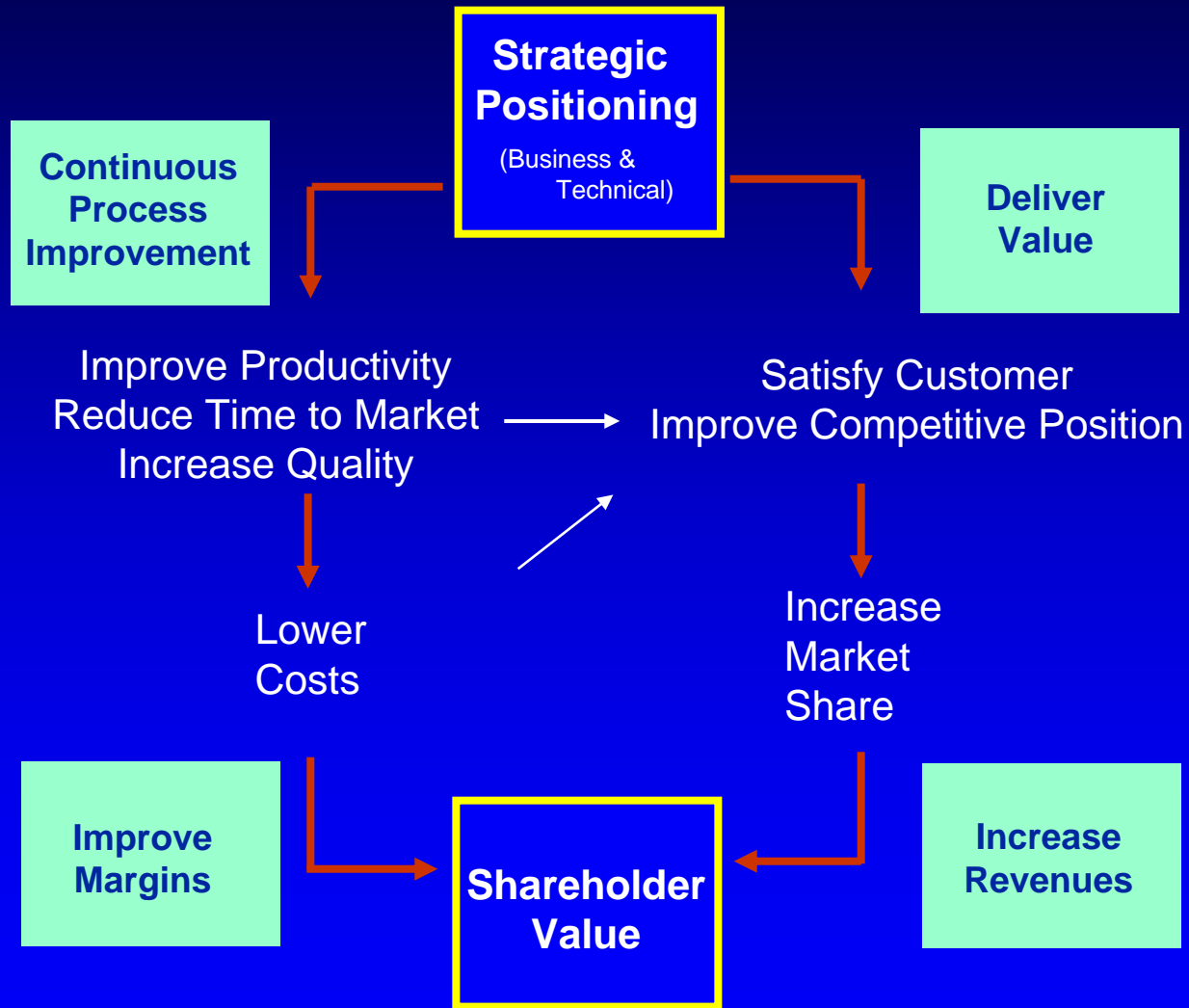# 2004 PSM Users' Group Conference

Performance Measurement of Software Application Development & Maintenance

The David Consulting Group
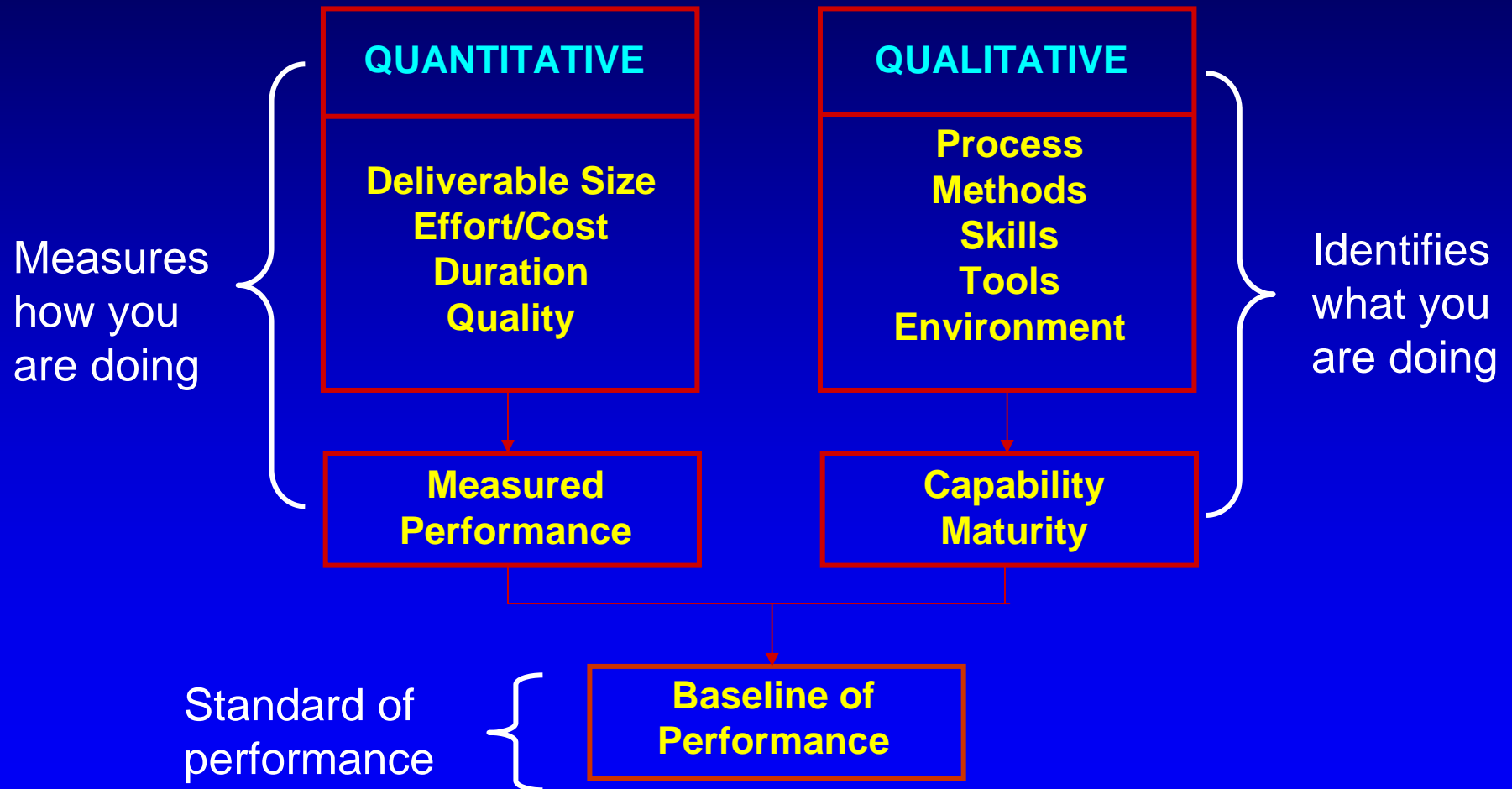**www.davidconsultinggroup.com**

1

Measurement Must Consider

Strategic Positioning
(Business & Technical)

Continuous Process Improvement

Deliver Value

Improve Productivity
Reduce Time to Market
Increase Quality

Satisfy Customer
Improve Competitive Position

Lower Costs

Increase Market Share

Improve Margins

Shareholder Value

Increase Revenues

2

Presentation Topics

- ä Measurement for Process Improvement

- ä Baseline your Performance

- ä Model Performance Improvements

3

Measurement for Process Improvement

QUANTITATIVE	QUALITATIVE
Deliverable Size **Effort/Cost** **Duration** **Quality**	**Process** **Methods** **Skills** **Tools** **Environment**

Measures how you are doing

Identifies what you are doing

Measured Performance

Capability Maturity

Standard of performance

Baseline of Performance

4

What Gets Measured?

Business Related Measures
- Unit Delivery Cost
- Time To Market
- Customer Satisfaction

Process Related Measures
- Effectiveness
- Integration
- Compliance

Project Related Measures
- Project Tracking
- Estimating
- Change Management

Contribution

Measures the impact of IT on the business

Identifies trends and helps to monitor progress

Effective utilization of measures in a pro-active format

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Utilize Results in Decision Making

⬈ Improvements resulting from current and future initiatives must be measured

⬈ The basis for measuring improvements may include:
- ◆ Industry data
- ◆ Organizational baseline data

⬈ It is necessary for the organization to put a "stake in the ground" relative to current performance level in order to improve development practices

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Presentation Topics

↗ Measurement for Process Improvement

↗ Baseline your Performance

↗ Model Performance Improvements

Baseline Activities

↗ Identify sample set (typically project oriented)

↗ Collect baseline data

- ◆ Project measures (e.g., effort, size, cost, duration, defects)
- ◆ Project attributes (e.g., skill levels, tools, process, etc.)

↗ Analyze data

- ◆ Performance comparisons (identification of process strengths and weaknesses)
- ◆ Industry averages and best practices
- ◆ Performance modeling (identify high impact areas)

↗ Report results

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Identify Sample Set & Collect Data

Research

MEASURES

Software Size
Level of Effort
Time to Market
Delivered Defects
Cost

CHARACTERISTICS

Skill Levels
Automation
Process
Management
User Involvement
Environment

Analysis

PERFORMANCE LEVELS ←→ **PROFILES**

Results

- **Correlate Performance Levels to Characteristics**
- **Substantiate Impact of Characteristics**
- **Identify Best Practices**

Analyze Project Attributes

MANAGEMENT
- Team Dynamics
- High Morale
- Project Tracking
- Project Planning
- Automation
- Management Skills

DEFINITION
- Clearly Stated Requirements
- Formal Process
- Customer Involvement
- Experience Levels
- Business Impact

DESIGN
- Formal Process
- Rigorous Reviews
- Design Reuse
- Customer Involvement
- Experienced Development Staff
- Automation

BUILD
- Code Reviews
- Source Code Tracking
- Code Reuse
- Data Administration
- Computer Availability
- Experienced Staff
- Automation

TEST
- Formal Testing Methods
- Test Plans
- Development Staff Experience
- Effective Test Tools
- Customer Involvement

ENVIRONMENT
- New Technology
- Automated Process
- Adequate Training
- Organizational Dynamics
- Certification

Strengths And Opportunities
(An Example)

Definition

Strengths

- Requirements are clearly stated and stable
- Development and customers are experienced in applications

Opportunities for Improvement

- More formal requirements gathering process on larger projects
- More consistent use of prototyping on larger projects
- A formal review process

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Establish A Baseline

Performance Productivity

Size is
expressed
in terms
of functionality
delivered to the
user

**Software
Size**

A representative selection
of projects is measured

Organizational Baseline
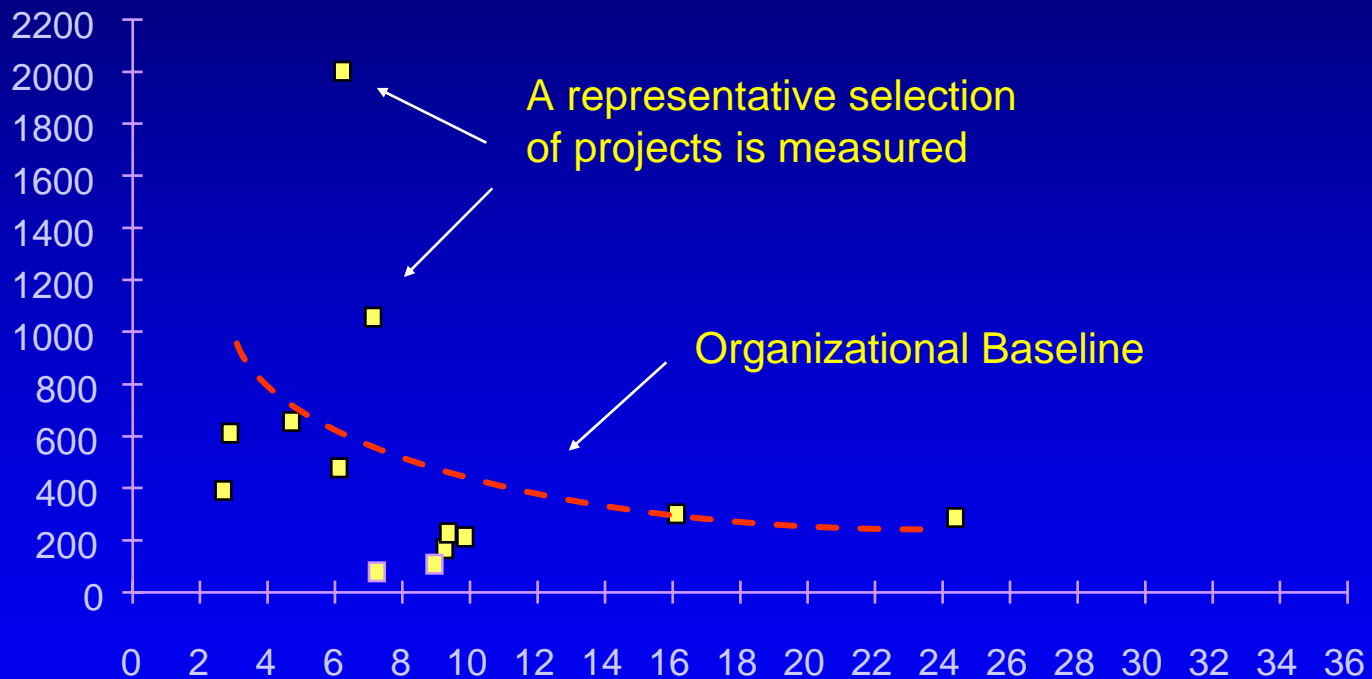
Rate of delivery is a
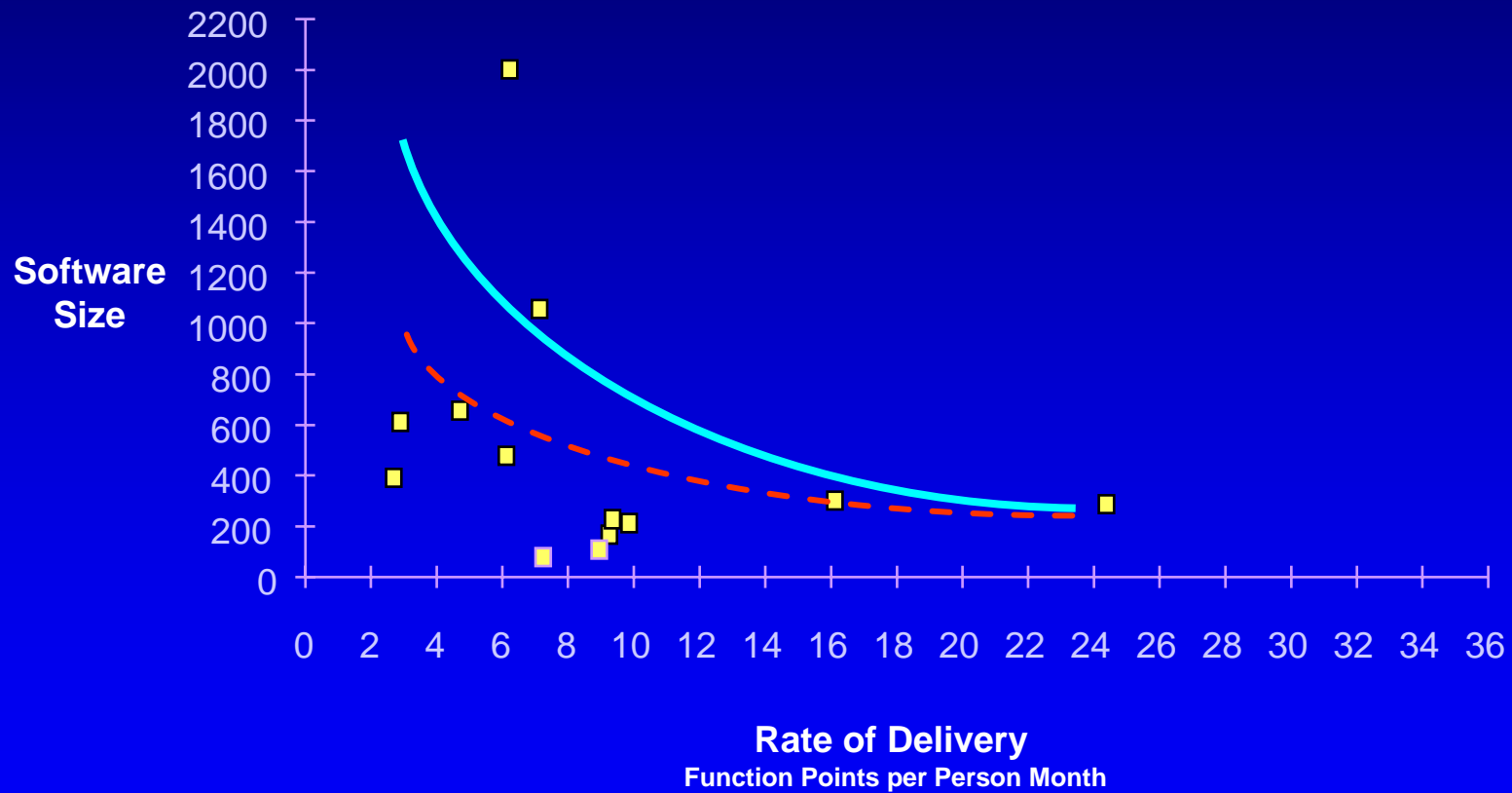measure of productivity

Rate of Delivery
Function Points per Person Month

Compare to Industry Benchmarks

Industry baseline performance

Software Size (y-axis: 0, 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200)

Rate of Delivery
Function Points per Person Month (x-axis: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36)

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Function Points Per Person Month

Average of Recent Projects Across
Different Platforms

Client Server	17
Main Frame	13
Web	25
e-business Web	15
Vendor Packages	18
Data Warehouse	9

Function Points Supported By One FTE

Average of Support Provided for
Corrective Maintenance by One FTE

Client Server	642
Main Frame	978
Web	756
e-business Web	438
Vendor Packages	740
Data Warehouse	392

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Track Improvements

Track Progress
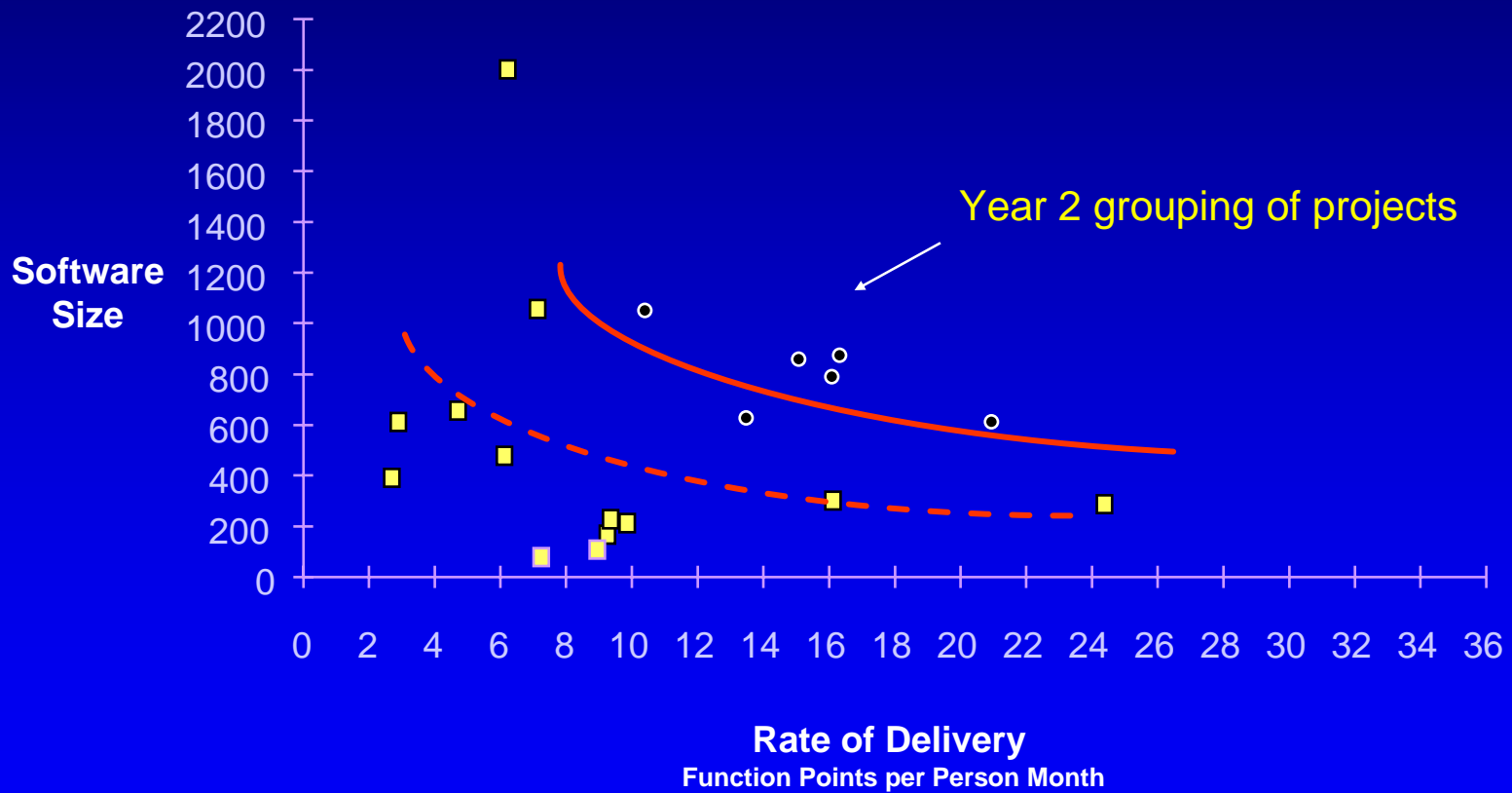
Software Size (y-axis: 0, 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200)

Rate of Delivery (x-axis: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36)

Year 2 grouping of projects

Rate of Delivery
Function Points per Person Month

Presentation Topics

↗ Measurement for Process Improvement

↗ Baseline your Performance

↗ Model Performance Improvements

Model Improvements

❑ Model the impact of implementing selected process improvements

❑ Evaluate the impact on productivity

❑ Modeling is performed from several perspectives: Management Improvements, Design Improvements, Definition Improvements, Build Improvements, Test Improvements, Environment Improvements and SEI CMM Specific Improvements

EXAMPLE: Improvements are measured from the following baseline --

Average Project Size:	133 Function Points (FPs)
Average Productivity:	10.7 FP/Effort Month (EM)
Average Time-to-Market:	7.3 Months
Average Cost/FP:	$934.58
Projected Delivered Defects/FP:	.0301

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Modeled Improvements

Current improvement initiatives (SEI) are appropriately targeted at the majority
of "weak spots" revealed by the baseline results.

Perspective	Productivity	Time-To-Market	Defects/FP	Cost/FP
Management	8.10%	0.00%	0.00%	-7.44%
Definition	16.20%	0.00%	0.00%	-15.70%
Design	30.80%	-25.00%	-25.00%	-23.55%
Build	10.70%	0.00%	0.00%	-9.67%
Test	24.40%	-25.00%	-25.00%	-20.25%
Environment	5.30%	0.00%	0.00%	-5.04%
SEI CMM Specific	131.50%	-50.00%	-75.00%	-56.78%
All	169.20%	-50.00%	-75.00%	-62.89%

	Baseline Productivity	SEI Productivity Improvements
Average Project Size	133	133
Average FP/EM	10.7	24.8
Average Time-To-Market (Months)	7.3	3.7
Average Cost/FP	$934.58	$467.29
Projected Delivered Defects/FP	0.0301	0.0075

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Strive for Continuous Improvement

PERFORMANCE PRODUCTIVITY

CAPABILITIES

BUSINESS VALUE

DELIVERABLES

DEFECTS

SKILL LEVELS

RESOURCES

TECHNOLOGY

COSTS

PROCESS

TIME TO MARKET

MEASURED BASELINE

PERFORMANCE

RISKS

Industry Averages

Best Practices

Organization Baseline

Sub Performance

35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00

0   100   200   400   800   1600   3200   6400

SOFTWARE PROCESS IMPROVEMENT

IMPROVEMENT INITIATIVES / BEST PRACTICES

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