Controlling Project Performance by Using a Defect Model

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TAKING YOU FORWARD

Overview

- Business Needs
- Project Defect Model
- Experiences
- Conclusions

Product quality and process effectiveness

Ericsson, The Netherlands

- Market Unit Northern Europe & R&D Center
- R&D: Value Added Services
  - Strategic product management
  - Marketing & technical sales support
  - Development & maintenance
  - Customization
  - Supply & support
- +/- 1300 employees, of which +/- 350 in R&D

Business Need for Quality

- Multimedia functionality
- Stability & Performance
- Customizations, flexibility
- Outsourcing

Target

Business: Increased R&D Efficiency

- R&D Scorecard
- Lead-Time, Cost & Quality

Quality: Lower Fault Slip Through (FST)

FST = Number of defects detected in integration & customer test that should have been detected earlier

"Should" implies that the defect is more cost effective to find earlier.

The test strategy defines what is cost effective

Measurement Values

Use Available Data	over	Collecting More
Analyze	over	Measuring
Give Feedback	over	Micro Managing
Take Actions	over	Reporting

Required

Control of Quality:

- Clear requirements
- Quality planned & tracked.
- Fact based decisions
- Known release quality
- Deliver on time
- Lower maintenance

Project Defect Model

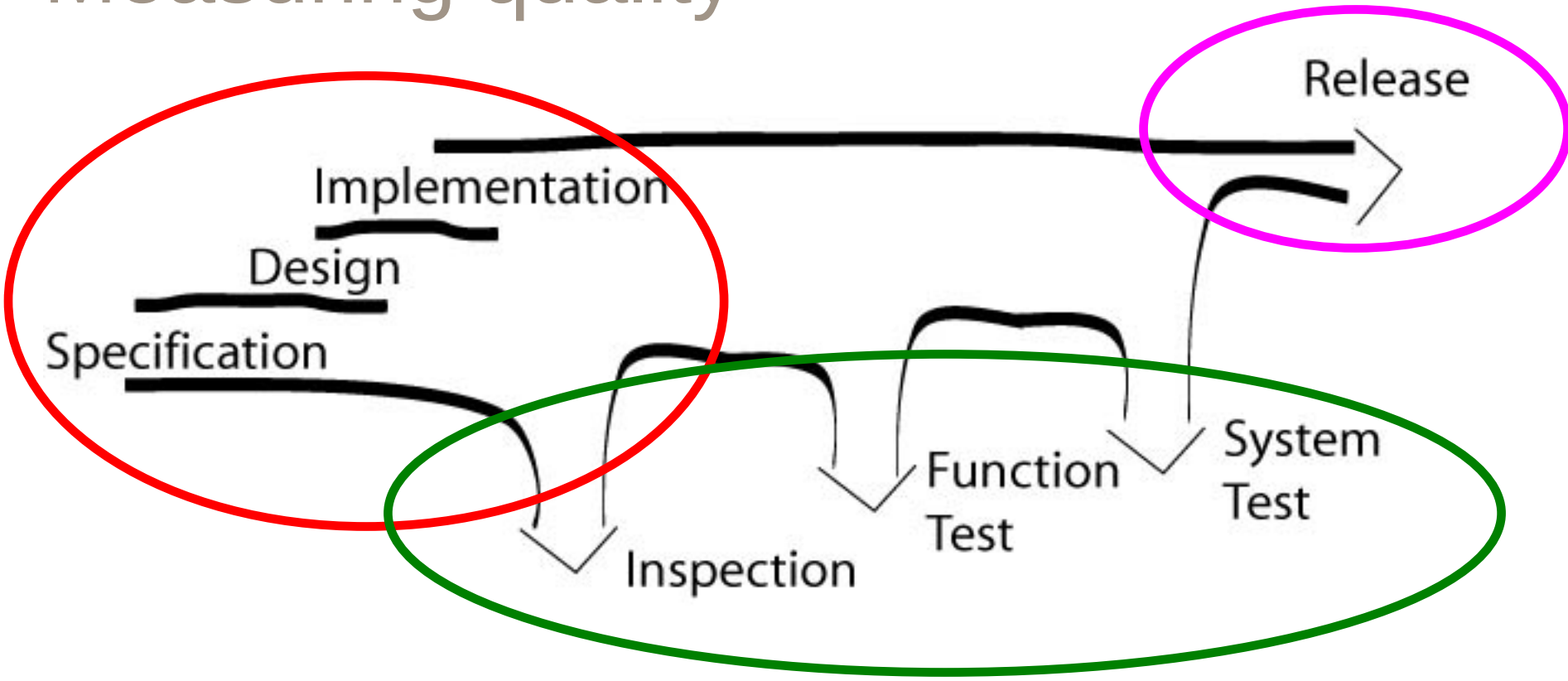
Why?

- Control quality of the product during development
- Improve development/inspection/test processes

Business Benefit:

- ➔Better planning & tracking
- ➔Early risks signals
- ➔Save time and costs
- ➔Happy customers!

Measuring quality



Insertion: Where are defects made? How to prevent?

Detection: Where are defects found? Early/economic removal?

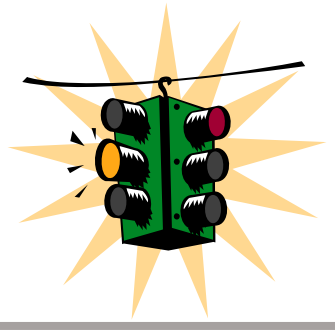
Quality: How many defect are left in the product at release?

Quality Management

- **Plan**
  - Documents/code (nr defects made)
  - Inspection & Test effectiveness (% detection rate)
  - ➢ **Quality consequence of project approach**

- **Track**
  - Actual nr. defects found
  - Estimate remaining defects
  - ➢ **Quality status, steer daily work**
  - ➢ **Project decisions, early escalation**

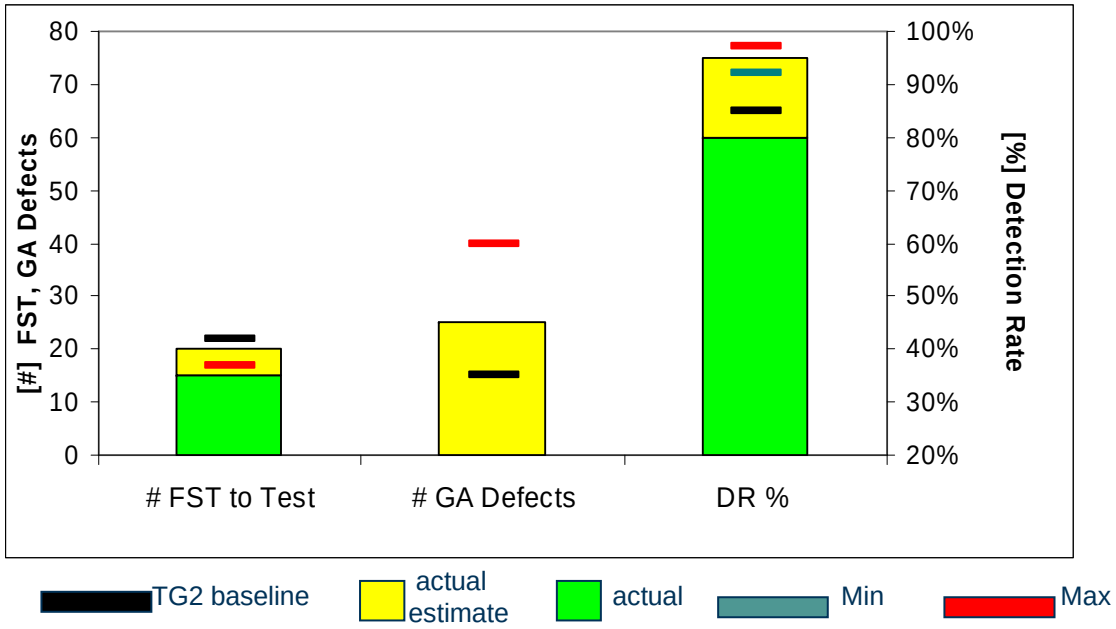
- **Steer**
  - Toll Gates, Quality Doors, Product Release
  - ➢ **Product Quality figures, quantitative decisions**



Reporting

Status

Project Status Deviation Report regarding Quality



Analysis of current situation

Targets – ……..

Fact – ……..

Reason – ……..

Consequence – ……..

Corrective actions **(Mandatory for targets with Minor or Major deviations.)**

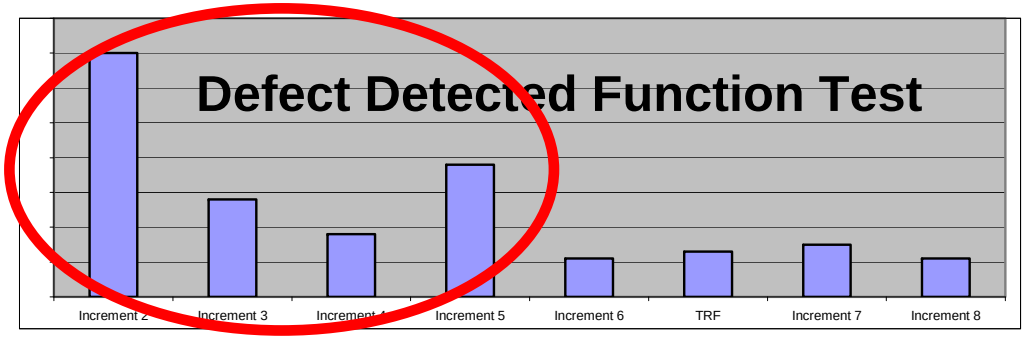
What	When (due date)	Who
▪ ……. ▪ ……. ▪ …….	**200y-mm-dd** **200y-mm-dd** **200y-mm-dd**	**xxxxx** **xxxxx** **xxxxx**

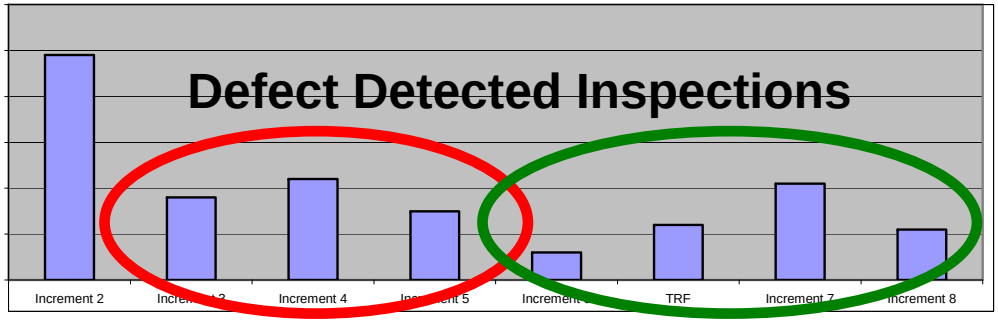
History

- **2001** Defined, pilot project started
- **2002** Evaluated, 2 new projects
- **2003** Industrialized, used in all major projects
- **2004** Integrated in Project Steering Model
- **2005** Corporate process, Pilot Cost of Quality
- **2006** Corporate Good Practice
- **2007** R&D Efficiency, reduce Fault Slip Through, Agile

Functional Test

- Project:
  - Incremental
  - Function Test Team
  - Weekly analysis
- Functional Testing: More defects then estimated
- Root Cause Analysis:
  - Missed Inspection
  - Design Rules



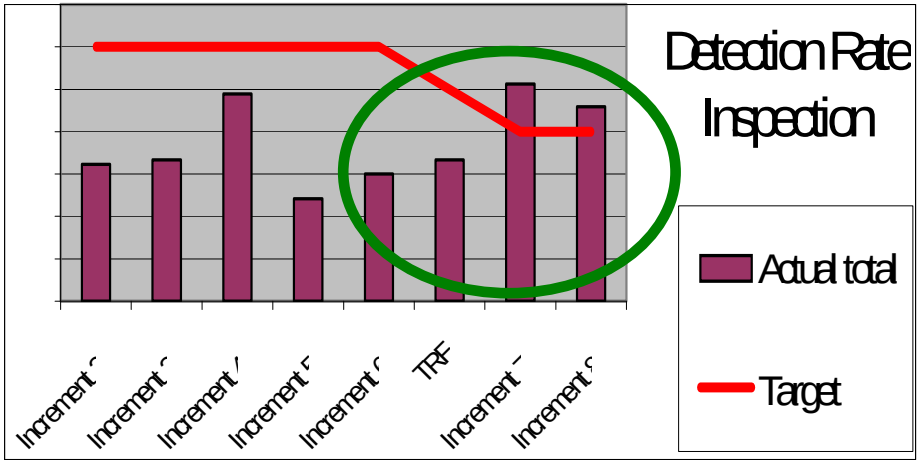


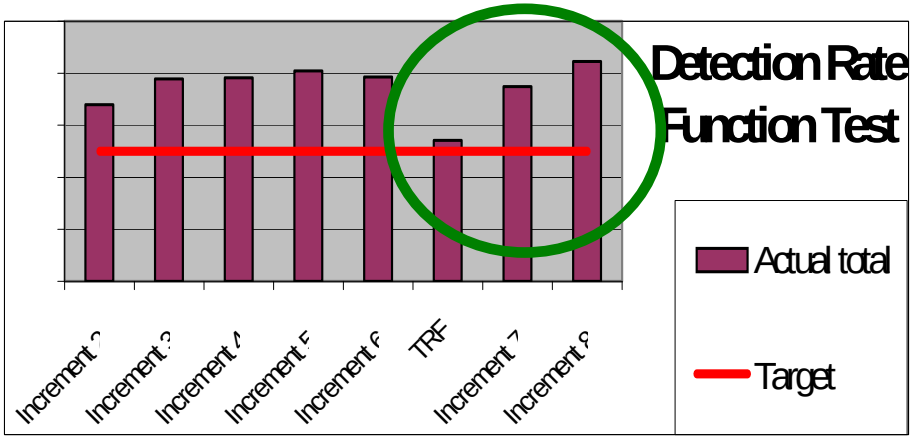
Improve Inspections

- Re-introduce Design Rules
- Coach Inspections

- More defects inspection
- Additional defects in test

- **Improved Inspection and Function Test**





Release defect prediction

Definition: Defects predicted at GA / Actual defects (%)

- Number of defects predicted at release (General Avail.)
- Actual defects tracked in first 6 months of operation
- Accuracy:
  - Mostly within 150% range
  - Only 1 product > 100% off
  - Only 1 product more defects

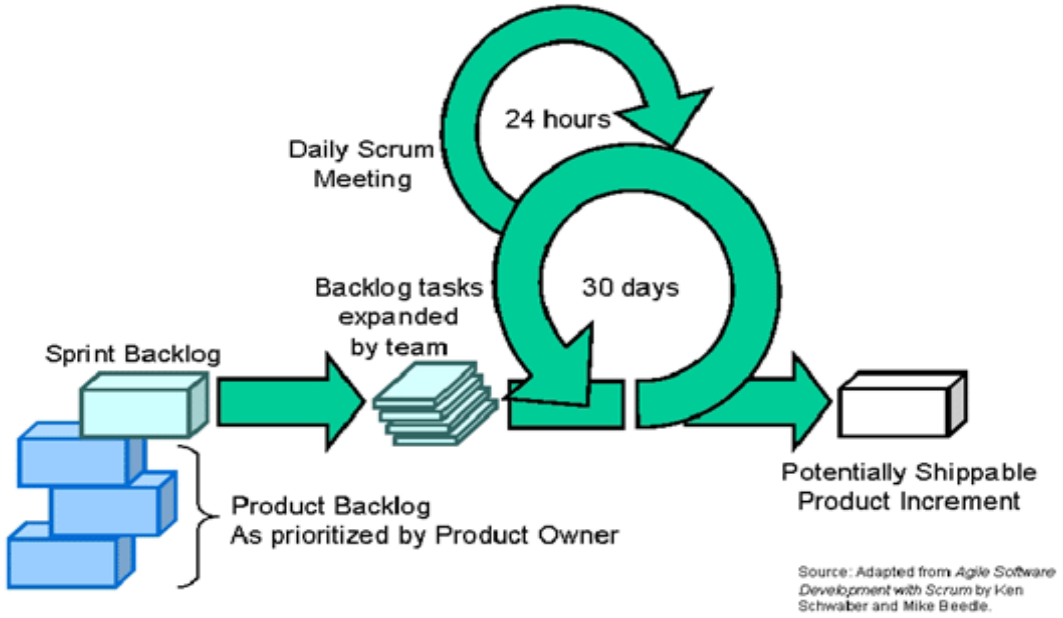
➢ Maintenance dimensioning

➢ Reduce Cost of Poor Quality

GA- 6MOP Defects				
Product	Release	Expected GA	Actual GA	GA Estimate Accuracy
A	R1			105%
	R2			178%
B	R7			100%
C	R1			100%
D	R1			600%
E	R2.1			120%
	R3			76%
F	R2.2			162%
	R3.0a			146%
	R3.0b			
	R3.0c			100%
	R3.0d			100%
G	R1			161%
H	R2a			100%
	R2b			100%

Agile Approach

- Planning game:
  - Analyze Quality
- Demo:
  - Deliver
- Network test:
  - Verify
- Team meeting:
  - Feedback



- **Balance Quality - Time – Costs**
- **Early Risk signals**
- **Optimized process**

Agile experiences

- Planning game:
  - Investigate solutions
  - Define Test strategy
  - Agree with Product Manager
  - Estimate remaining defects
  - Reduce Quality risks

- Team feedback:
  - Root Causes: **Test coverage, configuration problems**
  - Process update: **Inspection, test strategy, delivery test**

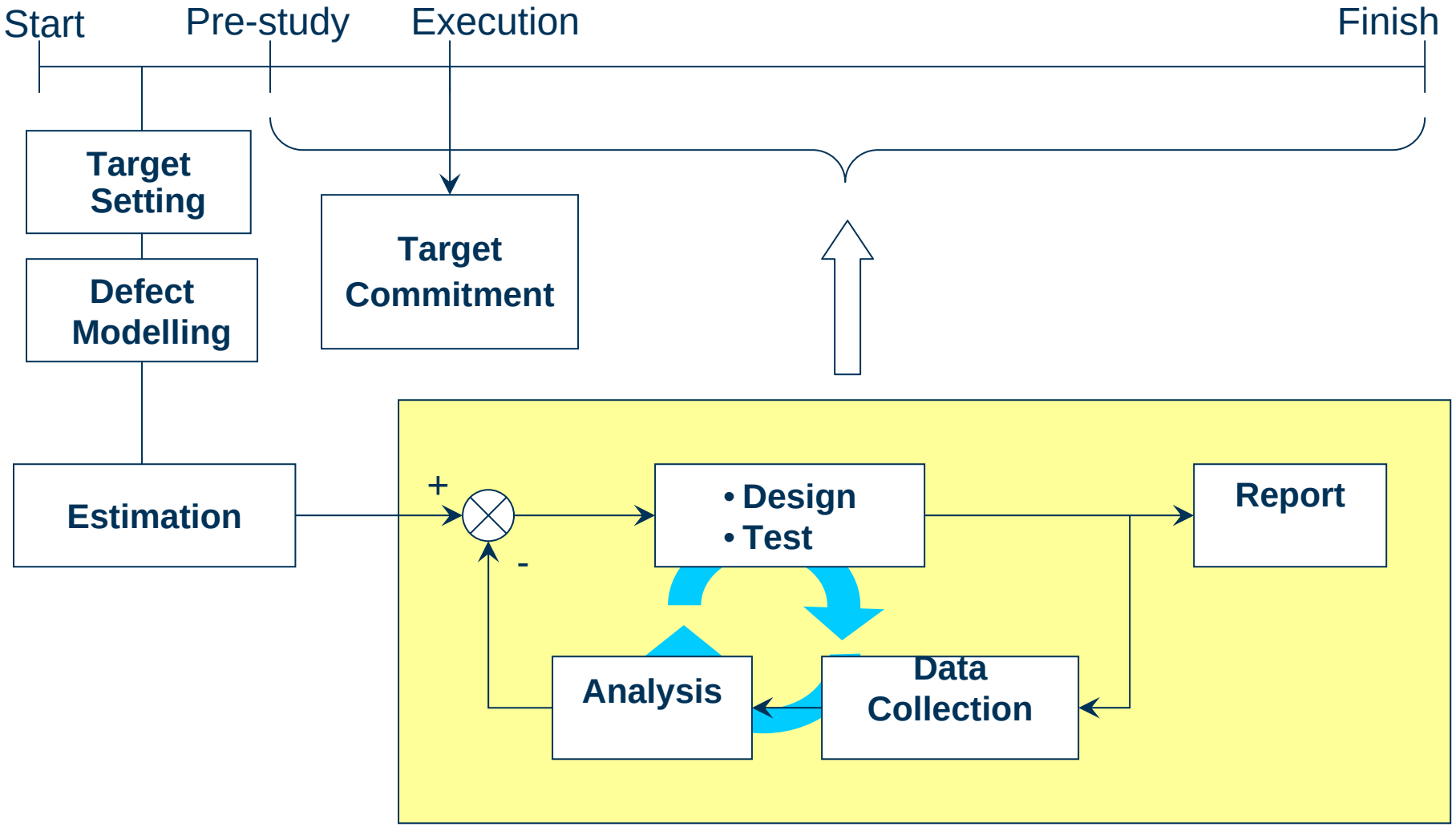
Key Success Factors

- Management Commitment
- Everybody involved
- Defect classification
- Frequent feedback

Management Targets

Target	Target Owner
GA Defects	Strategic Product Manager
Defect Detection Rate	Project Office Manager
Fault Slip Through	Design Manager

Bridging the gap



Defect Classification

Fault Slip Through: Could have been found?

- Orthogonal Defect Classification — Triggers
- Test Matrices — Focus
- Discipline maps — Proces Flow

Agree & deploy consistently

Feedback

- Frequent, short
- At the workplace
- All data available
- Design/test leaders

Feedback: Collected data delivered to the people that have done the work, in order to support understanding of the situation and help them to take needed actions

Show data

ask questions

form conclusions

take needed actions

Benefits

Qualitative

- Earlier risk signals: Deliver on time
- Incremental Development: Collaboration design-test
- Better decisions: Release quality
- Process adherence: Increased efficiency
- Less defects after release: Maintenance Reduction
- Less disturbances: Employee motivated

Quantitative

- Higher quality
- Reduced lead time
- Lower costs

ROI 5:1

Learnings

- Estimation & analysis with Design & Test Leaders:
  Valuable quality feedback
- All defect information in 1 excel sheet:
  Detailed insight, easy root cause analysis.
- Feedback sessions with project members:
  Essential for analysis, conclusions, and actions.
- Quality data next to planning and budget.
- Deployment and optimizing processes & methods.

Risks reduced: delivery date, budget & quality!

Quality Prediction

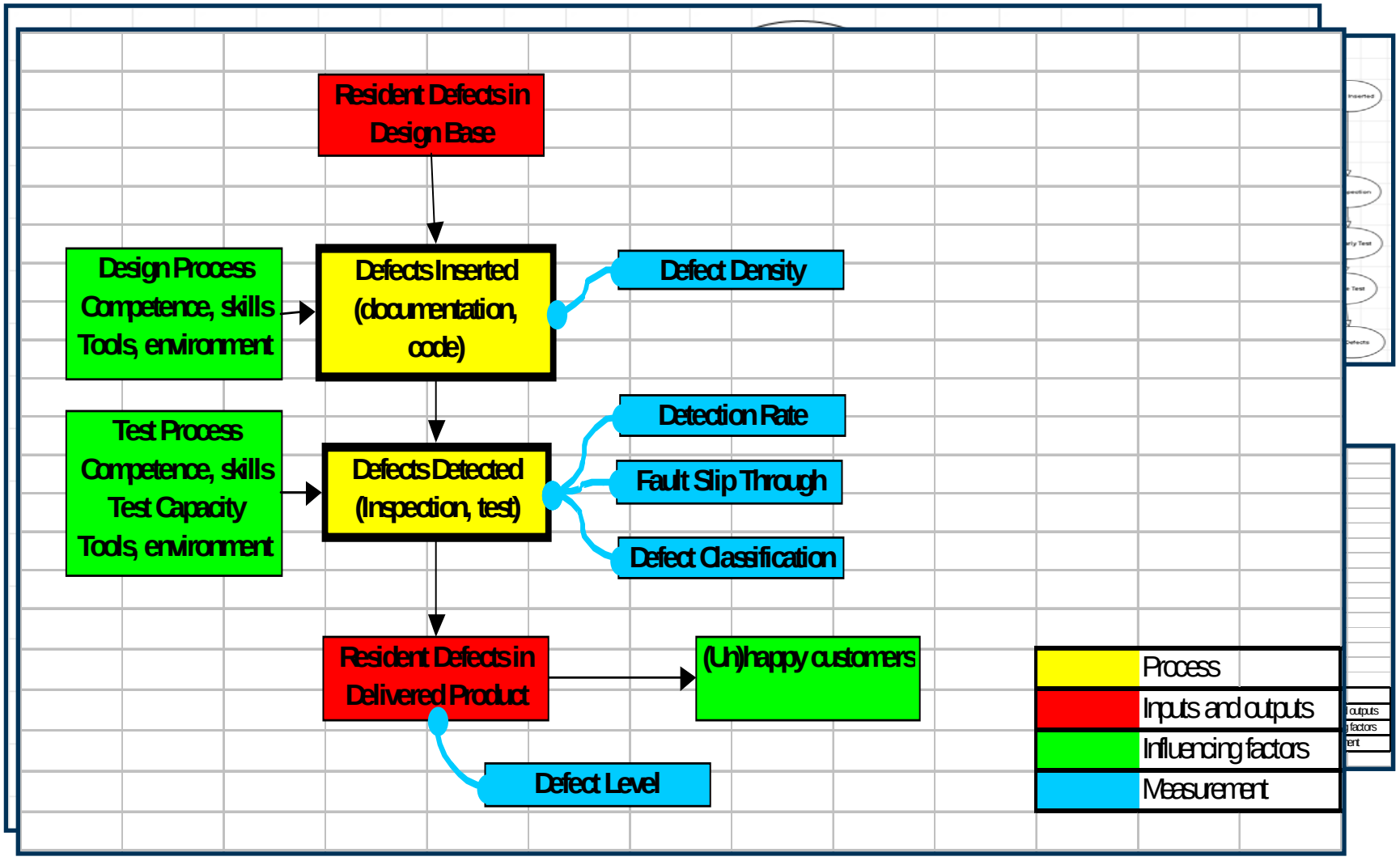
- Current Model: Estimation
  - Extrapolate past performance
  - Based on inserted/detected defects
  - Plan & track
- Wanted: Prediction
  - Causes of defects
  - What if Scenarios
  - Decision taking

All models are wrong

Some models are useful

Deming

SEI Affiliate Research



Pilot Agile: Prevention

- Determine defect insertion & detection costs

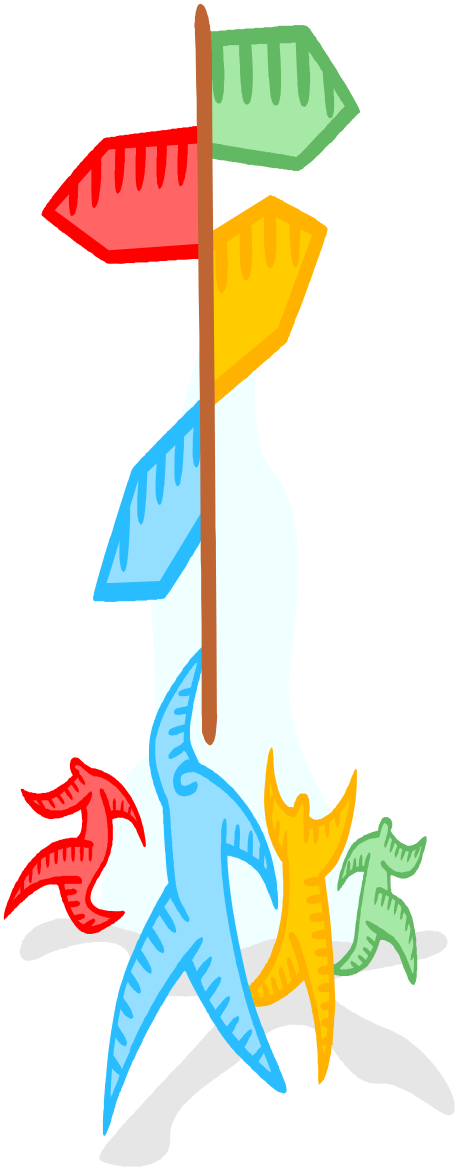
Phase	Quality Factor	Detected defects	Defects left	Cost
Req	4.5			
Arch	5.1			
Impl	5.1			
Total development			49	
Inspection	5.3	12	36	
Early Test	5.0	12	25	
Late Test	6.2	11	14	
Customer Test	5.0	5	10	
Total development				
Maint				
Total				

- Predict savings due to less defects inserted

Phase	Quality Factor	Detected defects	Defects left	Cost	Savings
Improvement					
Req	4.9				
Arch	5.1				
Impl	5.1				
Total development			49		
Inspection	5.3	12	35		
Early Test	5.0	11	24		
Late Test	6.2	10	14		
Customer Test	5.0	5	2		
Total development					3%
Maint					
Total					56%

Conclusions

- Quality has Business Value
- You can Measure & Manage Quality
- Estimate, Analyze, and Feedback:
  - Prevention
  - Early detection
  - Risk Management
- Why not start today?
  - Inspections & test
  - Release & maintenance
  - Agile



Further reading

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