

**Measuring the Economic  
ROI and Benefits of  
CMMI-based  
Improvements in Private  
Industry**



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# Introduction to ABB

- ABB is a multi-national corporation that develops products, largely software-intensive, for the power and automation technology market segments
- ABB products include: motors, drives, robots, instruments, control systems, low voltage devices, protective relays, power monitoring and control systems, and many more
- ABB's products help operate Utilities, power generation plants, process industries, manufacturing plants, and other industrial organizations
- Currently, the ABB Group of companies operates in more than 120 countries and employs around 120,000 people



# Organizational Structure of ABB

## ■ Power Technologies Division

- Power Systems
- Medium-Voltage Products
- High Voltage Products
- Transformers
- Utility Automation Systems



## ■ Automation Technologies Division

- Automation Products
- Manufacturing Automation
- Process Automation



# Process Improvement Motivation at ABB

- Primary customers of ABB are commercial organizations (Utilities and Industrials) non-DOD
- Motivation to improve is driven by commercial competitive advantage



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**Process Improvement**

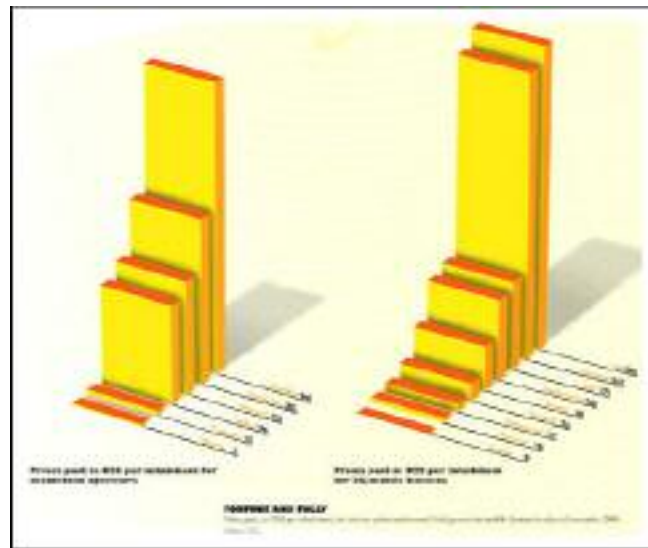


**Increase  
Competitive  
Advantage**

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# Implementing Continuous Process Improvement

- Define Medium-term Process Improvement Plan (PIP) and identify organization's business goals
- Conduct internal CMMI Appraisal
- Develop Strategic Action Plan (SAP) prioritizing process improvement activities using Business Goals
- Implement PIP and SAP
- Monitor ROI
- Re-start cycle



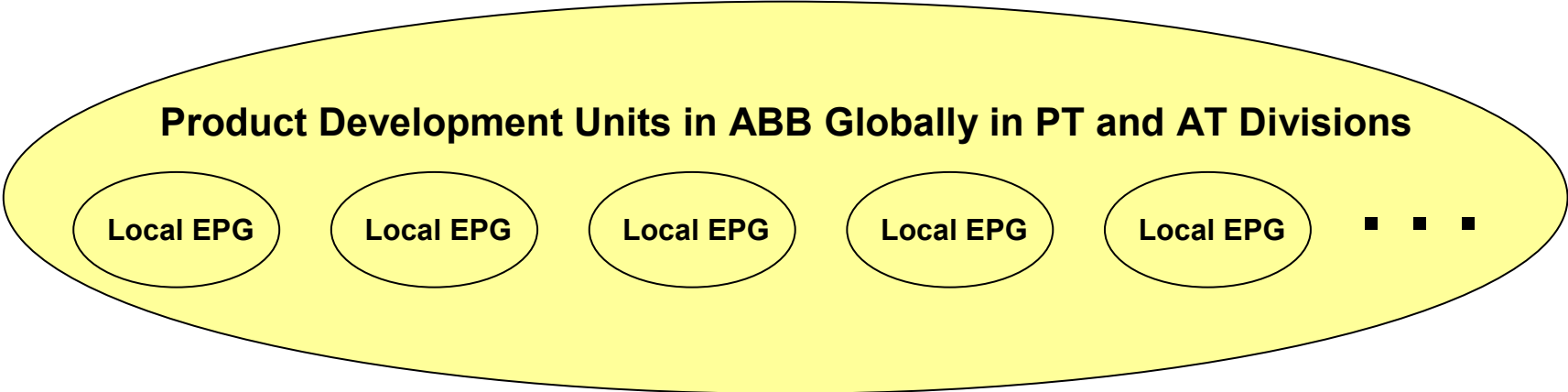
# ABB Corporate Engineering Process Group



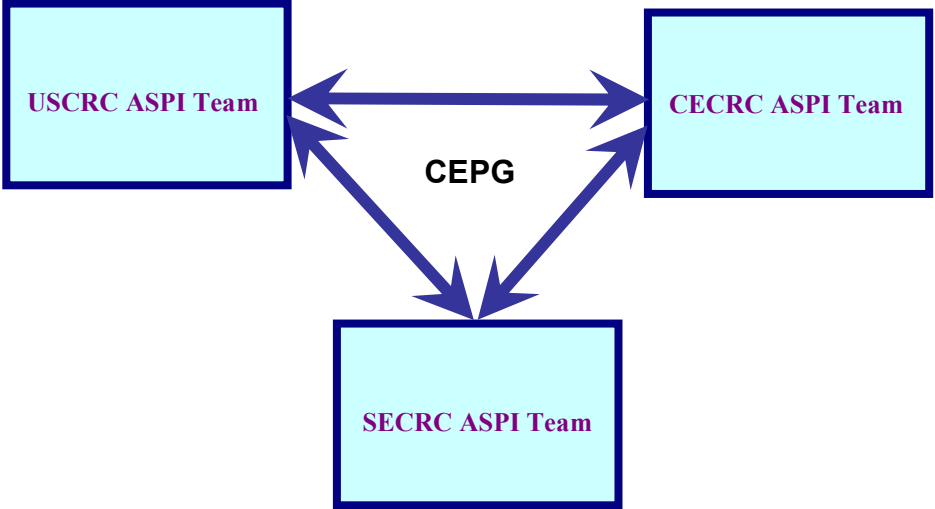
## ■ Mission

- To assist ABB organizations to improve their product development processes by implementing a sustained continuous process improvement culture using the Capability Maturity Model Integration (CMMI) and the IDEAL Model

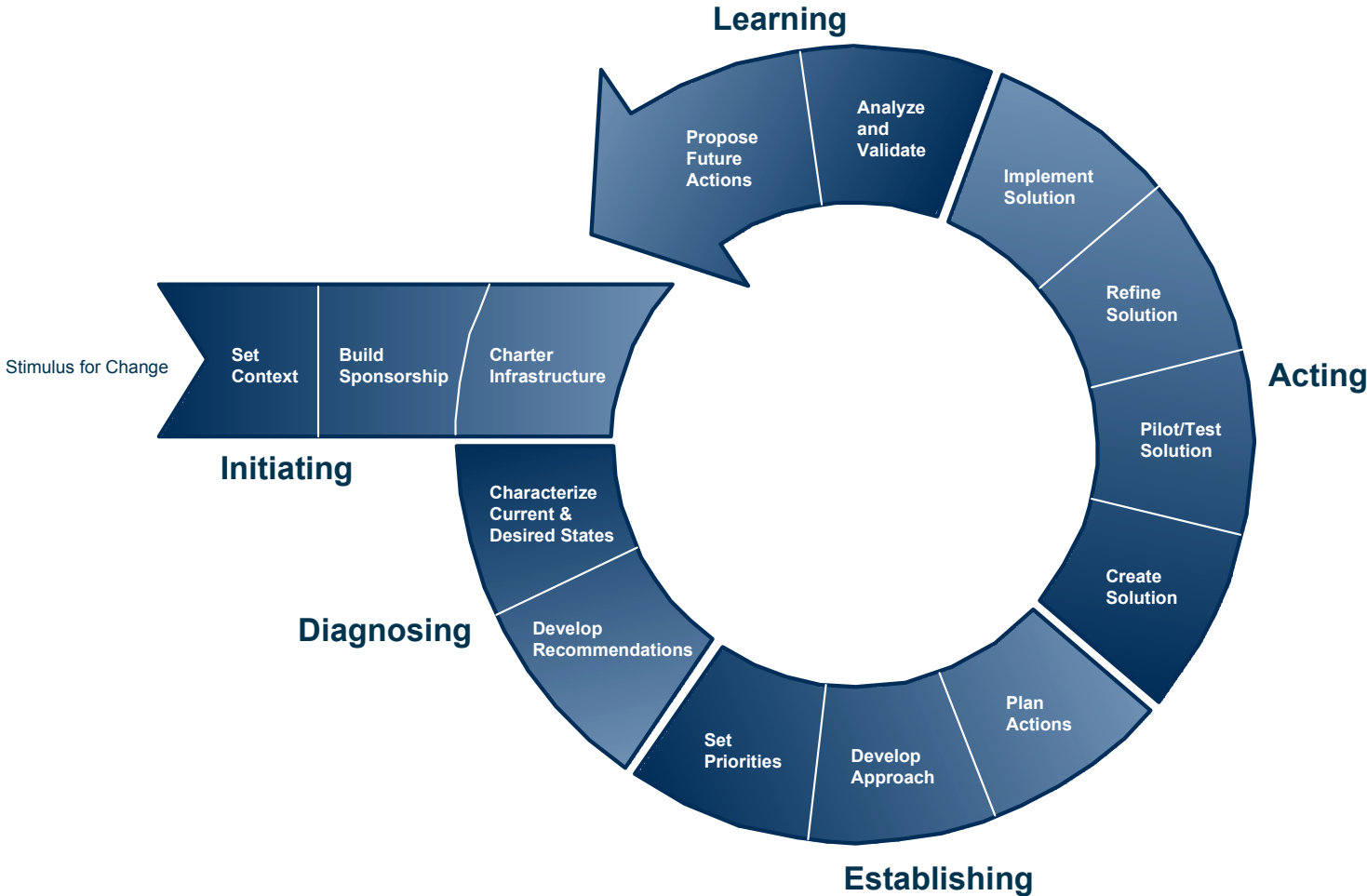
# ASPI Support at ABB



Support ABB Development Units in the Continuous Improvement of their Product Development Processes



# IDEAL Model





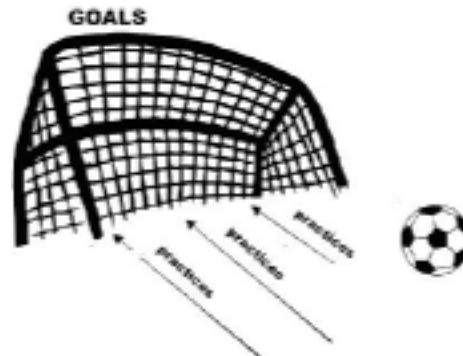
# Initiation Stage

- Identify the Business Goals of development organization
- Develop the organization's Process Improvement Plan (PIP) for medium-term and long-term
- Assess the organizational readiness for process improvement
  - Sponsor
  - Change Agent
  - Relevant stakeholders affected
- Identify metrics associated with process improvement in organization
  - Metrics will define measurements that will be taken to evaluate economic benefits of process improvement activities
  - On-time delivery, COPQ, cycle-time, first-yield, etc.



# Example of Organizational Business Goal

- Improve design process and procedures to assure zero defect designs - Continued Product Quality Improvement
  - **Measure:**
    - a) Zero Defects for 6 months after product release as measured by customer complaints
    - b) Zero Product Advisory Letters for 2 years after product release
    - c) COPQ (R&D) reduction by 15% from 2003 (Productivity gain of 3%)
    - d) Case Tracking/Software Action Request (bug) reduction by 10% from 2003



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# Example of Organizational Business Goal

- Product quality improvement.  
The measures:
  - R & D COPQ (cost of poor quality) to be reduced by 25% from 2002,
  - Case Tracking/SAR (bug) reduction by 50% from 2002.



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# Diagnostics Stage

- Use business goals to identify scope of appraisal
- Determine scope of the appraisal
- Perform an internal Class “B” Appraisal
- Identify strengths and weaknesses in processes



# Establishing Stage

- Create SAP
  - Used to document the shared understanding of the expectations, priorities, and goals of the process improvement project
- Prioritize Improvement Activities
  - Business Objectives
  - “Low-Hanging Fruit”
- Identify and Allocate Resources
  - Each activity run as a project
  - Change Agent / Process Owner = Project Manager
  - **BUDGET**, as well as **TIME**, must be allocated for personnel to perform work on the project
    - Schedule is developed
    - Resource conflicts are identified and negotiated

# Strategic Action Plan

## Activity Title

Description:

Resource Requirements:

Effort Estimate:

<u>Task Description</u>	<u>Resources</u>	<u>Effort</u>
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Deliverables:

Risks:

Description:

Mitigation Plan:



# Acting Stage

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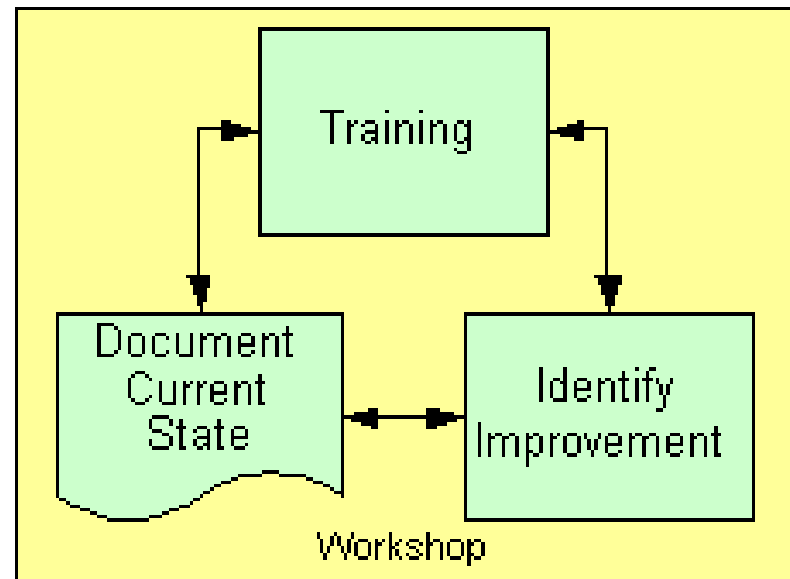
- Define Procedures
  - Define Process
  - Identify relevant stakeholders and responsibilities
  - Include Metrics as part of the process
- Review and Pilot Improved Procedure
- Formalize and Train Procedure
- Institutionalize Metrics Program
  - Collect metrics
  - Analyze metrics
  - Report metrics
  - Monitor metrics program (ASPI)

# Define Procedures

## Purpose

Define the process to be implemented to satisfy the scope of the Metrics program.

- Maintain the strengths of the processes identified during the appraisal
- Identify areas for improvement (Weaknesses identified)
- Agree on the process to meet the business needs.





# Institutionalize

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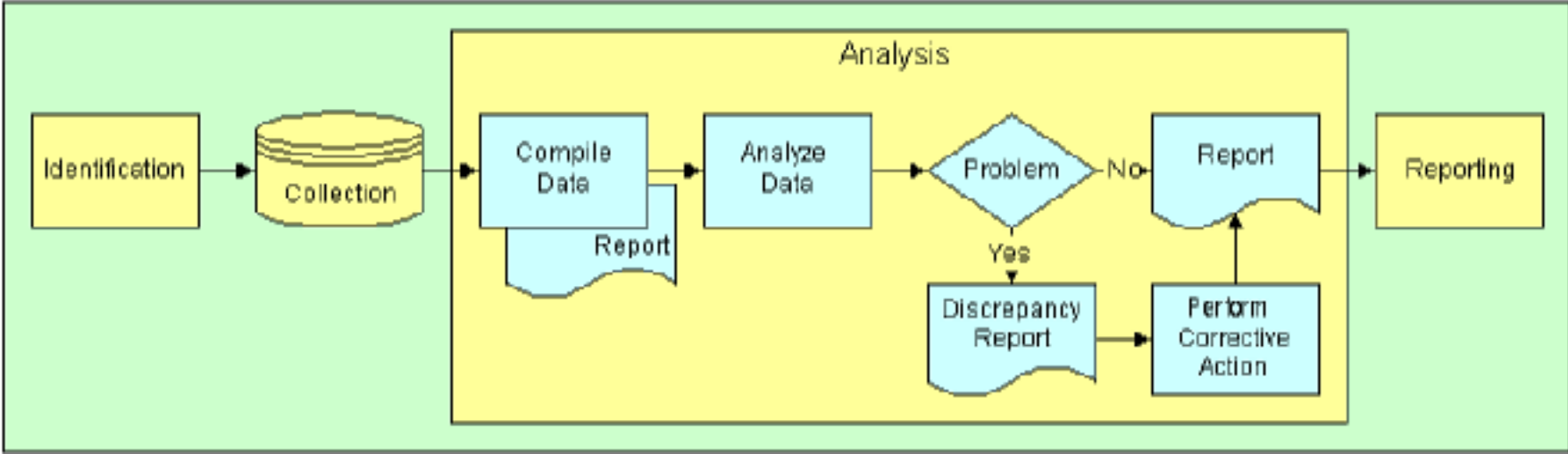
## ■ Training

- The rationale behind the procedure
- How the new process is performed
- The roles and responsibilities within the procedure
- How to obtain help

## ■ Monitoring

- Provide answers to any questions
- Provide help when problems are identified by identifying solutions quickly
- Monitor the status of the project
  - Business objectives are being obtained
  - Procedure is being implemented

# Metrics Process



# Metrics Form

	<b>Departmental Objective Form</b>	«Dev. No.»
<b>Title:</b>	Short descriptive name of the measurement described.	
<b>Owner:</b>	Identify the person responsible.	<b>Date:</b> mm/dd/yyyy
<b>Description:</b>	Provide the objective of the measurement by describing the purpose for which the measurement is reported.	
<b>Performance:</b>	Identify the measurement goals that are to be obtained. These measurement goals should be a range that the measurement should fall within to be acceptable. If the measurement falls outside of the goal, corrective actions to be implemented.	
<b>Calculation:</b>	<p><b>Derived:</b> Identify the formula used for calculating the derived measurements. Measurement Name = (Formula)</p> <p><b>Base:</b> Identify the source of the base measurement data. Measurement Name: Source Name, Source Location</p>	
<b>Report:</b>	Identify the format (type of chart) that the data will be displayed on the Measurement Report.	



# Learning Stage

- Year/Cycle end Meeting
  - Review progress with respect to SAP
  - Review progress with respect to PIP
  - Review process improvement project
  - Review updated process improvement metrics
    - Were metrics collected properly?
    - Enough resources to collect metrics?
  - Discuss economic benefits of process improvement activity reviewing metrics and organization's business goals
    - Were metrics adequate to measure business goals?
    - Were business goals achieved?
  - Discuss how to make corrective actions for things that did not work
  - Begin plans for next cycle



# Lessons Learned

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- All managers collect some form of metrics on their projects
  - Usually is not formalized
  - Do not always have defined performance objectives
  - Many times are not part of the development process
- Need constant (weekly) meetings to ensure that the metrics are being collected and analyzed
  - Ensure that everyone is aware of and performing their responsibilities
  - The collection and analysis of metrics needs to be institutionalized within the process
  - Verify that the metrics being collected and analyzed support the identified business objectives

# Lessons Learned - 2

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- Change is the only consistent constant factor in any process improvement activity
  - Need to ensure that all appropriate stakeholders have buy-in to the process and the metrics that are being collected
  - Make sure to keep management informed and involved
  - Have alternative (mitigation) plans available
- Processes need to be defined, implemented, and verified prior to automating the process
- Train everyone in the process to ensure successful implementation
- Determine as simple metrics as possible

# Questions ?

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