Metrics and Software Process Improvement

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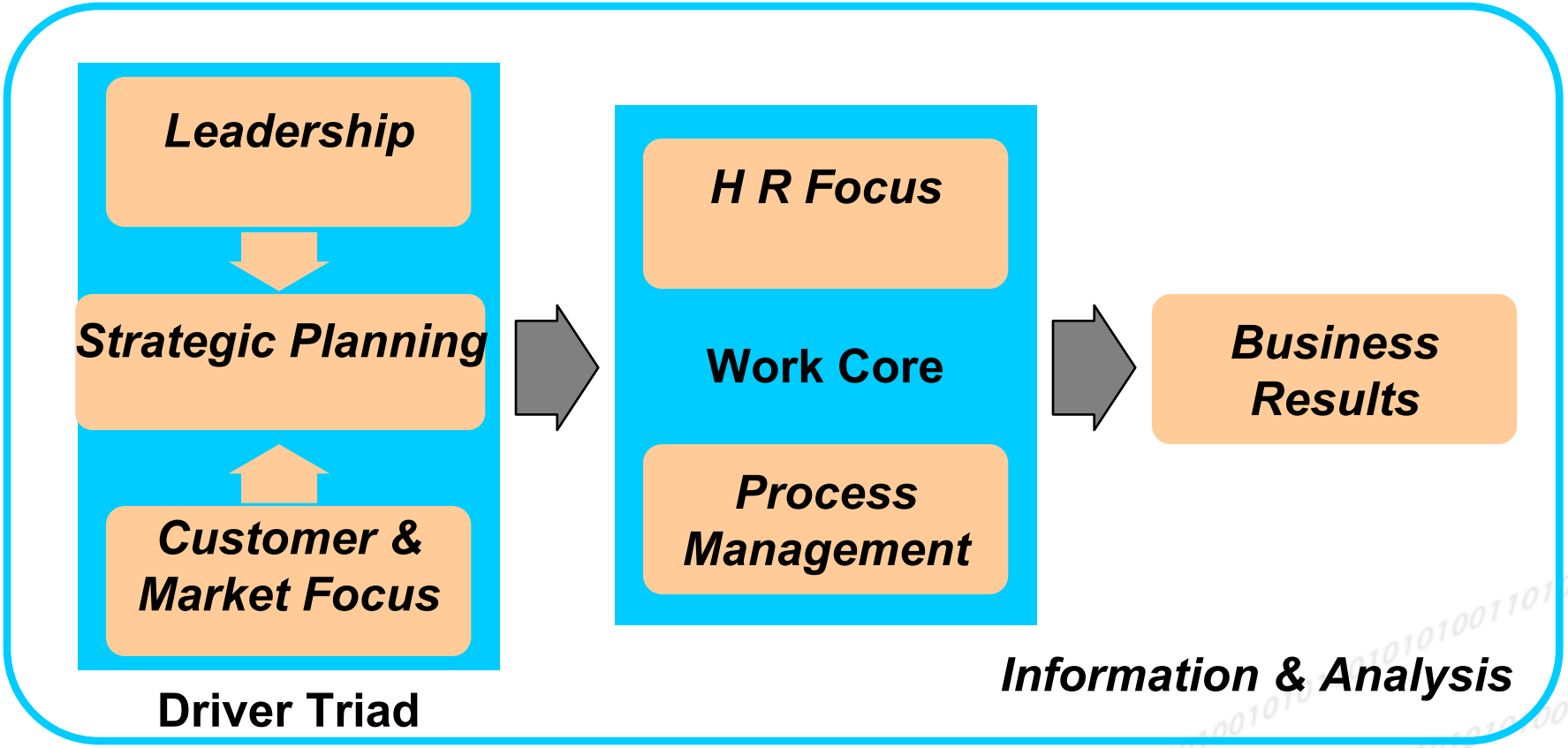
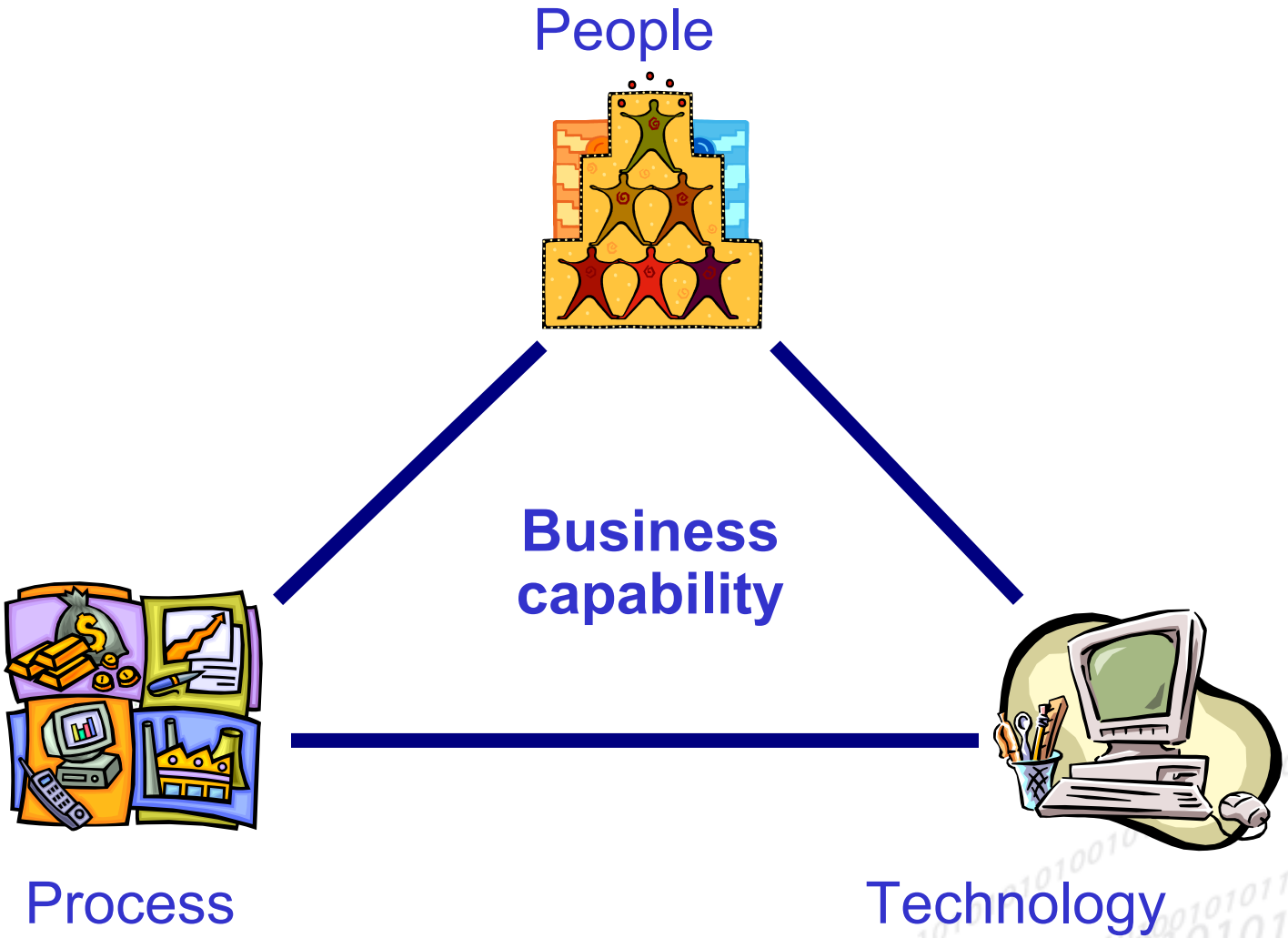
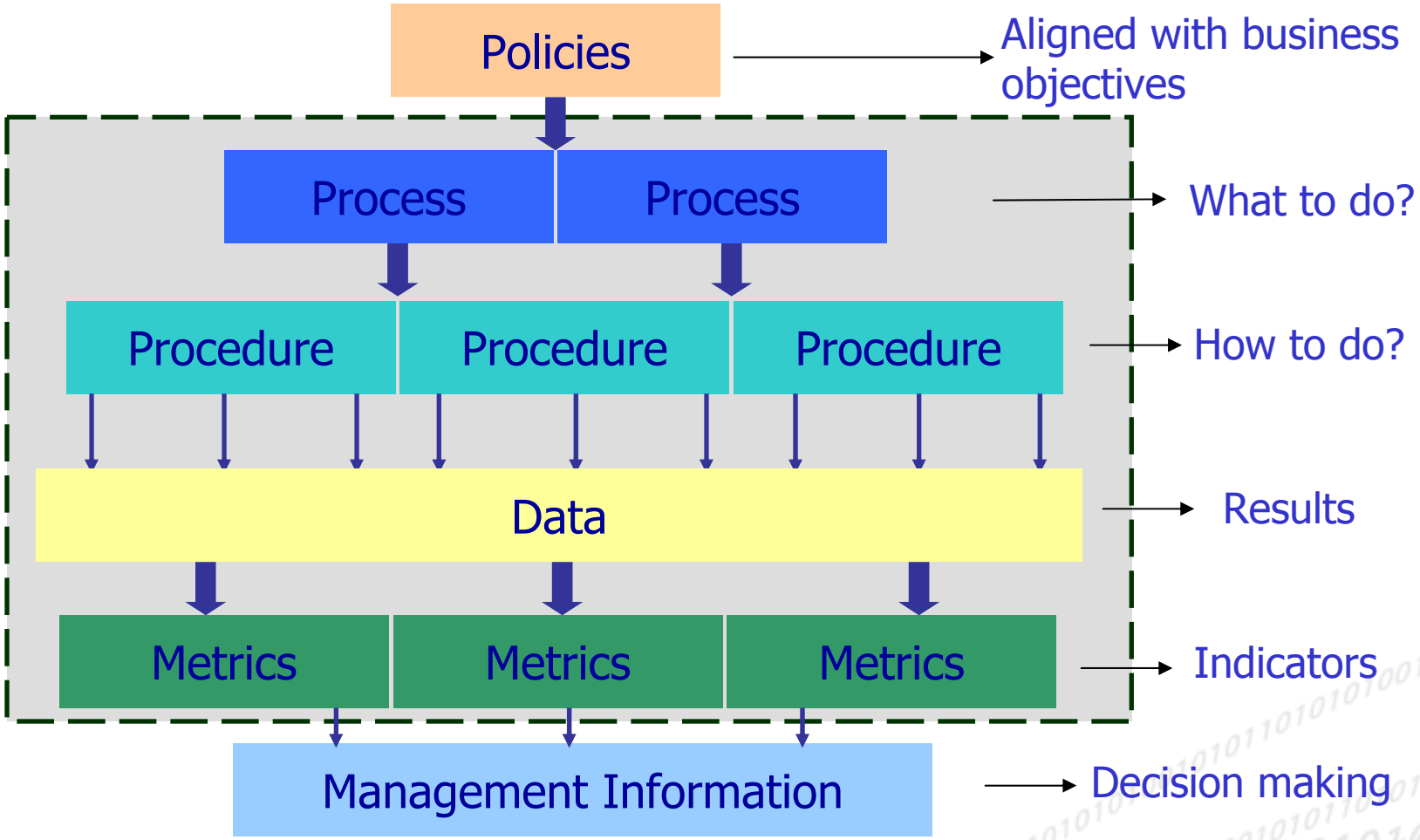
Business Excellence -MBNQA Framework



Improving Business Capability

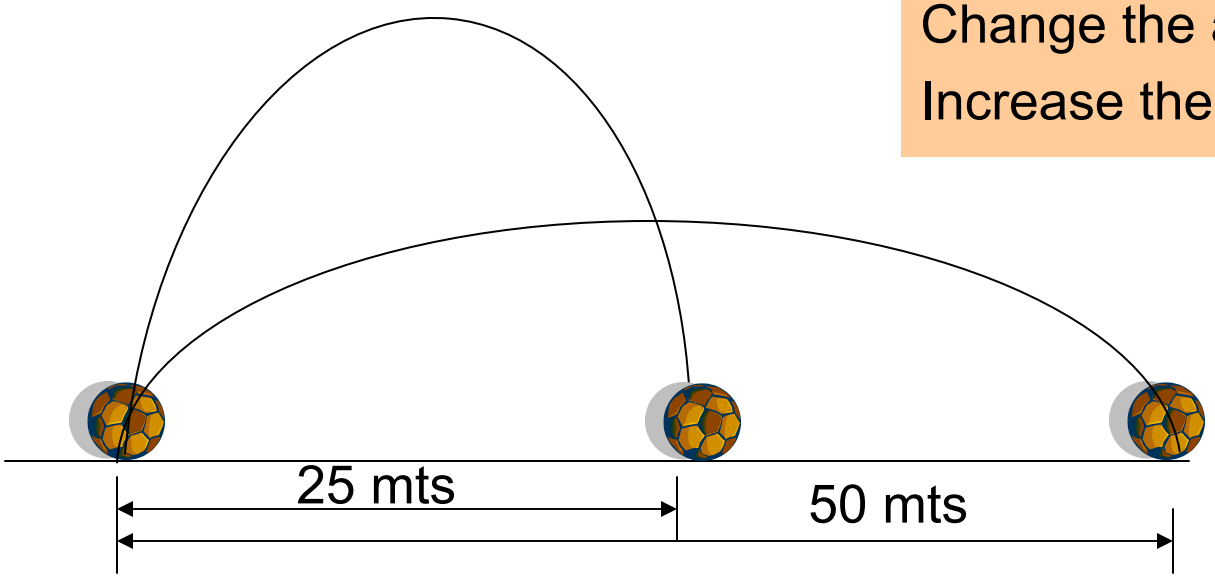


Organizational Processes



Soccer

Objective: Hit the ball to reach farther



Change the angle of hitting the ball

Increase the force

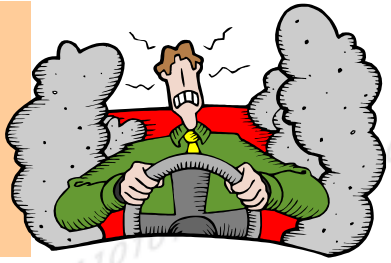
If we don't measure we don't know how much we have to improve or how much we have improved

A common scenario

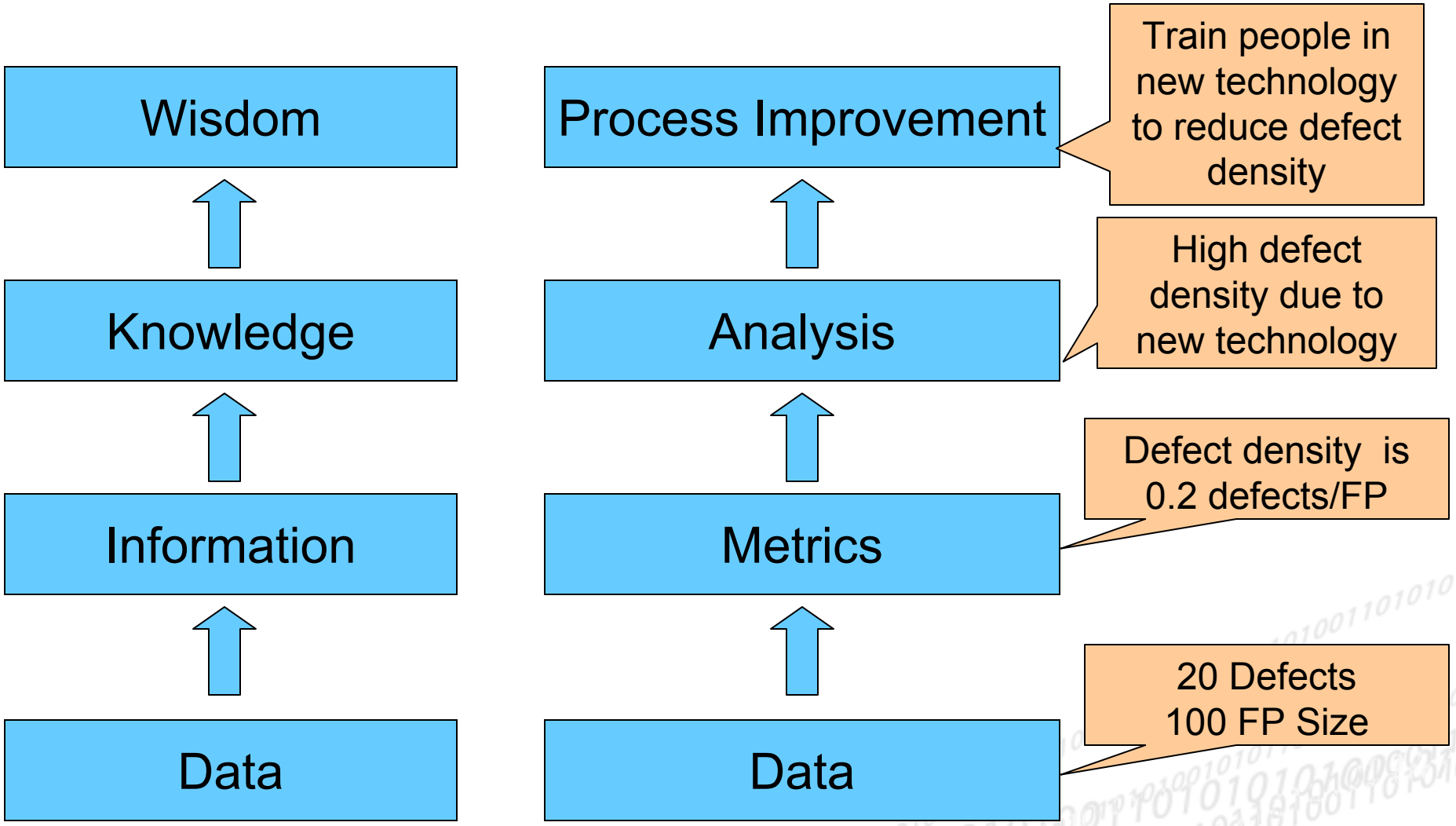
Developer says
- “I am working hard”
- “I am spending too much time for Quality documents”
- “I have no time for your processes”

But still…

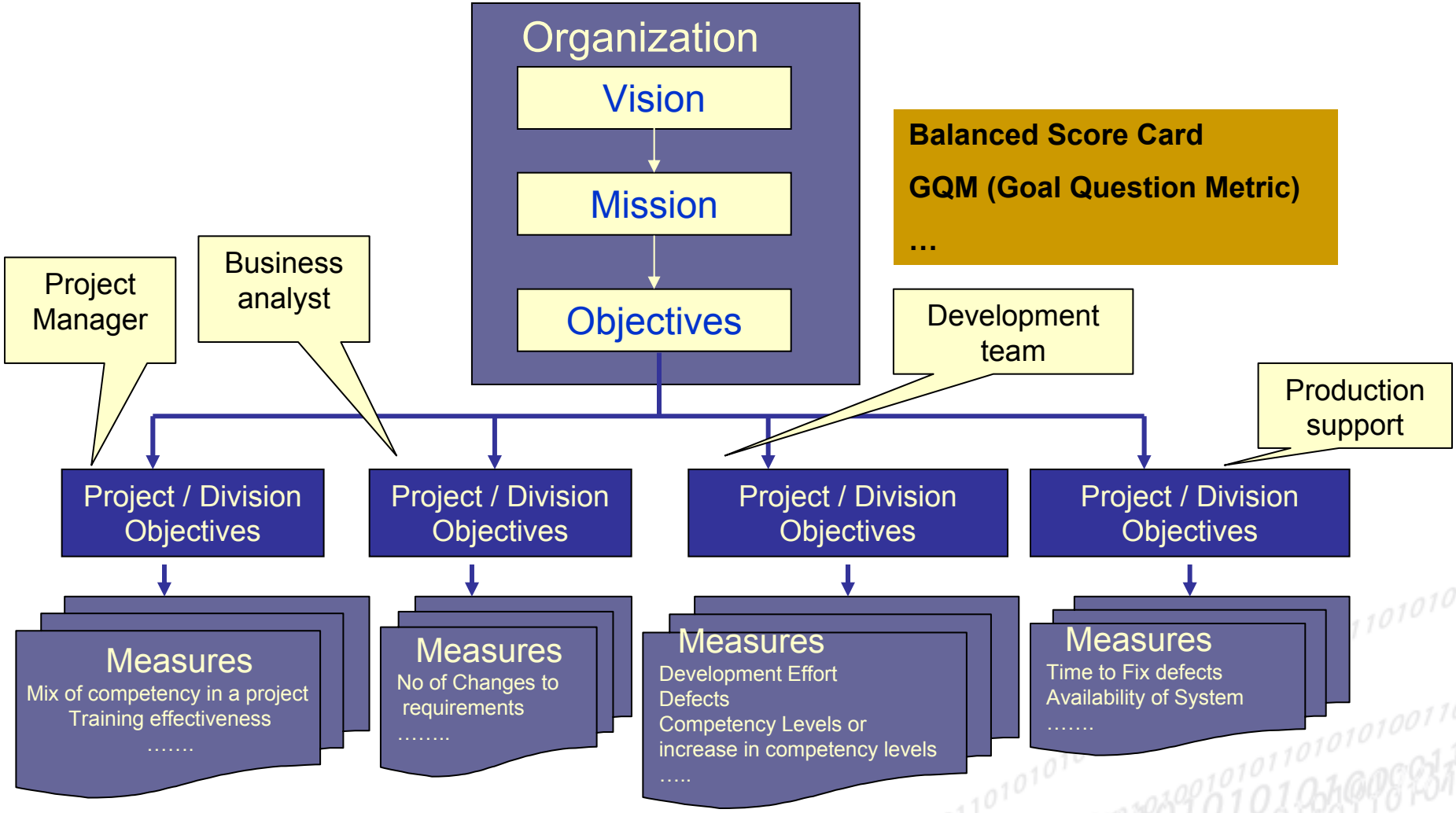
Manager says
- “Our Product Quality is poor”
- “Our Productivity is less”



Management by Facts



Establish objectives and specify measures



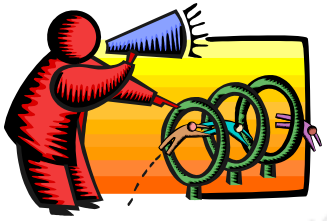
Communicate Objectives

Analysis of time sheet data did not provide any insight

Script to fill time sheet !!! To save Time!!!

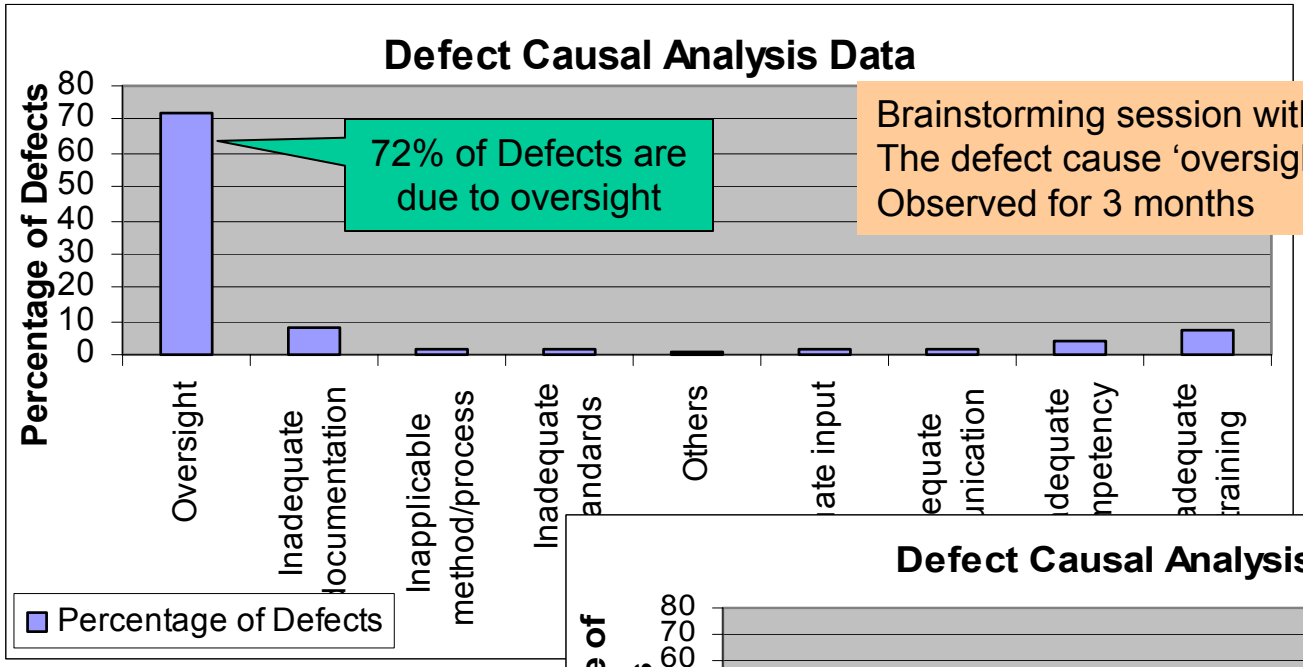
- Practitioners did not know how the data would be used
- Practitioners are required generate numerous reports, but receive no feedback

Communicate objectives for shared understanding of data usage

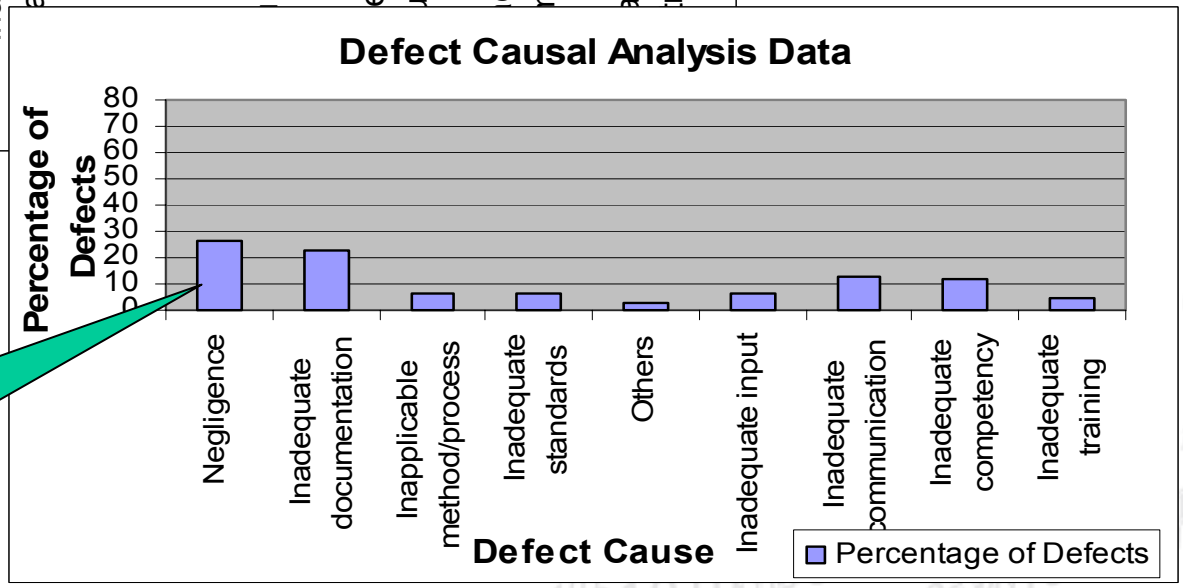


Practitioners need to be trained to use the collected data to make better decisions

Don’t just measure!!! Act!!!

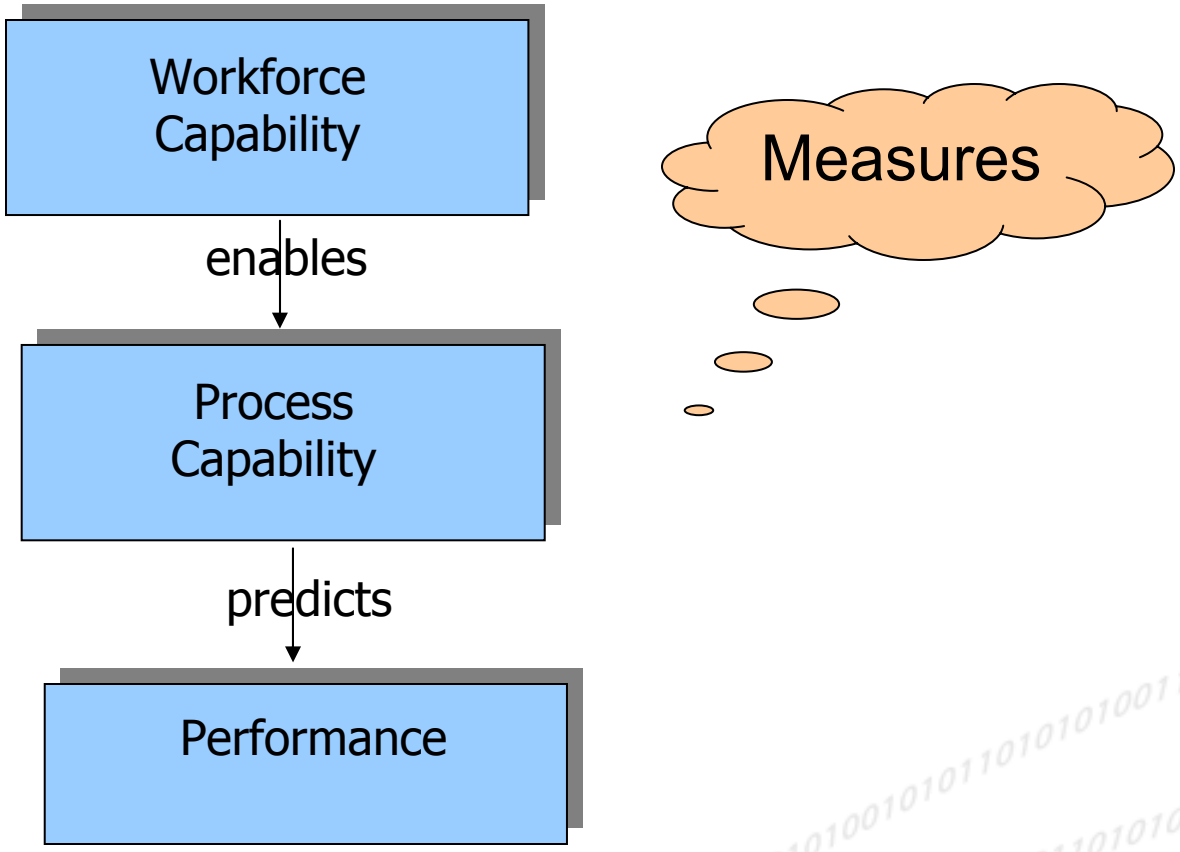


Brainstorming session with PM’s
The defect cause ‘oversight’ is changed to ‘negligence’
Observed for 3 months

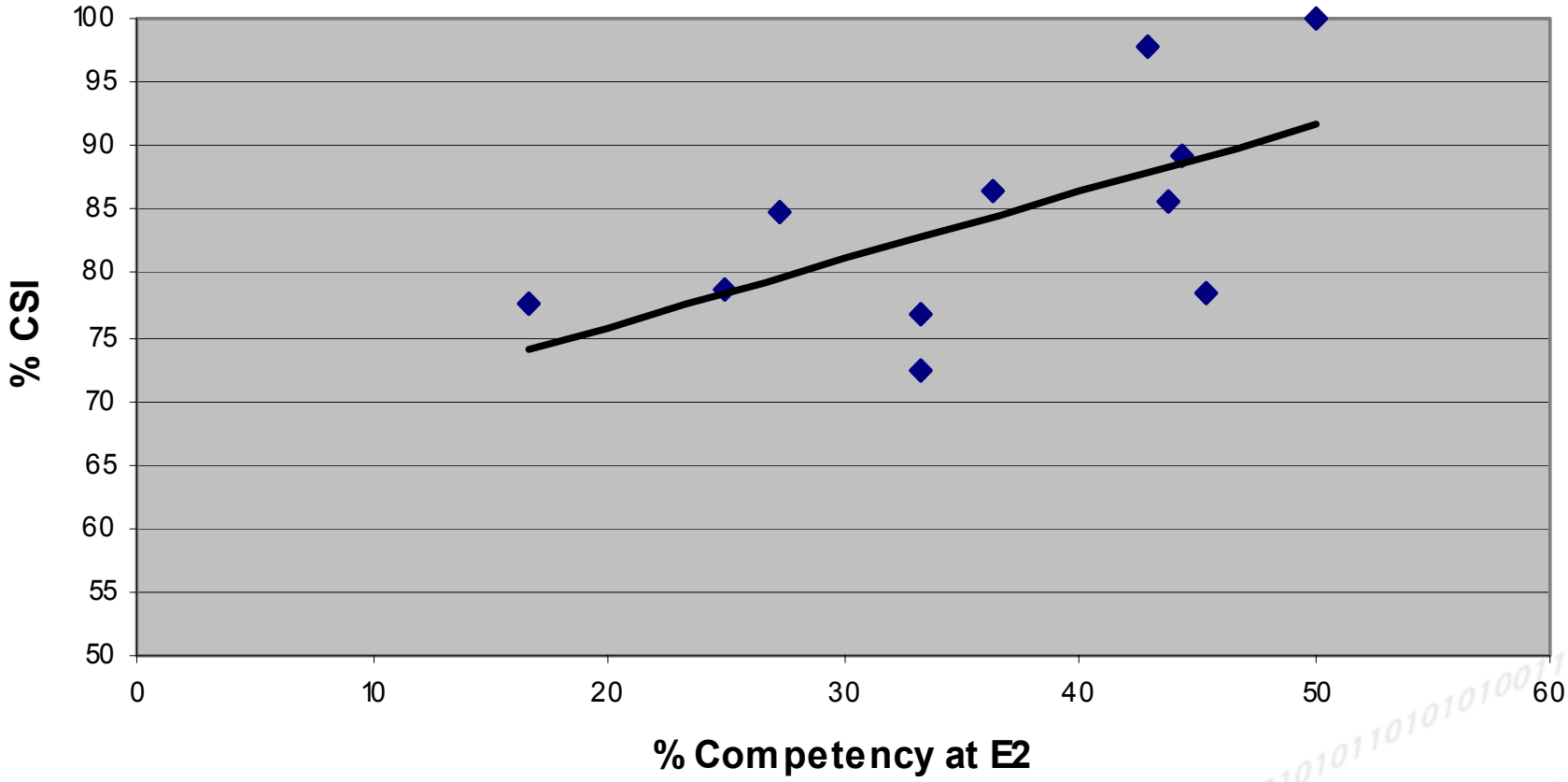


- Percentage of defect cause is reduced to 26%
- Better allocation of defect cause

Improve Performance



Competency and CSI analysis - Example



NCR Analysis - Example

Number of NCR's for projects was analyzed against the following parameters

- PL's total experience
- PL's total experience in the organization
- Whether the PL is an auditor
- Whether the PL is a first time PL

Average NCs where PM is not an auditor	4.0
Average NCs where PM is an auditor	2.3
Average NCs where PM is not a CSQA	3.6
Average NCs where PM is a CSQA	2.9

Refining People processes

- Training PM's as auditors
- Auditing and Project management reviews for mentoring
- Rotation of PM's between quality and projects
- Motivating auditors and reviewers by incentives and recognition

Resistance to process change

- Reluctance in documenting
- Perceived increase in paper work
- Additional effort required for metrics collection

….

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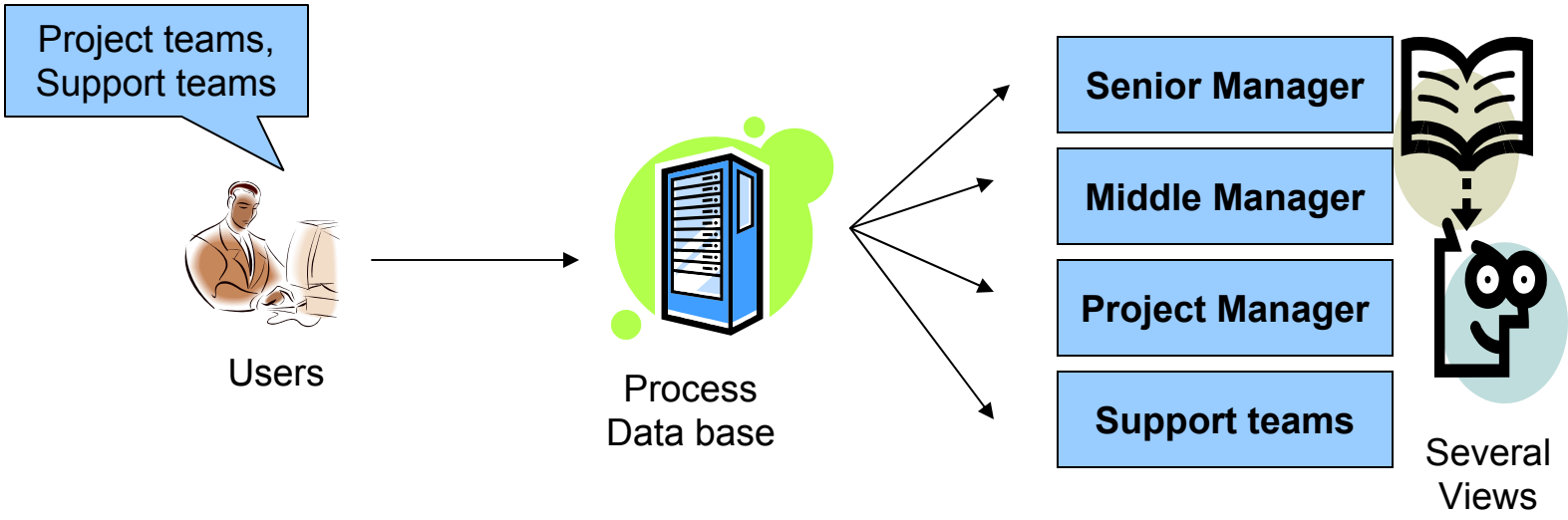
Strategy: Provide Automation Support

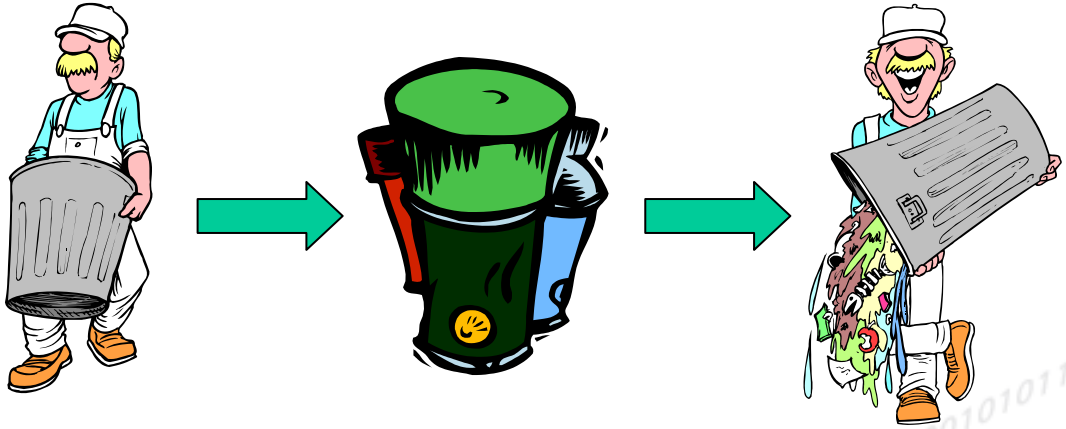


Common platform for project management, people management, defect management, monitoring delivery capability and process improvement

Role of Automation in SPI

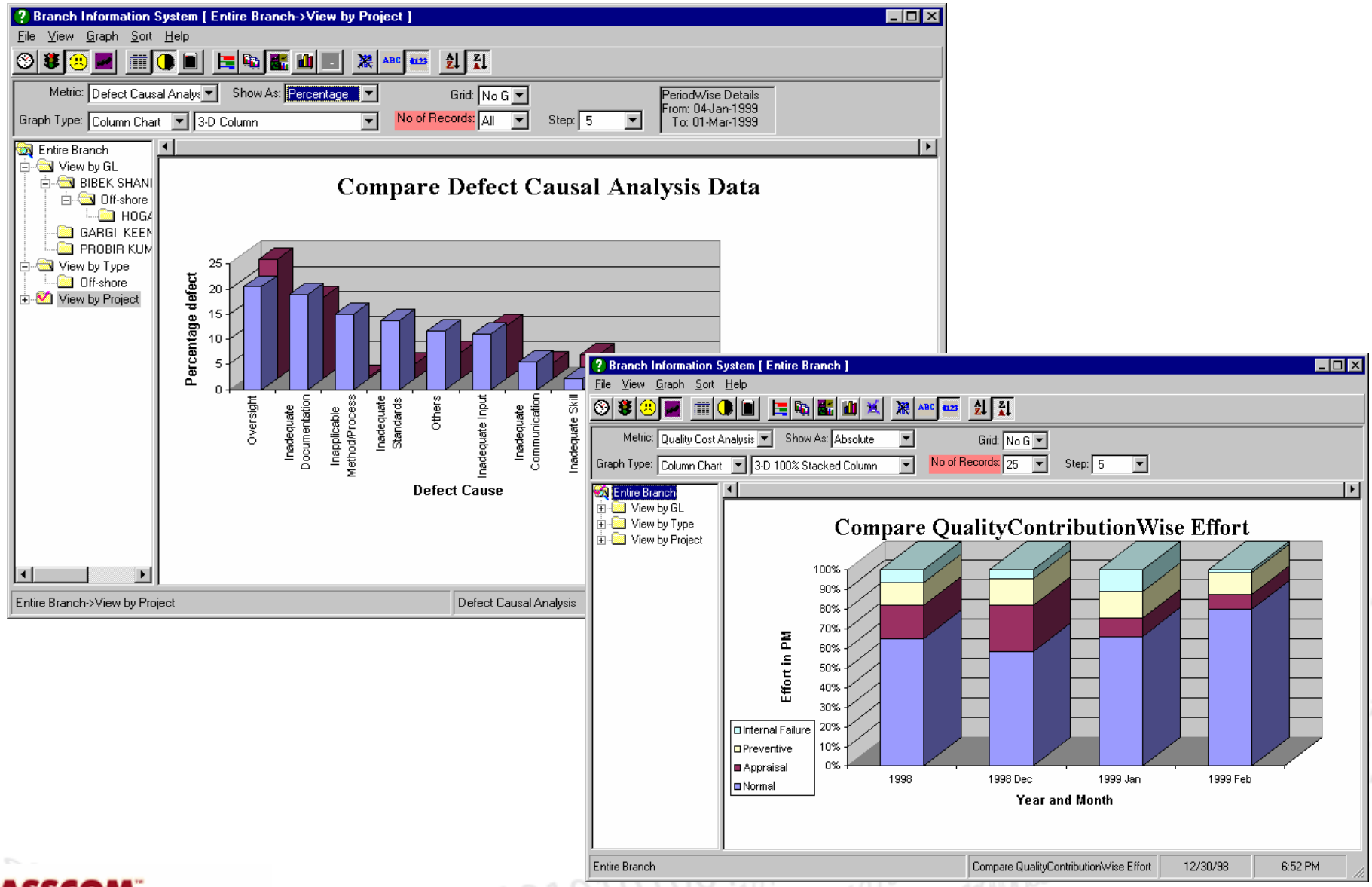
- Consistency of process use
- Enforcement of process
- Objective project management
- Easier collection and retrieval of project data
- Increase in data consistency

Caution!!!

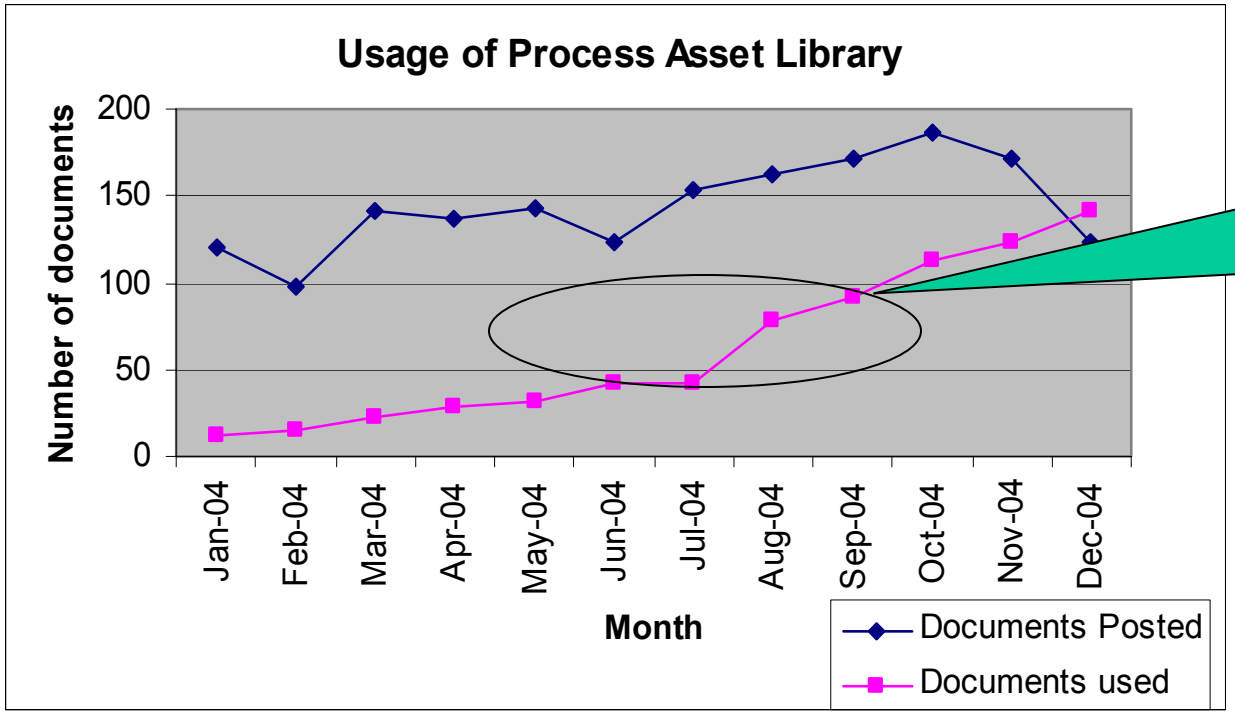


Garbage In Garbage Out

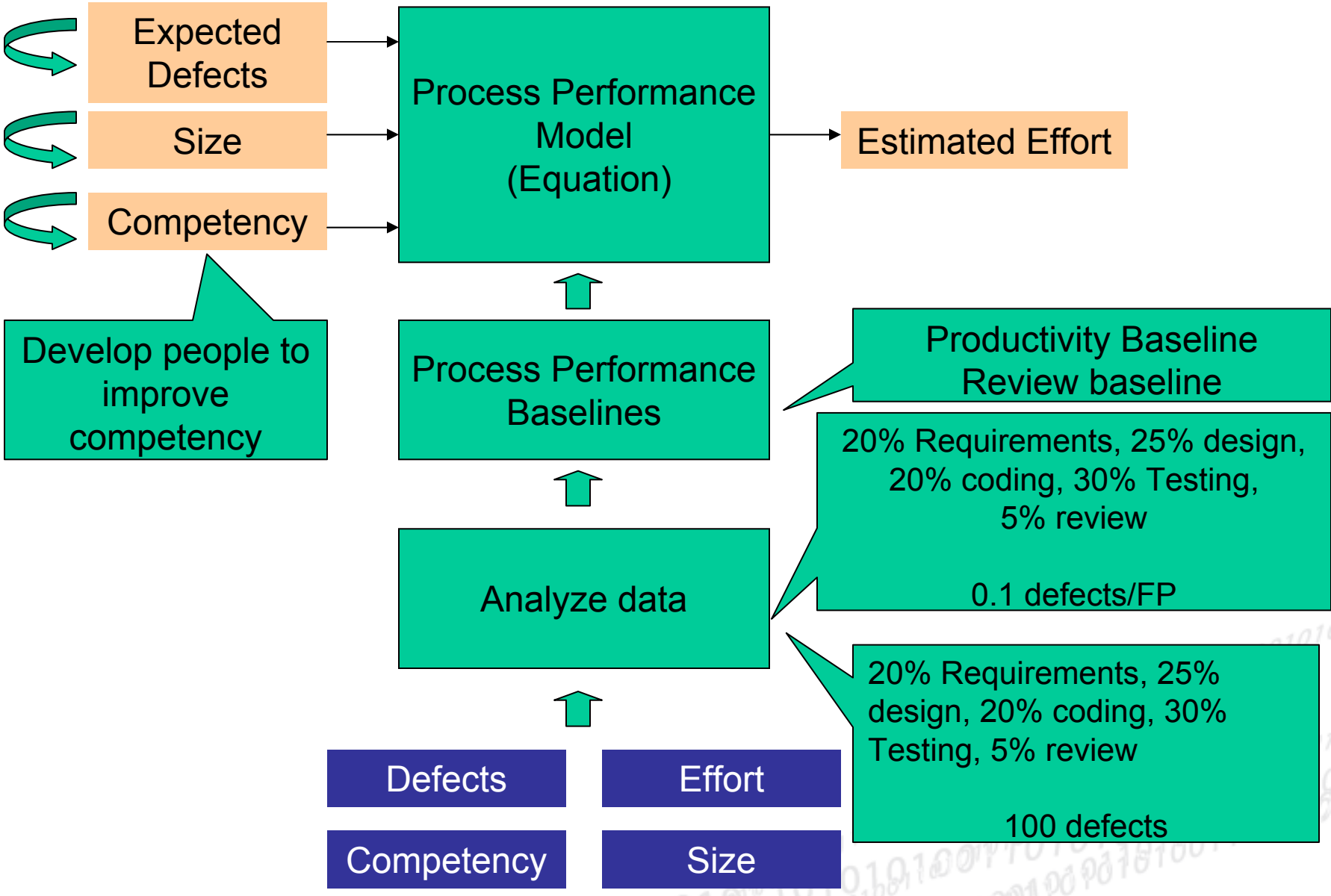
Using Automation for SPI-Example



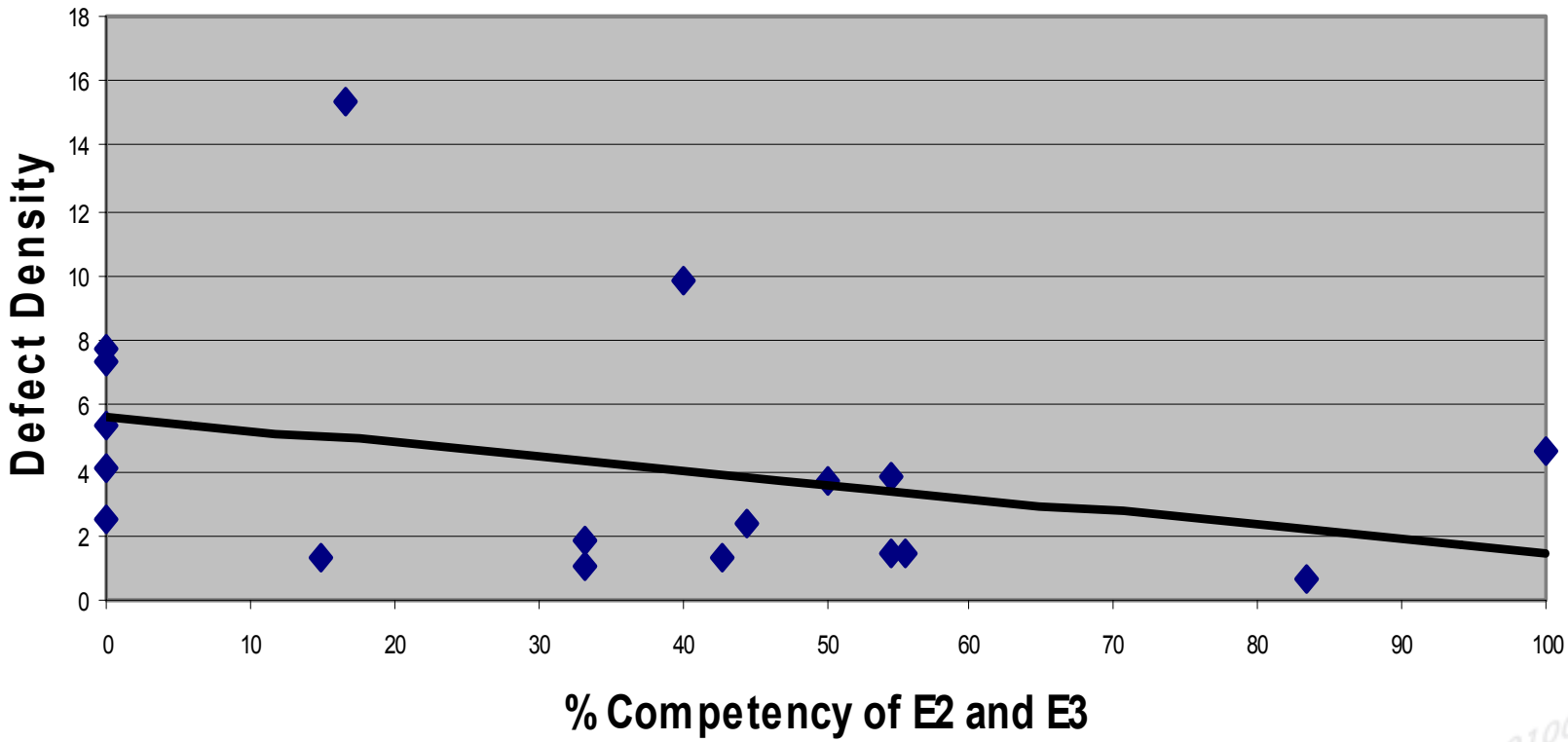
Using metrics to monitor usage of tools - Example



- Awareness session on PAL documents
- Updates on new documents in PAL by e-mail


Expected Defects
Size
Competency
Process Performance Model (Equation)
Estimated Effort
Develop people to improve competency
Process Performance Baselines
Productivity Baseline
Review baseline
20% Requirements, 25% design, 20% coding, 30% Testing, 5% review
0.1 defects/FP
Analyze data
20% Requirements, 25% design, 20% coding, 30% Testing, 5% review
100 defects
Defects
Effort
Competency
Size

Competency and defect density analysis - Example

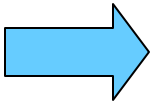


Challenges

- **Process related challenges**
  - Clarity of objective
  - Non ambigous definitions
  - Documentation
  - Training & ongoing facilitation
  - Choosing the correct metrics and data collection
  - …
- **People related Challenges**
  - Buy-in ... What is in it for me?
  - Communication
  - Using data to evaluate individuals
  - …
- **Technology related Challenges**
  - Selection of appropriate tool
  - Tools training
  - Proper usage of tools
  - …

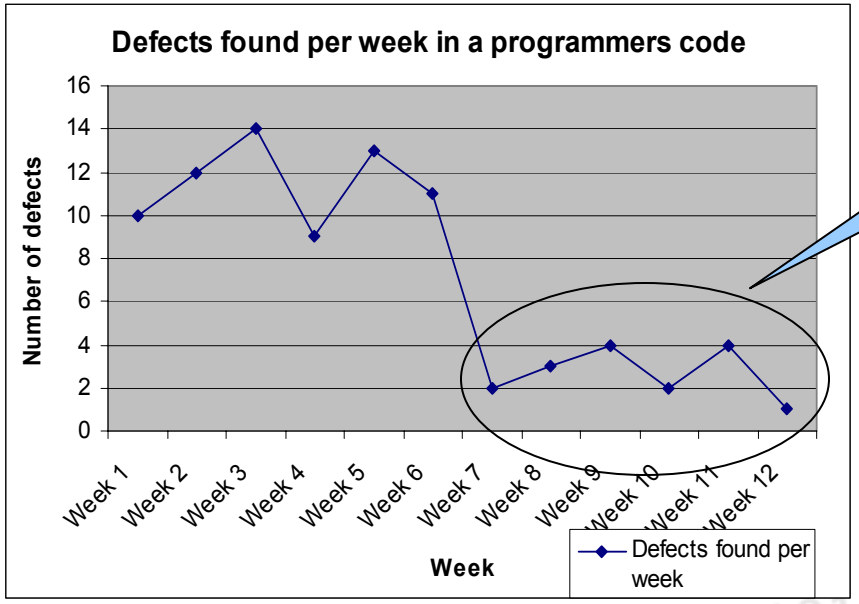
Using Metrics data to evaluate individuals

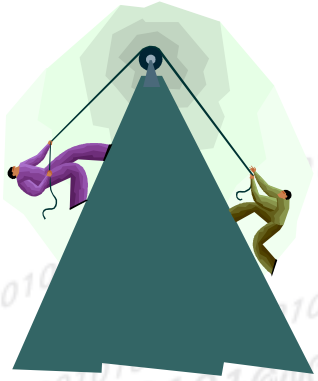
Review defects



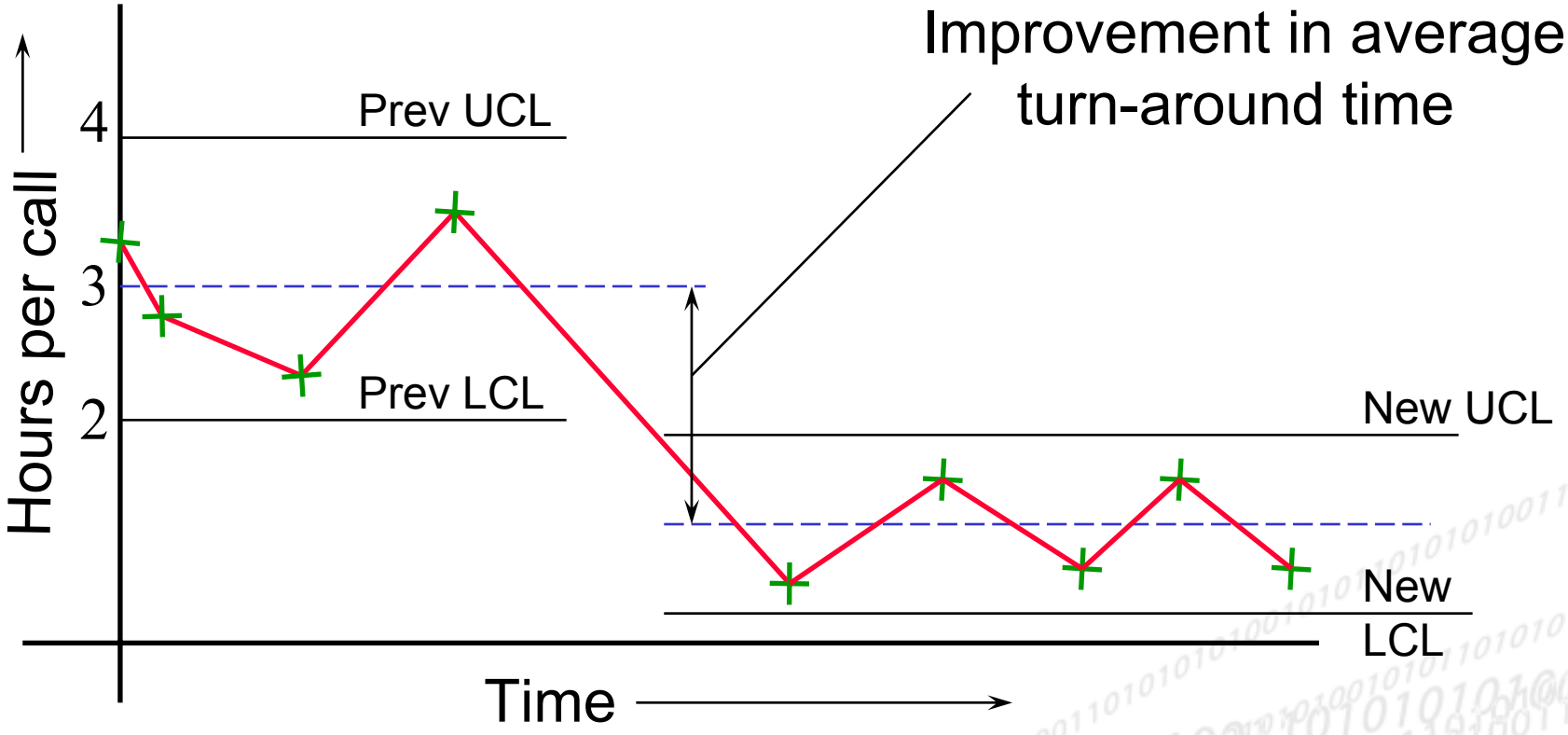
Performance evaluation

Using data for performance evaluation of a programmer has significantly reduced DEFECT REPORTING

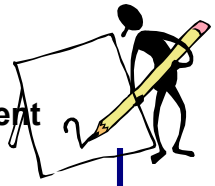




Measurement culture



Measurement Objectives



Measurements and analysis

Information needs

Communicate Results

Measures

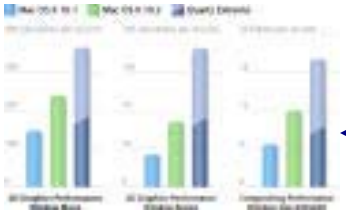
Data collection and Storage Procedures

Analysis Procedures

Process DB

Collect data

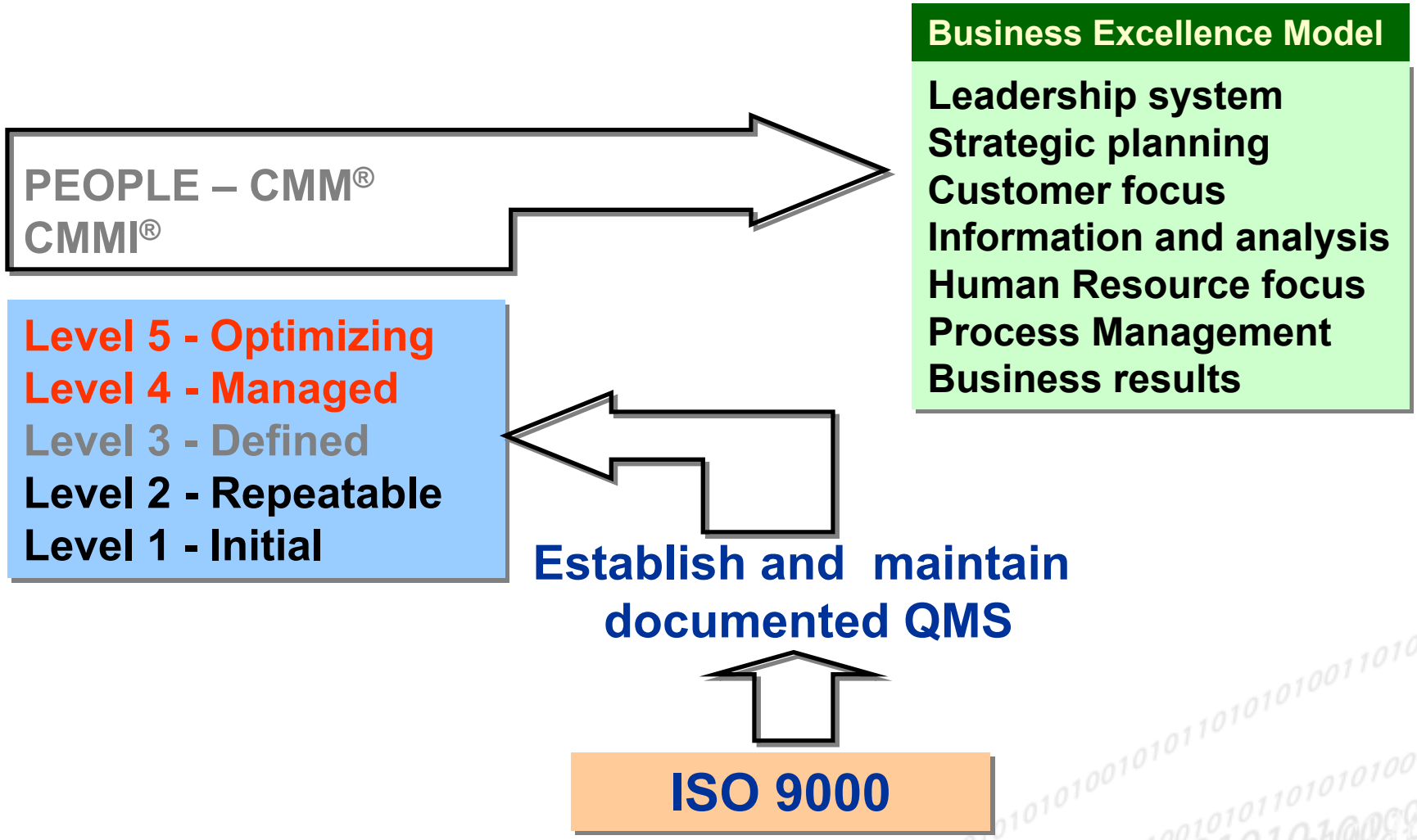
Analyze data



Data

Analysis results

Measure your Work… Don’t work to measure


Business Excellence Model
Leadership system
Strategic planning
Customer focus
Information and analysis
Human Resource focus
Process Management
Business results
PEOPLE – CMM®
CMMI®
Level 5 - Optimizing
Level 4 - Managed
Level 3 - Defined
Level 2 - Repeatable
Level 1 - Initial
Establish and maintain documented QMS
ISO 9000

SPI Benefits

Metric	Without Improvement	With SPI	Improvement
Primary Benefits			
Total Development Costs	$2,886,543	$780,174	$2,106,370
Total Rework Costs	$619,369	$26,080	$593,288
Average Schedule Length	27 Calendar Months	17 Calendar Months	10 Months
Post Release Defects	15% of Total Defects	<5% of Total Defects	80%
Secondary Benefits			
Projected Sales	$10,000,000	$10,500,000	$500,000
Penalties/Bonuses	($50,000)	$50,000	$100,000
Yearly Turnover Costs	$615,000	$102,500	$512,500
Repeat Business	$1,000,000	$5,000,000	$4,000,000
Cost of the Improvement		$373,000	($373,000)
Weighted Risk Likelihood			
High	$412,500	$0	
Medium	$1,678,125	$0	
Low	$0	$175,000	

Source: DACS Report

Thank you

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