

Use of Historical Data by High Maturity Organizations

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As an Organization Matures, its Measurement System Must Mature

- **Better measures, data, and analytic techniques for critical process and product characteristics**
 - Productivity, efficiency, rework, cost of quality, ...
- **Indicators of whether processes are behaving consistently and have stable trends (i.e., are predictable)**
- **Isolation of specific project practices which may be best practices**
- **Identification of improvements in standard corporate processes**
- **Better understanding of cost-quality-schedule tradeoffs**



Level	Process Areas	Measurement Guidance
5	Organizational Innovation and Deployment Causal Analysis and Resolution	Organizational & project incremental and innovative improvements driven by quantitative measures.
4	Organizational Process Performance Quantitative Project Management	Quantitative management of process and product measures, at both the organizational and project levels.
3	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Management for IPPD Risk Management Integrated Teaming Integrated Supplier Management Decision Analysis and Resolution Organizational Environment for Integration	Proactive, integrated use of project measures; use of organizational-wide historical data.
2	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management	Project-level measures for planning and tracking work and quality of work products.
1	(none)	Little, if any, measures in place.

Capability Maturity Model Integrated



Maturity Level 4

Understanding and managing special causes of variation

Organization

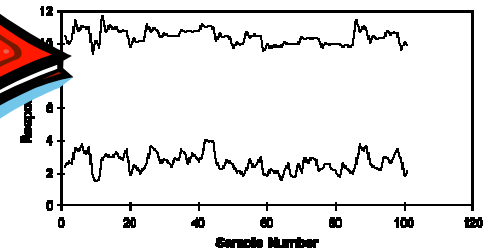
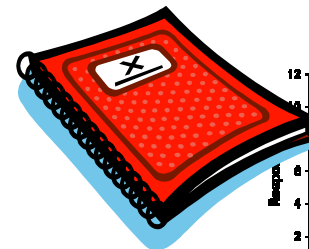
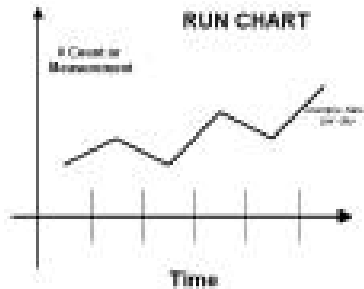
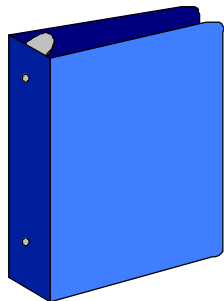


- Establishes organizational goals
- Establishes standard process
- Characterizes process performance and quality of the standard process

Project



- Establishes project goals
- Tailors standard organizational process to create project's defined process
- Selects critical subprocesses to quantitatively manage





New Questions at Level 4

- Which subprocesses are predictable at the project level? At the organizational level?
- Should different projects control different subprocesses?
- What statistical data should the organization collect?
- What differences in project subprocesses are permissible? How do they impact the historical data?
- Given two projects with two different subprocesses, how do I judge which is better? What does better mean? In what situations would it be better?
- Can I trade cost versus quality? How do I explain this trade to my customer?





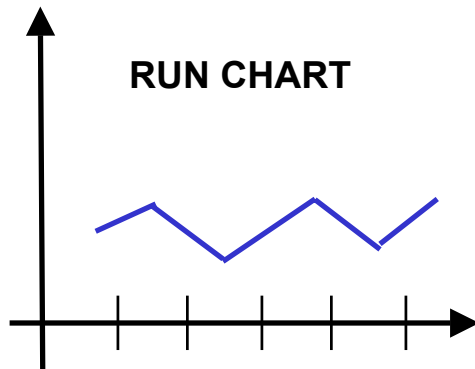
Maturity Level 5

Preventing defects and innovation (addressing common causes of variation)

Organization



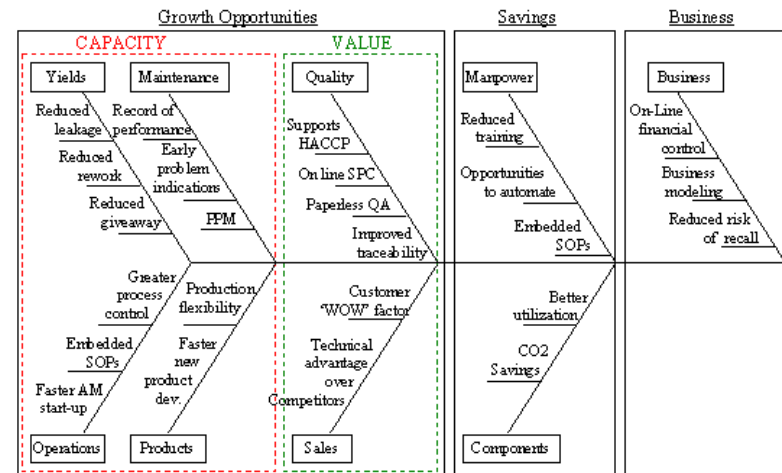
- Identifies incremental and innovative improvements
- Pilots improvements
- Deploys and measures (quantitatively) the results



Project



- Identifies causes of defects and other problems
- Takes actions to prevent them from occurring in the future





New Questions at Level 5

- What are reasonable organizational process and quality goals?
- How radically should I change organizational processes to meet these goals? How fast?
- What process changes should I make?
- How do I define a defect?
- Which defects are unrelated to process? How do I eliminate those from the analysis?





Implications on Collecting Historical Data

Key Level 3 Issues

- Comparing a future effort to past efforts
- Compensating for differences in the cost drivers – product, environmental

Typical Level 3 Measures

- Size
- Effort
- Complexity
- Environment, personnel, etc.

Key Level 4/5 Issues

- Identifying comparable subprocesses
- Identifying the factors which influence process and quality performance

Additional Level 4/5 Measures

- Process differences/tailoring
- Quality/defects
- Productivity/efficiency
- More granularity



Summary

- **As an organization matures, its measurement system must mature**
- **Maturing processes bring a host of new questions**
- **Further research and experience is needed to address these questions**