



Continuous Improvement Toolkit

Cost Benefit Analysis

Managing Risk

PDPC
FMEA RAID Logs
Fault Tree Analysis
Risk Assessment*
Traffic Light Assessment

Deciding & Selecting

Pros and Cons
Break-even Analysis
Force Field Analysis
Decision Tree
QFD
Kano Analysis
Critical-to Tree
Pugh Matrix
Matrix Diagram
Prioritization Matrix
Paired Comparison
Cause & Effect Matrix
Confidence Intervals
ANOVA
Hypothesis Testing
Scatter Plot
Correlation
5 Whys
Fishbone Diagram
Brainstorming
Nominal Group Technique
Affinity Diagram
Attribute Analysis
Lateral Thinking
Visioning

Planning & Project Management*

Importance-Urgency Mapping
RACI Matrix
Stakeholders Analysis
PEST
PERT/CPM
Activity Diagram
Roadmaps
Project Charter
Gantt Chart
PDCA
Control Planning
Gap Analysis
Hoshin Kanri
Kaizen
How-How Diagram
Tree Diagram**
Standard work

Understanding Performance

Lean Measures
KPIs
OEE
Capability Indices
MSA
RTY
Descriptive Statistics
Cost of Quality
Probability Distributions
Graphical Analysis
Run Charts
Control Charts
Benchmarking
Sampling
Focus groups
Interviews
Photography
Check Sheets
Measles Charts
Surveys
Data
Critical Incident Technique
Observations

Understanding Cause & Effect

Pareto Analysis
Simulation
TPM
Mistake Proofing
Pull Systems
JIT
Ergonomics
Work Balancing
Automation
Regression
Multi-Vari Charts
Relations Mapping*
TRIZ***
SCAMPER***
Mind Mapping*

Identifying & Implementing Solutions***

Visual Management
5S
SMED
Time Value Map
Process Redesign
IDEF0
Value Stream Mapping
SIPOC
Flow Process Chart
Process Mapping
Flowcharting
Service Blueprints
Bottleneck Analysis
Flow
Value Analysis
Wastes Analysis
Value Stream Mapping

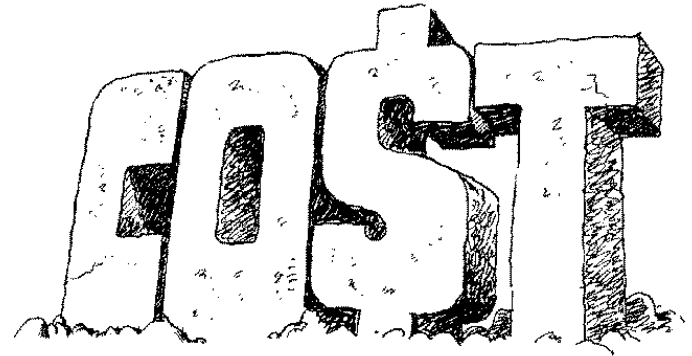
Creating Ideas**

Designing & Analyzing Processes

- Cost Benefit Analysis

Project Selection Methods:

- ❑ Mathematical/decision models.
- ❑ Comparative approaches:
 - **Cost-Benefit Analysis.**
 - **Scoring Models.**
- ❑ Benefit contribution methods:
 - Payback Period.
 - Discounted Cash Flows.
 - Net Present Value (NPV).
 - Internal Rate of Return (IRR).
 - Economic value among the projects.



- Cost Benefit Analysis

Cost Benefit Analysis:

- ❑ Compares the cost to the benefit as a result of executing a project.
- ❑ Used to confirm that the project is worth doing.
- ❑ Outlines the economic feasibility of the project.
- ❑ It compares between expected costs and anticipated benefits.
- ❑ Allows comparisons among alternative projects.
- ❑ **The most beneficial solution is the one that gives the most benefits for the lowest cost.**



- Cost Benefit Analysis

- ❑ This can be then reviewed and updated at regular intervals throughout the project.
- ❑ Remember to update the project charter with this information.
- ❑ Every organization uses different categorizations and different rules for cost benefit calculation.
- ❑ It's recommended to get the finance department involvement in the analysis.
- ❑ The goal of this analysis is to derive the “Return on Investment” index.



- Cost Benefit Analysis



Costs

Implementation costs

On-going costs

Benefits

Hard savings

Soft savings

One-time savings

- Cost Benefit Analysis

Implementation Costs (One time costs):

□ **Examples:**

- **Capital costs:** All equipment, materials, hardware, software, land, buildings, etc.
- **Outside professionals.**
- **Internal labor:** Total hours estimated to complete activities by internal resources.
- **Lost of productivity** during implementation and training.
- Planning, training, travel and living expenses.



Costs

Benefits

Implementation

Hard

On-going

Soft

One-time

- Cost Benefit Analysis

On-going Costs:

□ **Examples:**

- **Maintenance cost:** Any on-going costs paid to outside party to maintain the project.
- **Operational Cost:** All expected operational costs including:
 - Internal labor.
 - Materials.
 - Expendables.
 - Expected upgrades, supplies and services.



| <u>Costs</u> | <u>Benefits</u> |
|----------------|-----------------|
| Implementation | Hard |
| On-going | Soft |
| | One-time |

- Cost Benefit Analysis

Hard Savings:

- ❑ A direct benefit that affects bottom line.
- ❑ Will be seen in the accounts reports.
- ❑ **Examples:**
 - Sales increase.
 - Price increase.
 - Cost reduction as of a reduction in material, labor or overhead costs.
 - Productivity savings result from increases in productivity.



Costs Benefits

| | |
|----------------|----------|
| Implementation | Hard |
| On-going | Soft |
| | One-time |

- Cost Benefit Analysis

Soft Savings:

- ❑ Difficult to quantify. But should be quantified and shown whenever possible.
- ❑ **Examples:**
 - Increased customer/employee satisfaction.
 - Elimination of waste in business processes.
 - Lower cycle times.
 - Quality cost reduction (e.g. reduced testing).
 - Improved yields and lower scrap and rework rates.
 - Improved capacity to increase sales (production rates projects).
 - Increased safety in the workplace.



| <u>Costs</u> | <u>Benefits</u> |
|----------------|-----------------|
| Implementation | Hard |
| On-going | Soft |
| | One-time |

- Cost Benefit Analysis

One-time Savings:

□ **Examples:**

- Sale of unneeded assets (equipment, vehicle, etc.).
- Value of inventory reduction.



Costs

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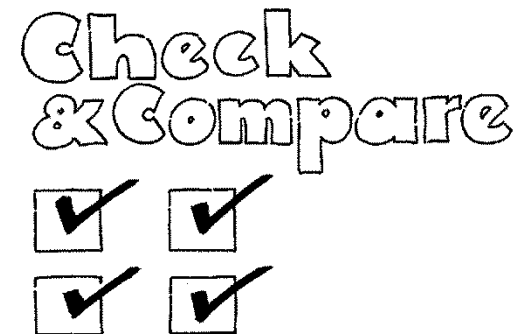
- Cost Benefit Analysis

| | | Cost/Benefit | Unit | Entry | Extended | Year 1 | Year 2 | Year 3 |
|--|---|--|---------------|-------------|-----------|--------|--------|--------|
| <Project title> | C | Implementation costs (one time) | | | \$0 | | | |
| <Project ID> | O | | | | | | | |
| <Date> | S | | | | | | | |
| <Estimate or Final> | T | | | | | | | |
| 1 Financial analyst / reviewer | S | | | | | | | |
| | | Ongoing costs (monthly) | | | \$0 | | | |
| 2 Expected life span monthly (After project) | | | | | | | | |
| | | | | | | | | |
| 3 First year months (After project) | | | | | | | | |
| | | | | | | | | |
| 4 Internal labor cost/hour (Average) | | >>>Total Costs (monthly) | | | | | | |
| | B | Hard savings / direct benefits (monthly) | | | \$0 | | | |
| Assumptions: | E | | | | | | | |
| | N | | | | | | | |
| | F | | | | | | | |
| | I | Soft savings / indirect benefits (monthly) | | | \$0 | | | |
| | T | | | | | | | |
| | S | | | | | | | |
| Comments: | | One-time savings (one time) | | | \$0 | | | |
| | | | | | | | | |
| | | >>>Total Benefits (monthly) | | | | | | |
| Payback (months) | | | Monthly Gains | Monthly ROI | Net Gains | | | |
| | | | | | ROI | | | |

- Cost Benefit Analysis

Scoring Models:

- ❑ A scoring model is a relatively an easy and quick way to identify the best decision alternative from a multi-criteria decision problem.
- ❑ It is a decision-making techniques that will help selecting the options that will have the most impact.
- ❑ It identifies criteria and assigns weight depending on its importance.
- ❑ Used to assess, prioritize and select improvement projects.



- Cost Benefit Analysis

Examples of Criteria:

- ❑ Sponsorship.
- ❑ Benefits.
- ❑ Scope.
- ❑ Probability of success.
- ❑ Time to complete.
- ❑ Availability of resources.



More important criteria should carry a higher weight than less important criteria

- Cost Benefit Analysis

| Project Title | Sponsorship | Benefits | Resources Availability | Scope | Deliverables | Time of Completion | Team Members | Project Charter | Total Score |
|---------------|-------------|----------|------------------------|-------|--------------|--------------------|--------------|-----------------|-------------|
| Weight | 0.23 | 0.19 | 0.16 | 0.12 | 0.09 | 0.09 | 0.07 | 0.03 | 0.98 |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |

- Cost Benefit Analysis

Pareto Priority Index:

- ❑ A simple scoring model is the Pareto Priority Index (PPI).
- ❑ The PPI is calculated as follows:

$$\mathbf{PPI} = \frac{\text{Savings} * \text{probability of success}}{\text{Cost} * \text{time to completion}}$$

- ❑ The PPI values allow comparison of various projects.
- ❑ The resulting number is an index value for a given project.
- ❑ The result is totally dependent on the accuracy of the inputs.

- Cost Benefit Analysis

| Pareto Priority Index (PPI) | | | | | |
|-----------------------------|---------|-----------|------------------------|--------------------|-----|
| Project title | Costs\$ | Savings\$ | Probability of Success | Time to Completion | PPI |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |