Continuous Improvement Toolkit

KPIs
(Key Performance Indicators)
The Continuous Improvement Map

Managing
- Risk
- FMEA
- RAID Log*
- Risk Assessment*
- Fault Tree Analysis
- Traffic Light Assessment
- Lean Measures
- Bottleneck Analysis**
- Process Yield
- Capability Indices
- Gap Analysis*
- Reliability Analysis

Understanding Performance
- Benchmarking**
- Data collection planner*
- Check Sheets
- Interviews
- Questionnaires
- Data Collection
- Descriptive Statistics
- Probability Distributions
- Histograms & Boxplots
- Graphical Analysis
- MSA
- Run Charts
- Control Charts
- Sampling
- Brainstorming
- Affinity Diagram
- Mind Mapping*
- Observations

Deciding & Selecting
- Decision Balance Sheet
- Force Field Analysis
- Break-even Analysis
- Decision Tree
- Critical-to Tree
- Kano Analysis
- Cost of Quality*
- OEE
- Pugh Matrix
- Matrix Diagram
- ANOVA
- Chi-Square
- Scatter Plots
- Multi vari Studies
- Fishbone Diagram
- Tree Diagram*
- SIPOC*
- How-How Diagram**
- SCAMPER**
- Morphological Analysis
- Attribute Analysis
- Affinity Diagram
- Mind Mapping*
- Relationship Mapping*
- Lateral Thinking
- Suggestion systems
- Creating Ideas

Understanding Cause & Effect
- Importance-Urgency Mapping
- Cost Benefit Analysis
- Voting
- TPN Analysis
- Four Field Matrix
- Paired Comparison
- Prioritization Matrix
- C&E Matrix
- Design of Experiment
- Confidence Intervals
- Multi vari Studies
- Regression
- Design of Experiment
- Confidence Intervals
- Multi vari Studies
- Regression
- Data Snooping
- Root Cause Analysis
- How-How Diagram**
- SCAMPER**
- Morphological Analysis
- Attribute Analysis
- Relationship Mapping*
- Lateral Thinking
- Suggestion systems
- Creating Ideas

Planning & Project Management*
- Daily Planning
- MOST
- RACI Matrix
- Activity Networks
- PDCA
- Policy Deployment
- Gantt Charts
- DMAIC
- Kaizen Events
- Control Planning
- Standard work
- Document control
- Cross Training
- Value Analysis
- Mistake Proofing
- Ergonomics
- Simulation
- TPM
- Automation
- Pull
- Flow
- Just in Time
- Visual Management
- 5S
- Waste Analysis
- Quick Changeover
- Time Value Map
- Service Blueprints
- Value Stream Mapping
- Flow Process Charts
- IDEF0
- Process Mapping

Implementing Solutions**
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- Value Analysis
- Mistake Proofing
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Designing & Analyzing Processes
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Performance Management:

- An approach used to manage performance of an organization.
- It plays an important role in the success or failure of a business.
- It is applied to measure the performance of:
  - An organization.
  - A business unit.
  - A single department.
  - A project.
  - A process that builds a product or service.
  - An employee.
Performance Management:

- It includes activities such as:
  - Planning and setting expectations.
  - Developing the capacity to perform.
  - Continually monitoring performance.
  - Periodically rating performance in a summary fashion.
  - Rewarding good performance.
- KPIs

Performance Indicators:

- Measurements that define and assess the performance of an organization, department, employee, etc..
- Objectives to be targeted in order to add the most value to a business.
- Choosing the right performance indicators relies upon a good understanding of what is important to the business.
- **KPIs**

Two Types:

- **Result oriented indicators:**
  - Focus on the key outputs of a process.
  - Related to the critical success factors.
  - **Examples:** *customer complaints* and *return on investment (ROI)*.

- **Process oriented indicators:**
  - Focus on the inputs to a process.
  - **Examples:** *time to process customer order* and *late deliveries*.
- **KPIs**

**Performance Indicators are Used to:**

- Help organizations to understand their performance levels.
- Help setting realistic performance goals.
- Help aligning daily work to strategic goals.
- Help monitoring progress on a real-time basis.
- Help understanding the weaknesses and establishing improvement priorities.
- Determine whether an improvement is being made and maintained.
- Help benchmark internally and externally.
- Identify if staff are doing well and to help them if they are not.
- Provide a basis for recognizing team and individual performance.
Selecting the Proper Performance Indicators:

- Performance indicators should be developed based on:
  - Critical Success Factors (CSFs).
  - Voice of the Customer (VOC).
Critical Success Factors:

- Elements that are necessary for a strategy to be successful.
- CSFs selection is a very subjective exercise.

Examples of CSFs are:

- Delivery on-time and in-full.
- Providing superior customer service.
- Short time to market new products.
- Management commitment.
Voice of the Customer:

- Performance indicators should reflect the Voice of the Customer.
- The **Critical-to-Quality characteristics (CTQs)** features of your customer should be then used as the basis to select your KPIs.
- Raw data needs to be collected from customers.
Example - Selecting the Proper Performance Indicators:

CTQs / CSFs
- All repairs to be done within 5 days
- On-time in-full delivery
- Calls answered within 5 rings

KPIs
- % of repairs done within 5 days
- % of on-time in-full deliveries
- % of calls answered within 5 rings

Data to be Collected
- Time to complete each repair
- Time and quantity delivered
- Time to answer each call
- **KPIs**

**KPI Tree:**

- A visual method of displaying measures:
  - In an organization.
  - Related to a project.
- Brings all measures together.
- Provides a visual representation for which measures contribute to other measures.
- Helps aligning work with the organization strategy.
KPI Tree:

- Board of Directors / GM
  - Purchasing
  - HR
  - Operation
  - Marketing
  - Finance
    - Planning
    - Production
      - Processing
      - Assembly
      - Packaging
        - PI-1, PI-2, PI-3
KPI Tree Example:

Customer Satisfaction Project

- Customer notifications
  - # of notifications
  - % notifications answered within 24 hours
  - % dissatisfaction

- Customer complaints
  - # of complaints
  - % of major complaints
  - $ cost to business

Average answer time
- **KPIs**

KPI Tree:

- A successful KPI tree is the one that contains a **balance** of measures covering efficiency, effectiveness, quality, delivery and cost.

- **Effectiveness performance indicators** measure processes in the eyes of the customer.

- **Efficiency performance indicators** measure processes from business perspective.
  - Are of interest of internal customers.
  - Have close links with the 8 Wastes.
Characteristics of Effective Performance Indicators:

- Reflect the Voice of the Customer.
- Relate to critical success factors.
- Are agreed with and owned by the areas themselves.
- Are well defined and understood by all.
- Are measured regularly and consistently.
- Enable open and transparent communication.
- Are acted upon by the senior management.
- Are used for continuous improvement.
- KPIs

Balanced Scorecard:
- A common way to manage and monitor performance indicators.
- It has evolved from a simple performance measurement framework to a full strategic planning and management system.
- It helps monitor performance against strategic goals.

The Four-Perspectives Balanced Scorecard

- Customer
- Business Process
- Financial
- Learning & Growth
Performance Dashboards:
- A series of graphics, charts and other visual tools that can be easily interpreted and analyzed.
- Easily monitor the performance in an organization.
- They allow to see if the performance indicators are being met based on the goals in place.
- If not, they will visually alert that corrective actions should be made.
- They are typically limited to show summaries, comparisons and trends.
A Good Dashboard:

- Is simple and easy to understand.
- Conveys important information at a glance.
- Contains minimal distractions and visually appealing.
- Displays real-time information.
- Should be displayed on the shop floor using a screen or a bulletin boards.
## Examples of Performance Indicators:

<table>
<thead>
<tr>
<th>Manufacturing / Production</th>
<th>Purchasing and Inventory</th>
<th>Sales, Marketing and Shipping</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Spoilage / Rejection Rate</td>
<td>• Cancelled Purchase Requests</td>
<td>• Time to Process Customer Orders</td>
</tr>
<tr>
<td>• Re-work Rate</td>
<td>• Purchase Orders Completed</td>
<td>• Time to Resolve Customer Claims</td>
</tr>
<tr>
<td>• Time Spent on Product Re-work</td>
<td>• Purchase Order Cycle Time</td>
<td>• Visits to Key Customers</td>
</tr>
<tr>
<td>• Total Units Manufactured</td>
<td>• Emergency Purchase Rate</td>
<td>• New Customers Rate</td>
</tr>
<tr>
<td>• Units per Day</td>
<td>• Rejected Receipt Rate</td>
<td>• Customer Retention Rate</td>
</tr>
<tr>
<td>• Units Per Labor Hour</td>
<td>• Late Deliveries from Suppliers</td>
<td>• Sales Forecast Accuracy</td>
</tr>
<tr>
<td>• Line Efficiency</td>
<td>• Changes in Approved Suppliers</td>
<td>• Market Share Growth</td>
</tr>
<tr>
<td>• Production Capacity</td>
<td>• Unloading Time</td>
<td>• Marketing Expenses</td>
</tr>
<tr>
<td>• Capacity Utilization</td>
<td>• Stock Level</td>
<td>• Product Availability</td>
</tr>
<tr>
<td>• First Time Right Ratio</td>
<td>• Inventory Days Coverage</td>
<td>• Loading Time</td>
</tr>
<tr>
<td>• Rolled Throughput Yield (RTY)</td>
<td>• Re-work on Procured Inventory</td>
<td>• Not On-Time In-Full (NOTIF)</td>
</tr>
<tr>
<td>• Average Change Over Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Material Usage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **KPIs**
### Examples of Performance Indicators:

<table>
<thead>
<tr>
<th>Finance and Accounting</th>
<th>Maintenance</th>
<th>Human Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Net Profit Margin</td>
<td>• Response Time to Breakdown</td>
<td>• Staff Turnover Ratio</td>
</tr>
<tr>
<td>• Cost of Goods Sold</td>
<td>• Mean Time Between Failures</td>
<td>• Employee Satisfaction Index</td>
</tr>
<tr>
<td>• Operating Income</td>
<td>• Mean Time to Repair</td>
<td>• Exit Interview Satisfaction Rate</td>
</tr>
<tr>
<td>• Cost per Unit</td>
<td>• Spare Parts Inventory Turnover</td>
<td>• Internal Promotion Rate</td>
</tr>
<tr>
<td>• Working Capital</td>
<td>• Work Orders Completed</td>
<td>• Labor Utilization Rate</td>
</tr>
<tr>
<td>• Accounts Receivable Turnover</td>
<td>• Preventive Maintenance Completed</td>
<td>• High Performing Employees</td>
</tr>
<tr>
<td>• Inventory Turnover Ratio</td>
<td>• Repair Cost</td>
<td>• Training Hours Ratio</td>
</tr>
<tr>
<td>• Return on Investment (ROI)</td>
<td>• Repair Cost per Unit</td>
<td>• Training Attendance Ratio</td>
</tr>
<tr>
<td>• Budget Variance</td>
<td>• Maintenance / Repair Downtime</td>
<td>• Absenteeism Rate</td>
</tr>
<tr>
<td>• Capital Expenditure (CAPEX)</td>
<td></td>
<td>• Part-Time Employees</td>
</tr>
<tr>
<td>• Monthly Department Expenses</td>
<td></td>
<td>• Disabled Staff Ratio</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Health, Safety and Env.</th>
<th>Quality</th>
<th>Lean</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recorded Safety Observations</td>
<td>• Customer Complaints</td>
<td>• Value Added Time</td>
</tr>
<tr>
<td>• Workplace Inspection Audits</td>
<td>• Returns from Key Customers</td>
<td>• Takt Time</td>
</tr>
<tr>
<td>• Risk Assessments Implemented</td>
<td>• Customer Satisfaction Index</td>
<td>• Operator / Machine Cycle Time</td>
</tr>
<tr>
<td>• Lost Work Days</td>
<td>• Customer Surveys Conducted</td>
<td>• Order Processing Cycle Time</td>
</tr>
<tr>
<td>• Significant Injury Cases</td>
<td>• Defects at Customer Site</td>
<td>• Net Available Time</td>
</tr>
<tr>
<td>• Near Miss Cases</td>
<td>• Defects per Million Opportunities</td>
<td>• Work in Process Time</td>
</tr>
<tr>
<td>• First Aid Treatment Cases</td>
<td>• Defects per Unit</td>
<td>• Value Stream Ratio</td>
</tr>
<tr>
<td>• Environmental Incidents</td>
<td>• Cost of Non Quality</td>
<td>• Process Cycle Efficiency</td>
</tr>
<tr>
<td>• Safety Circles Conducted</td>
<td>• Quality Personnel to Total Personnel</td>
<td>• Uptime Ratio</td>
</tr>
<tr>
<td>• Satisfaction with Ergonomics</td>
<td>• Quality Circles Conducted</td>
<td>• Overall Equipment Effectiveness</td>
</tr>
<tr>
<td>• EHS Training Hours</td>
<td>• Audits Performed on Schedule</td>
<td>• Muda-Free Cost</td>
</tr>
</tbody>
</table>

Continuous Improvement Toolkit . www.citoolkit.com
KPIs and Continuous Improvement:

- KPIs are key to the continuous improvement process.

- **Examples:**
  - Chartered improvement projects
  - Project charters approved and signed off
  - SOPs developed after improvement projects
  - Completed improvement projects
  - Financial department involvement in improvement projects
  - Processes perform at 4.5 Sigma or higher
  - Staff trained in Lean Six Sigma
  - Savings resulting from an employee suggestions
  - Time to respond to suggestions
  - Idea conversion rate
  - Kaizen events conducted
  - Cross-industry benchmarking studies conducted
- KPIs

Operational Definitions:
- A clear and detailed description of a performance indicator.
- Ensure consistent data collection.
- Ensure standards are applied in the same manner.

![Diagram showing a process flow with KPIs:]

1. Time to repair (hours)
2. Fixed first time (%)
### Components of Operational Definitions:

<table>
<thead>
<tr>
<th>Performance Indicator:</th>
<th>Perspective:</th>
<th>Unit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description / Formula:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Source:</td>
<td>Measurement Instrument:</td>
<td>Process Diagram or Drawings:</td>
</tr>
<tr>
<td>Method of Test (How):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency (When):</td>
<td>Decision Criteria:</td>
<td></td>
</tr>
<tr>
<td>Data Collector (Who):</td>
<td>Owner:</td>
<td></td>
</tr>
<tr>
<td>Baseline:</td>
<td>Target:</td>
<td></td>
</tr>
</tbody>
</table>
- **KPIs**

**Utilizing Performance Indicators:**

- Review the quality of the current data collection methods.
- Train staff on CTFs, KPIs, empowerment and process improvement methods.
- Start by a few easily understood performance indicators.
- Relate to critical success factors and reflect the voice-of-the-customer.
- Allow teams to define and select their own performance indicators.
- Have performance indicators approved by senior management.
- Measure and report only what matters.
- Monitor performance using dashboards.
- Display at workplace.
- Use them as a basis for team meetings and decision making.
- Identify and pursue improvement goals.
Further Information:

- A problem arise when managers struggle to identify the vital few performance indicators, and instead collect and report a vast amount of everything that is easy to measure.

- Many of the customer related performance indicators (mentioned earlier) are developed and managed using customer relationship management software.