



Q/P MANAGEMENT
GROUP, INC.

Is it a Volkswagen or a Bus?

**Estimating Software Projects
with Function Points**

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Is it a Volkswagen or a Bus?

Estimating Software Projects with Function Points

The methodologies reflected in the enclosed material, including the benchmark comparisons, are confidential and proprietary information of Q/P Management Group, Inc.

Class Goals and Objectives

- Learn estimating techniques using function points
- Understand the impact of project attributes on estimates
- Demonstrate the creation of function point based estimates using student materials

Class Agenda

Topic



Overview of Estimating with Function Points

Understanding and Evaluating Project Attributes

Estimating Workshop



Overview of Estimating with Function Points

Definitions of Estimating

- Process of giving or forming an approximation
- An approximate judgment or calculation, as of the value, amount, time, size of something
- A statement of the approximate charge for work to be done, submitted by a person or business firm ready to undertake the work
- Forecasting / predicting in quantifiable terms

Objectives of Software Project Estimation

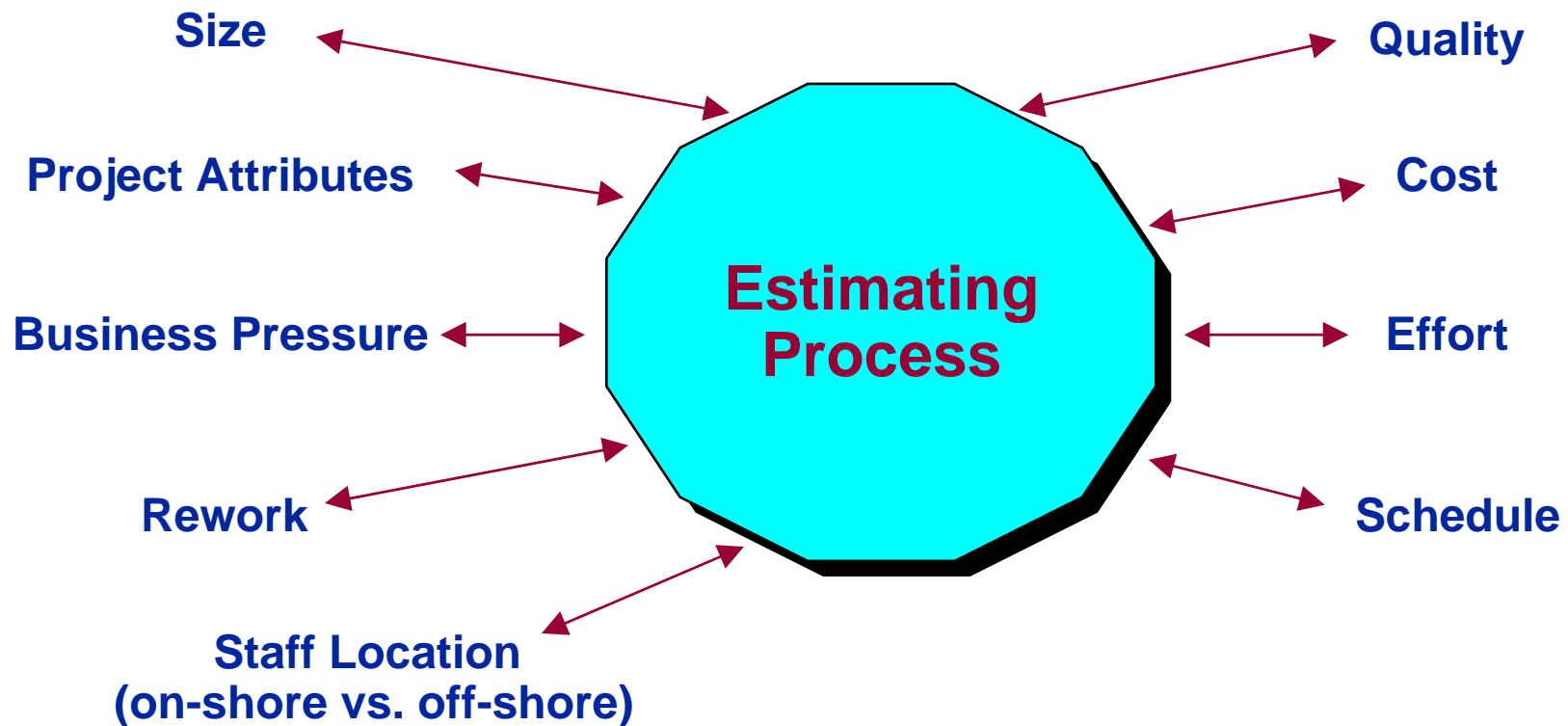
Determine a realistic commitment

- Effort
- Cost
- Schedule
- Quality

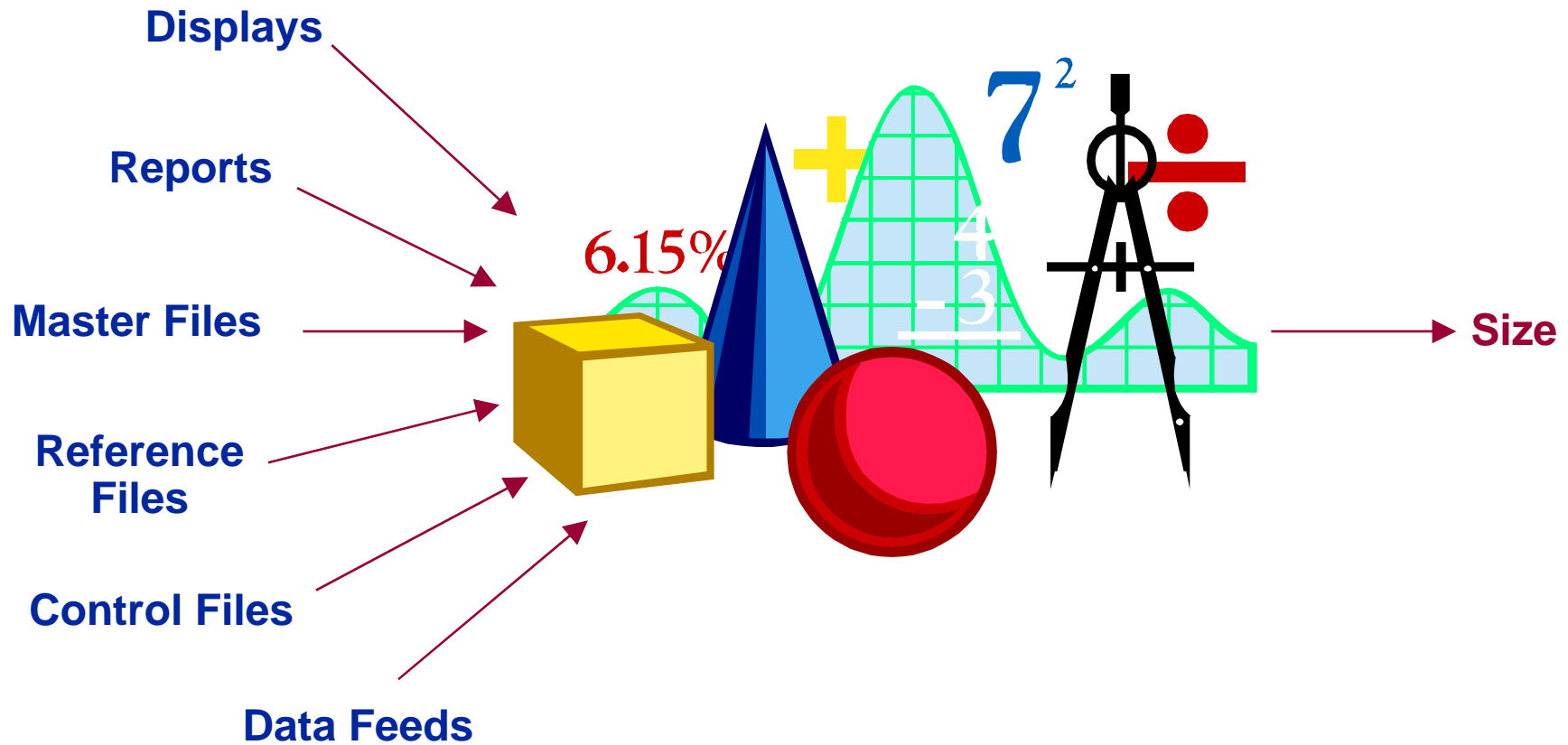
Examples of Estimates for Software Projects

- Size in Function Points
- Effort in hours by activity and/ or resource
- Cost in dollars by activity
- Staffing
- Defects
- Contracted cost breakdown
- Schedule in days
- Documentation pages
- Data volumes

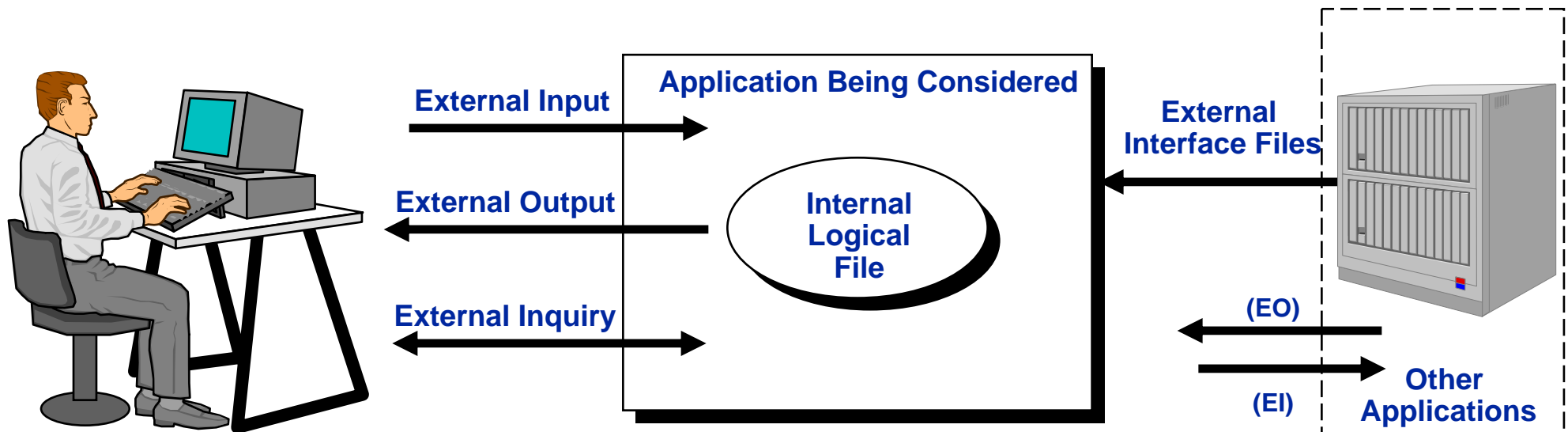
Many Factors Influence Project Estimation



Size has the Greatest Impact on Estimates

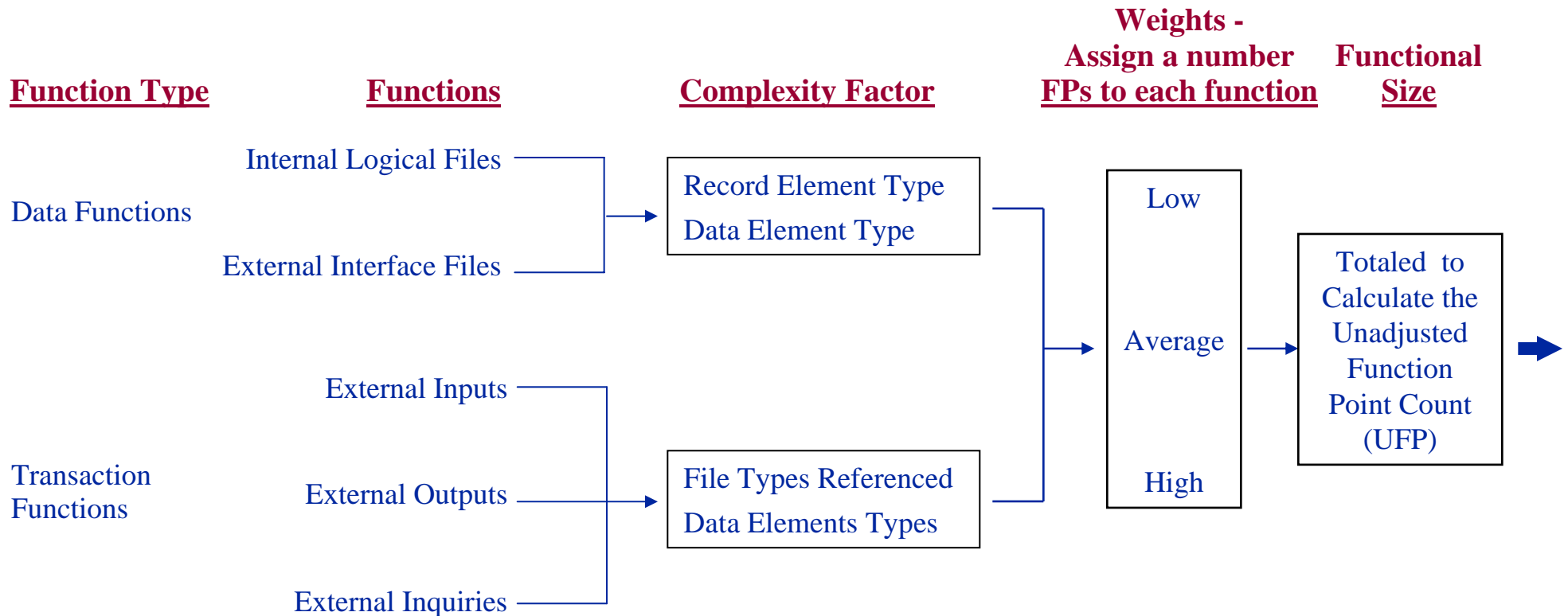


Function Points are the Best Measure of Software Size



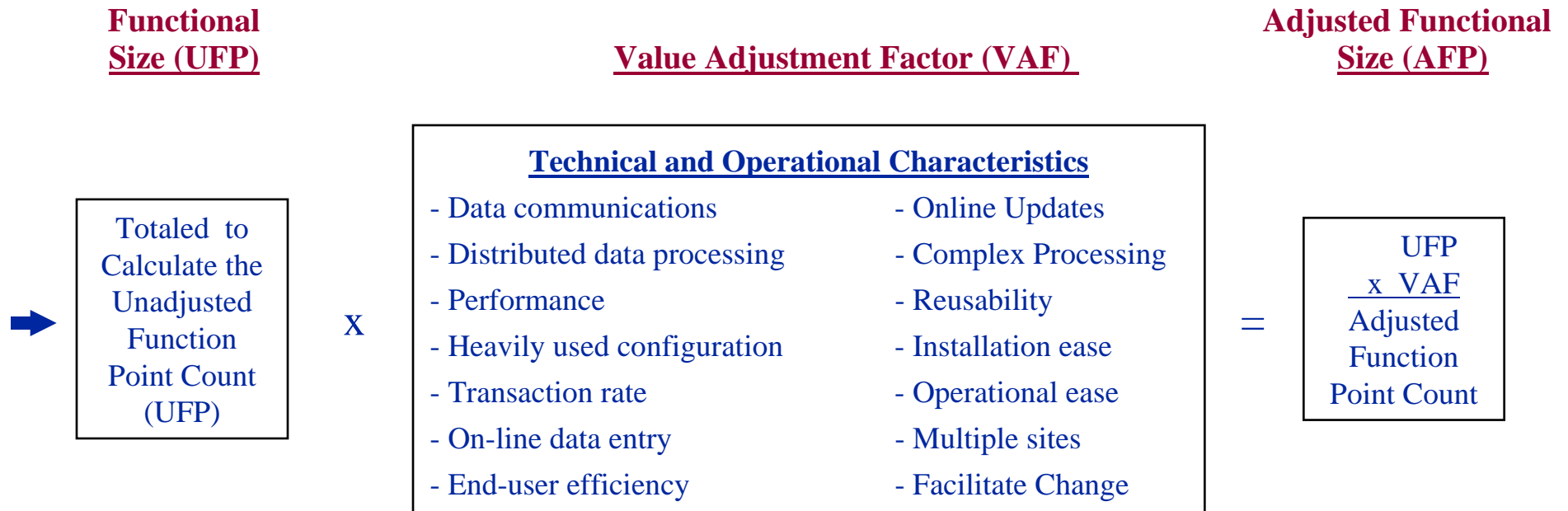
Functionality as viewed from the user's perspective

Definition of Function Points



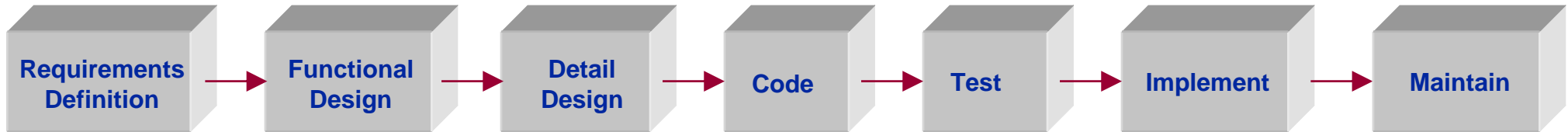
Produces the “size” of the application or project based purely on the functions recognized by the user of the application (a.k.a. Unadjusted Function Point Count (UFP))

Definition of Function Points (Continued)



Counting Rules, Complexity Factors and Calculations maintained, promoted and monitored by the International Function Point Users Group (IFPUG)

When and Why Function Points are Counted and Estimates are Created



Initial FP Count

- Define Customer Requirements
- Ballpark Estimate

Interim FP Count

- Refine Customer Requirements
- Refine Estimate(s)
- Manage Change of Scope

Final FP Count

- Report actual FPs (functionality) delivered
- Manage Change of Scope
- Review the project (post-implementation)
- Baseline the Organization

Asset FP Count

- Account for assets
- Document systems
- Manage maintenance

Function Point Analysis for Estimating

Function Point Estimate

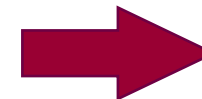
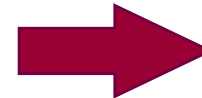
Project A - 100 FPs

Project B - 100 FPs

Project Variables

- On-line/database
- New development
- JAVA
- Highly experienced development staff
- Excellent tools, techniques, and processes

- Batch
- Enhancement
- Cobol
- Average experienced development staff
- Average tools, techniques, and processes



Project Estimate based on Historical Data and/or Vendor Tool

Effort = 5 months
Schedule = 3 months
Cost (@\$5K) = \$25,000
Delivered Defects = 25
Productivity Rate = 20 FP/Mo.

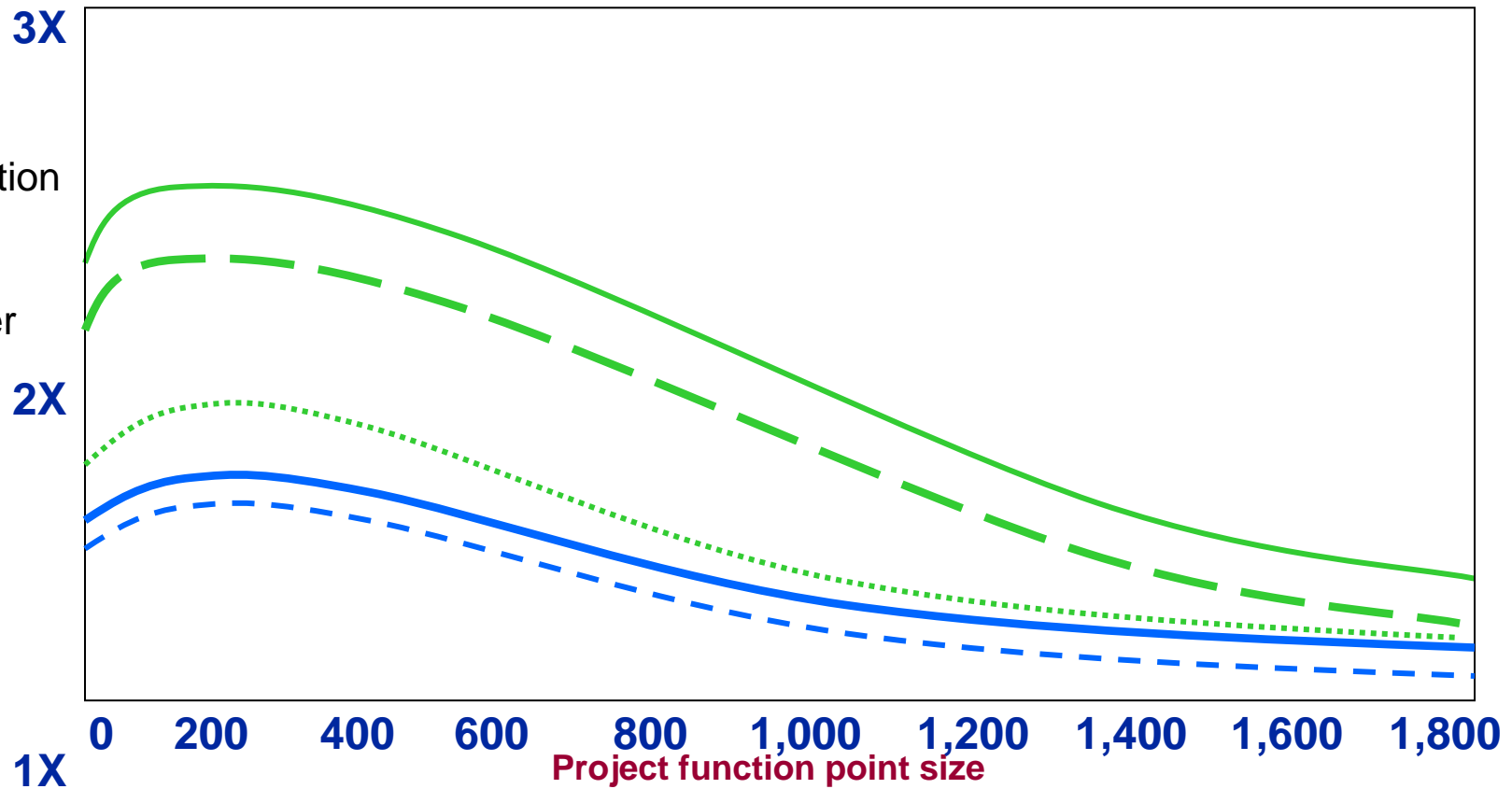
Effort = 20 months
Schedule = 6 months
Cost (@\$5K) = \$100,000
Delivered Defects = 100
Productivity Rate = 5 FP/Mo.

Productivity Varies by Development Type, Size and Platform

Example

Project Productivity
FP/Hour

- Web
- PC/workstation
- Mainframe
- Mixed
- Client server

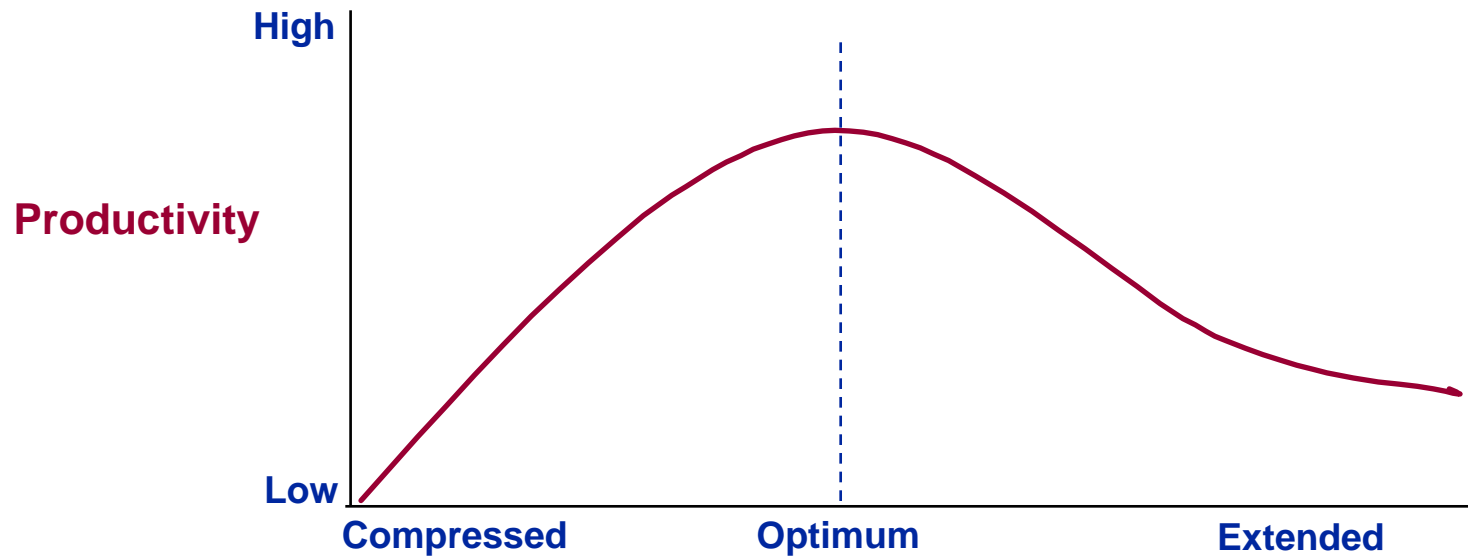


Project Size can account for a 3 times productivity variation

The Schedule Tradeoff Needs to be Evaluated

Example

Productivity versus Schedule

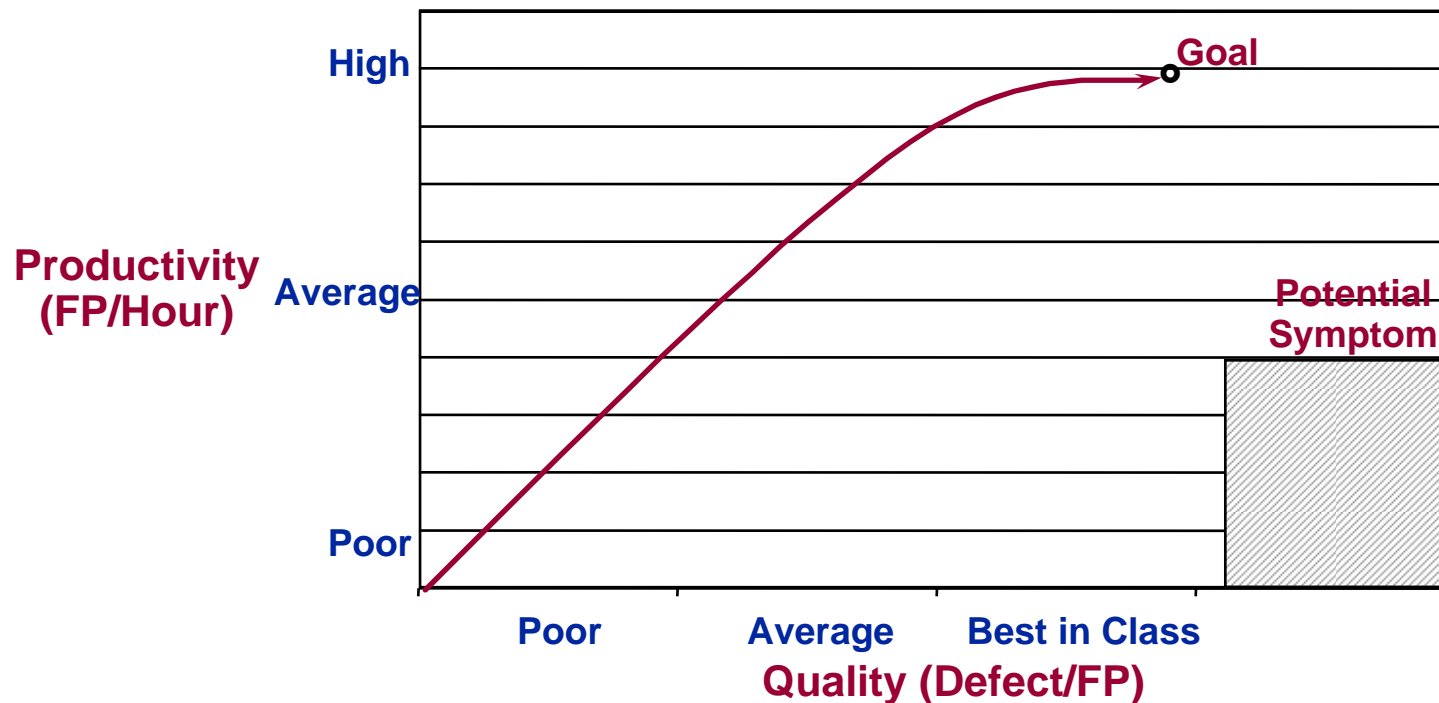


Severely compressed or extended schedules can significantly reduce productivity and increase cost

The Quality Tradeoff Needs to be Evaluated

Example

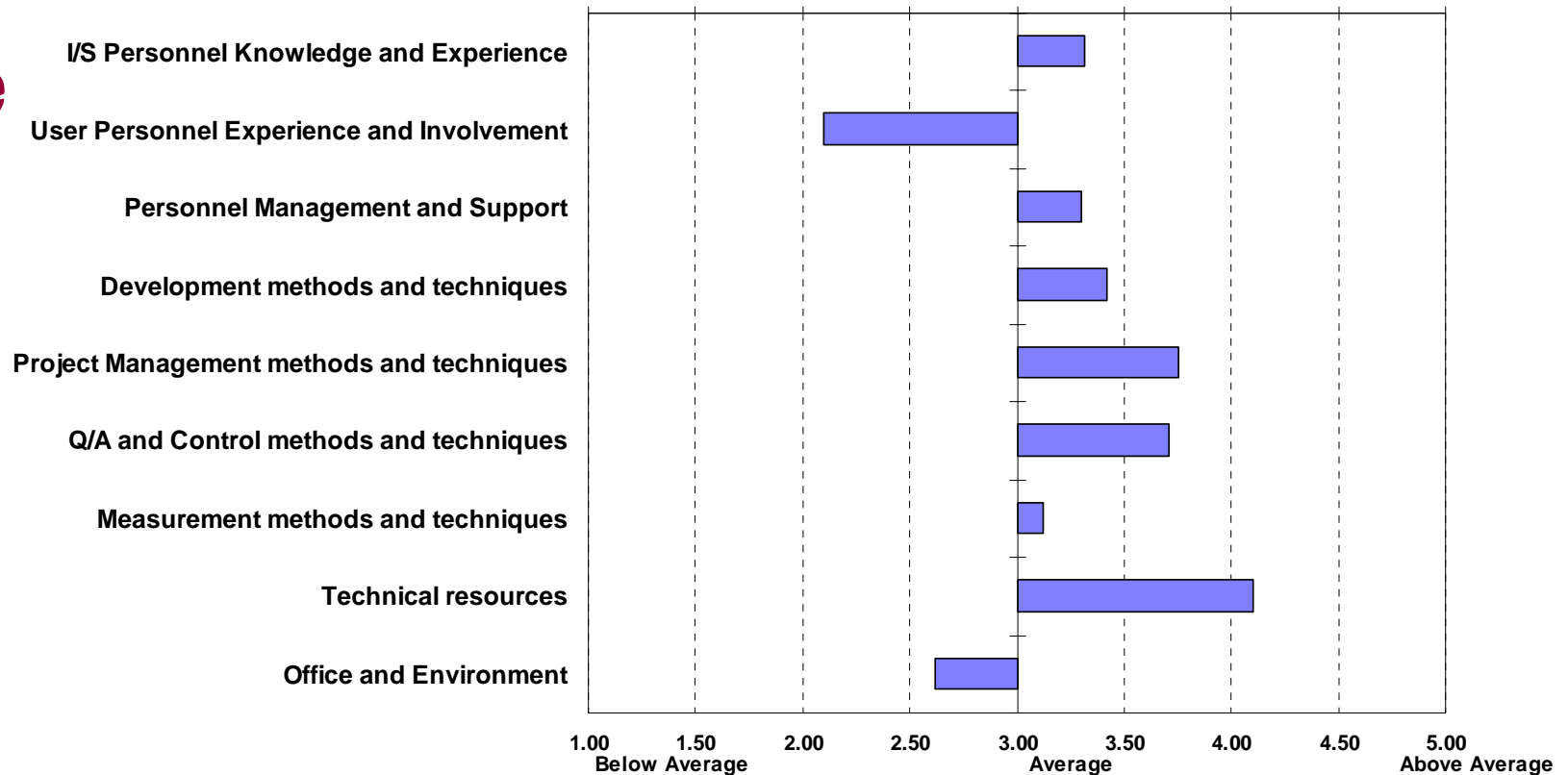
Productivity / Quality Comparison



Better than Best in Class quality and mature processes (with overhead) may result in low productivity

Project Attributes can Impact Productivity, Cost, Schedule, and Quality

Example



- Project attribute assessments help to identify organizational strengths and weaknesses
- The assessment results are critical to accurately interpreting the results from software measurement
- The results can be used as input into a process improvement program as well as improving the estimation processes

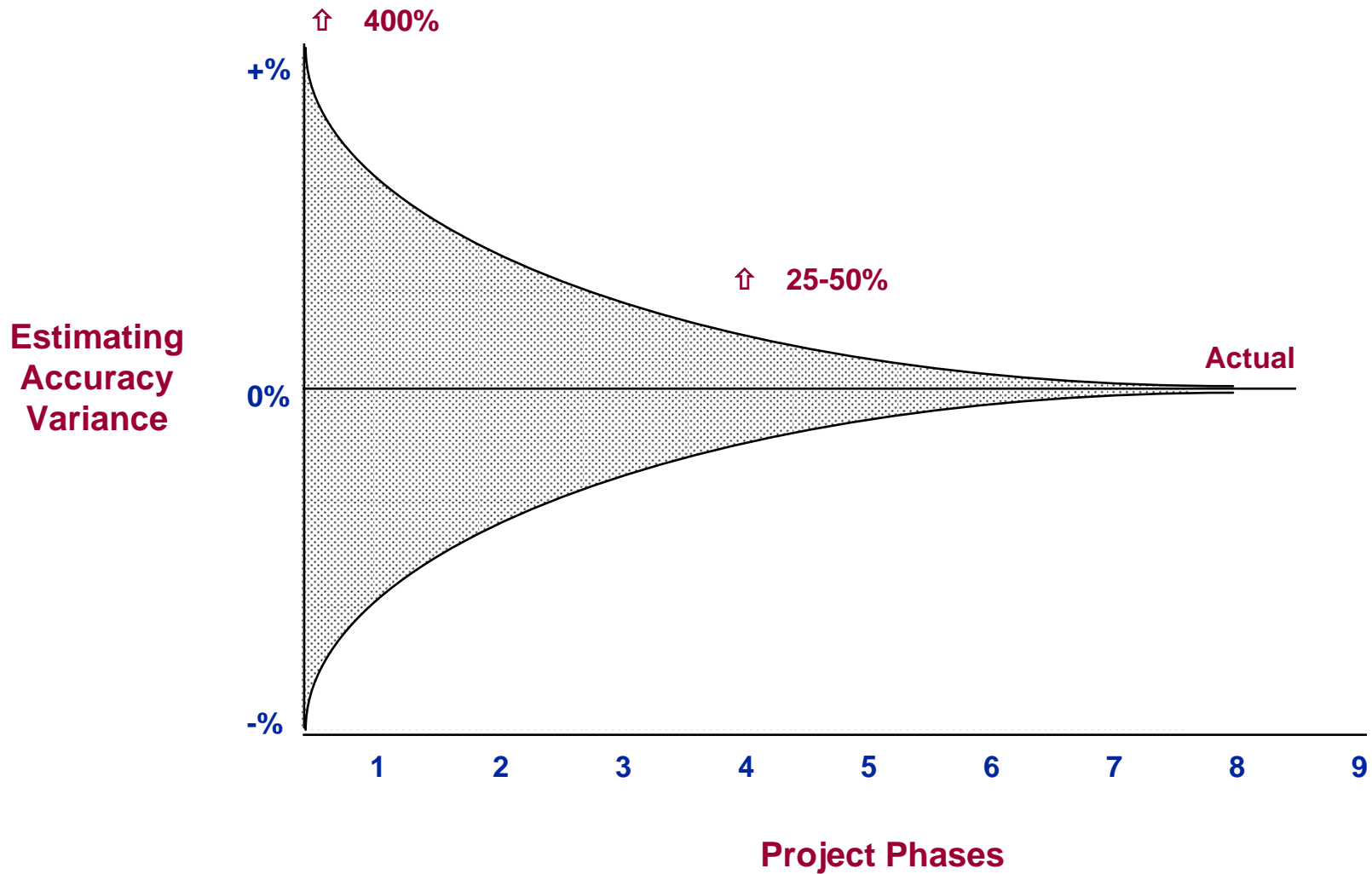
Estimation with Function Point Benefits

- Identify and quantify size based on the customer's perspective
- Estimate early in the development process
- Quantify and manage change of scope
- Base agreements on measured data
- Monitor progress compared to estimates
- Recognize requirements problems early and take corrective action
- Improve communications
- Repeatable

Challenges of Estimation

- Accurate estimating is very complex
- Clear/ concise statements
- Communicating estimating influences
- Pressure from participants (political)
- Satisfying the various participants' interests
- Consistent definitions and application of definitions
- Accurate actual reported information
- Limited available information
- Misuse of estimates

Estimating Accuracy Improves Over Time



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Understanding and Evaluating Project Attributes

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Understanding and Evaluating Project Attributes

Why Evaluate Project Attributes?

- Estimate project resources and schedule
- Improve project quality and productivity
- Assess project risk
- Continuous process improvement

Project Attributes are the Soft Factors that Impact a Project's Productivity, Cost and Quality

Project Attributes	% Impact on Project Effort and Schedule
Personnel Management	+/- 100%
Process and Methods	+/- 75%
Technology and Tools	+/- 50%
Environment and Support	+/- 25%

Project Attributes

Major Categories

- Personnel and Management
- Process and Methods
- Technology and Tools
- Environment and Support

Project Attributes (Continued)

Personnel and Management

- Experience in various disciplines
- Organization structure
- Culture
- Morale
- Management support

Project Attributes (Continued)

Process and Methods

- Systems Development Methodology
- Project Management
- Requirements Definition
- Quality Assurance and Control
- Measurement

Project Attributes (Continued)

Technology and Tools

- Computer resources
- Automated Design tools
- Construction tools
- Debugging tools
- Testing tools
- Maintenance tools

Project Attributes (Continued)

Environment and Support

- Office space
- Meeting room facilities
- Office equipment and supplies
- Administrative support
- Communications

Customization / Calibration Project Attributes

You can customize the Attribute influences to reflect your own particular environment

- An advantage of this technique is that you can identify the influencing ratios you feel are appropriate
- By weighting these influencing factors the estimates can become more reliable and accurate
- This technique can be used with other models

Estimating Models & Trends

- Internal historical information is the most reliable source on which to base estimates
- Estimation models require calibration and recognition of influencing factors which contribute positively or negatively to performance
- The estimation models are generally only applicable to direct project activity (requirements definition through 1st implementation)
- Other activities may affect the estimate
 - Rigorous processes
 - Non direct software development activity (loading/ installing, travel, etc.)

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