



TeraQuest

intelligent process solutions.

Focusing a Set of Measures

A Case Study Using PSM for Level 3 Behavior

Joyce Statz
TeraQuest

Agenda

Background on the Case Study

Zealots at the Gate Seeking Measures

Coach Suggests Restraint

PSM and Users Help Refine Measures Set

Use Provokes Extensions -- Success!

Result Show Benefits

Background on One Company...

Global systems and software integrator (US, Europe)

- mission-critical software systems for manufacturing, healthcare, defense, and service companies
- Denmark's largest private software company, founded 1985

TeraQuest engaged in late 2000

- company was ISO9000 registered
 - limited value from the processes
 - management skeptical about process benefits
- had worked to improve processes for 2.5 years
- customer drove requirements for CMM level 2, and

... the journey continued to a CMM Level 3 in 2002 ...

2003 - working on measurement to help business and L4



The Company's Journey - 1

Step 1 - 1 year government study - value of CMM

- small SPI team formed; did gap analysis using study advisors
- organization had TeraQuest do CMM training
- SPI team built plan, improved company business manual

Step 2 - after study, only small effort by Quality Manager and part time of 3 software personnel for the next year

- little progress, just more changes to the business manual
- much frustration over lack of use of business manual

Step 3 - customer expressed requirement for CMM L2

- Quality Manager asked TeraQuest for gap analysis
- result showed business manual had good processes, little use

One Company's Journey - 2

Step 4 - Quality Manager located budget source

- engaged TeraQuest to help craft a plan for deployment
- convinced senior management to staff and support project
- worked with TeraQuest monthly for a year, to review work products and progress, coach on internal audits/assessments, train on measurement, and secure involvement of management
- measures helped to track institutionalization
- key breakthrough point - project managers began asking for specialized measures to help with issues they faced

Step 5 - CMM level 3 assessment

- passed with flying colors - no significant weaknesses
- story is part of their Intellectual Capital Report for 2002

**33,000 staff hours invested in 125-person organization,
17,000 of which were the work of the SPI team**

Zealots at the Gate

What happens when you put measurement geeks in charge of defining measures for a level 2 organization?

- they read the CMM
- they list every possible measure mentioned or implied
- they categorize, alphabetize, more is better

but... 42 is not the answer.

Nor is 45, which is the number of measures this team selected as their starting set

45 is not the answer

KPA & No.	Description	Mapped to
SPP	<i>Described in Project Management Process</i>	
1	Completion of milestones for the software project planning activities compared to Plan	1
2	Work completed, effort expended, funds expended in the software project planning activities, compared to plan	4,5
SPTO	<i>Described in Project Management Process</i>	
3	Effort and other resources expended in performing the tracking and oversight activities	4
4	Change activity for the software development plan, which includes changes to size estimates, cost estimates, critical computer resources, and schedules	1,4,5, 6,7
ISD	<i>Described in Project Management Process</i>	
5	Effort expended over time to manage the software project compared to plan	4
6	Frequency and magnitude of the replanning effort	1,4
7	For each identified software risk, the realized adverse impact compared to the estimated loss	deleted
8	The number and magnitude of unanticipated major adverse impacts to the software project tracked over time.	deleted
RM	<i>Described in the Project Process Management Process</i>	
9	Status of each allocated requirement	8
10	Change activity for the allocated requirements (effort spent on RM)	8,4

(portions excerpted for purposes of illustration, only)

Coach Suggests Restraint

Reviewing their start at a measurement program showed

- **minimal automation support to gather data**
 - **time tracking system in place to support billing**
 - **part of the group using a project planning tool**
 - **old issue tracking system, being replaced by a new one**
 - **no requirements management tool**
 - **locally-developed CM tool**
- **good detailed spec for measurement database, leveraging their own database product**
- **spec for reporting tools that leveraged Excel**

It looked like more measures than needed, from insufficient sources, but what's useful?

PSM and Users Provide Sanity Check

Conducted PSM workshops

- 2-day session with measurement team and SPI Team
- 1-day session with project managers
 - identified their key problem areas, issues
 - identified information wanted in those areas

From this we built a more focused set of measures

- covered CMM requirements
- fit project manager needs

13 Measures Seemed Sufficient

	Measure	RM	SPP	SPTO	SSM	SQA	SCM	OPF	OPD	TP	ISM	SPE	IC	PR
1	Milestone dates	*	*	*	*	*	*	*	*	*	*	*	*	*
2	Observations (defects)						*		*			*		
3	Review Status						*					*		*
4	Effort	*	*	*	*	*	*	*	*		*	*	*	*
5	Earned Value/Cost		*	*							*			
6	Lines of Code		*	*								*		
7	Pages of Text		*	*								*		
8	Requirements	*										*		
9	Reference Model Rating							*						
10	Process Audit Findings					*		*				*		
11	Productivity			*								*		
12	Training Attendance									*				
13	Training Performance									*				

Specification and Use Refined the Set

Measurement team found PSM guidance very useful

- studied analysis model, to help identify relationships between measures, and effective use of measures
- specified templates and measures using PSM v 3 and 4

Working out the details made some changes

- renamed one, using IEEE standards term (anomalies)
- removed one, that didn't fit the culture at project level (productivity)
- added one, that was useful for SPI (compliance status)
- split Earned Value/Cost into two, to fit use

Evolved Measures and Categories

	Measure	Project Management	Process Practice	Process Improvement	Competence Management
1	Milestone dates	*			
2	Anomalies	*			
3	Review Status	*			
4	Effort	*			
5	Earned Value	*			
6	Cost	*			
7	Lines of Code	*			
8	Pages of Text	*			
9	Requirements	*			
10	Self Assessment			*	
11	Process Audit Findings		*		
12	Compliance Status			*	
13	Training Activity				*
14	Training Quality				*

Deployment Required Enforcement

Measures were implemented incrementally

Project managers were asked to use them in monthly status reports

- a few did
- others didn't see the need to

so management made it a requirement, and then...

- compliance was complete
- supervisors of the project managers reviewed monthly

Monthly Project Status Report - 1

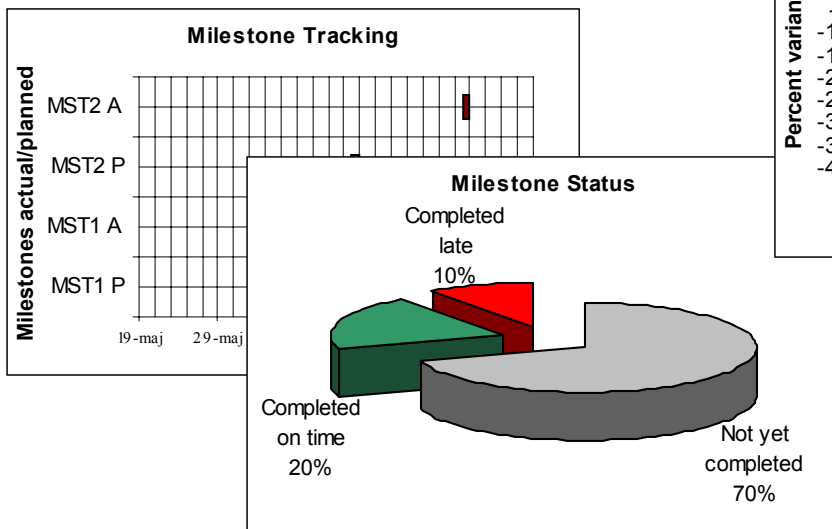
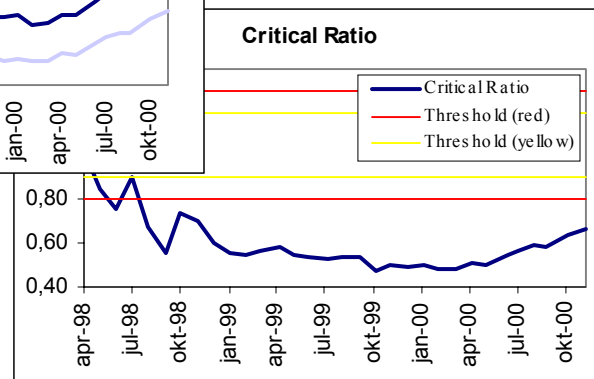
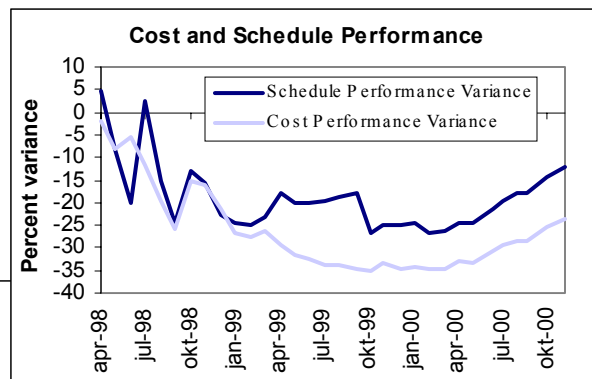
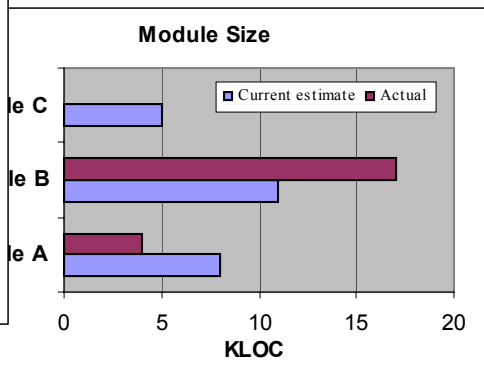
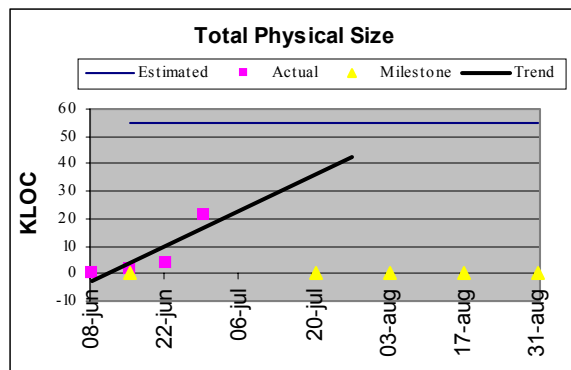
<Project Name> Monthly Status Report							
Tech. Effectiveness	Size	Cost	Schedule	Quality	Process Performance	Customer Satisfaction	Risk
Technology Effectiveness							
Size							
Cost and Effort							
Schedule							
Quality and Process Performance							
Risk and Customer Satisfaction							

Quick Overview

Supporting Comments

Monthly Status Report - 2

Suite of indicators for each area of reporting, available from the intranet, for review by project managers, team members, and business managers



Use Provokes Extensions -- Success!

But... the real success came next

- **several project managers asked for more measures!**
- **these could be done with new indicators off the same data**
- **measurement team provided flexibility in Excel to handle**

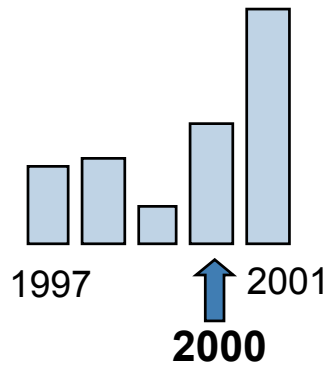
Even the General Manager found use for the measures

- **skeptical at first that the measurement effort would pay off**
- **pleasantly surprised by PM use**
- **now leverages the results in the organization Balanced Scorecard**
- **describes value of improvement in the Intellectual Capital Report**

Company Results Show Benefits



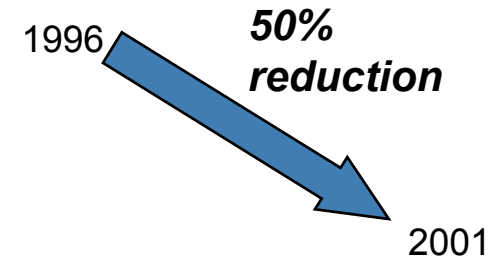
Profit After Tax



Employee Satisfaction



Estimation Errors
(hours estimated vs. actual)



“If a comparison is made with 3 to 5 years ago, the projects have enhanced their estimation and planning, and we have thus reduced fire-fighting.

Consequently, our employees work less overtime and employee satisfaction has increased.”

Peter, Business Unit Director

“It has become a lot easier to shift to a new project as the work processes have been unified.

We do not need to reinvent the wheel over and over again, but can get assistance from different tools, templates, guidelines and checklists.”

Simon, Software Developer