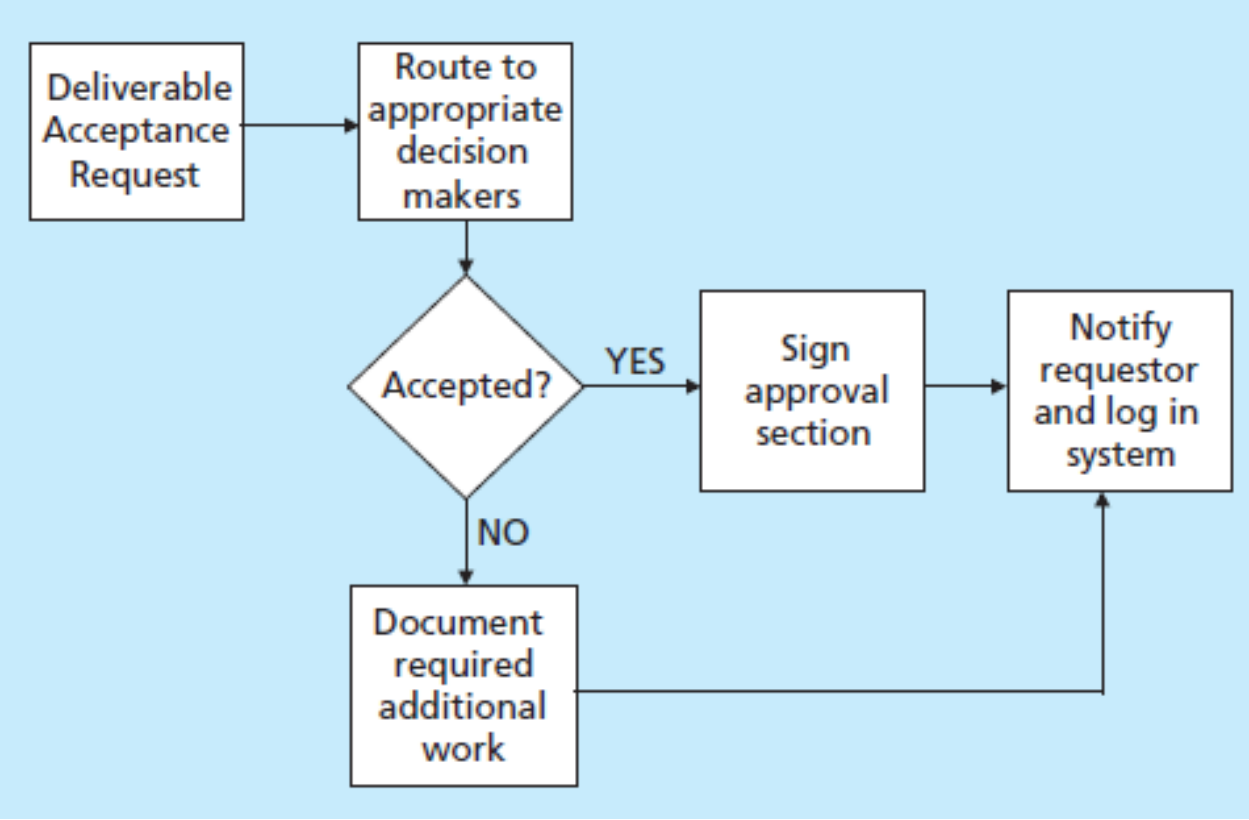
Reject Item	Frequency	Accumulation Frequency	Percentage from Total	Accumulation Frequency
Solder Short	222	222	33%	33%
No Solder	198	420	30%	63%
Solder ball	99	519	15%	78%
Solder pinhole	57	576	9%	86%
Missing	49	625	7%	94%
Solder crack	33	658	5%	99%
others	10	668	1%	100%
Total	668		100%	

Pareto example



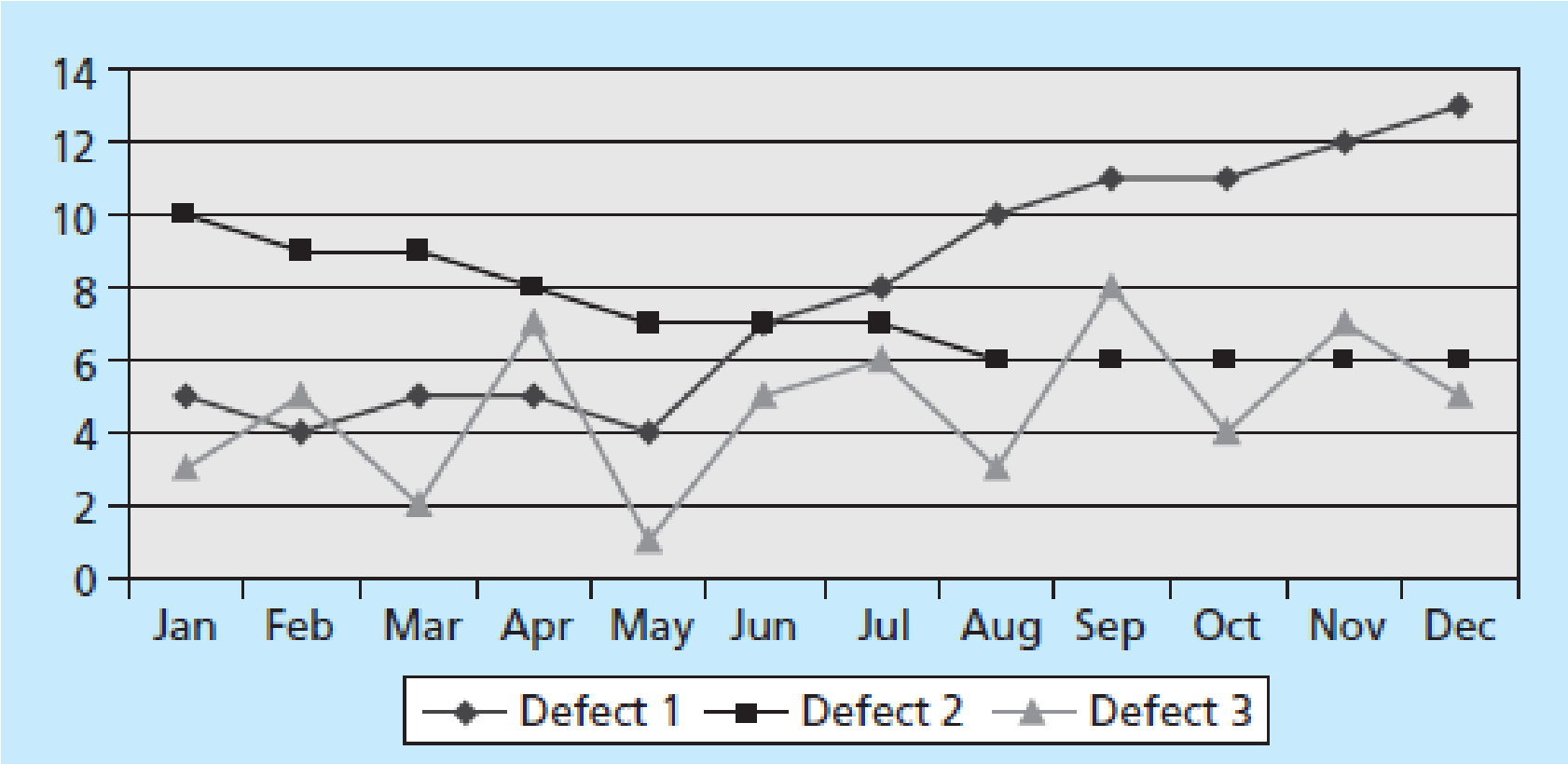
Flow chart

- **Flowcharting→** analyze how **problems occur** and how processes can be improved.

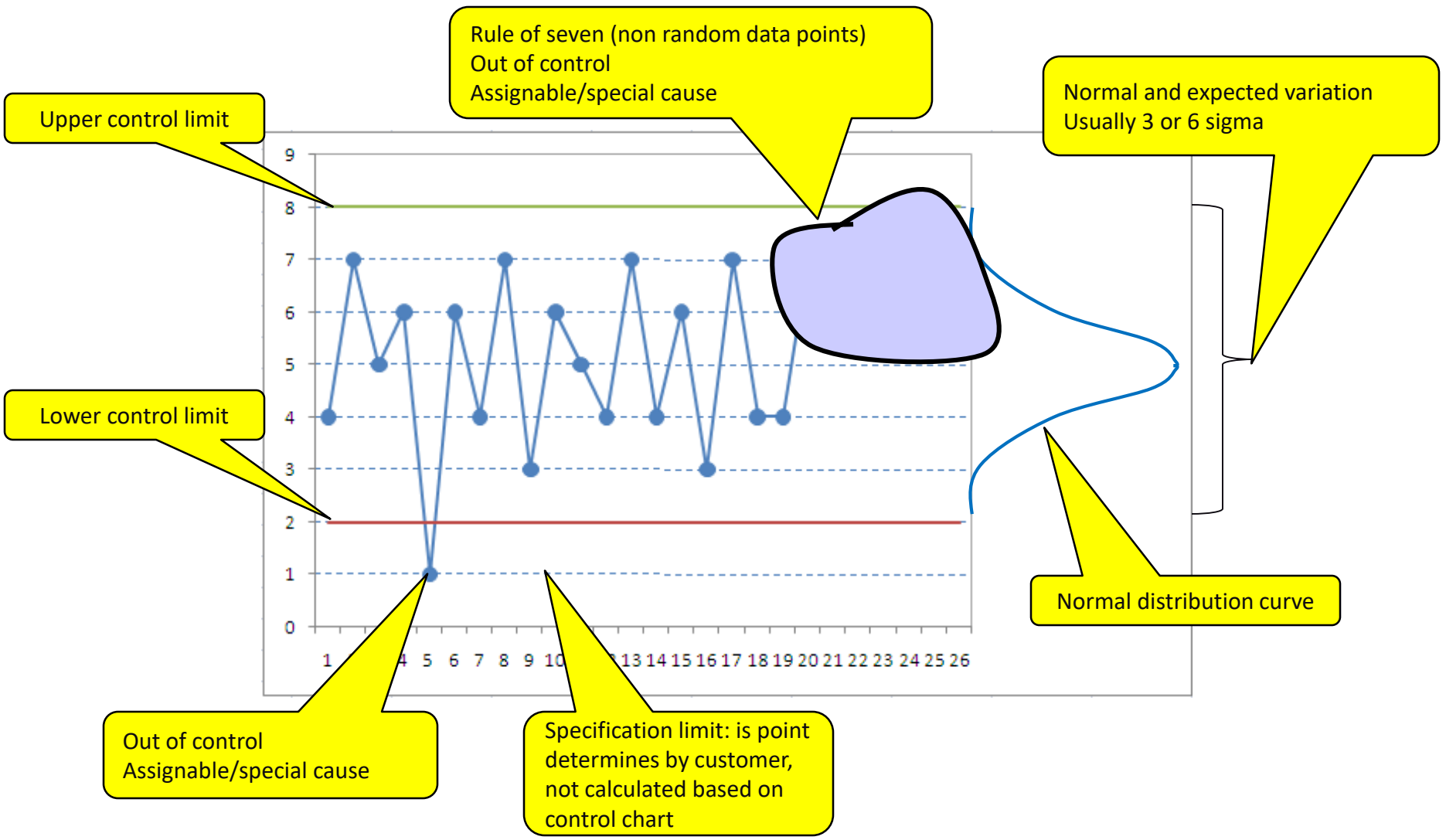


Run chart

Run Chart: To look at history and see a pattern of variation



Control chart

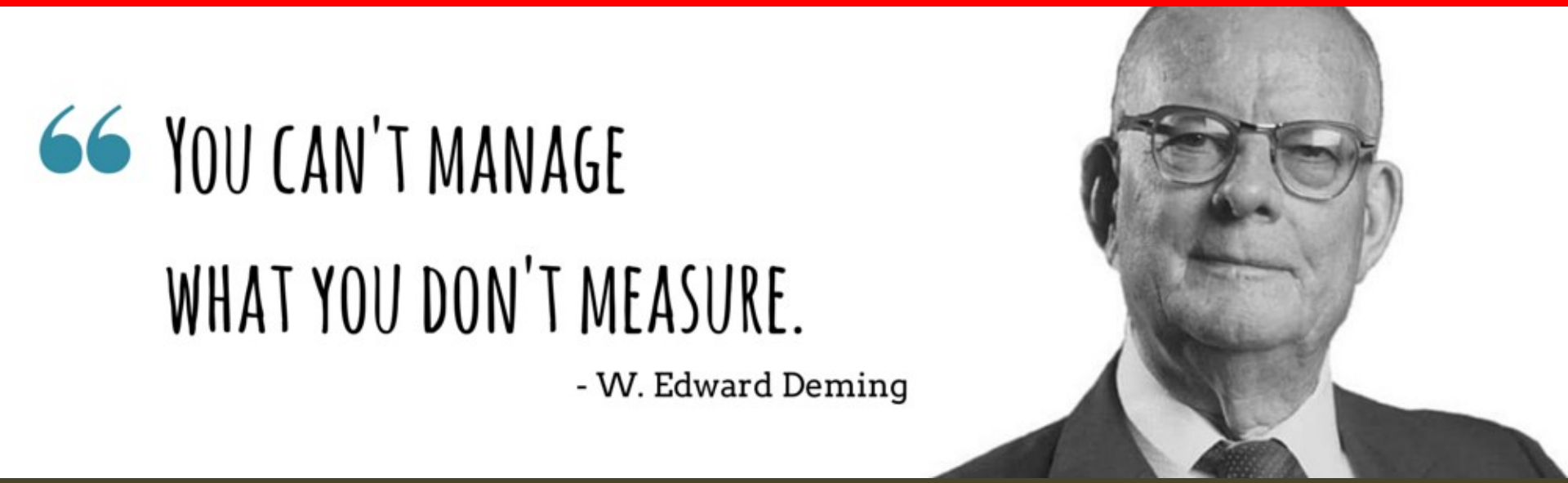


Additional Quality Planning tools

SIX SIGMA→ achievement of no more than 3.4 defects, errors, or mistakes per million opportunities.

Additional Quality Planning tools

Additional Quality Planning tools

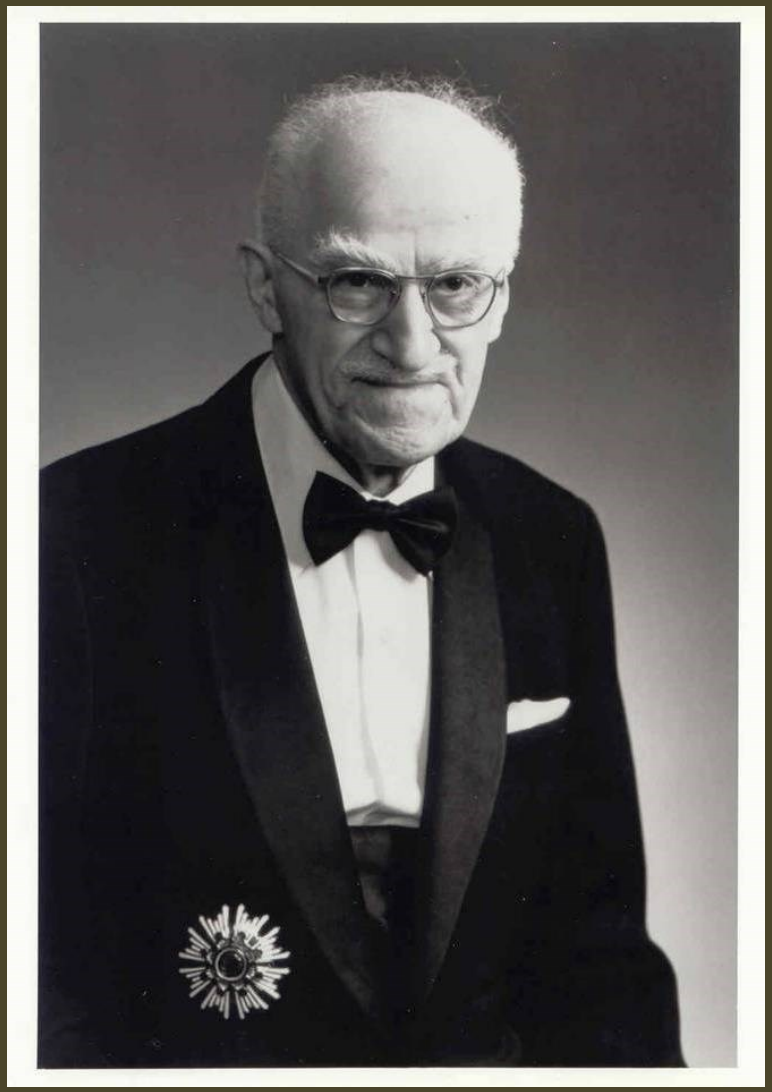


Deming's 14 Points on Quality Management

A core concept on implementing total quality management (TQM)

PLAN→DO→CHECK→ACTION

Additional Quality Planning tools

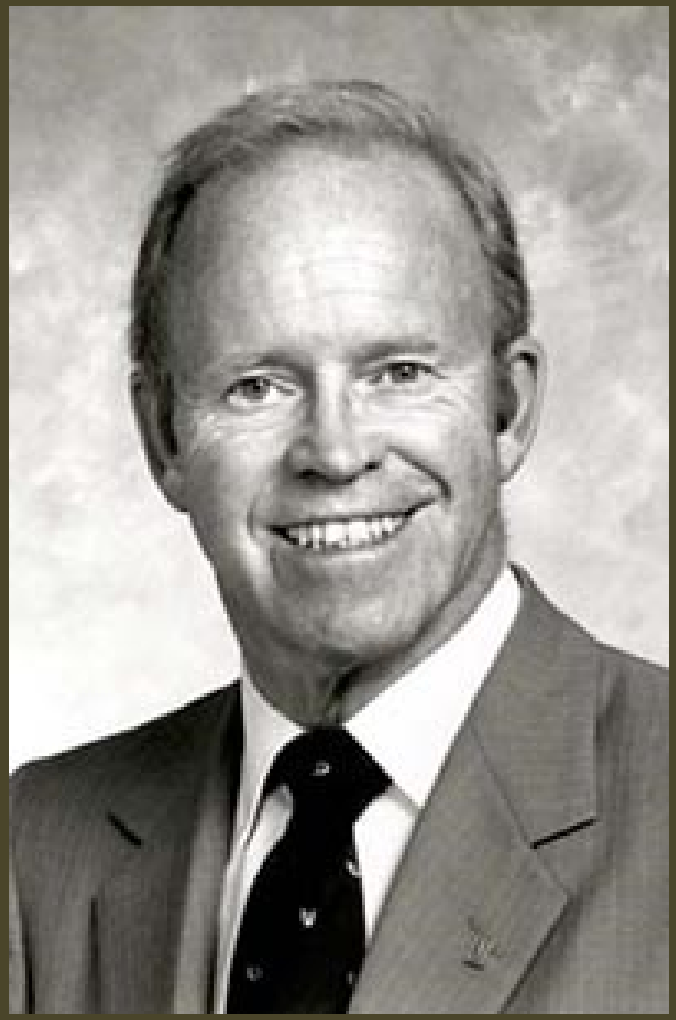


Joseph Juran

Juran's trilogy on TQM

1. Planning
2. Improve
3. Control

Additional Quality Planning tools



Philip Corsby

"Zero defect philosophy
Quality is free"
14 principals on TQM

Additional Quality Planning tools

Genichi Taguchi

Quality must be desgined
And robust
A statistical method

1 Project management method

2 Role and responsibility in managing quality

3 Standard monitoring & controlling

4 Deliverable measurement

Quality Management Plan

Process Review

Major checkpoint

nspection and acceptance criteria

Quality metrics and chekclist

Quality Management Plan

Quality metrics

“Translating customer’s requirement to a specific measurement”

Quality metrics

Example:

- **Number of customer satisfaction**
- **Number of defect**
- **Availability of good service**

Quality metrics is input for
- Quality Assurance AND
- Quality Control

Quality checklist is input for
- **Quality Control ONLY**

Quality checklist

A list of items to inspect, step to be performed and note if any defects found

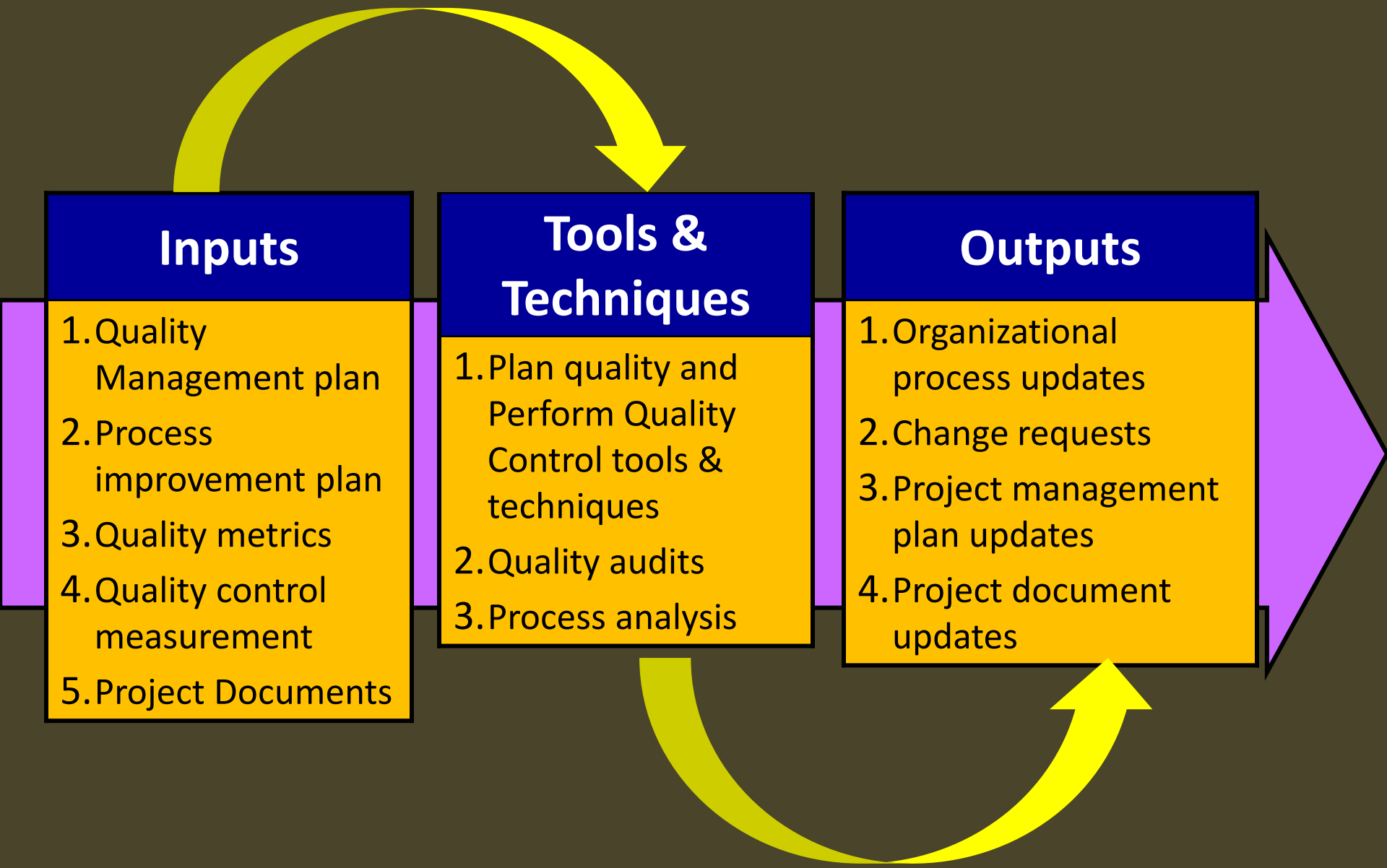
Example of quality checklist

- ❑ **functionality and features test**
- ❑ **system outputs test**
- ❑ **Performance** test
- ❑ **Reliability** test
- ❑ **Maintainability test**

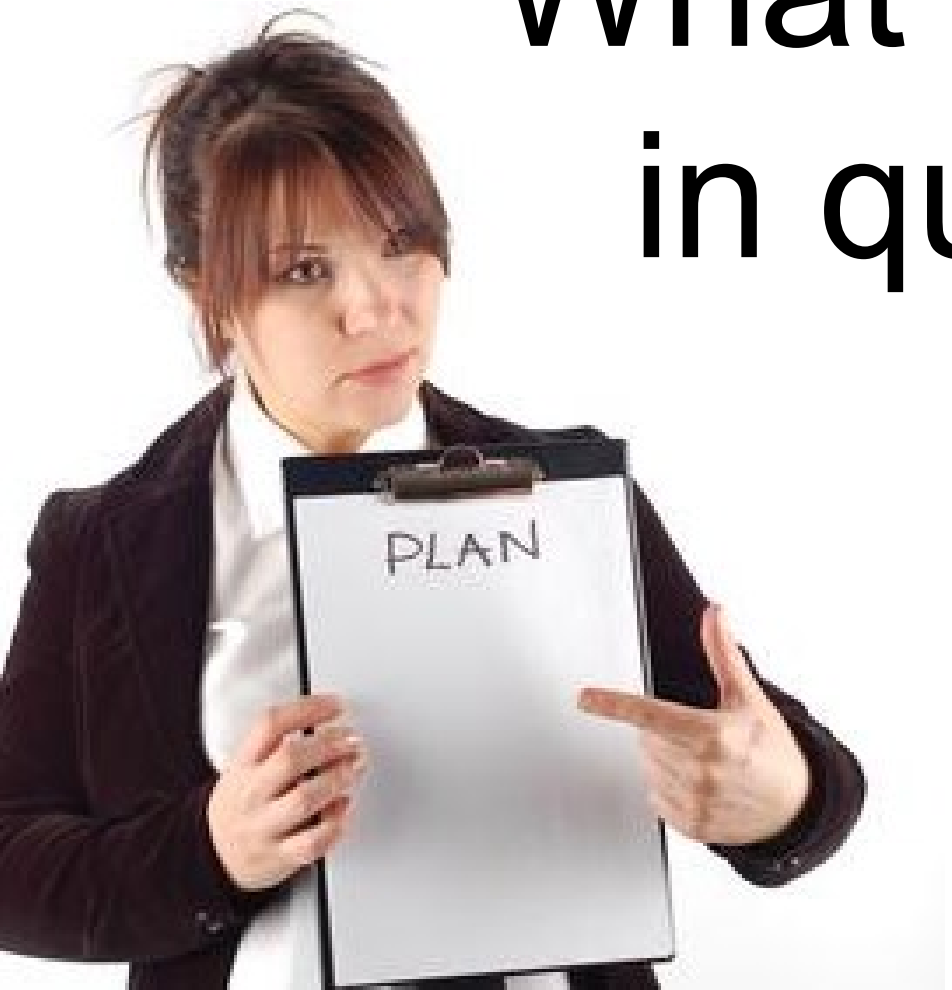
Quality Assurance

Auditing the quality requirement and the result of quality control

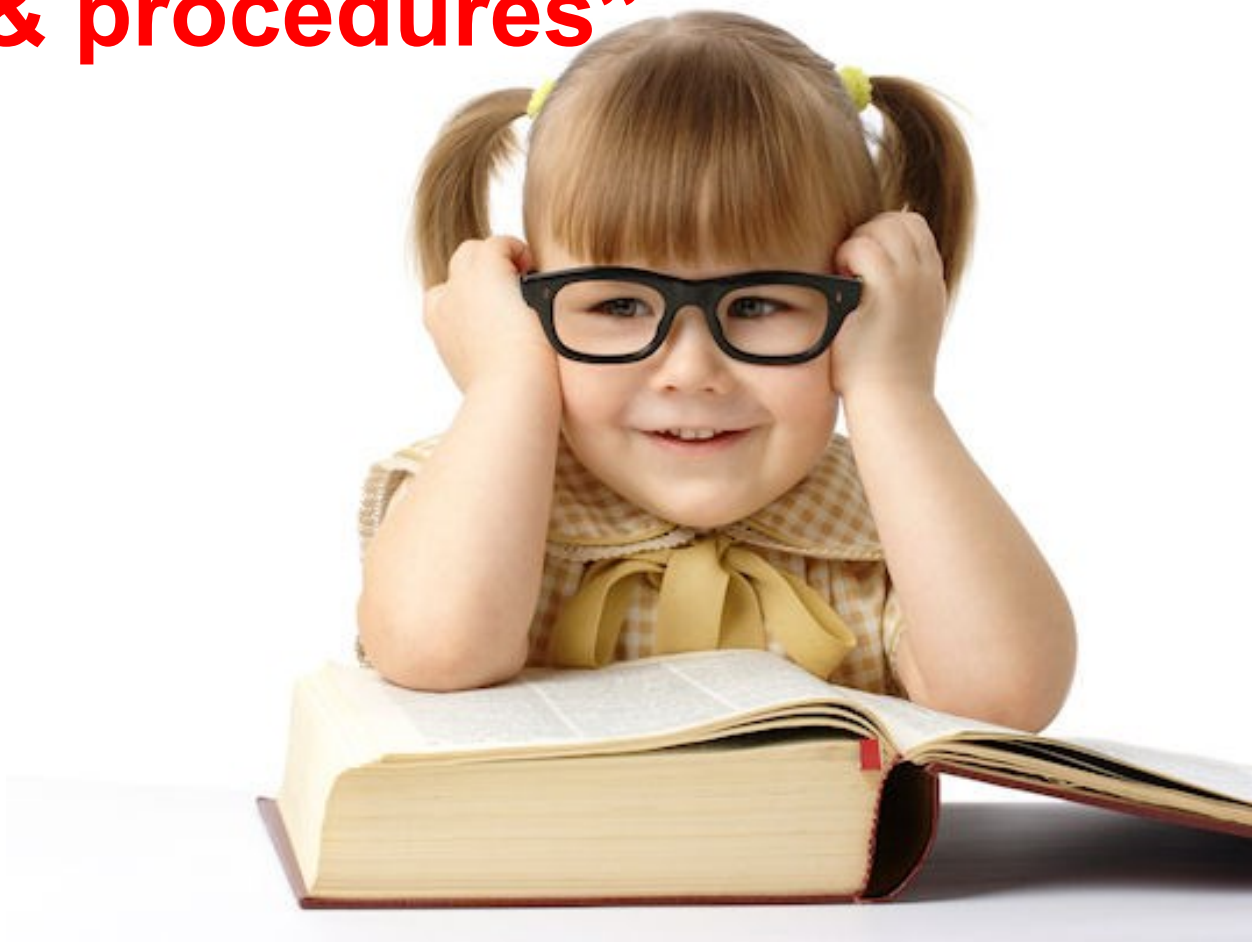
Are we using the standard?
Can we improve the standard?


Inputs
1. Quality Management plan
2. Process improvement plan
3. Quality metrics
4. Quality control measurement
5. Project Documents
Tools & Techniques
1. Plan quality and Perform Quality Control tools & techniques
2. Quality audits
3. Process analysis
Outputs
1. Organizational process updates
2. Change requests
3. Project management plan updates
4. Project document updates

What must we do in quality audit?

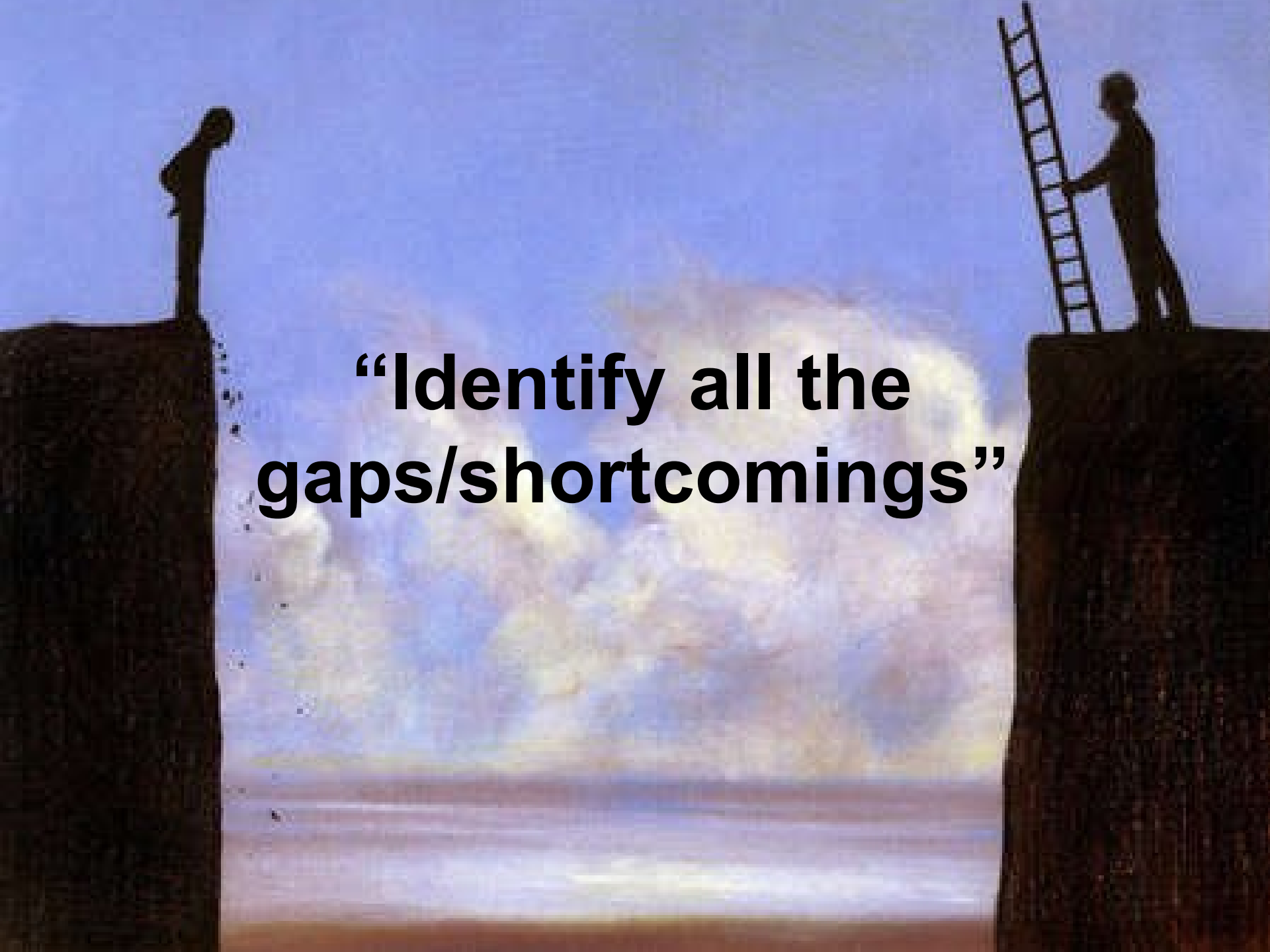


“Check out the compliance of quality action with company **policies, standards & procedures**”



“Determine whether they are used efficiently & effectively”

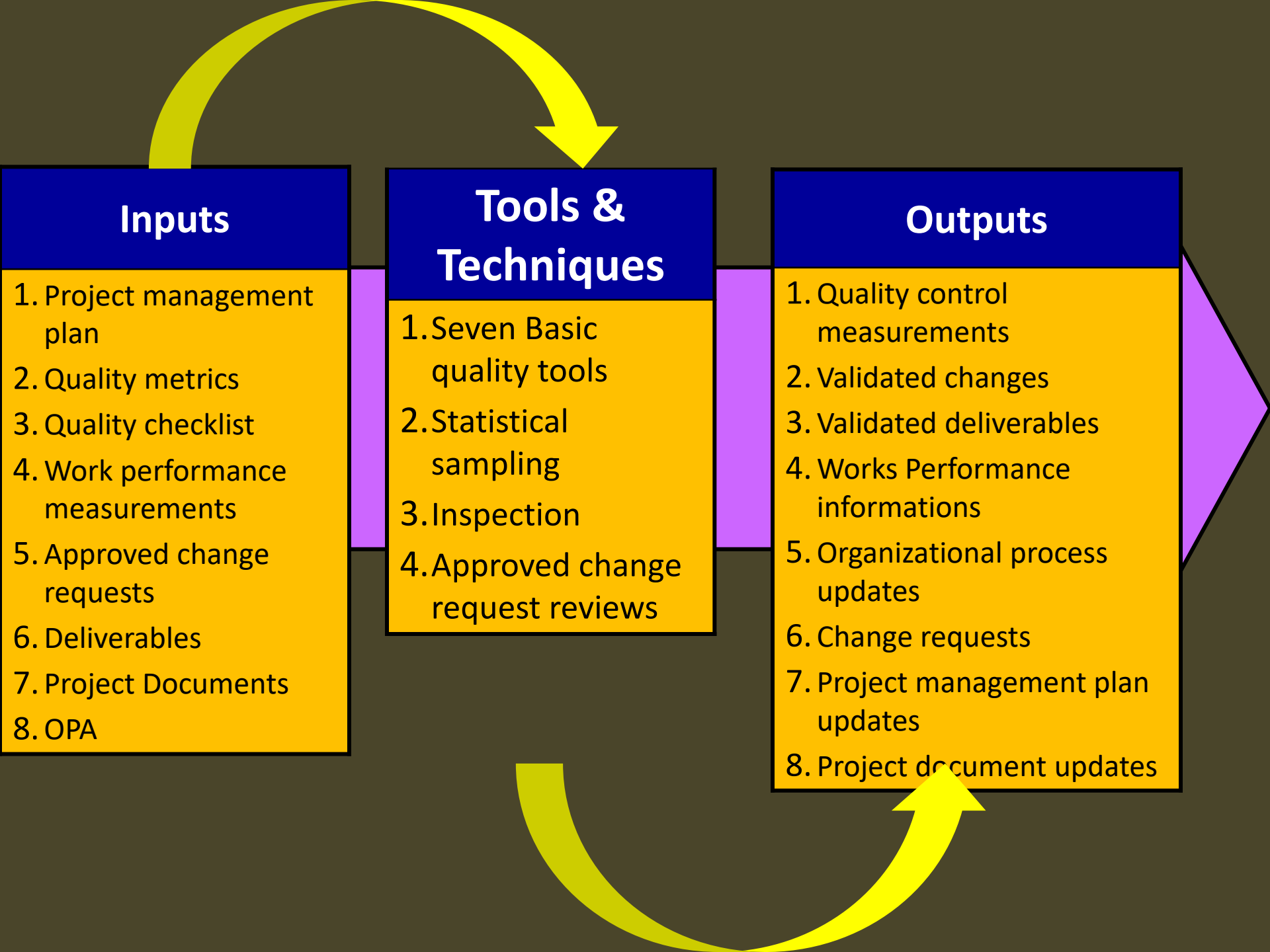
“Identify all **the good practices** being **implemented**”


“Identify all the gaps/shortcomings”

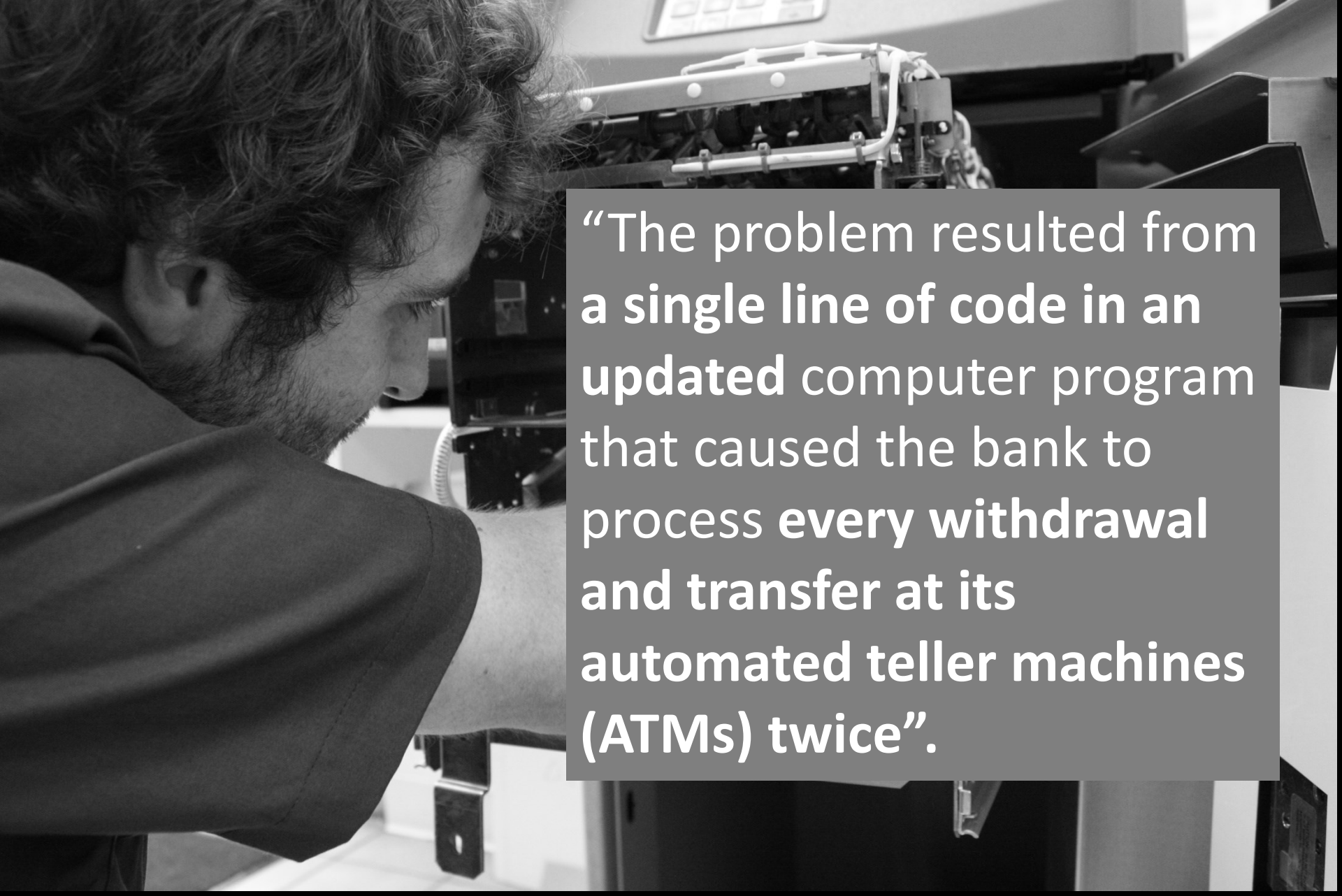
“Look for **new lesson learned** & good practices”

Quality Control

Monitoring and recording **results of executing the quality activities to assess performance and recommend necessary changes**


Inputs
1. Project management plan
2. Quality metrics
3. Quality checklist
4. Work performance measurements
5. Approved change requests
6. Deliverables
7. Project Documents
8. OPA
Tools & Techniques
1. Seven Basic quality tools
2. Statistical sampling
3. Inspection
4. Approved change request reviews
Outputs
1. Quality control measurements
2. Validated changes
3. Validated deliverables
4. Works Performance informations
5. Organizational process updates
6. Change requests
7. Project management plan updates
8. Project document updates

Chemical Bank mistakenly deducted about $15 million from more than 100,000 customer accounts.


“The problem resulted from **a single line of code in an updated** computer program that caused the bank to process **every withdrawal and transfer at its automated teller machines (ATMs) twice”.**

BACKUP SLIDES

Important Terms

- Mutual Exclusive: if two events cannot both occur in a single trial
- Probability: something will occur
- Normal Distribution: common probability density distribution chart
- Statistical independence: the probability of one event occurring does not affect the probability of another event occurring
- Standard deviation (or Sigma): how far you are from the mean
- 3 or 6 sigma
  - Represent the level of quality has decided to try to achieve
  - 6σ is higher quality standard than 3σ
  - Used to calculate the upper and lower control limits in a control chart

Number of σ	Percentage of occurrences between two control limits
1	68.26%
2	95.64%
3	99.73%
6	99.99985%