



Best Projects/Worst Projects: the Role of Size in Productivity

Debra L. Maschino
4300 S Saginaw St.
Flint, MI 48557
Mail Stop: 485-302-000

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Agenda

- Organizational and Process Background
- The Best Project Process
- Key Characteristics of Best Projects
- Worst Project Analysis
- Analysis by Size
- Conclusions



Organizational and Process Background

- **EDS**
 - 100,000+ Employees divided into geographies
 - Common software development process
 - Corporate software metrics repository (web based) in place since end of 1999
 - Projects estimated at more than 500 effort hours required to record metrics in repository
- Our focus for this analysis is on new development and enhancement projects. The vast majority of these are smaller than 1000 UFP.



Best Project Process – Statement of Problem

- Statement of Problem:
 - Projects are under pressure to shorten delivery time and increase technical productivity
 - Frequently, one of these is optimized at the expense of the other: especially when the schedule is compressed
- Some projects excel at both technical productivity and time to market. What characteristics do they have in common?



Best Project Process Steps

- Process Steps:
 - Use ISBSG data to determine medians for technical productivity (FP/Staff Month) and schedule productivity (FP/Calendar Month)
 - Calculate the technical and schedule productivity of each project for the time frame and organization(s) you want to analyze
 - Look for common characteristics in the projects that are above average in both technical productivity and schedule productivity
 - Conduct interviews with the project teams to uncover additional “soft” contributors to productivity
 - Analyze and publish the results



Best Projects Process

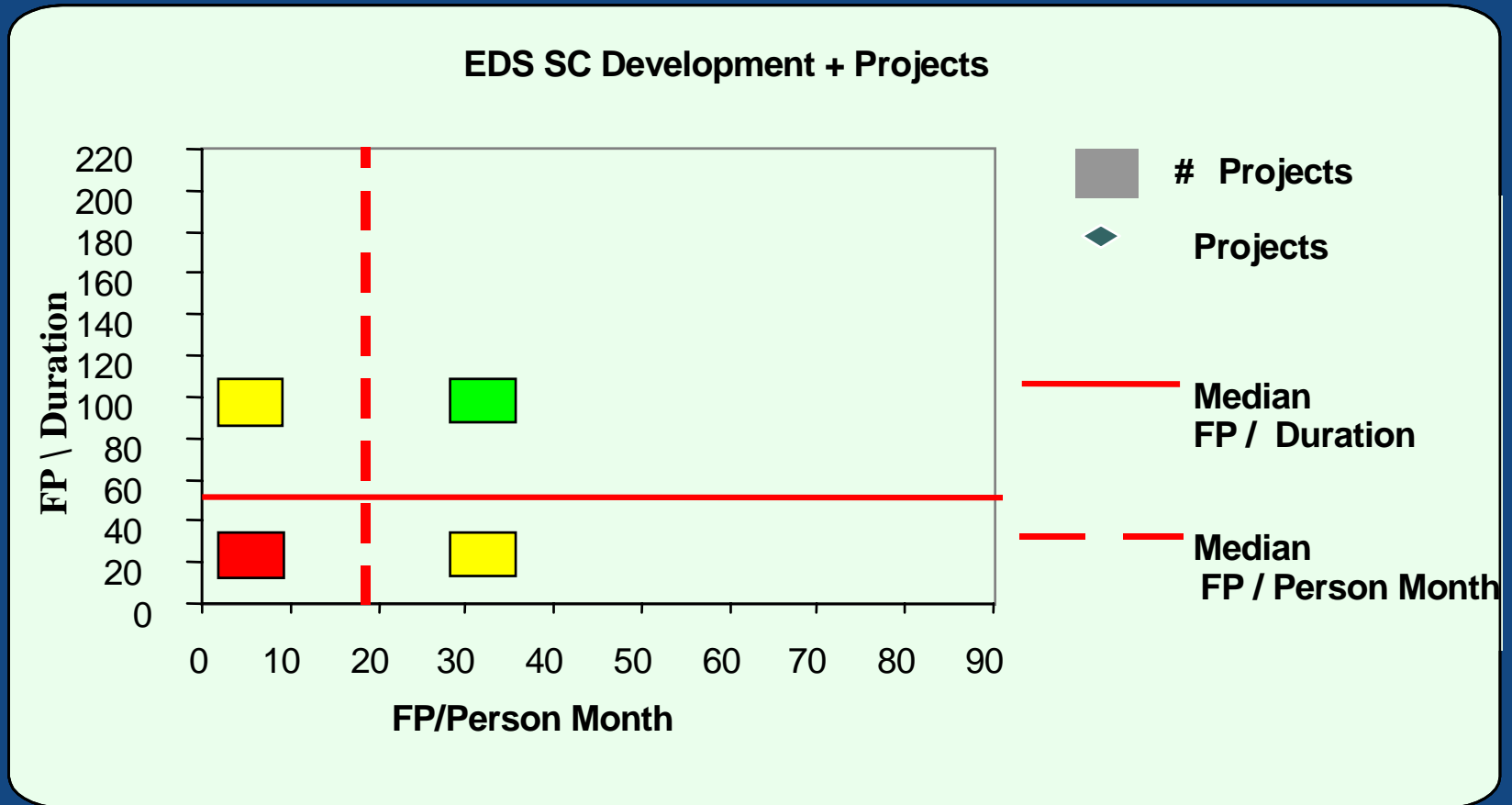
Based on a project's technical and schedule productivity it was placed in one of the following categories:

- **High technical/High schedule productivity**
- High technical/Low schedule productivity
- Low technical/High schedule productivity
- Low technical/Low schedule productivity



Best Projects Benchmarking

Technical Plotted With Schedule Productivity





Common Characteristics of Best Projects

- Short to medium project duration – between 4 & 8 months
- Medium project size – 231-732 Function Points
- Small to medium team size – Peak staff between 4 and 15
- Tracked defects
- Stable requirements
- Reuse
- Experienced team leadership - > 1 year experience
- Process Maturity (CMM level 2 or 3 processes)
- Client involvement



Worst Project Analysis Process

- Select all software development and enhancement projects that closed between 2001-2003.
- Determine the technical and schedule productivity for each project and assign them to a category
- Analyze and compare key environmental and project characteristics for Best and Worst Projects in order to identify key differentiators
- Compile and publish the results



Worst Project Analysis Hypothesis

Hypothesis: Best projects will score significantly higher on key environmental characteristics. (a + indicates the predicted results)

	Best Projects	Worst Projects
Team complexity	+	
System Experience	+	
Tool Experience	+	
Info Tech Experience	+	
Language Experience	+	
Computer Experience	+	
Client Participation	+	
Proj. Mgt. Experience	+	



Environmental Characteristic Scoring

Team Complexity

- 1 - Single person
- 2 - Single team
- 3 - Multiple teams at single site
- 4 - Multiple sites
- 5 - Multiple sites – different cities
- 6 - Multiple time zones
- 7 - Multiple countries



Environmental Characteristic Scoring

- Environmental characteristics that evaluate the team's level of experience use a 3 point scale
- 1 – Less than one year
- 2 – From one to three years
- 3 – More than three years



Worst Project Analysis Hypothesis Results

Hypothesis disproven. Worst projects averaged higher on all experience based characteristics and had only slightly more complex team structure

	Best Projects	Worst Projects
Team complexity	+	
System Experience		+
Tool Experience		+
Info Tech Experience		+
Language Experience		+
Computer Experience		+
Client Participation		+
Proj. Mgt Experience		+



Worst Project Analysis Environmental Characteristics

Environmental Characteristics

	Best Projects	Worst Projects
Duration	6.6	7.1
Peak Staff (Median)	7.0	8.0
Effort months (Median)	15.5	14.7
Size in UFP (Median)	456	77.0

The difference in size is noteworthy: the median for the Best Projects is 5.9 times larger than the Worst Projects

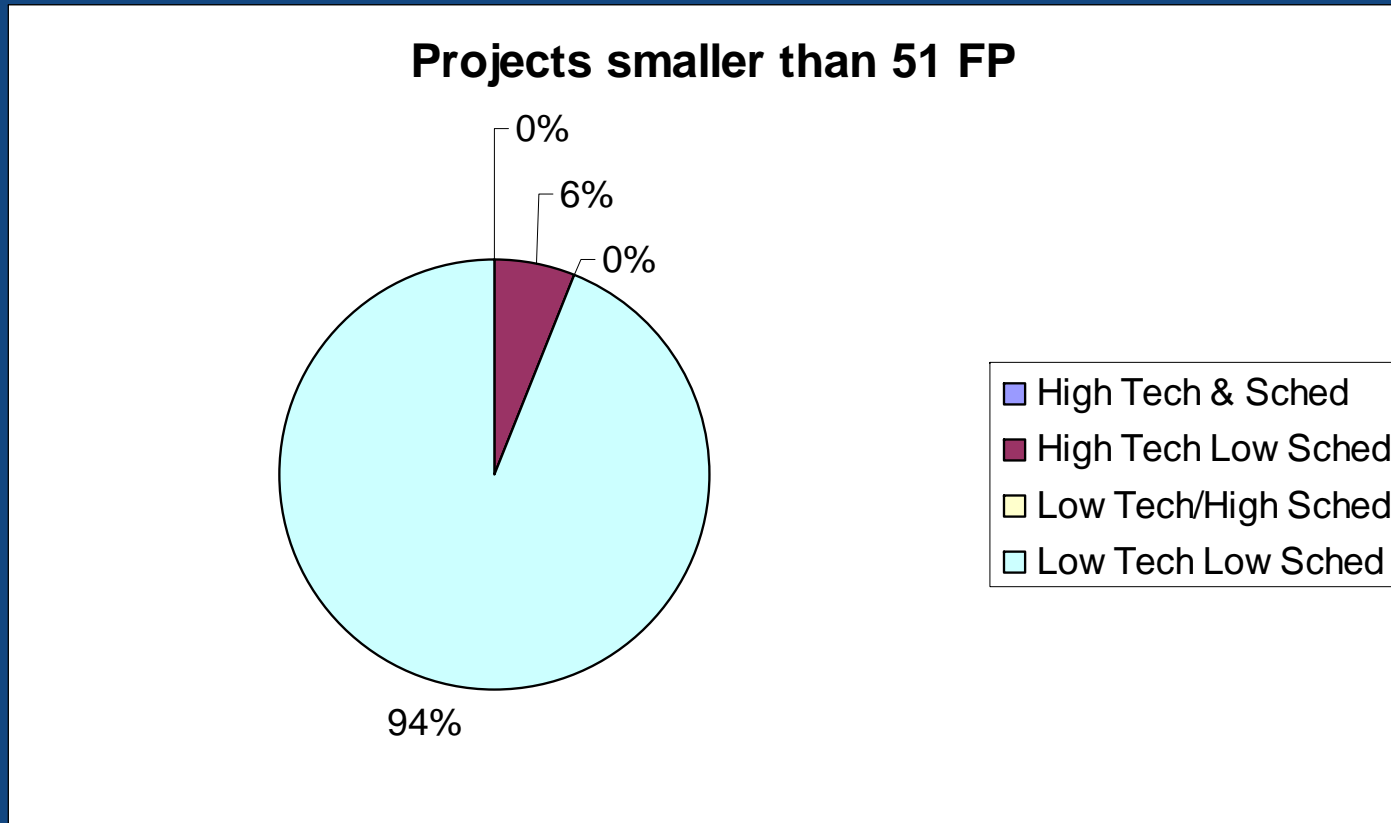


Analysis by size – process steps

- Sort projects by size and divide into ranges
- For each size range compute the percentage of each project type
- Look for trends as project size increases



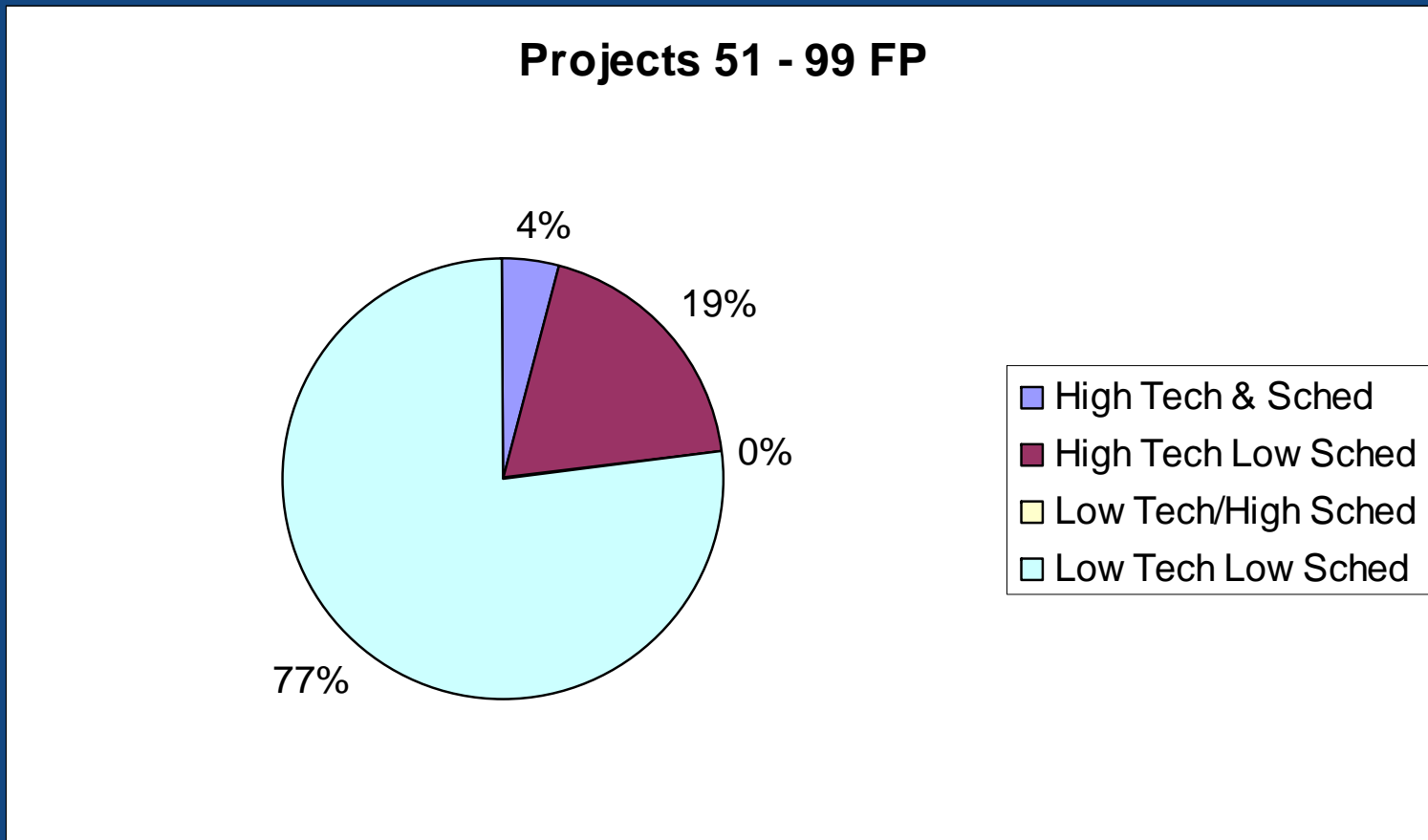
Analysis by Size – Projects <51 UFP



The overwhelming majority of projects smaller than 51 UFP are “worst projects”. None is a best project.



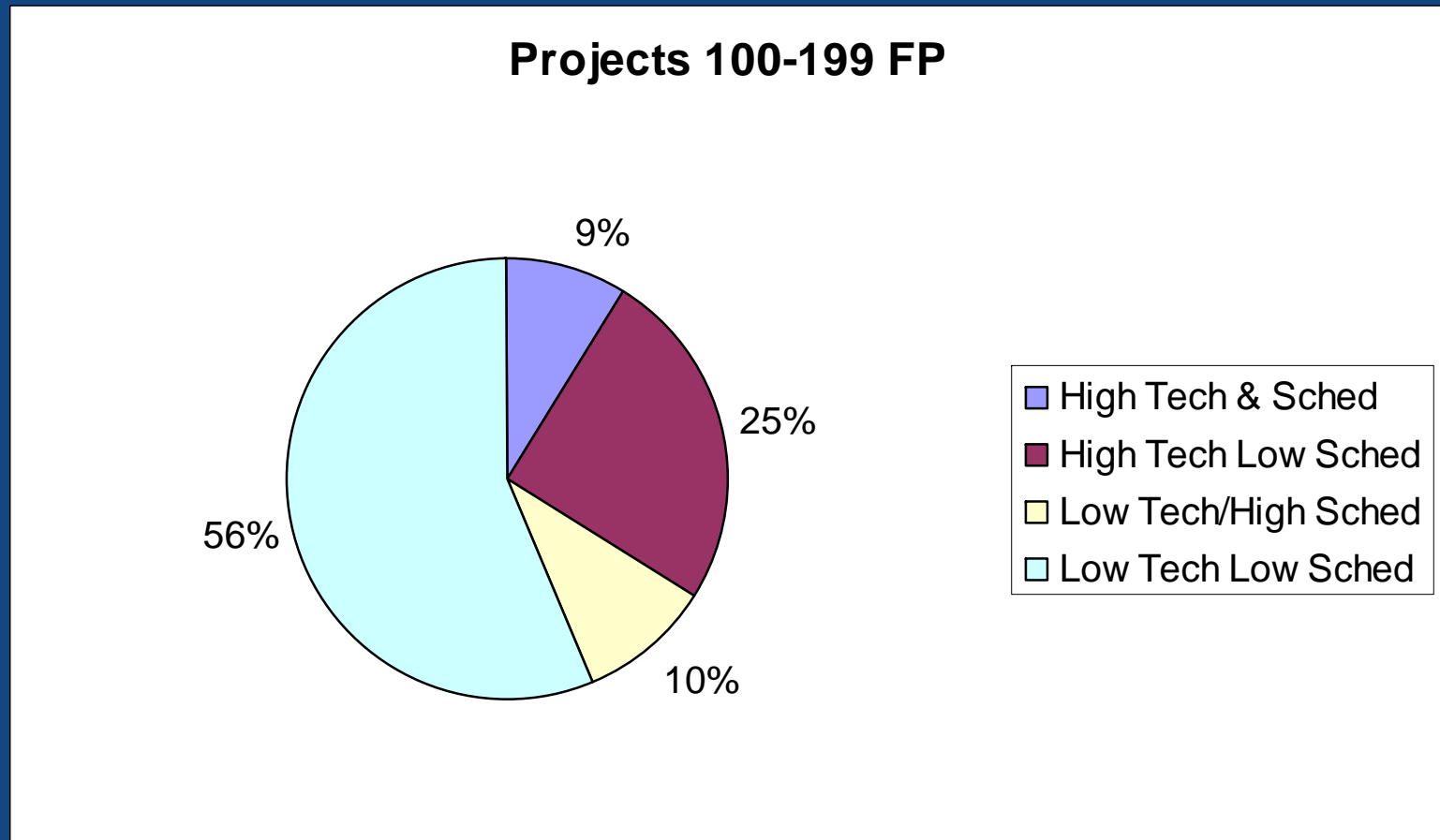
Analysis by Size – Projects 51–99 UFP



As project size increases the percentage of worst projects decreases although it is still 77%



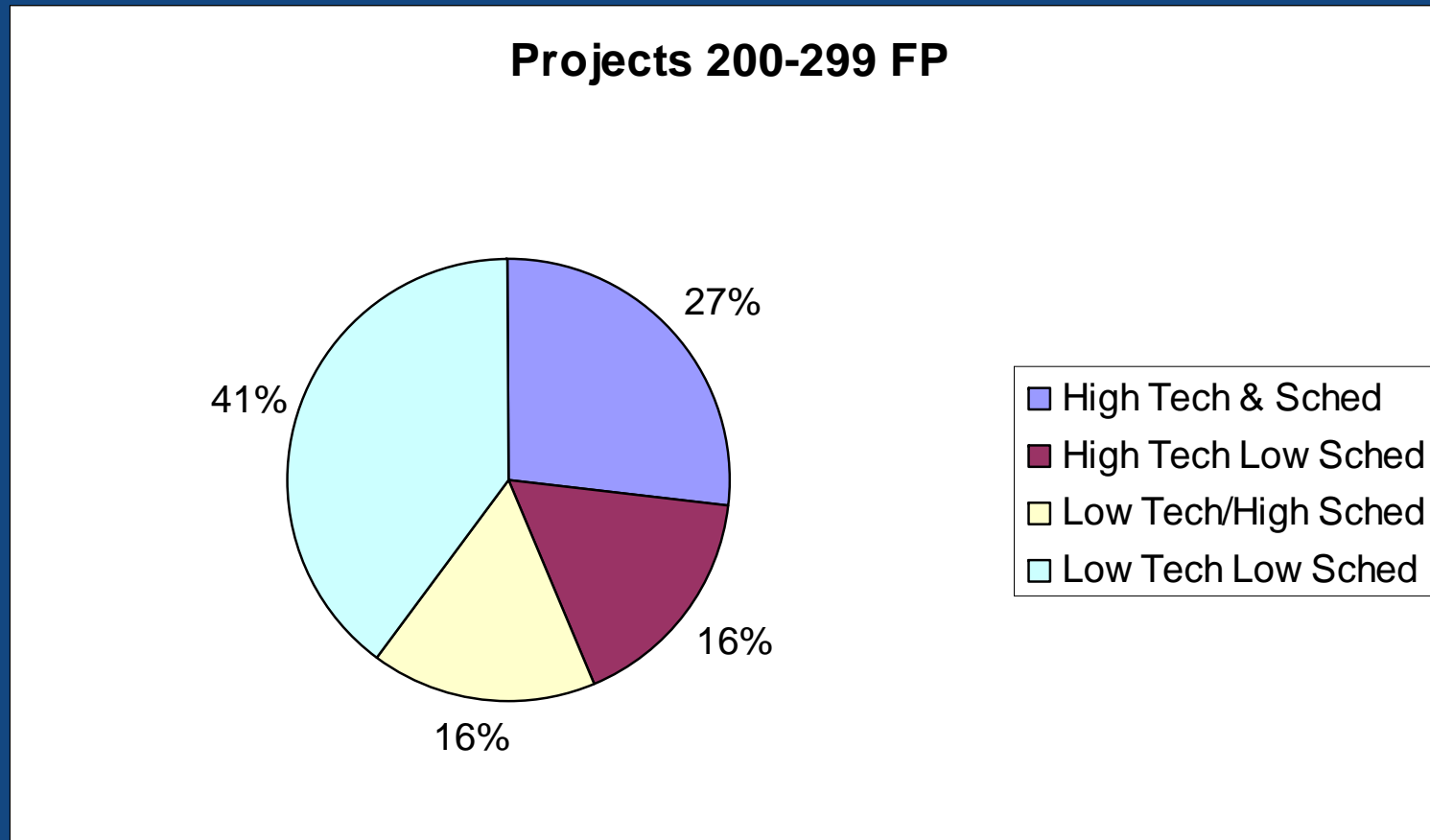
Analysis by Size – Projects 100–199 UFP



The percentage of worst projects continues to decrease as size grows. While still a majority, all four productivity categories are now present.



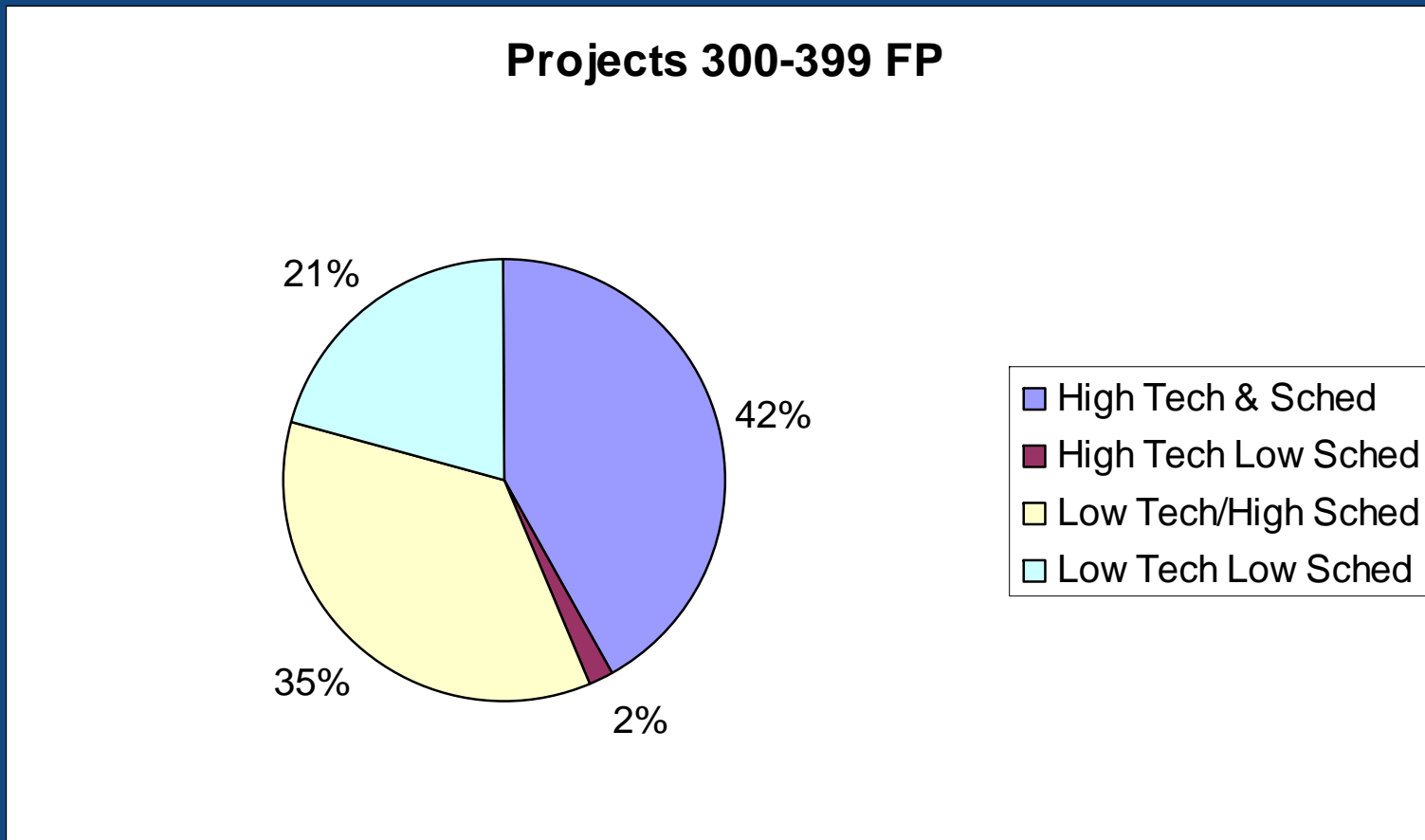
Analysis by Size – Projects 200–299 UFP



The percentage of worst projects continues to decrease as size increases although they are still the largest category



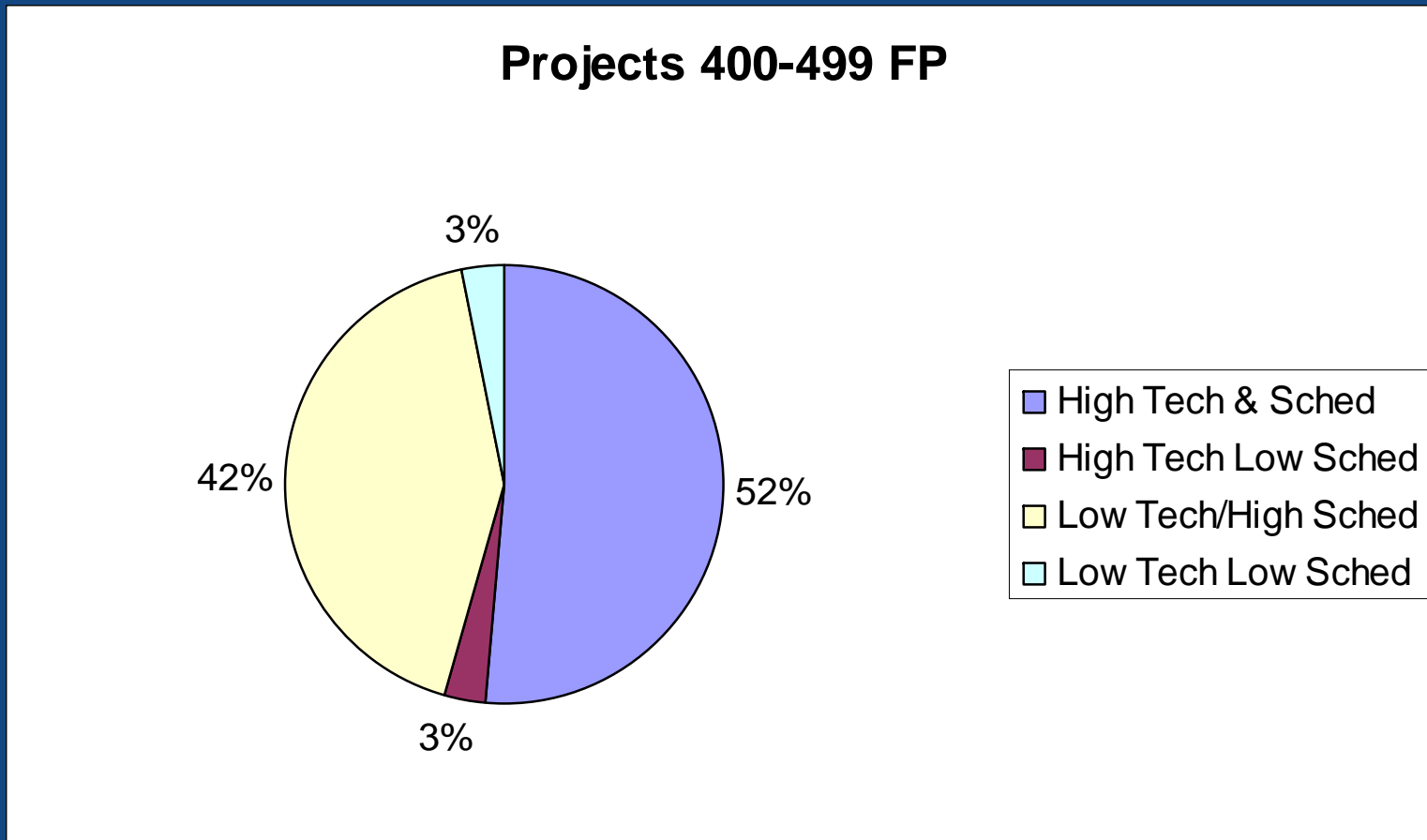
Analysis by Size – Projects 300–399 UFP



Percentage wise there are twice as many Best projects than Worst projects: a dramatic reversal as project size increases



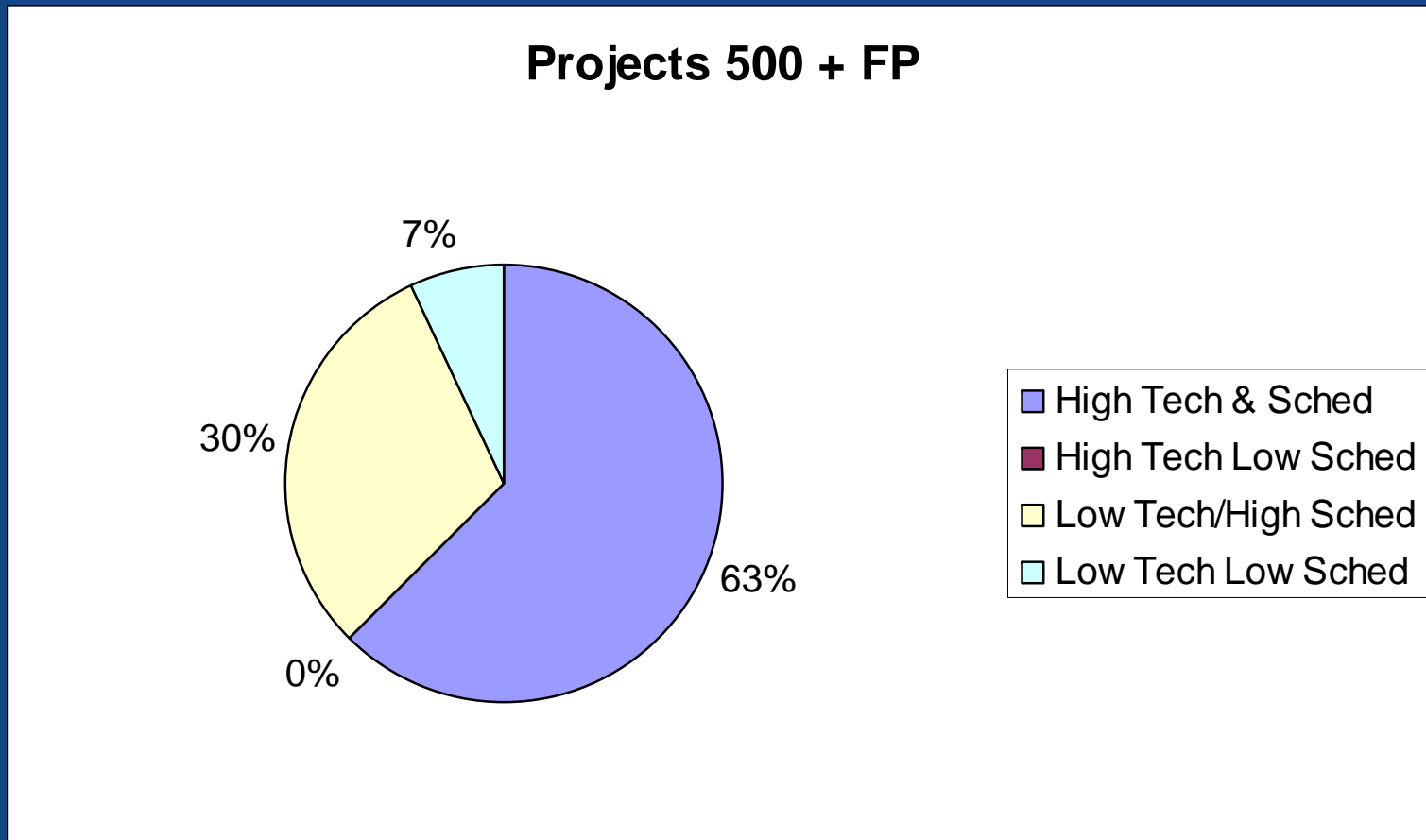
Analysis by Size – Projects 400–499 UFP



There are very few worst projects in this range. Over half of the projects are Best projects



Analysis by Size – Projects > 500 UFP



A clear majority of these projects are Best projects. Most of the remainder are schedule optimized. Few are Worst projects.



Conclusions

- Best projects do not enjoy any advantages over the worst projects in the project characteristics and experience categories we track
- Platform does not appear to be a crucial factor. Although a higher percentage of small (less than 51 FP) projects are mainframe, all platforms are well represented in both best and worst projects
- Small projects do not require more project management or overhead effort
- While larger size does not guarantee increased productivity, it is a characteristic of successful projects



Conclusions

- Project size strongly influences schedule and technical productivity
- Larger projects (over 300 function points in size) are more likely to be Best Projects
- The median size of Best Projects is 5.9 times that of the Worst Projects. The technical productivity of the Best Projects is 6.9 times that of the Worst

⋮ Questions?