QSM®

The Intelligence behind Successful Software Projects

# Good and Bad Software Projects: by the Numbers

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# Framework

- Correlation is not Causation
  - 100% of Convicted Felons Have/Had a Mother and a Father
  - No Causal Relationship Between Parenthood and Felony
- "There are three kinds of lies: lies, damned lies, and statistics" – *Benjamin Disraeli*
- What is Measured Tends to be Optimized
  - Focusing on a Single Factor (Variable) May Lead to Unintended and Undesirable Results

 

# Quotation

*The Government is extremely fond of amassing great quantities of statistics. These are raised to the nth degree, the cube roots are extracted and the results are arranged into elaborate and impressive displays. What must be kept in mind, however, is that in every case, the figures are first put down by a village watchman and he puts down anything he damn well pleases.*

Sir Josiah Stamp, Her Majesty's (Queen Victoria) Collector of Inland Revenues, more than a century ago.

 

# Outline

- Project Selection
- “Normal” Variability for Schedule & Effort
- Best Performing & Worst Performing Projects Defined
- Best & Worst Projects Compared
- Differentiators
- Non-differentiators
- Conclusion
- Questions?

 

# Project Selection

- Business IT (Information Technology) Projects
- Completed in Last 5 Years
- Confidence Level of Average or Better in Quality of Metrics
- 1509 Projects
- 66 Distinct Organizations (Many Divisions within Companies)

 

# Normal Variability, Time/Cost Trade-off

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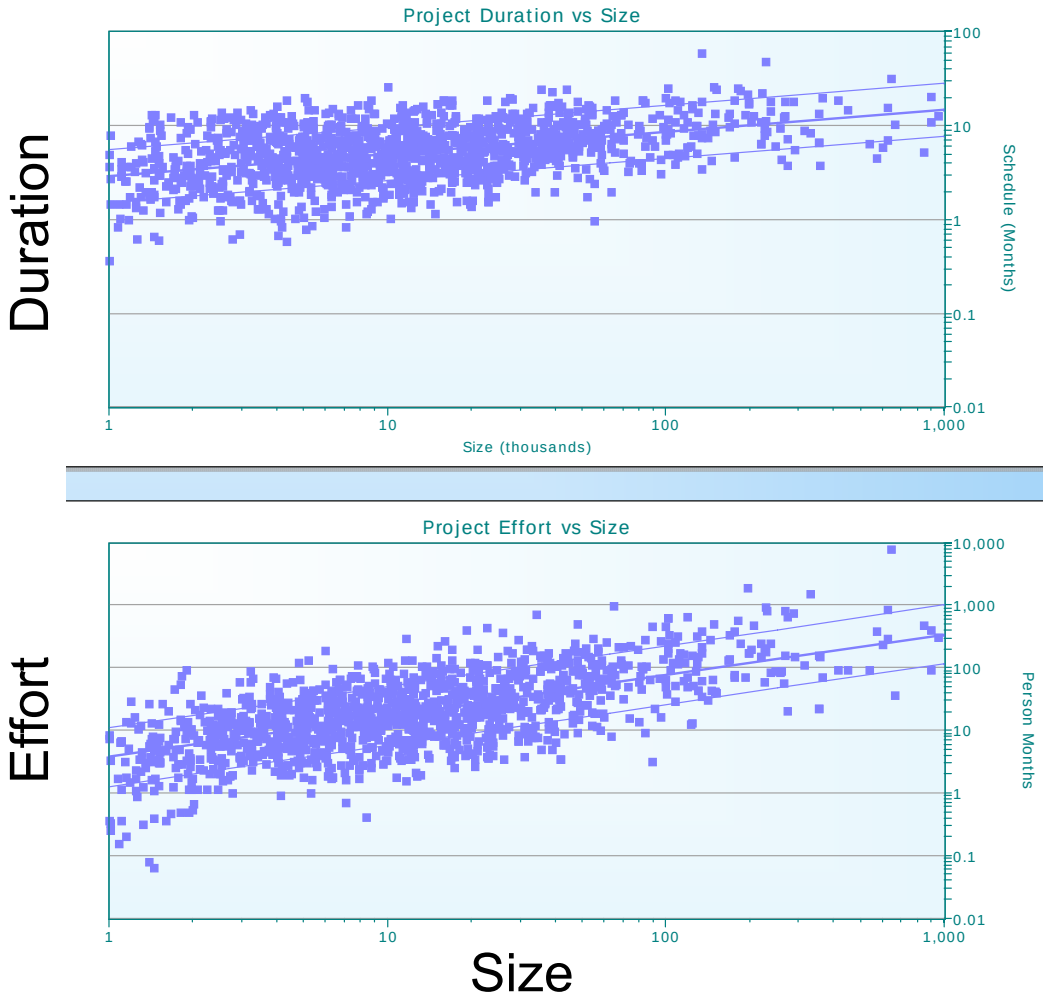
| U.S. Postal Service 1 Ounce Letter | | |
|---|---|---|
| **Service** | **Time Frame** | **Cost** |
| | | |
| 1st Class | 1 to 3 days | $0.42 |
| Priority Mail | 2 days | $4.80 |
| Express Mail | Overnight | $14.55 - $23.40 |

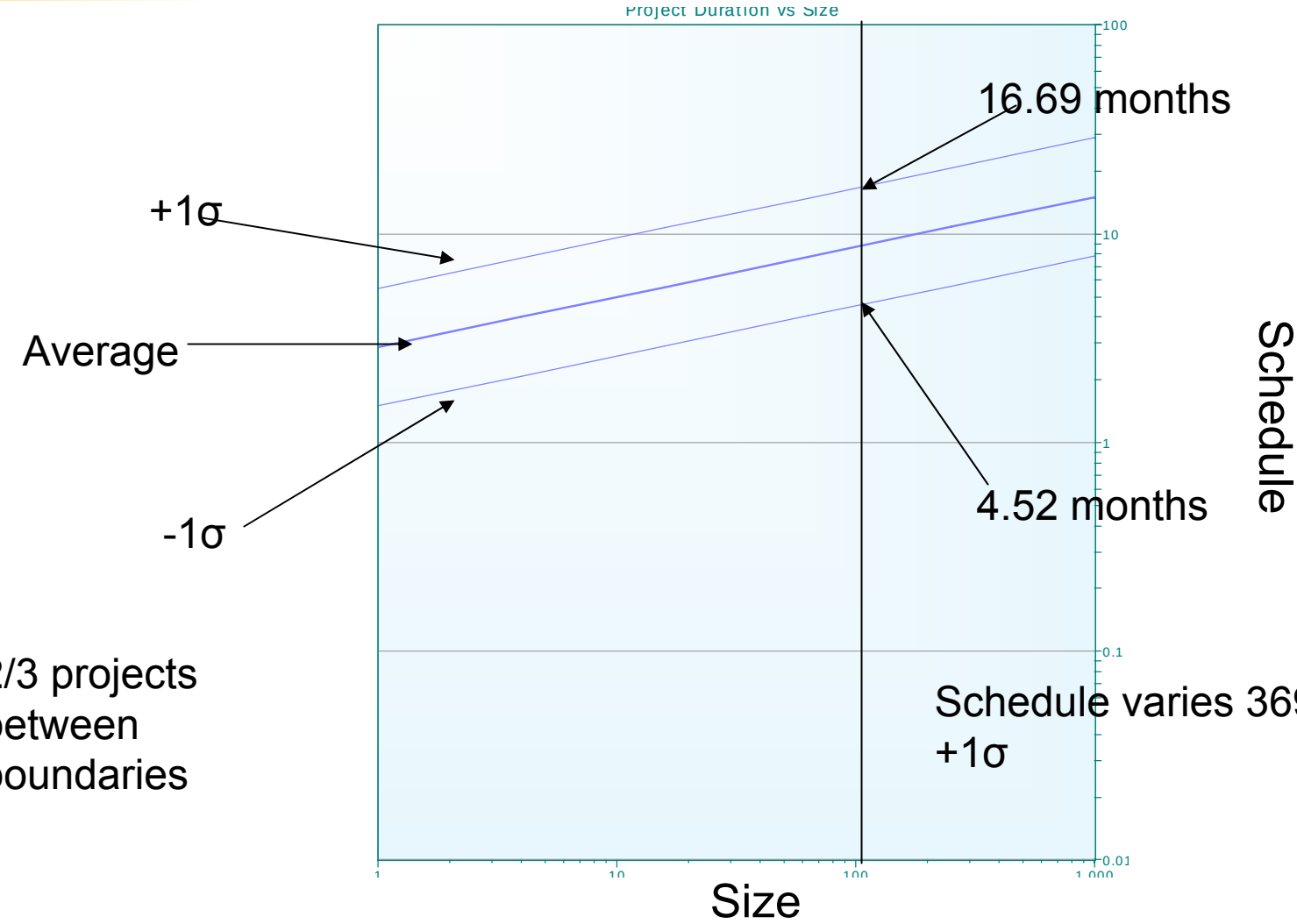
- You pay a premium for guaranteed quick delivery
- Software functions the same way:
  - The relationship between Cost/Effort and Schedule is non-linear

# Normal Variability



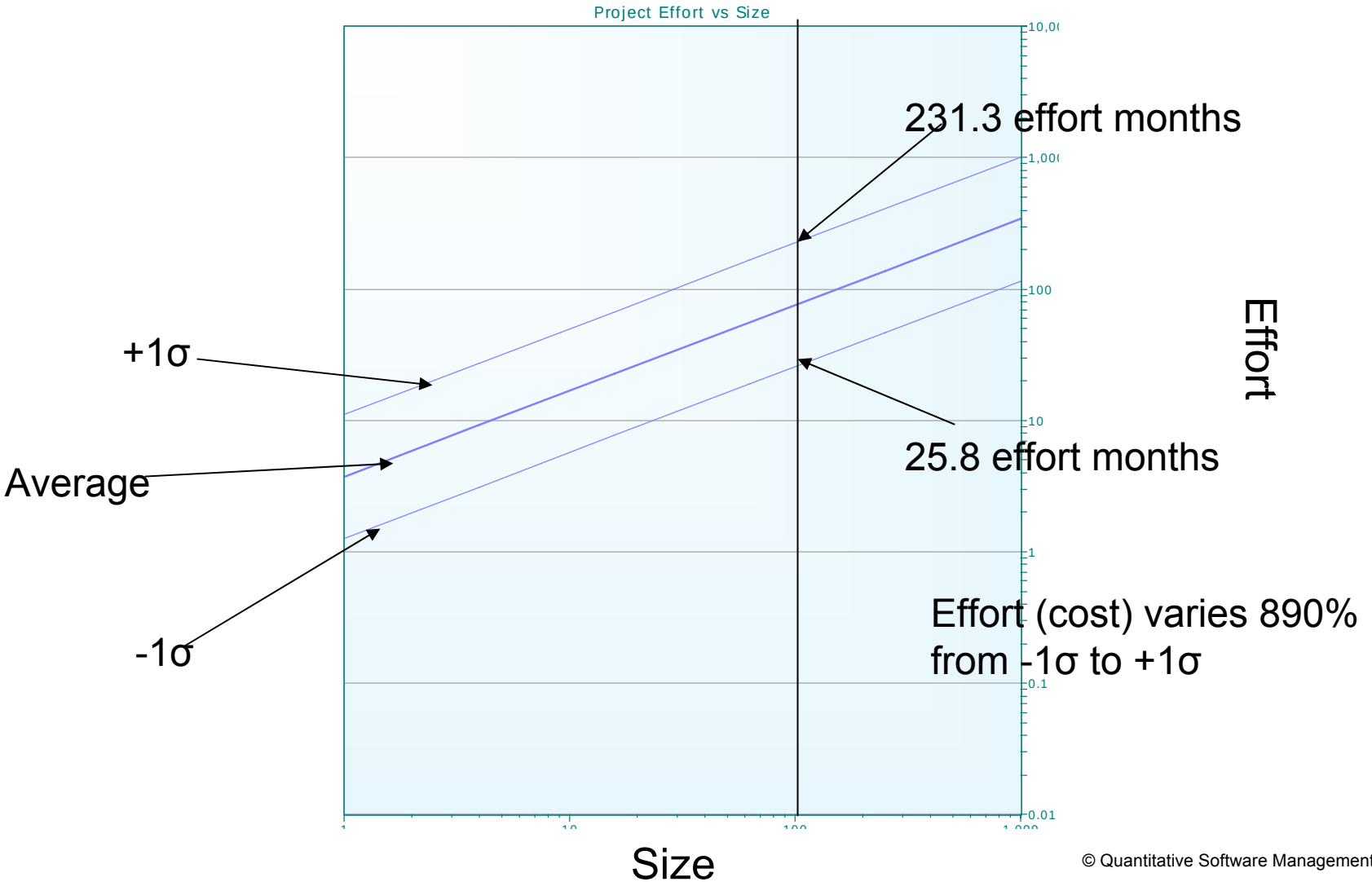
# Normal Variability, Schedule




2/3 projects between boundaries

Schedule varies 369% from -1σ to +1σ

# Normal Variability, Effort

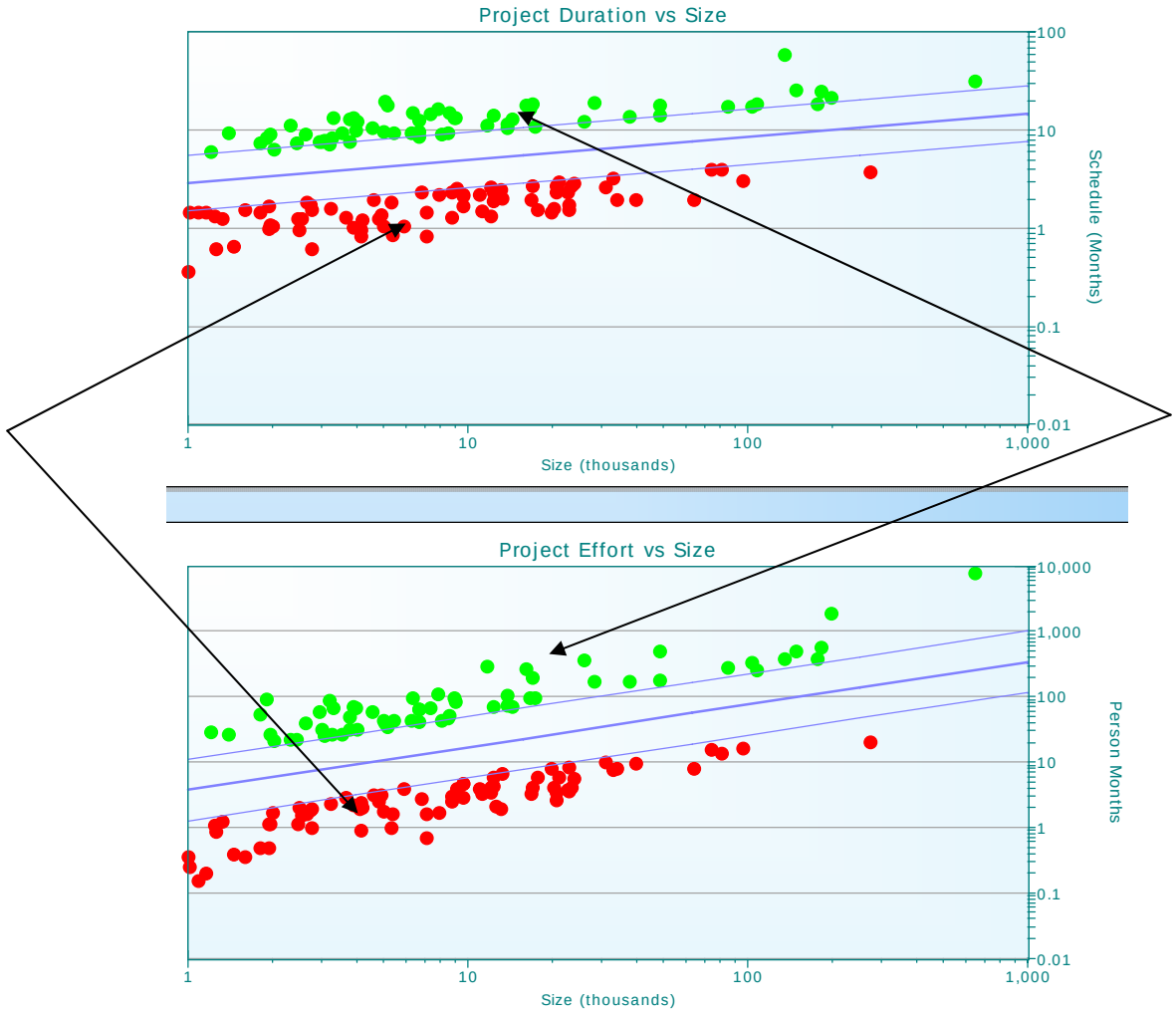


# Best & Worst Defined

- Projects Often Optimize Schedule at the Expense of Effort (Cost) or Vice-Versa
  - Time/Effort Trade-off
- Some Projects Optimize Both; Others Fail on Both Counts
- Best Projects are Defined as Being One Standard Deviation or More Better than Average for Both Schedule and Effort
  - Worst Projects are Just the Opposite

# Best & Worst Defined

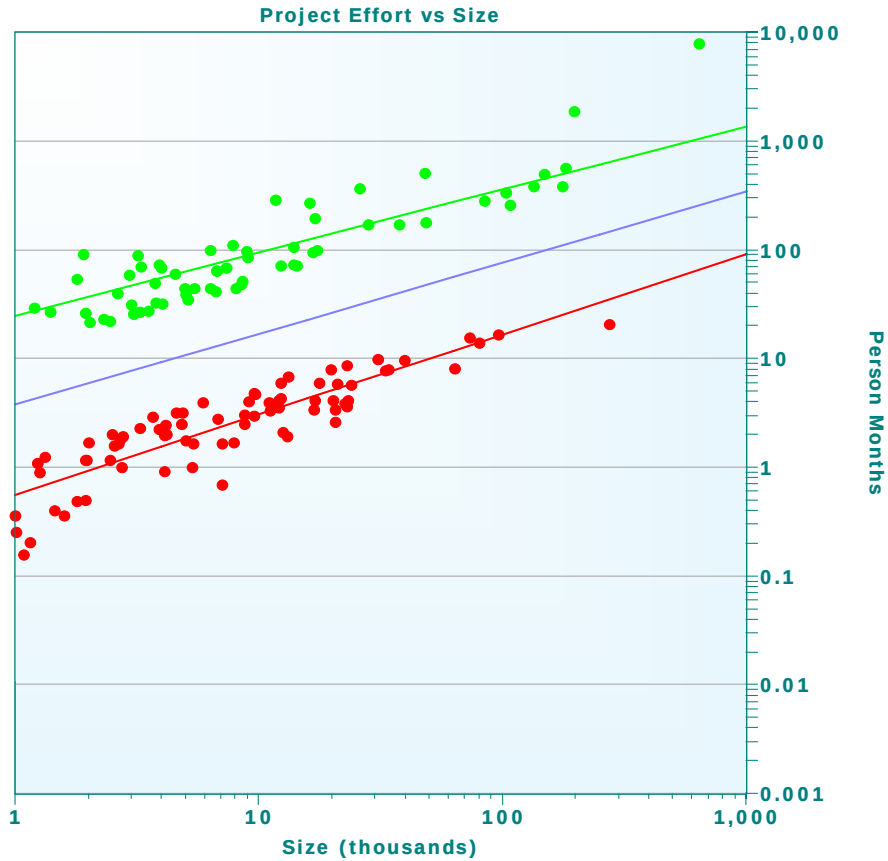



Best projects
5.4% of total

Worst projects
4.5% of total

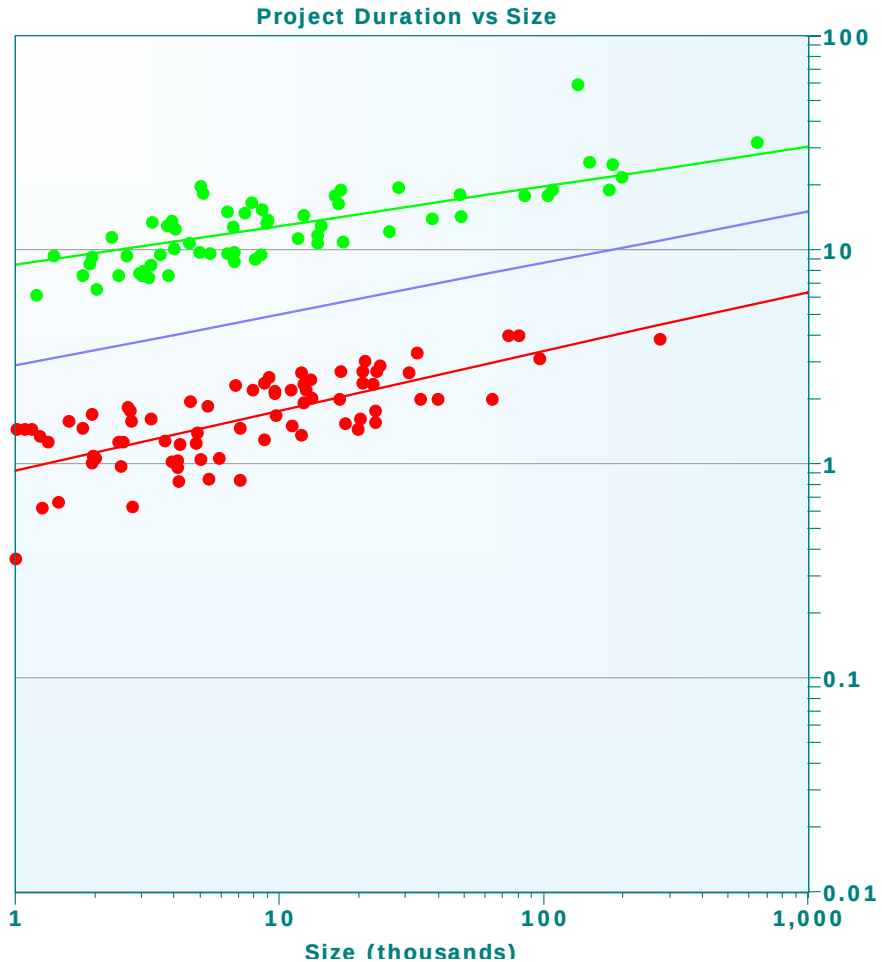
# Best & Worst Compared: Cost/Effort

- For a 10,000 line of code project, the Worst projects average 30.6 times as much effort
  - For a 100,000 line of code project the Worst projects average 23 times as much effort
- Effort is usually the largest cost component in software development



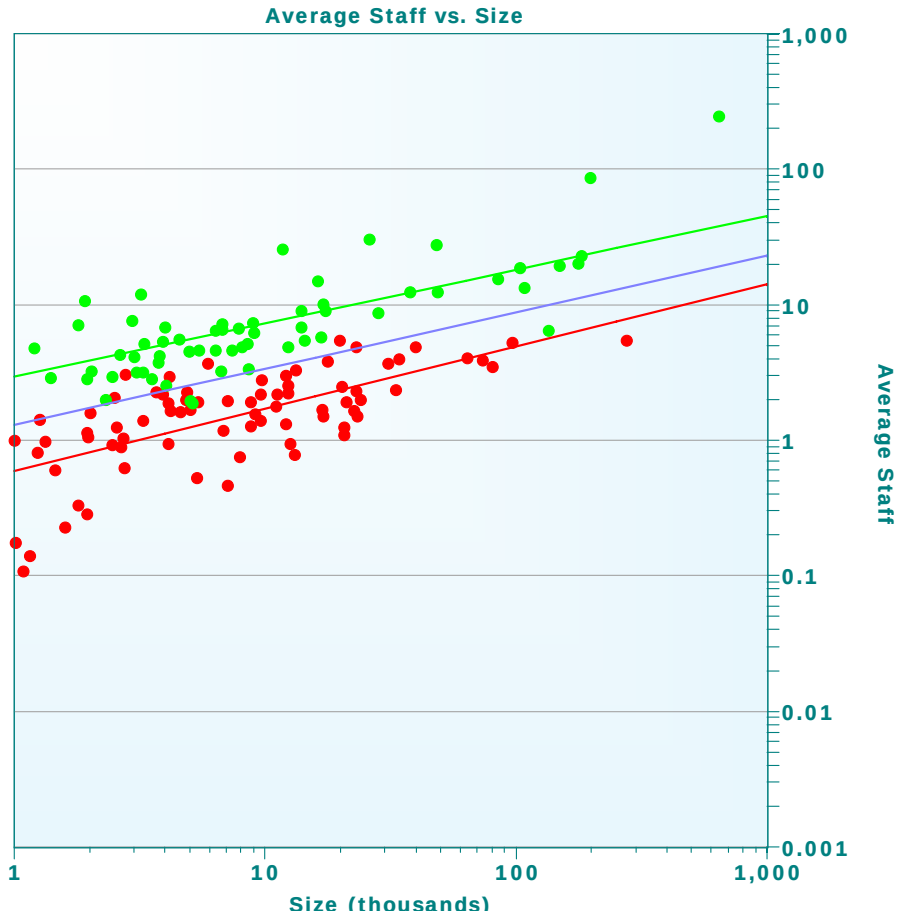
# Best & Worst Compared: Duration

- Worst projects' schedules are 7.3 times as long for a 10,000 line of code project
  - 5.8 times as long for a 100,000 line of code project



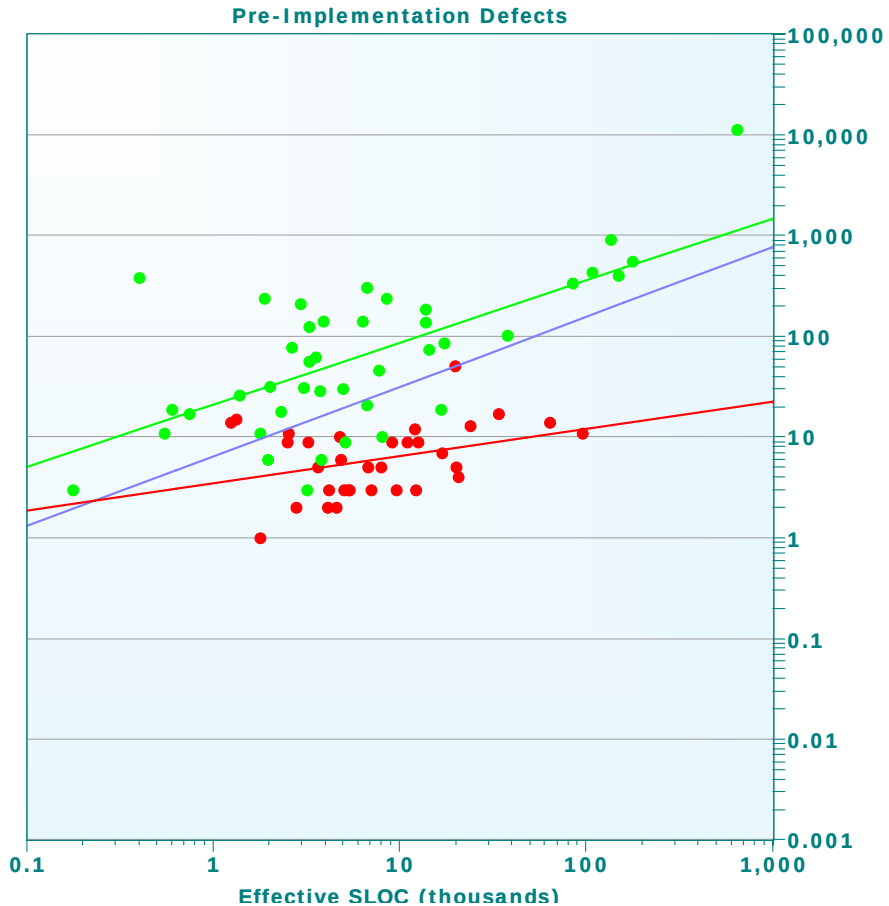
# Best & Worst Compared: Avg. Staff

- Worst projects had significantly higher staffing levels
  - 4.2 times greater for a 10,000 line of code project
  - 3.8 times greater for a 100,000 line of code project
- All Best Projects had average staff less than 6



# Best & Worst Compared: Quality 1

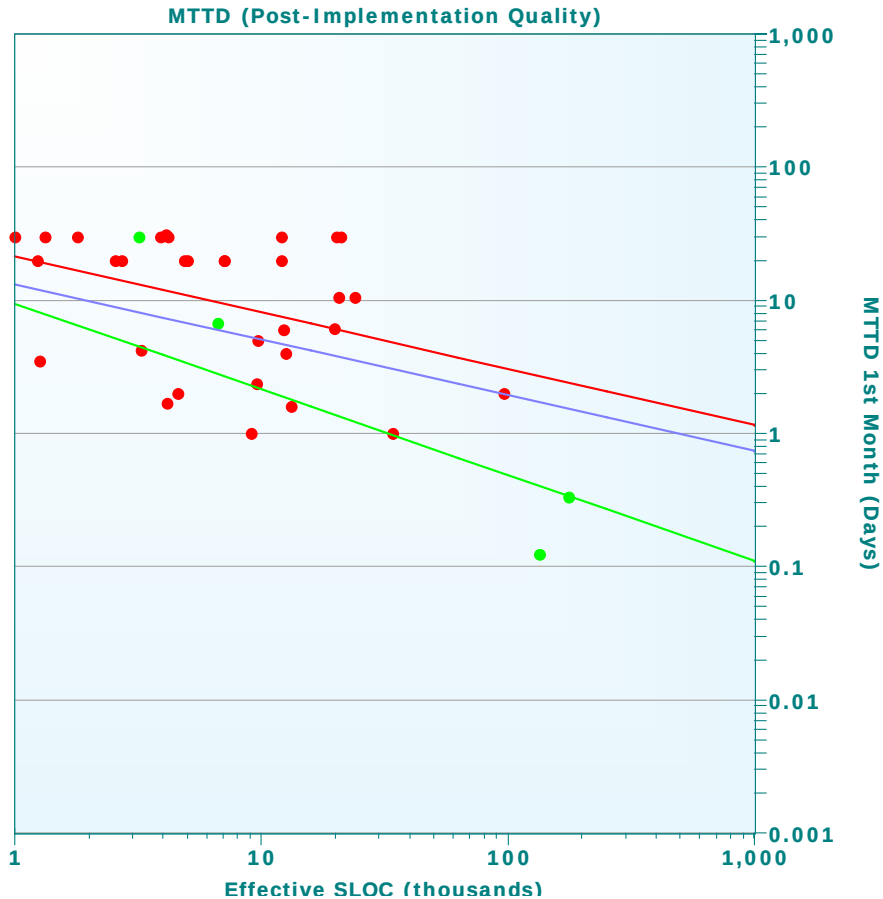
- Worst projects have far more defects
  - 13.3 times as many for a 10,000 line of code project
  - 29.5 times as many for a 100,000 line of code project
- Quality difference increases with project size



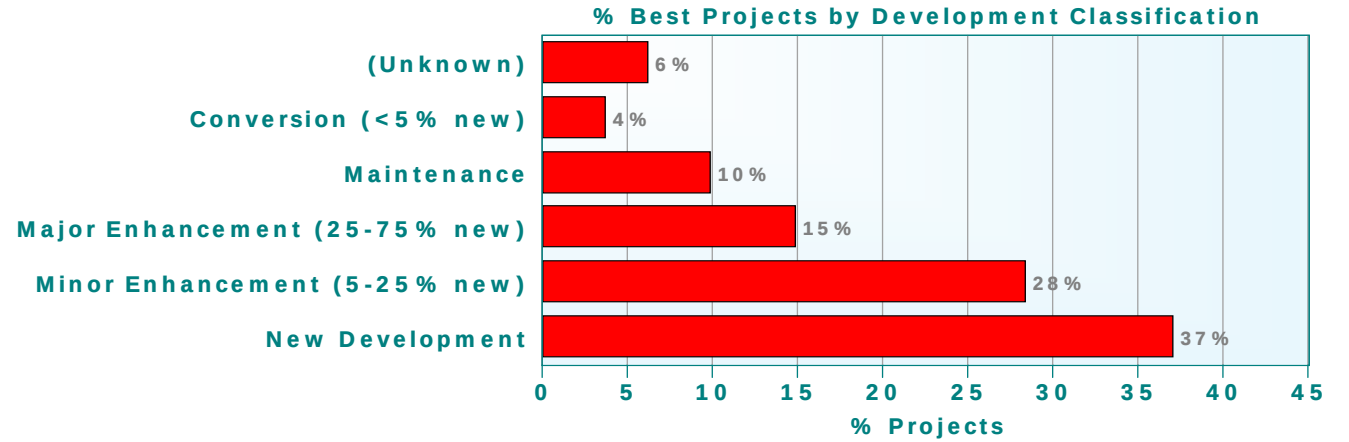
# Best & Worst Compared: Quality 2

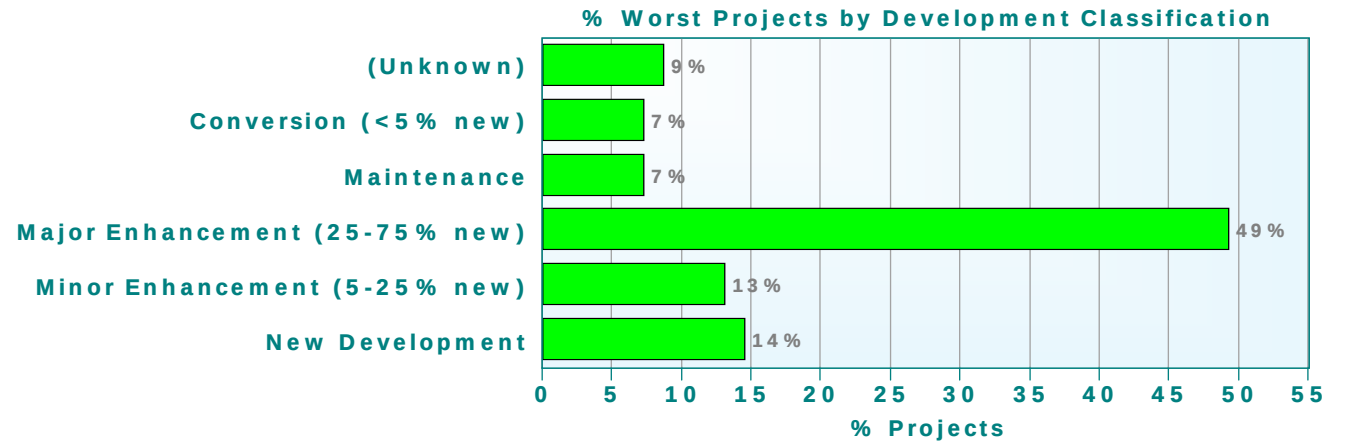
- Few Worst Projects report post-implementation defects
- Best Projects trend parallels entire data set; but is slightly better



# Best & Worst Development Type



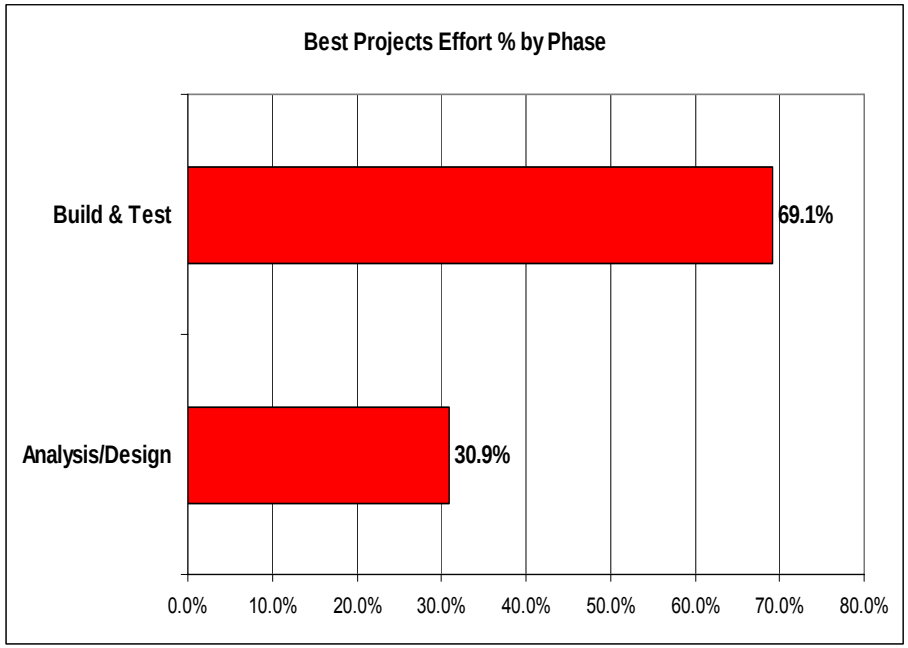

 

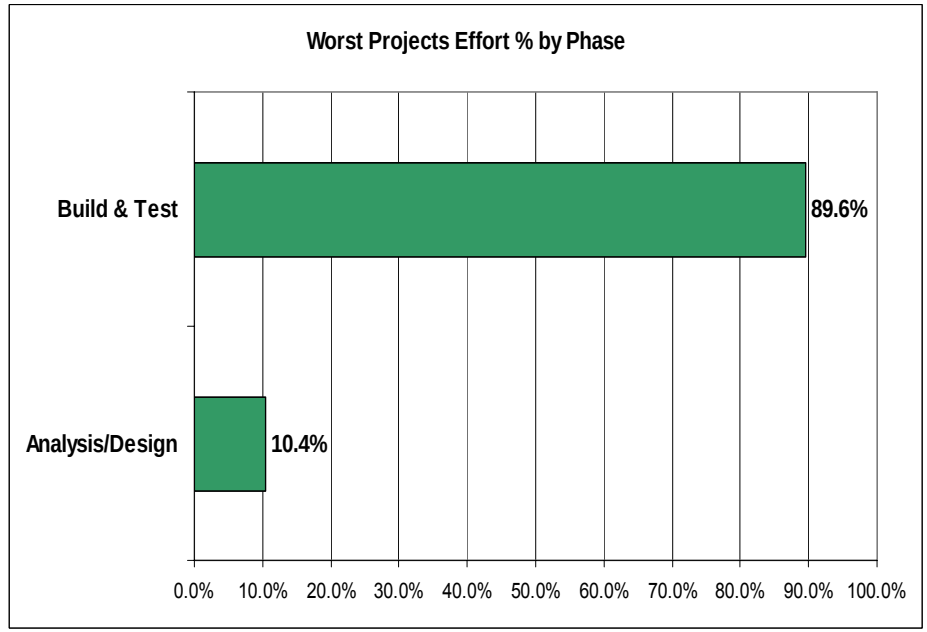
# Best & Worst Development Type

- Best projects likely to be New Development or Minor Enhancements
- Worst projects are disproportionately Major Enhancements

# Best & Worst Phase Effort Percentages

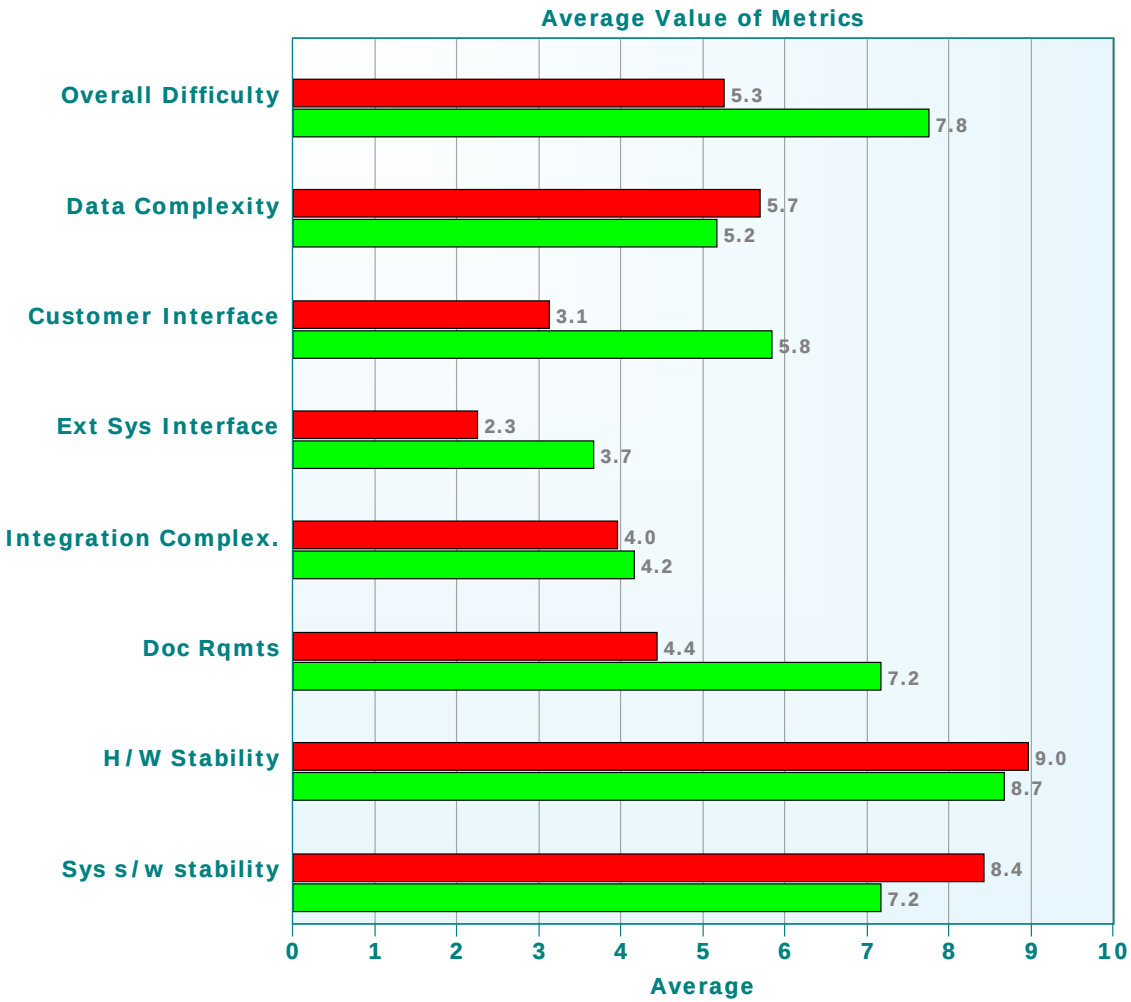


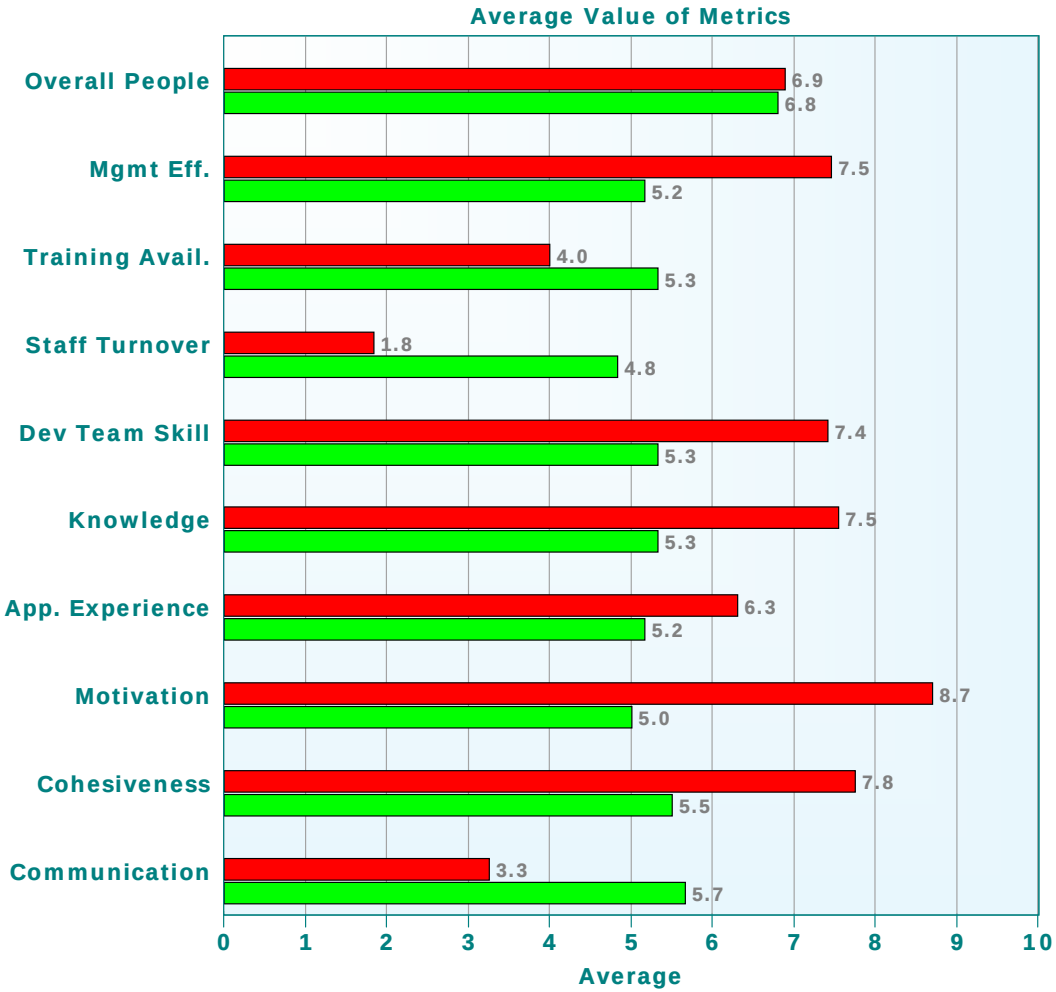

- Best projects allocate nearly 3 times as much effort to Analysis & Design on a percentage basis

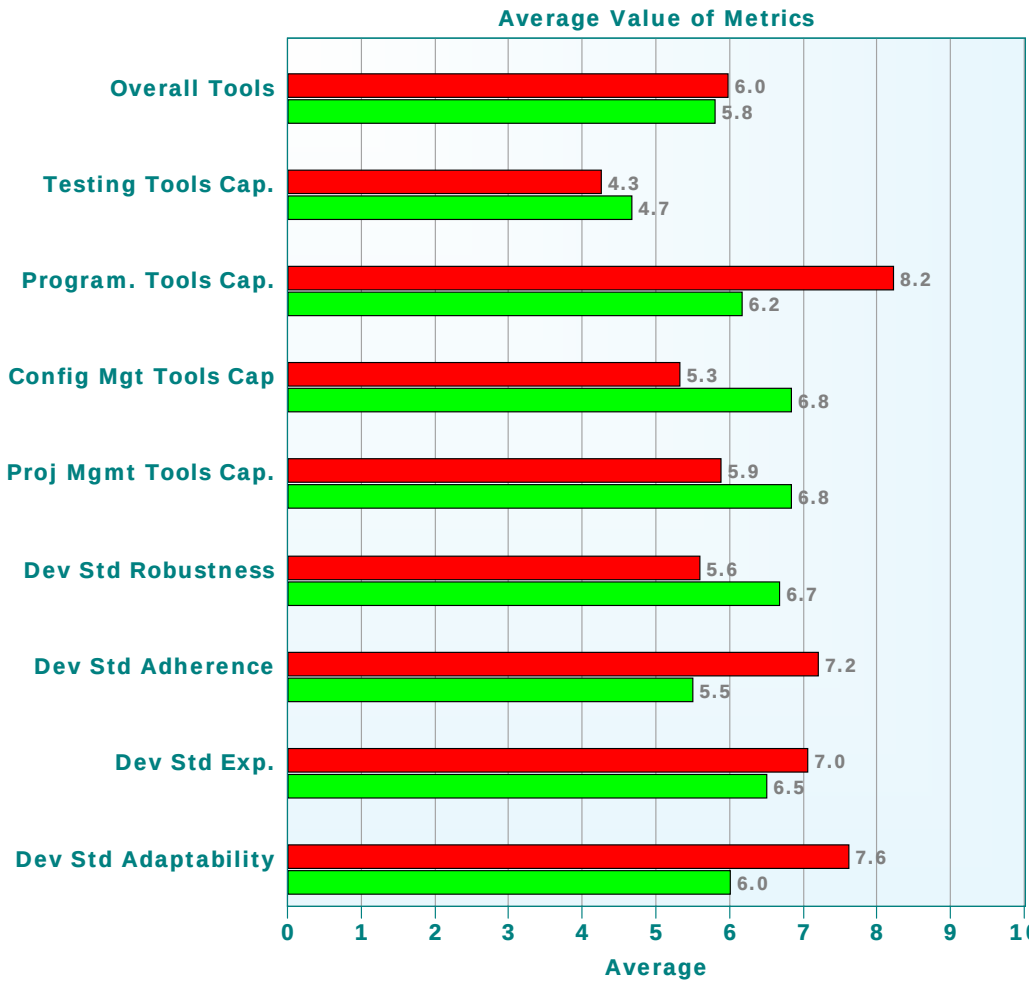
# Best & Worst: Difficulty



# Best & Worst: Personnel



# Best & Worst:Tools



# Differentiators

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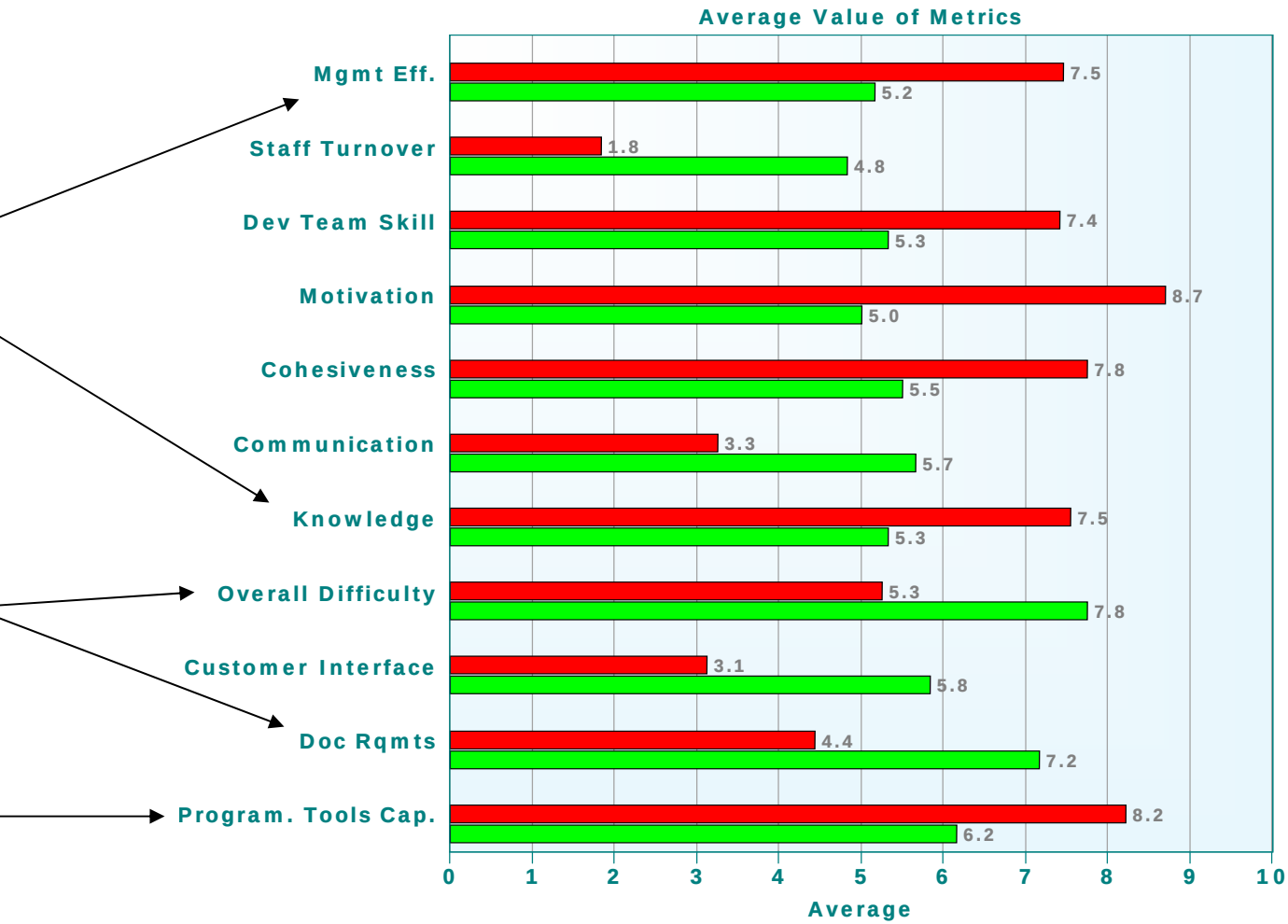
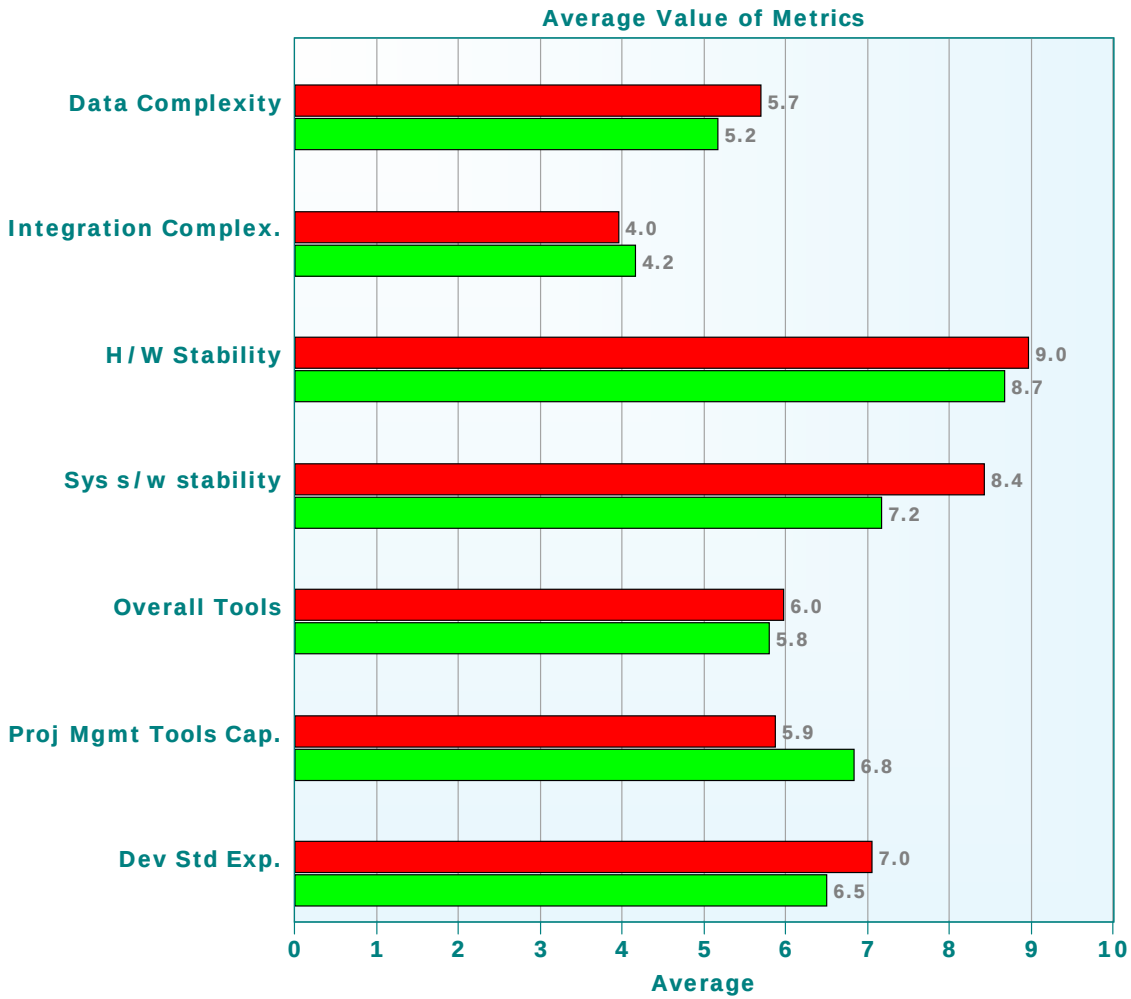
People, Communication, Knowledge

Complexity

Tools



# Non-Differentiators



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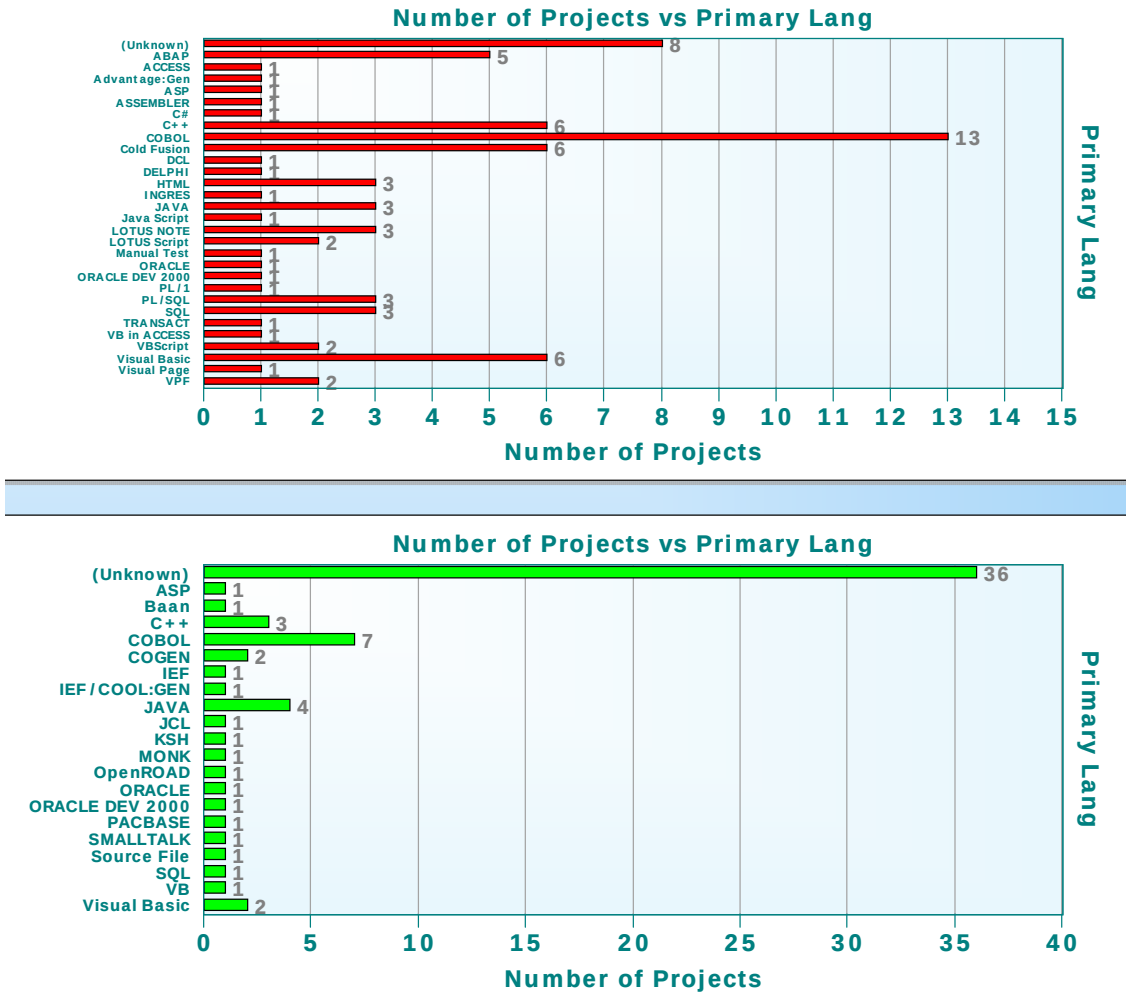

# Conclusions

- Projects of the same size and complexity can vary dramatically in cost and schedule
- Major enhancements are a “mine field”: comprising half of worst performing projects
- The amount of effort spent in Analysis & Design is a key differentiator between Best and Worst projects
- Social and leadership factors seem to contribute more to project success or failure than technical ones
- Programming language is not a key differentiator

 

# Questions??


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