Taking Advantage of Agile while Minimizing Risk: User Stories and Other Fables

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AFEI Agile Summit
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Outline

Just how good is Agile?

- **The good, the bad, and the ok….**

Is it right for all circumstances? If not, when?

- **Not a silver bullet**

Must it be done in a "pure" form? If not, what is gained and what is lost?

- **Maybe so, maybe not**

What must I do to be successful

- **Some take aways**

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JUST HOW GOOD IS AGILE

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Empirical Studies on Agile

Studies by research method*

Research method	Number	Percent
– Single-case	13	39
– Multiple-case	11	33
– Survey	4	12
– Experiment	3	9
– Mixed	2	6
Total	33	100

Industry-performed quantitative studies

- VersionOne surveys
- Rally Software Quantitative Analysis
- CAST CRASH Report

Company studies and case studies

- **Microsoft Research**
- **Virginia Polytechnical Institute PhD (2013)**

Workshops and Cross company interviews

- **SEI Agile Collaborators Working Group**
- **NDIA/AFEI ADAPT**

*T. Dyba˚ , T. Dingsøyr. Empirical studies of agile software development: A systematic review, Information and Software Technology 50 (2008) 833–859

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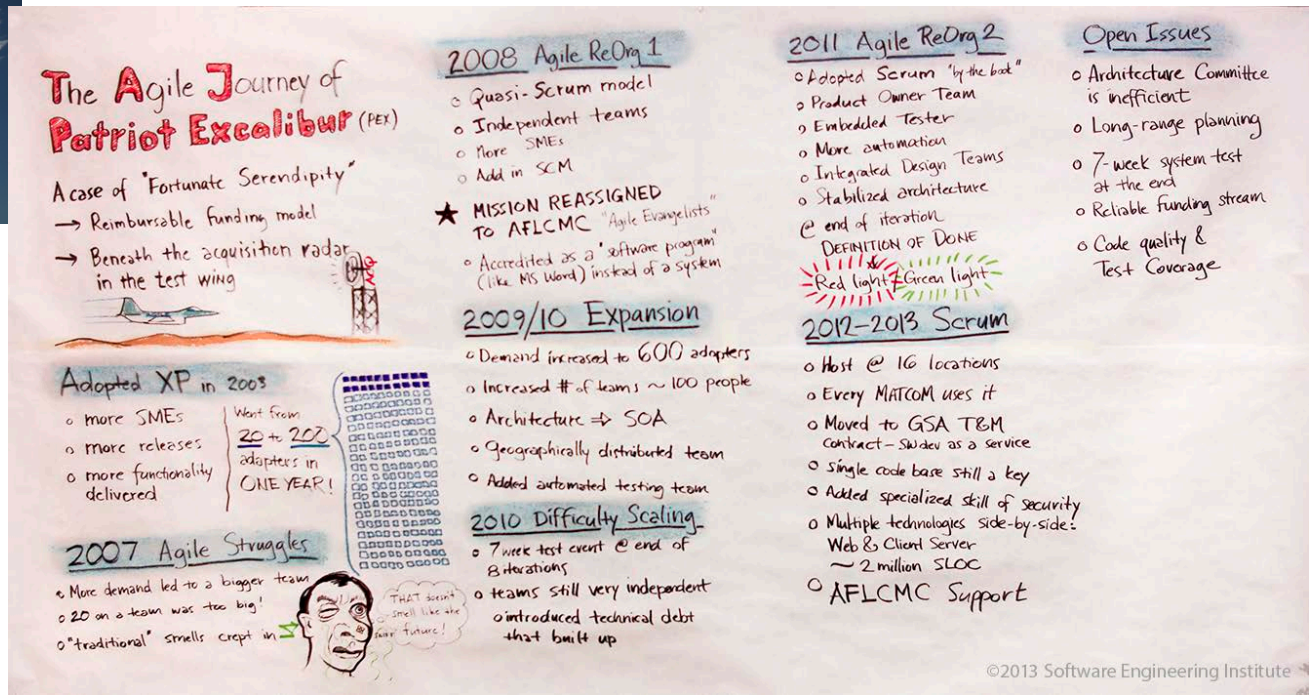
It's a Journey……

Patriot Excalibur started in 2003 and continues today….



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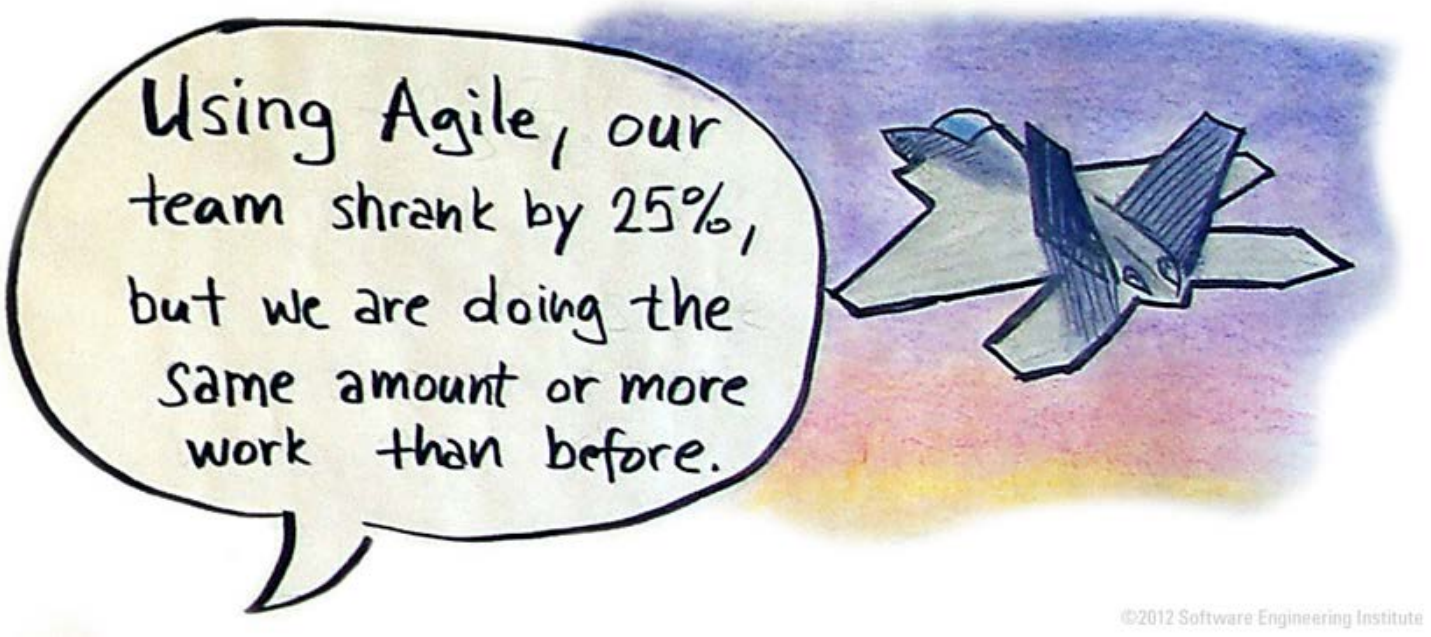
Agile Delivers Even with Smaller Team



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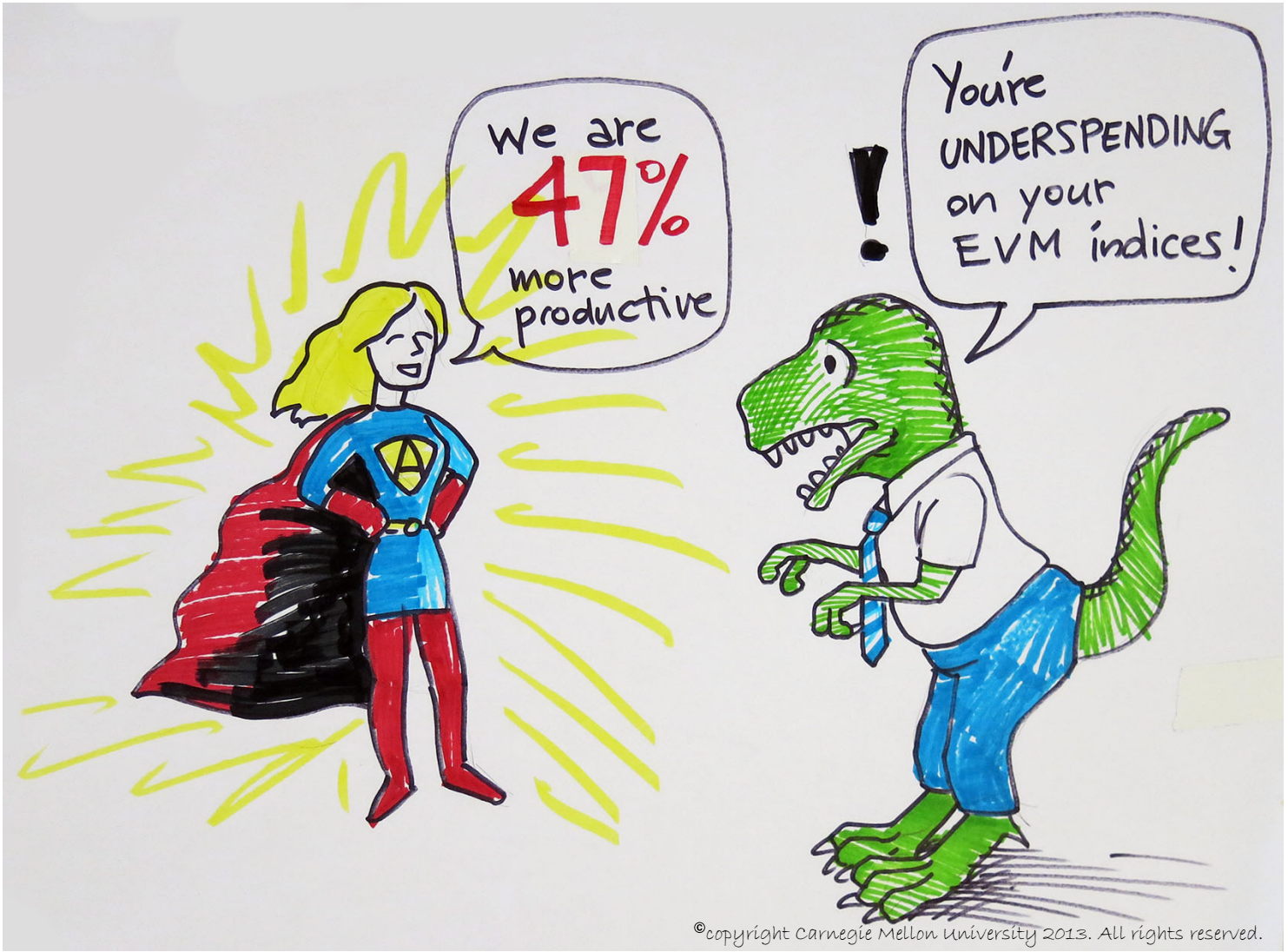
Agile Success Comes with Challenges



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CRASH Report - 2011/12 • Summary of Key Findings

Figure 16b. Transferability Scores by Development Methods

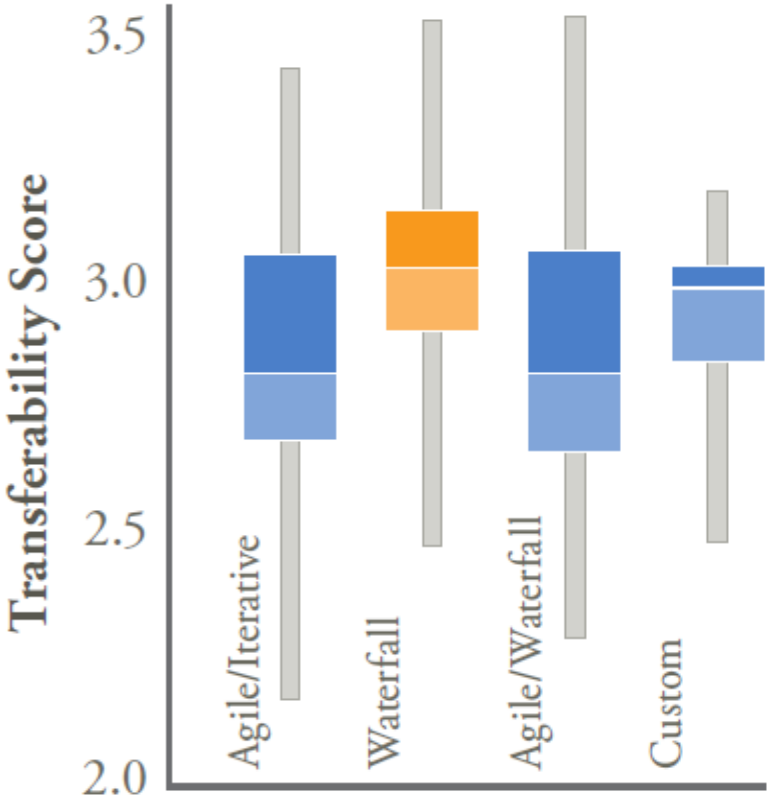
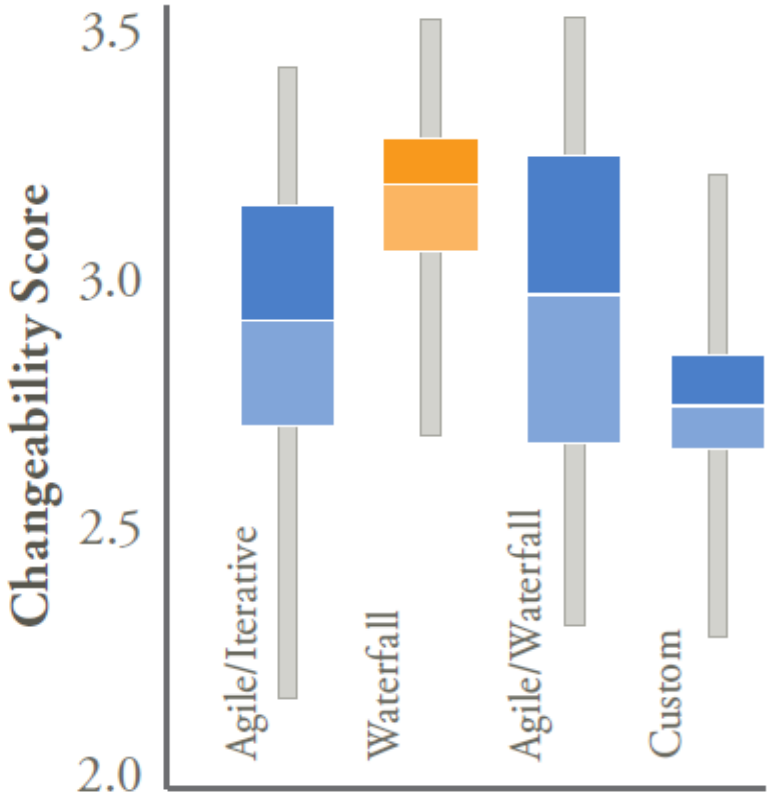


Figure 16c. Changeability Scores by Development Methods



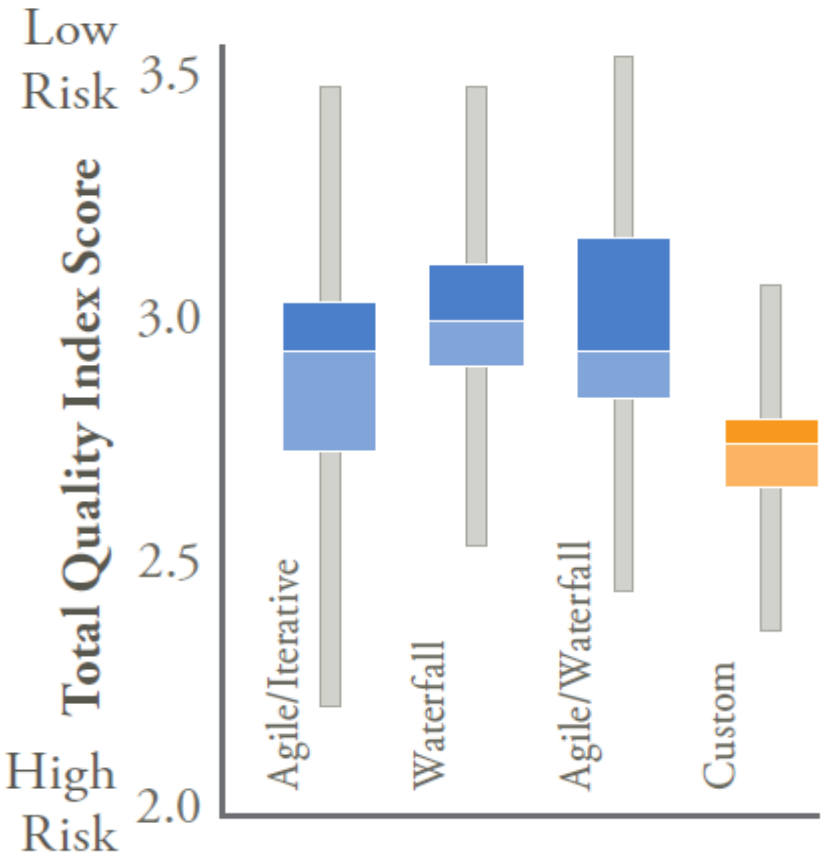
CAST Report on Application Software Health (**research.castsoftware.com)**

CRASH Report - 2011/12 • Summary of Key Findings

Finding 6—Development Methods Affect Structural Quality

- agile methods are nearly as effective as waterfall at managing the structural quality affecting business risk (Robustness, Performance, and Security)
- less so at managing the structural quality factors affecting cost (Transferability and Changeability)

Figure 16a. Total Quality Index Scores by Development Methods



CAST Report on Application Software Health (**research.castsoftware.com)**

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Pitfalls of (Agile) Measurement

The Seven Deadly Sins of Agile Measurement

	Deadly Sin	Heavenly Virtue
1	Using metrics as levers to change someone else's behavior	Using metrics for feedback to improve your own performance
2	Unbalanced metrics	Day-one have one metric from each quadrant
3	Believing metrics can replace thinking	Use quantitative insight to complement rather than replace qualitative insight
4	Too costly metrics	Favor automatic metrics from passively acquired data or lightweight surveys
5	Using a convenient metric	Use ODIM to determine metrics the provide critical insight and drive to your desired outcomes
6	Using bad analysis	Get your statistics right by consulting experts
7	Forecasting without discussing probability	Use the percentile coverage distribution, the cone of uncertainty, or Monte Carlo simulation

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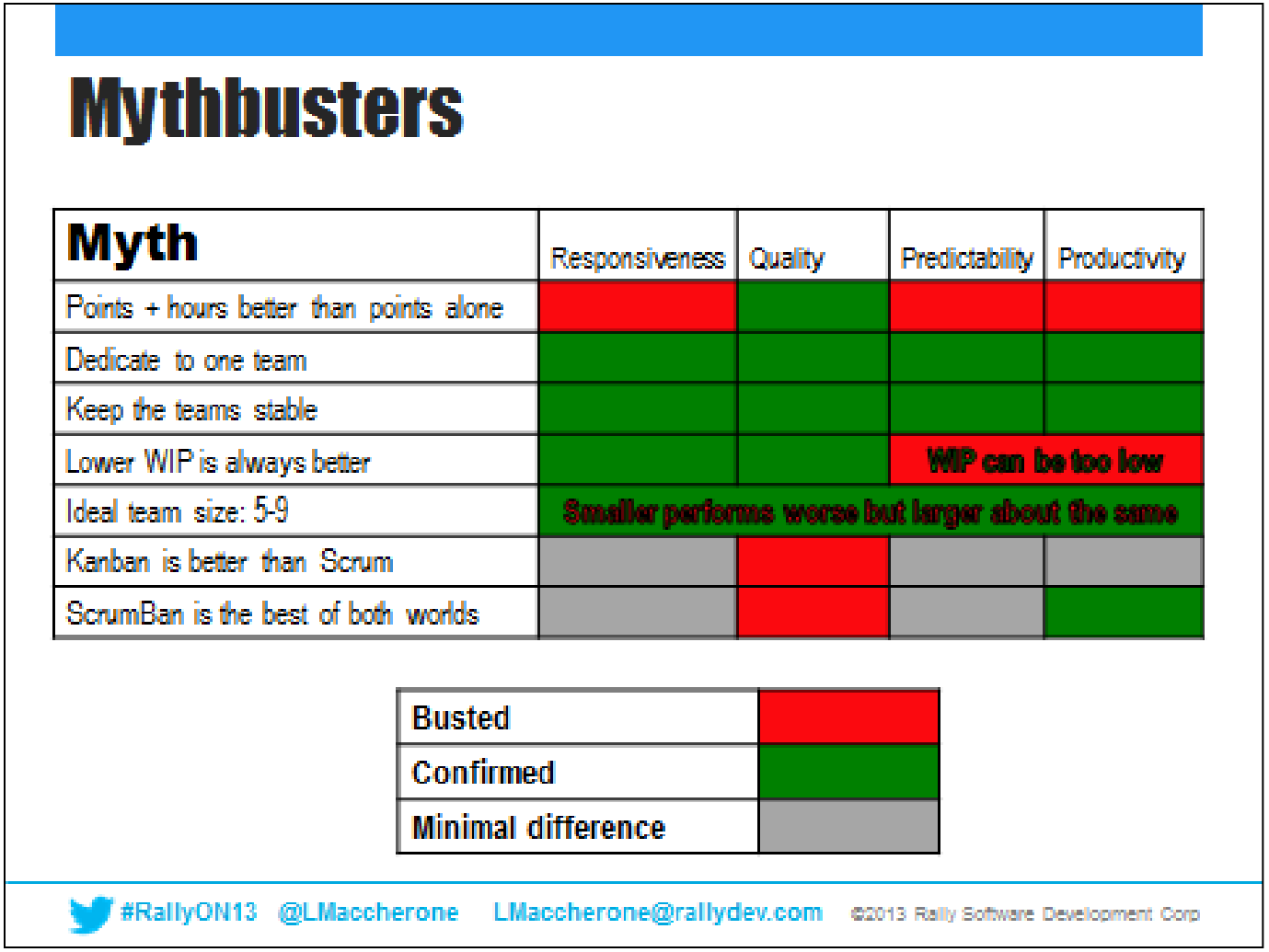
Some Common Agile Myths



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Federal Challenges in Applying Agile

GAO 2012 report of experiences in 5 agencies

- 32 Agile practices identified for consideration
- 10 practices were used and deemed effective
- 14 challenges were identified reflecting on the need to transition
  - Team transition issues
  - Guidance and adoption of tools were difficult
  - Agency commitment of staff
  - Customer trust of iterative solutions
  - Adapting to iteration time frames was difficult
  - Federal reporting and reviews not aligned with Agile

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IS AGILE RIGHT FOR ALL?

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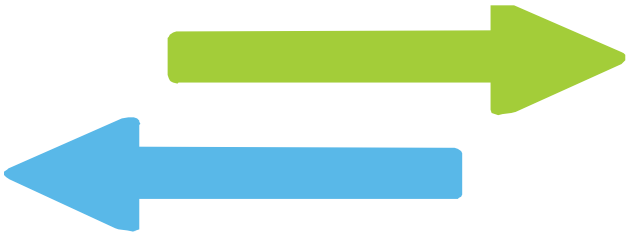
Dynamic Environments - Traditional versus Agile Worlds

…..the Traditional World struggles to deliver as it constantly looks back at long-fixed requirements and priorities.

- If requirements are stable, then safer and more prudent to use waterfall

…..the Agile World adapts as it delivers by constantly looking forward at evolving requirements and priorities.

- In settings with significant operational or technology dynamism, the Agile methods are an advantage



Parallel Worlds: Agile and Waterfall Differences and Similarities (CMU/SEI-2013-TN-021).
http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=62901

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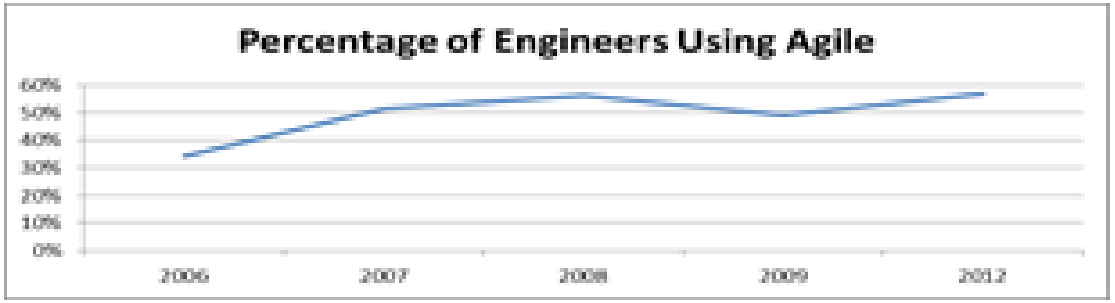
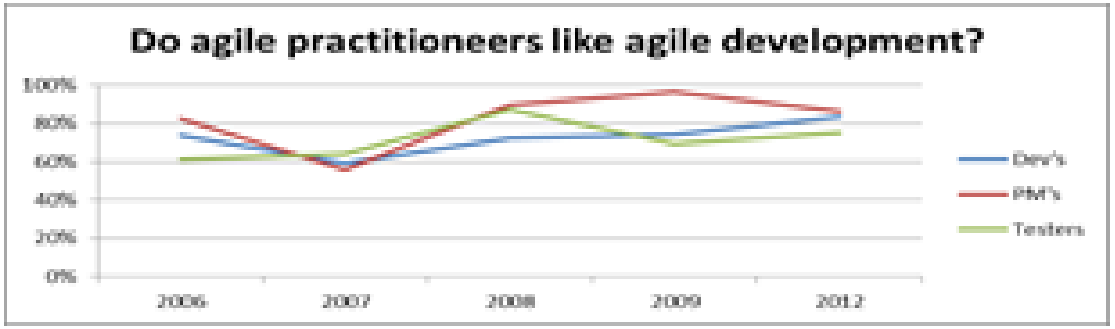
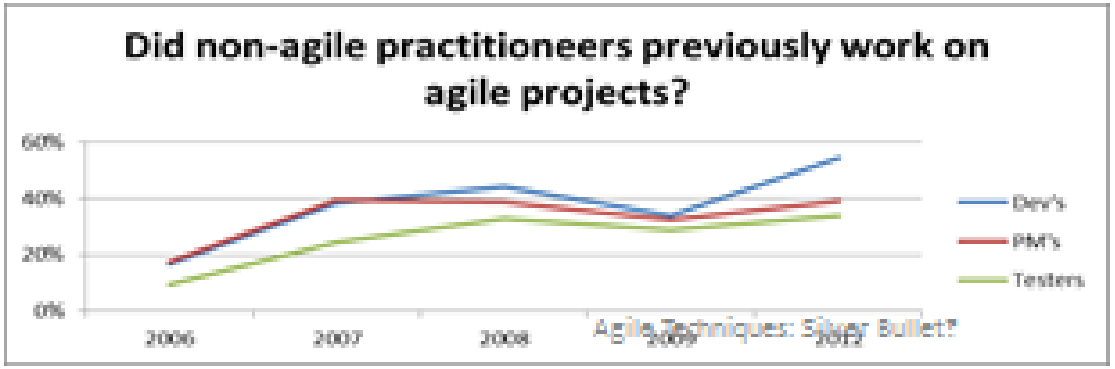
Microsoft Research Agile Trends (2013)



Usage Increasing



Popular techniques



Not Life Changing

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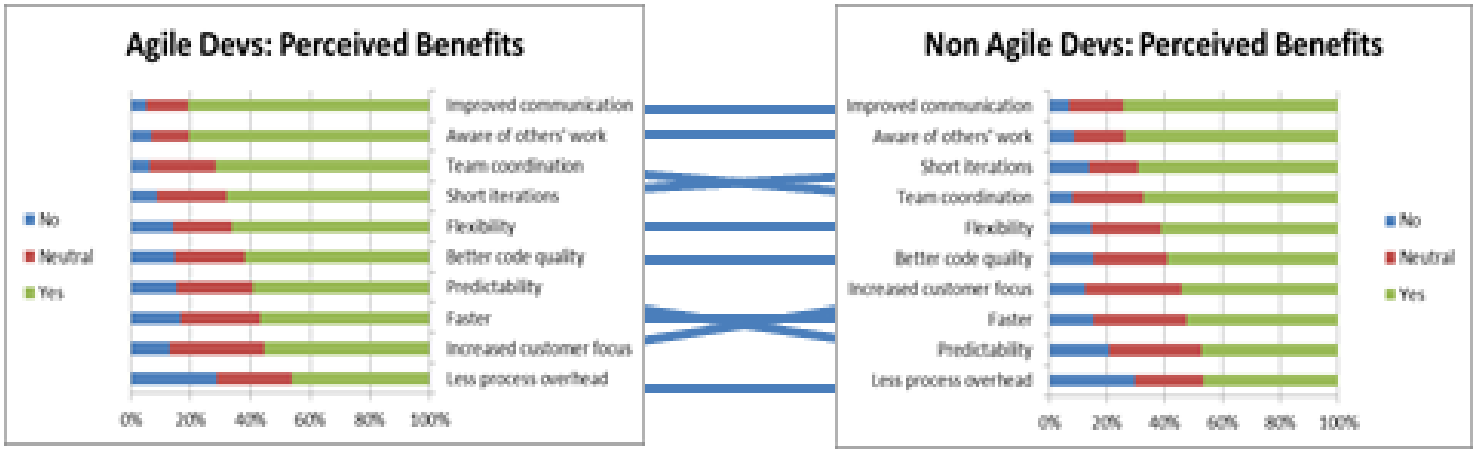
Comparison of Agile Benefits

Microsoft Research

Agile Benefits



Benefits	Trend	Range	Ranking Microsoft	Ranking VersionOne
Improved communication		0.83-0.84	1	
Aware of others' work		0.74-0.85	2	
Team coordination		0.73-0.76	3	
Short iterations		0.67-0.74	4	
Flexibility		0.63-0.72	5	2
Better code quality		0.59-0.62	6	4
Faster		0.54-0.63	7	1
Predictability		0.54-0.62	8	6
Increased customer focus		0.53-0.60	9	
Less process overhead		0.42-0.52	10	

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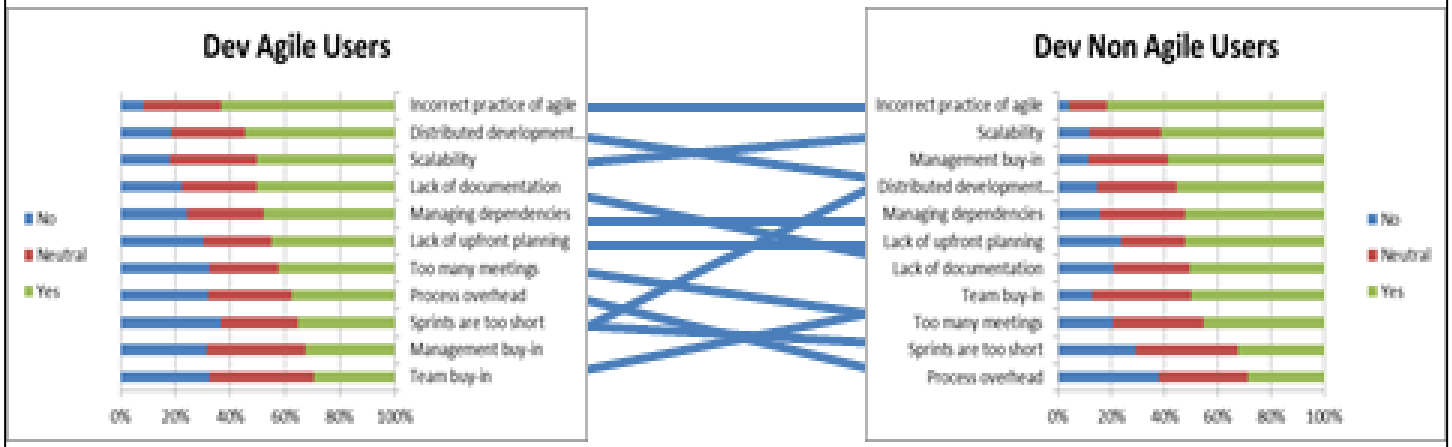
Some Alleged Agile Problems

Microsoft Research

Agile Perceived Problems



Problems	Trend	Range	Ranking Microsoft	Ranking VersionOne
Incorrect practice of agile		0.56-0.66	1	
Lack of documentation		0.45-0.61	2	4
Distributed development difficult		0.51-0.53	3	
Managing dependencies		0.50-0.52	4	
Lack of upfront planning		0.46-0.49	5	1
Scalability		0.44-0.50	6	8
Too many meetings		0.31-0.49	7	
Process overhead		0.30-0.44	8	
Management buy-in		0.32-0.35	9	3
Sprints are too short		0.33-0.34	10	
Team buy-in		0.28-0.31	11	7

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Have Agile Techniques been the Silver Bullet for Software Development at Microsoft?

Results

- the growth of agile adoption at Microsoft is slower than expected
- no individual agile practice exhibited strong growth trends
- both agile and non-agile practitioners agreed on the relative benefits and problem areas of agile techniques

Conclusions

- no clear trends in practice adoption
- non-agile practitioners are less enamored of the benefits and more strongly in agreement with the problem areas
- the ability for agile practices to be used by large-scale teams generally concerned all respondents

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Traditional vs Agile Approaches Fit$_1$

Traditional approach

- consistent with the acquisition life cycle guidance provided in the DoD Acquisition Deskbook and its supporting documents.
- programs with stable requirements and environment, with known solutions to the requirements
- programs with a homogeneous set of stakeholders who communicate well via documents
- programs for which the technology base is evolving slowly (technology is not expected to be refreshed/replaced within the timeframe of the initial development)

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Traditional vs Agile Approaches Fit$_2$

Agile approach

- programs with volatile requirements and environment
- programs where solutions are sufficiently unknown that significant experimentation is likely to be needed
- programs for which the technology base is evolving rapidly
- programs with stakeholders who can engage with developers in ongoing, close collaboration

concluded that, in reality, no acquisition context that we have seen is "ideal" for either the traditional or agile approach.

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MUST IT BE DONE IN "PURE" FORM

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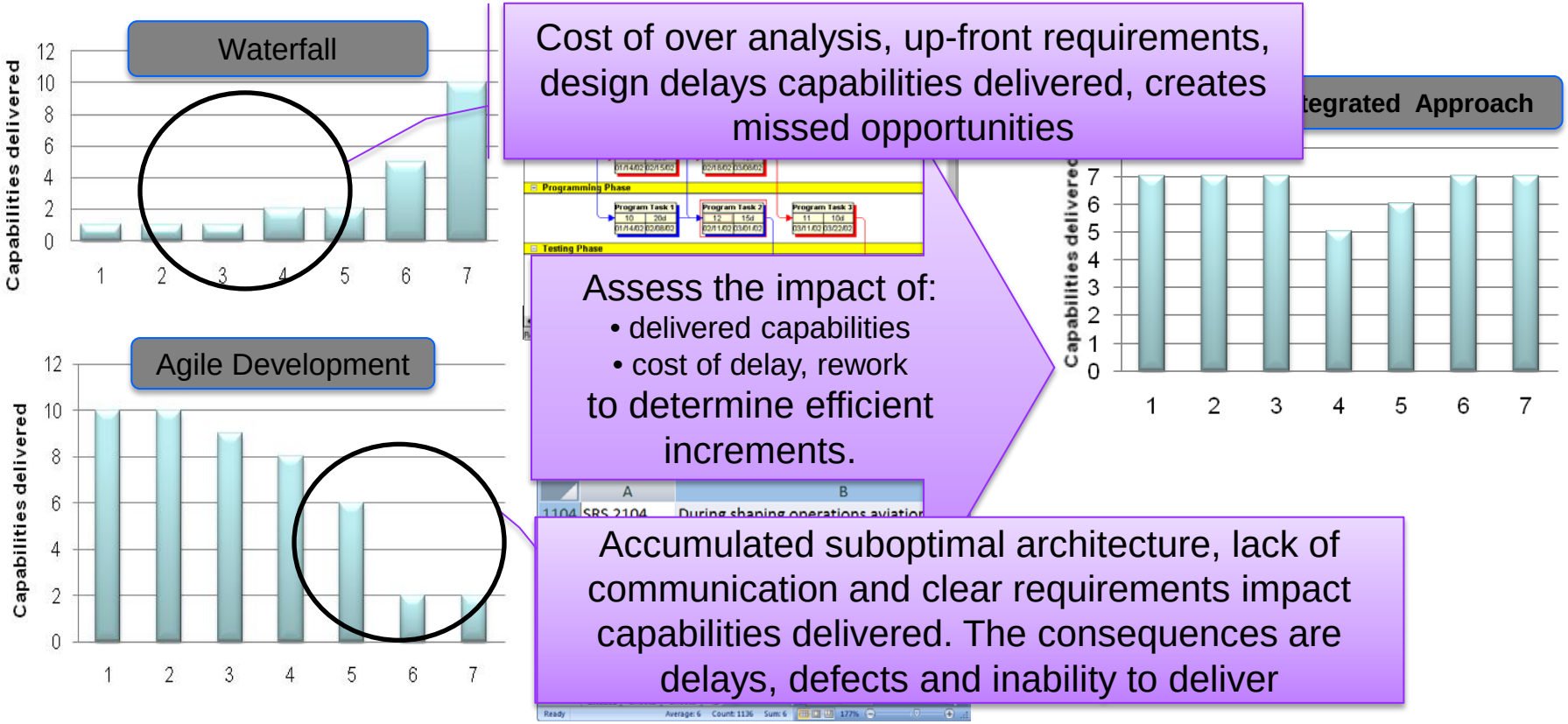
Both Waterfall and Agile Development Have Risks



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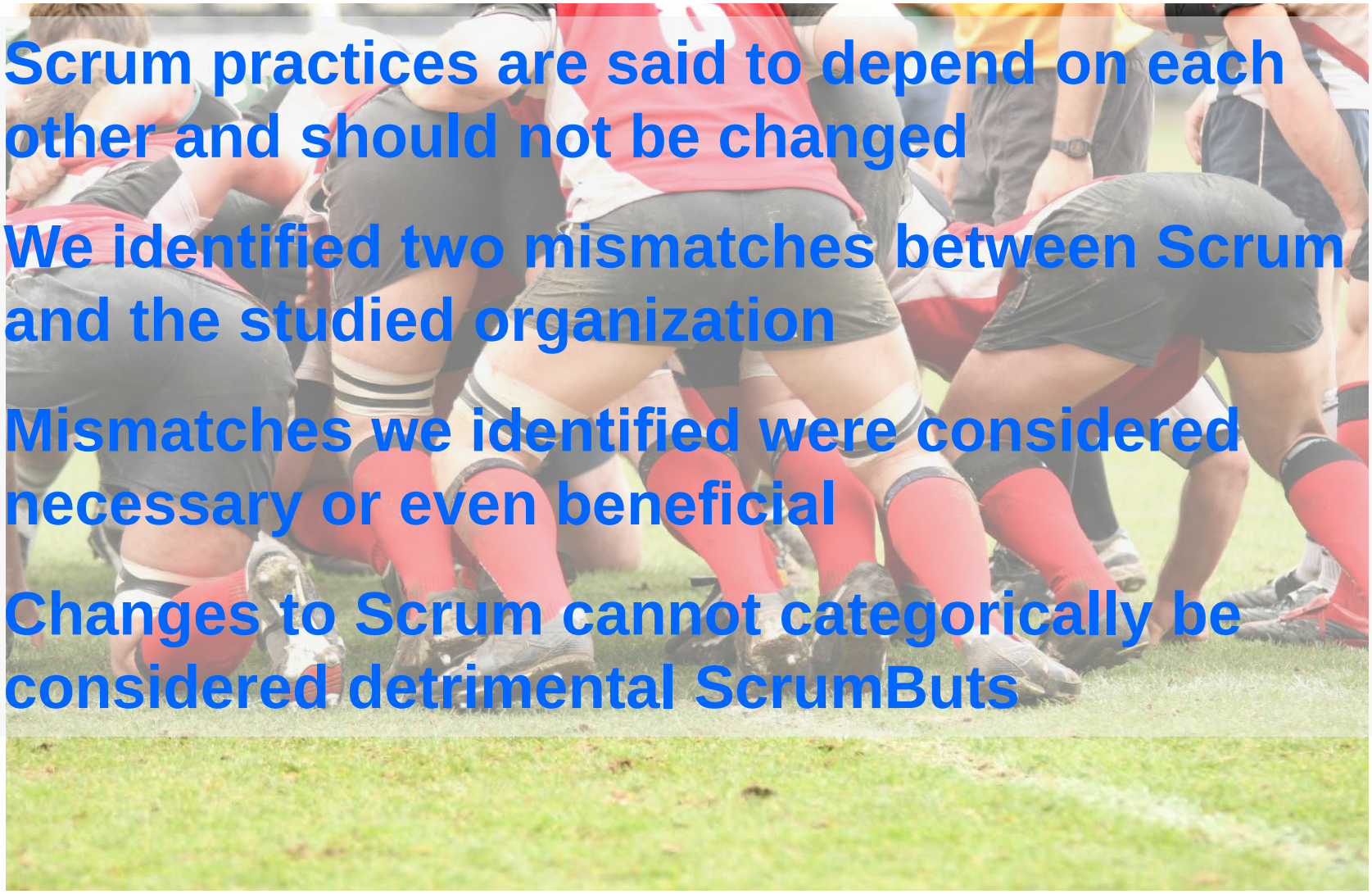
What about modifying SCRUM?



Scrum practices are said to depend on each other and should not be changed

We identified two mismatches between Scrum and the studied organization

Mismatches we identified were considered necessary or even beneficial

Changes to Scrum cannot categorically be considered detrimental ScrumButs

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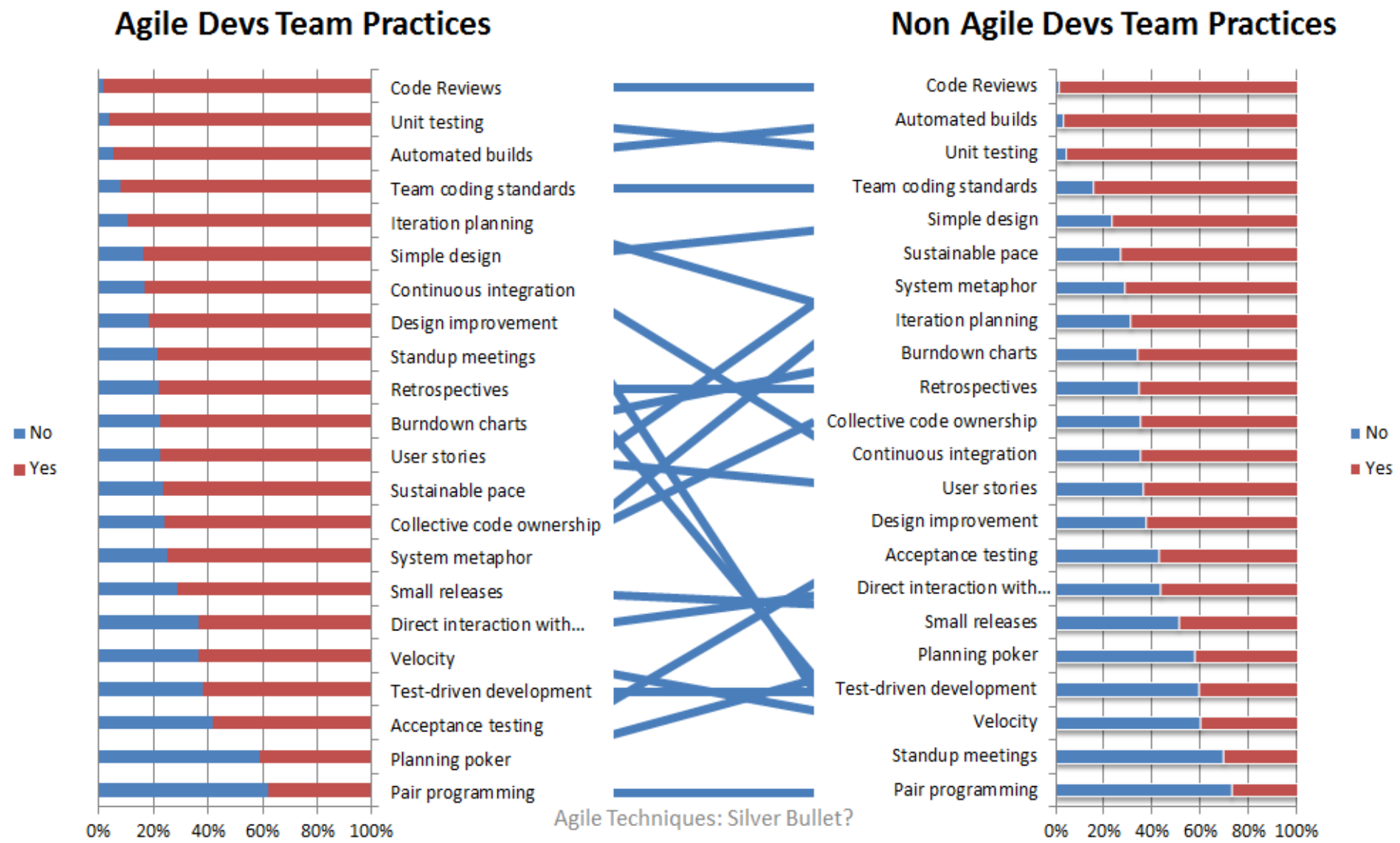
Microsoft Research Practices



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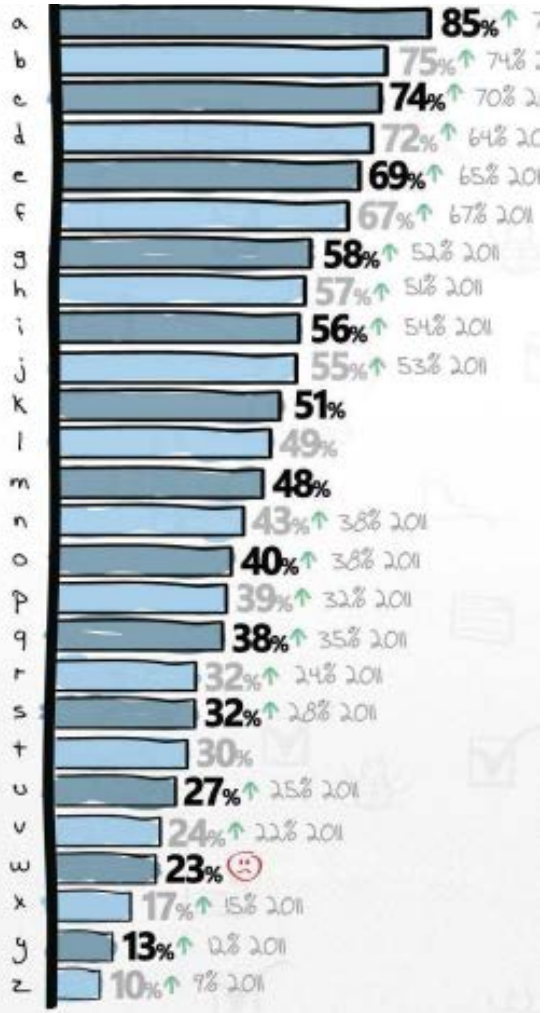
Use of Agile Techniques

AGILE TECHNIQUES EMPLOYED

Again this year, core agile tenets currently in use are* Daily Standup, Iteration Planning and Unit Testing. The two techniques that grew the most in usage from this year to last year were Kanban and Retrospectives; yet, agile techniques increased in every area but one (Continuous Deployment).

*Respondents were able to select multiple options.

- a Daily Standup
- b Iteration Planning
- c Unit Testing
- d Retrospectives
- e Release Planning
- f Burndown/ Team-Based Estimation
- g Velocity
- h Coding Standards
- i Continuous Integration
- j Automated Builds
- k Dedicated Product Owner
- l Integrated Dev/QA
- m Refactoring
- n Open Workarea
- o TDD
- p Digital Taskboard
- q Story Mapping
- r Kanban
- s Collective Code Ownership
- t Pair Programming
- u Automated Acceptance Testing
- v Analog Taskboard
- w Continuous Deployment
- x Agile Games
- y Cycle Time
- z BDD



VERSIONONE
Agile Made Easier

Respondents = 4048

VERSIONONE.COM
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Scaling Agile Brings in More Variation

Scaled Agile Framework

- Kanban, SCRUM, Value Stream Mapping

Disciplined Agile Delivery

- RUP, XP, SCRUM

DSDM

- Popular scaling approach in Europe

https://www.thecsiac.com/spruce/resources/ref_documents/agile-scale-aas-spruce-sei

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It’s not about the practices and methods
It’s about the principles

1. Highest priority is satisfy the customer through early and continuous delivery of software.
2. Welcome changing requirements, even late in development.
3. Deliver working software frequently, from a couple of weeks to a couple of months.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Provide environment and support they need.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development…a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity--the art of maximizing the amount of work not done--is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

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WHAT MUST I DO TO BE SUCCESSFUL

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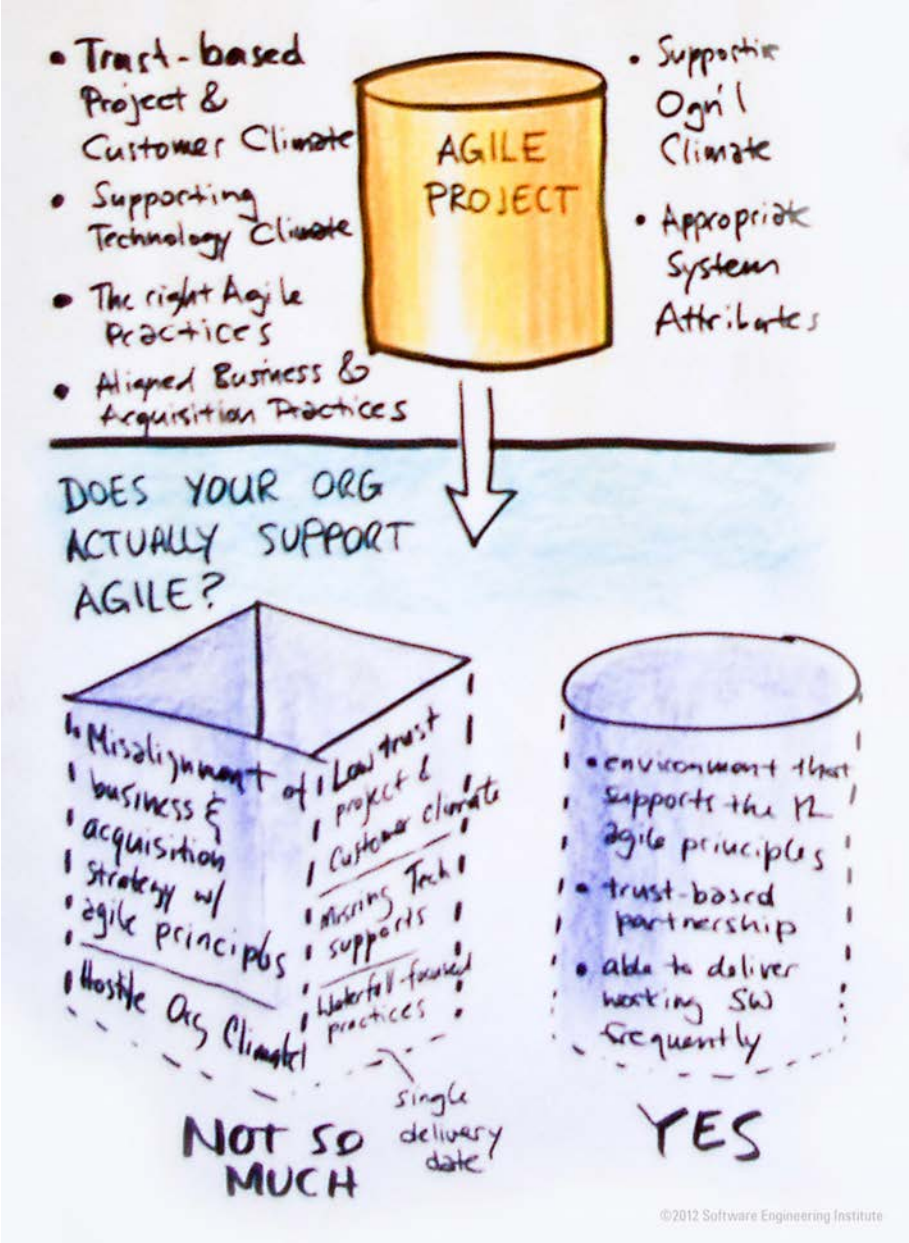
Understand your organization's alignment with Agile principles and practices



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Traditional approach

Strengths of the traditional approach include:

- enables the comparability and repeatability that standardization provides
- enables a contractually verifiable definition of completed intermediate work products
- reduces risks by means of contractually assured baselines

Weaknesses of the traditional approach include:

- the process drives measurement of compliance with itself as a primary measure of success (i.e., rather than measuring success as deploying a workable solution)
- it depends on documents as the basis to verify and validate the requirements, the architecture, and the detailed design
- most of the requirements are completed before any code is written, thus extending development timelines

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Agile approach

Strengths of this approach include

- early insight by the users into the shape of the solution
- early course correction
- “fail fast” (If the early solution ideas turn out to be flawed, little time or money is spent before that learning occurs.)
- explicit understanding that the requirements are expected to evolve

Weaknesses of this approach (particularly in large acquisition settings) include

- more dependence on tacit knowledge (e.g., lack of explicit documentation) as the basis for decision-making than is comfortable for most acquisition organizations
- dependence on availability of actively engaged user/customers
- difficulty in aligning implementation-driven artifacts and measures with those of the larger traditional acquisition setting.

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Effective Agile Practices in Federal Settings

Table 1: Practices Used and Found Effective by Five Agencies

Practice
1. Start with Agile guidance and an Agile adoption strategy.
2. Enhance migration to Agile concepts using Agile terms and examples.
3. Continuously improve Agile adoption at both project and organization levels.
4. Seek to identify and address impediments at the organization and project levels.
5. Obtain stakeholder/customer feedback frequently and closely.
6. Empower small, cross-functional teams.
7. Include requirements related to security and progress monitoring in your queue of unfinished work (backlog).
8. Gain trust by demonstrating value at the end of each iteration.
9. Track progress using tools and metrics.
10. Track progress daily and visibly.

Source: GAO.

GAO-12-681 Agile Effective Practices and Federal Challenges

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Successful Management Traits within Agile Teams

Executing Side (developer)

Leader – more time with team than behind the office desk

Coach – seed team with ideas and allow them to solve the problem

Expeditor – help remove operational impediments

Champion – communicate with upper-level management and stakeholders (translator role)

Ambassador – cultivate relationships with end users and subject matter experts and their management

Acquiring Side (PMO)

Leader – establish and maintain relationships with executing group

Coach – help existing personnel make transition to fast-tempo, high-interaction environment of Agile

Expeditor – efficiently deploy people interacting with development team.

Champion – maintain buy-in from external funders and stakeholders

Ambassador – ensure appointment of end users or SMEs to work with developers.

Agile Methods: Selected DoD Management and Acquisition Concerns
http://www.sei.cmu.edu/library/abstracts/reports/11tn002.cfm?DCSext.abstractsource=SearchResults

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Bottom Line Take Aways

Accumulated empirical evidence is scant but increasing. Evidence shows:

- Agile can be effective
- Agile is not a silver bullet
- Agile is not conducive to every situation
- Agile is a different mindset and requires trust
- Agile requires planning and hard work

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