McKinsey&Company

Numetrics
Analytics-driven R&D optimization

www.numetrics.com

Numetrics
Analytics to optimize R&D productivity and reduce project delays

Numetrics enables R&D leaders to calculate the complexity of their development projects, generate accurate project plans, and improve their teams' effectiveness.

Use Numetrics to answer critical questions in R&D execution such as:

☾ **CxO/Executives:** How can I Improve time-to-market performance and evaluate overall R&D performance?

☾ **Engineering leadership:** What are the root causes of low R&D productivity? How can I optimally allocate resources across projects to reduce scheduling risk?

☾ **Project/product managers:** How do I calculate design complexity and generate fact-based plans for new projects

A McKinsey solution

Underestimating project complexity and over-estimating team productivity are the top two reasons for late delivery.

Numetrics allows R&D leaders to measure and benchmark the productivity achieved on completed projects, create a solid performance baseline, generate more accurate plans, and allocate the appropriate resources for new projects.

Solutions

Numetrics is delivered as Software as a Service (SaaS) through an easy-to-use web interface. We offer three products:

R&D Performance Benchmarking

R&D Performance Benchmarking analyzes project execution to compare your product development performance against industry peers or across internal teams to create a baseline, evaluate improvement opportunities and close the gap to best-in-class. Use it to:

- Measure development team productivity
- Benchmark execution against industry peer groups on standardized metrics such as project effort, duration, team size, reuse leverage etc.
- Create a performance baseline and develop quantifiable improvement opportunities

Project Planner

Project Planner is an analytical platform to help you make fact-based decisions on optimal staffing at the project's outset to meet your schedule and quality requirements. Use it to:

- Accurately estimate product development cycle time and staffing requirements
- Generate early top-down project plans, perform risk analysis on bottom-up plans, and continuously refine plans during the project life cycle
- Simulate 'what-if' scenarios to trade off project cycle time vs staffing level, functionality, and performance
- Calibrate project plans against industry norms to validate schedule and staffing assumptions
- Calculate "should-cost" of 3rd party development

Multi-Project Pipeliner

Multi-Project Pipeliner aggregates project-specific plans, providing you with a complete view on resource demands and visibility into future staffing bottlenecks, by role and over time, so that you can match available resources to the product development pipeline. Use it to:

- Identify future staffing needs and bottlenecks
- Make informed decisions on project priority and staffing tradeoffs
- Optimize resource utilization across the product pipeline

Benefits

Numetrics solutions allows you to optimize project plans by reconciling competing constraints, including resource availability, product functionality, time-to-market, and development cost.

Gain transparency

- Measure and create a baseline for R&D capability across metrics, e.g., productivity, throughput, cycle time, quality
- Identify root causes of bottlenecks, low productivity, and inefficiency
- Benchmark internally across groups and externally to industry peers
- Understand what best-in-class peers do differently

Optimize project planning and risk assessment

- Determine schedule, resources, and cost requirements
- Readily identify high-risk project plans before committing
- Optimally staff projects to maximize productivity
- Quantify your R&D organization's capacity

Boost R&D productivity & throughput

- Plan and execute a successful R&D transformation program
- Identify and apply internal best practices across teams
- Design tailored improvement initiatives

60-90%
reduction in TTM delays

20-40%
higher R&D capacity

Contact

For more information on Numetrics, please email Numetrics@mckinsey.com
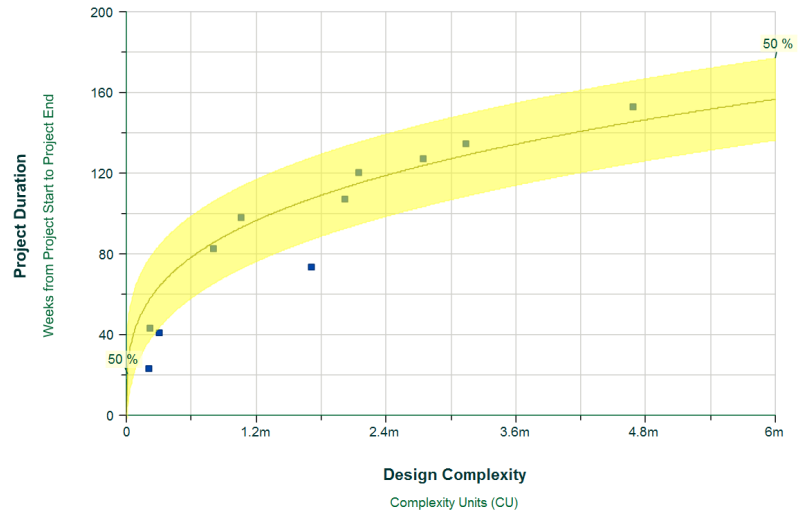
R&D performance benchmarking
Measure and benchmark your R&D performance and identify improvement opportunities

Benchmark
Measure project complexity and benchmark R&D productivity, cycle time, quality, etc.

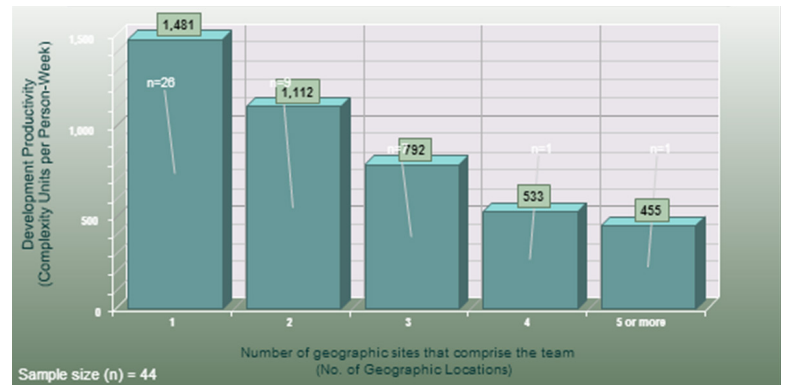Sample analysis:
Project duration Vs. complexity

■ Band containing 50% of industry peers
■ Client Software Projects

Root cause analysis
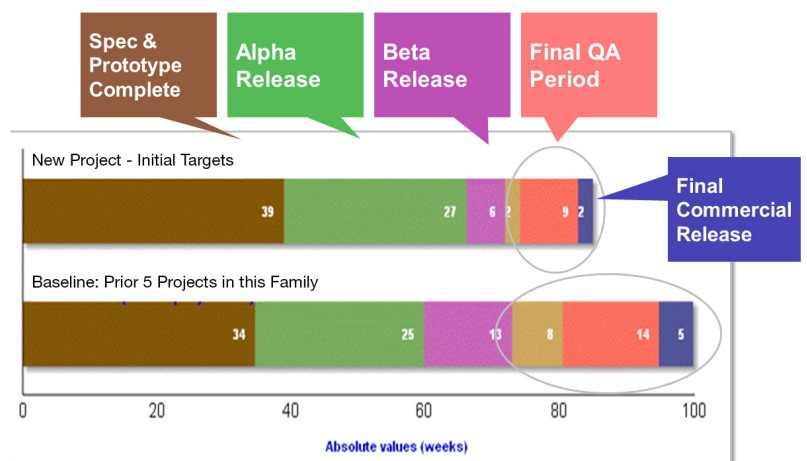Identify best practices & root causes of poor R&D performance

Sample analysis: Development productivity Vs. number of geographic R&D sites

Baseline
Create a baseline to evaluate future plans and improvement opportunities

Sample analysis: Baseline and new project schedules by phase
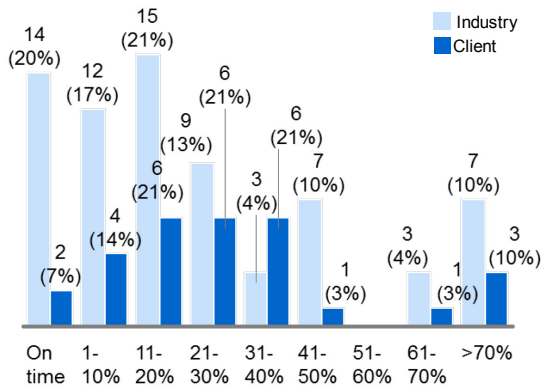
R&D performance benchmarking

Sample analyses and outputs from performance benchmarking and root cause analysis of an embedded SW organization

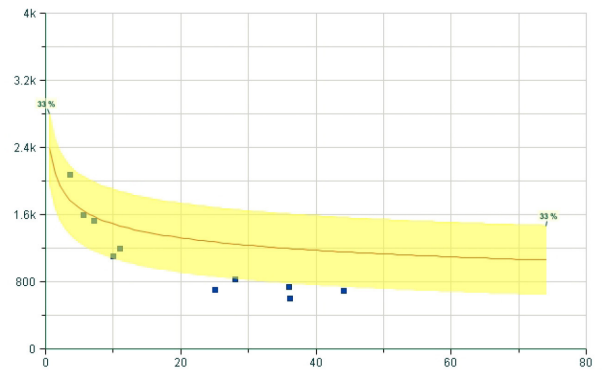■ Client Software Projects   ☐ Band containing industry peers

How predictable is the time to market?
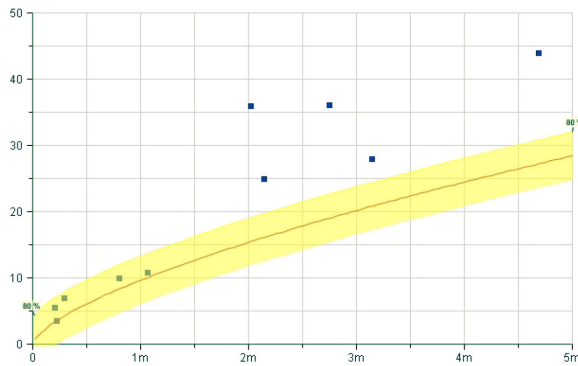Schedule slip vs. plan

Legend: ☐ Industry ■ Client

Values shown:
- On time: 14 (20%), 2 (7%)
- 1-10%: 12 (17%), 4 (14%)
- 11-20%: 15 (21%), 6 (21%)
- 21-30%: 9 (13%), 6 (21%)
- 31-40%: 3 (4%), 6 (21%)
- 41-50%: 7 (10%), 1 (3%)
- 51-60%: 3 (4%)
- 61-70%: 1 (3%)
- >70%: 7 (10%), 3 (10%)

How efficient are different team structures?
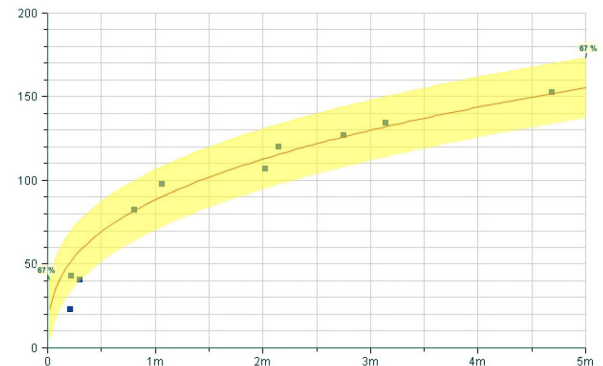Productivity vs. Team Size

Are projects properly staffed?
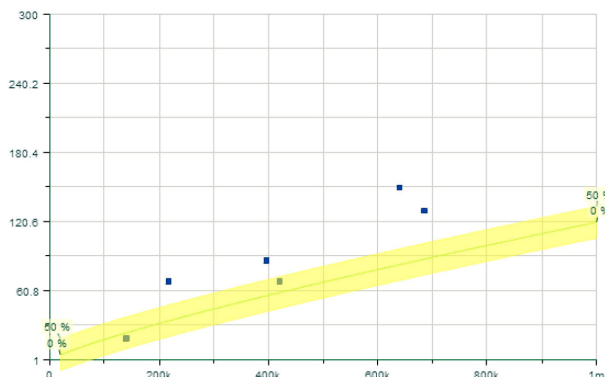Team size vs. Complexity

How does time to market compare to industry?
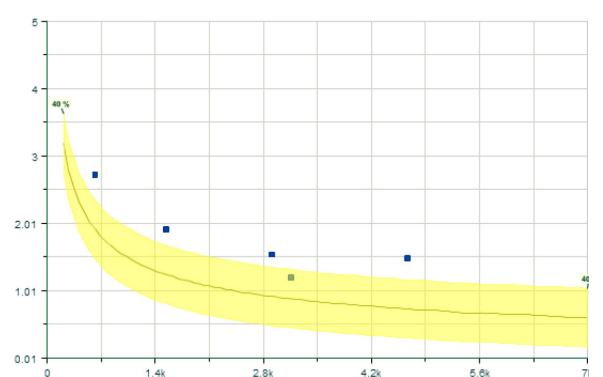Duration vs. Complexity

What is the coding quality & test effectiveness?
Defects Found vs. Design Complexity

How cost competitive is the organization?
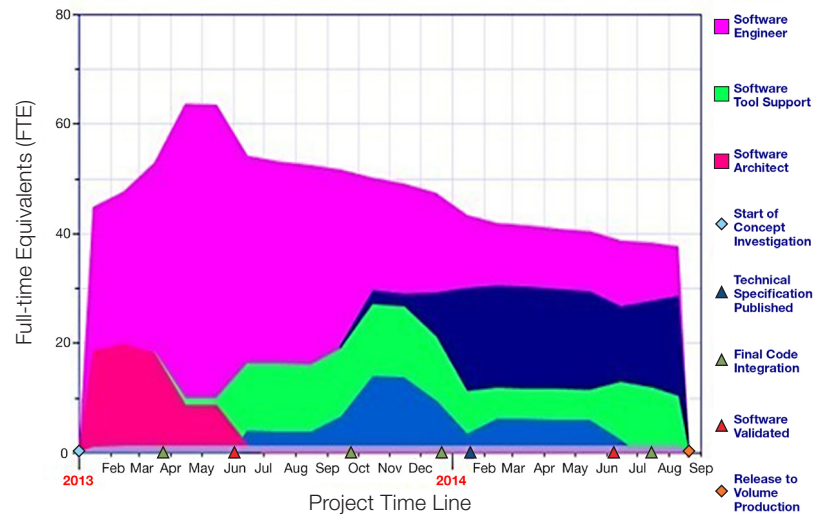Cost/Complexity Unit vs. Productivity

Project planner
Make fact-based decisions on optimal staffing to meet your schedule and quality requirements

Project plan

Estimate development time, staffing requirements and the true cost of new projects

Sample analysis:
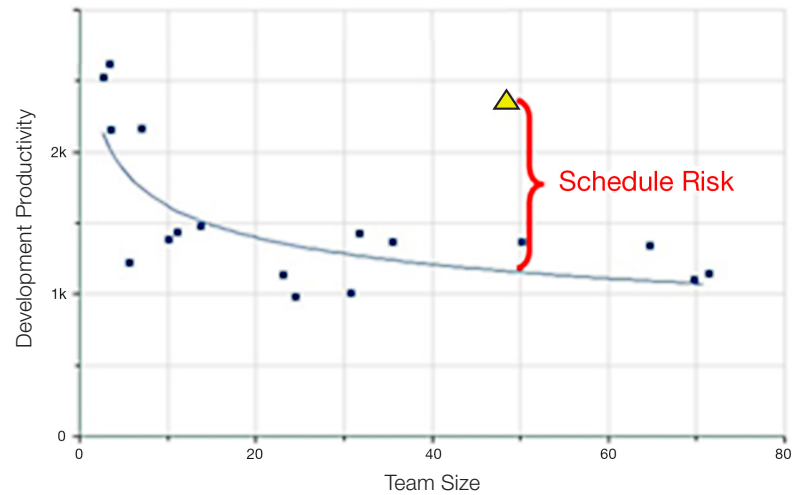Staffing requirements by role

Schedule risk

Uncover hidden schedule risk by benchmarking the underlying execution assumptions

Sample analysis:
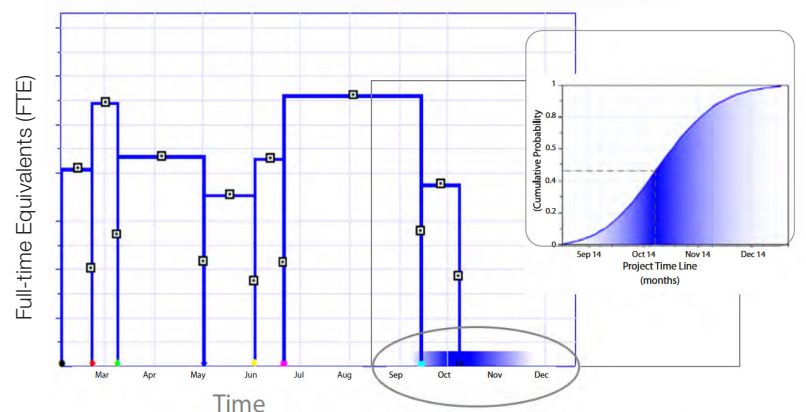Schedule risk due to unrealistic productivity assumptions

■ Past projects
— Trend line
▲ New project

'What-if' scenarios

Optimize tradeoffs in schedule, staffing, functionality and performance

Sample analysis:
Likelihood of schedule slippage for a specific scenario

Multi-project pipeliner
Aggregate project plans to provide a complete view of resource demand and bottlenecks

Project roadmap view

Model project roadmap, constraints and dependencies to generate staffing estimations per project

Sample analysis:
Project staffing estimations

Actual is 68 days Before

Must Occ is More than 60 days Before
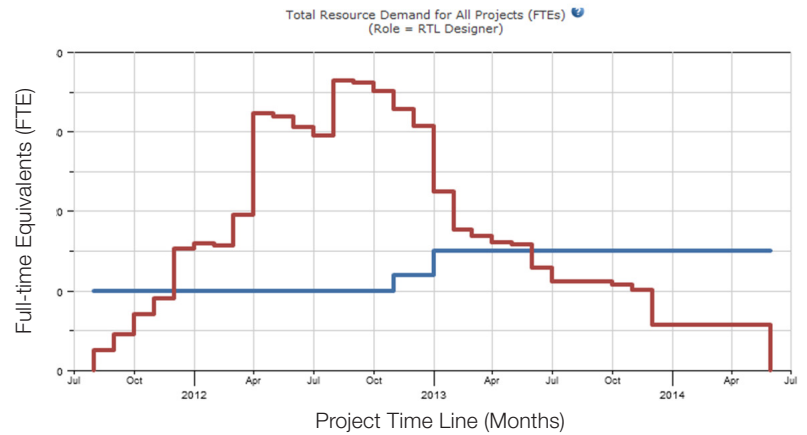
2014
Project Time Line (Months)
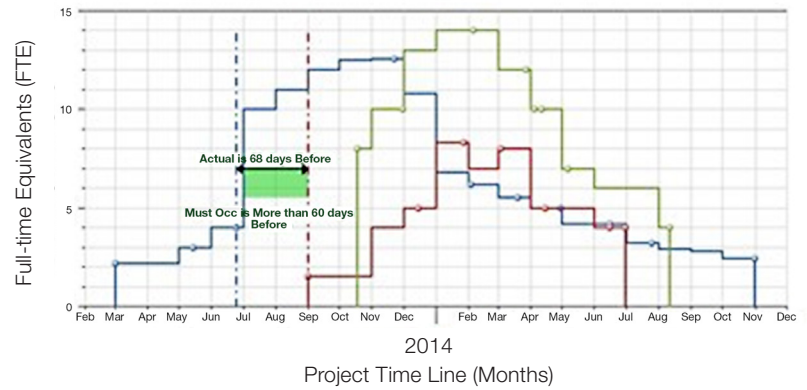
Aggregated resources view

Aggregate staffing requirements across all projects in the pipeline and compare to the available resources

Sample analysis:
Required Vs. available resources

— Required resources
— Available resources

Total Resource Demand for All Projects (FTEs)
(Role = RTL Designer)

Project Time Line (Months)

Resources optimization

Analyze resource utilization of R&D resources (by role) to roadmap requirements

Sample analysis:
R&D resource utilization by role

	Role	Peak Demand		Tolerance	Utilization %								
		Original	Optimized		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14
☐	Cryptographer	12.1	12.1		105%	118%	121%	114%	94%	115%	117%	107%	114%
☑	Digital Design Engineer	107.8	107.8		107%	115%	115%	120%	108%	125%	116%	111%	118%
☐	Firmware Engineer	82.4	82.4		166%	180%	188%	204%	201%	229%	217%	212%	224%
☑	General & Administrative	0.1	0.1		12%	12%	12%						
☑	Hardware Architect	1.0	1.0		48%	49%	49%	46%	43%	48%	49%	48%	49%
☑	Laboratory Engineer	17.0	17.0		83%	85%	99%	174%	262%	281%	425%	423%	411%
☑	Mechanical/Packaging Engineer	1.7	1.7		16%	17%	17%	16%	22%	23%	24%	23%	24%
☑	Mixed-signal Design Engineer	1.2	1.2		62%	62%	62%	62%	62%	62%			
☑	NVM Design Engineer	13.7	13.7		111%	119%	119%	129%	120%	115%	141%	142%	163%