IBM Rational Software Conference 2009

Agile Software Development by the Numbers:
What's Really Going On Out There

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Rational software

Warning!

- **You'll be presented with a lot of information very quickly**

Agenda

- **The Surveys**
- **Agile Practices**
- **Agility@Scale**
- **Adoption and Success Rates**
- **Management**
- **Governance**
- **Development and Quality**
- **Modeling and Documentation**
- **Communication**
- **Parting Thoughts**

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- **The Surveys**
- **Agile Practices**
- **Agility@Scale**
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The Surveys

- **All survey data, original questions, and summary slide decks can be downloaded from www.ambysoft.com/surveys/**
  - If you can't look at the original questions and analyze the data yourself, how can you trust the survey results?
- **Some surveys were done via Dr. Dobb's Journal (DDJ), a community with a wide range of readers, not just Agilists**
- **Some surveys, the Ambysoft ones, focused on just the agile community**
- **The source survey for each chart is indicated using graphics such as:**

DDJ 2009 State of the IT Union

Ambysoft 2009 Agile Practices

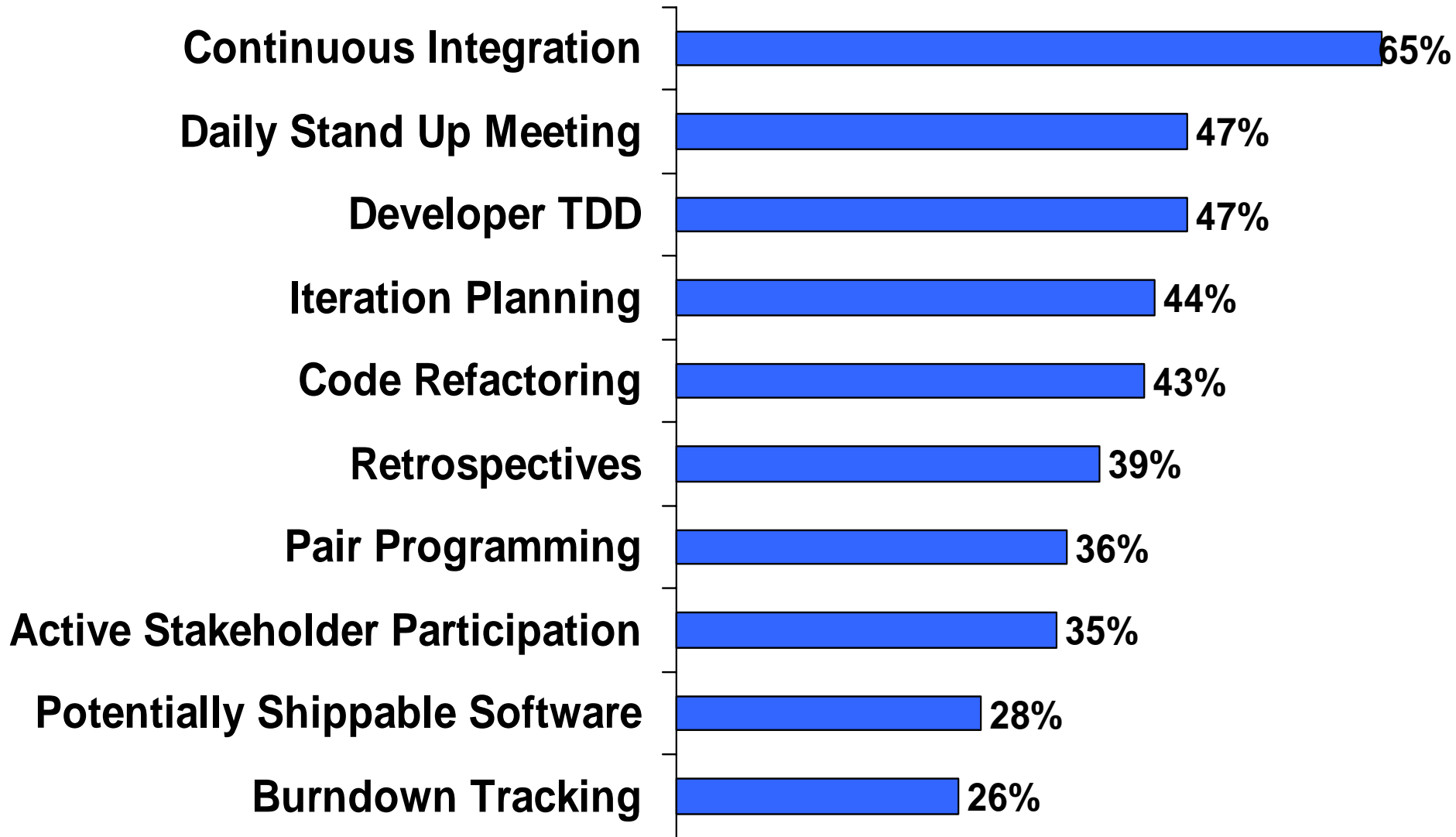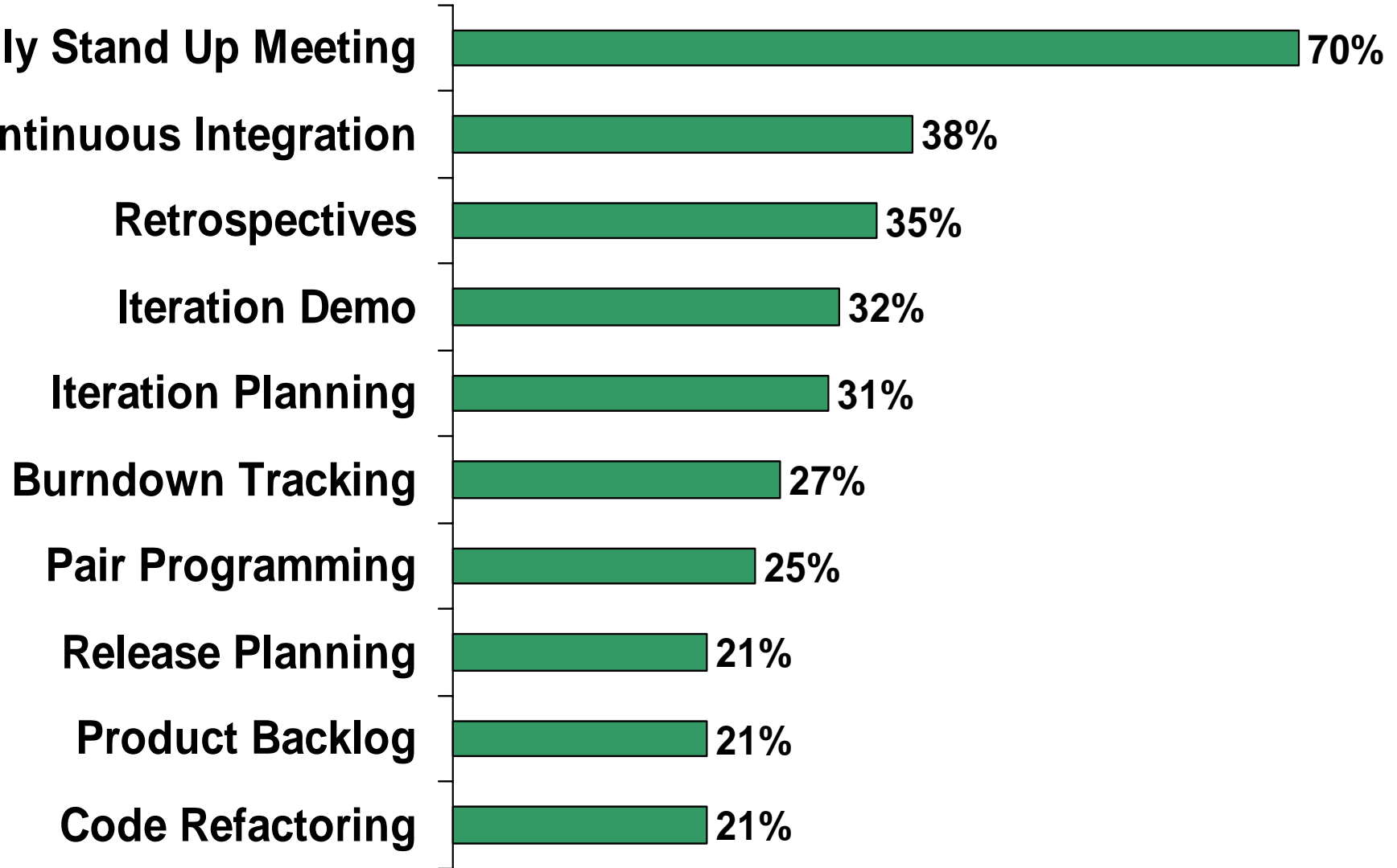**Warning: You'll be presented with a lot of information really quickly!**

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Most Effective Practices: Top 10 (out of 30)

Practice	Percentage
Continuous Integration	65%
Daily Stand Up Meeting	47%
Developer TDD	47%
Iteration Planning	44%
Code Refactoring	43%
Retrospectives	39%
Pair Programming	36%
Active Stakeholder Participation	35%
Potentially Shippable Software	28%
Burndown Tracking	26%

Ambysoft 2009 Agile Practices

Practices Easiest to Learn: Top 10 (out of 30)

Practice	Percentage
Daily Stand Up Meeting	70%
Continuous Integration	38%
Retrospectives	35%
Iteration Demo	32%
Iteration Planning	31%
Burndown Tracking	27%
Pair Programming	25%
Release Planning	21%
Product Backlog	21%
Code Refactoring	21%

Ambysoft 2009 Agile Practices

Practices Most Difficult to Learn : Top 10 (out of 30)

Practice	Percentage
Developer TDD	37%
Aceptance TDD	30%
Pair Programming	28%
Initial Estimate and Schedule	26%
Active Stakeholder Participation	24%
Database Refactoring	22%
Potentially Shippable Software	20%
Executable Specifications	19%
Release Planning	18%
Continuous Integration	18%

Ambysoft 2009 Agile Practices
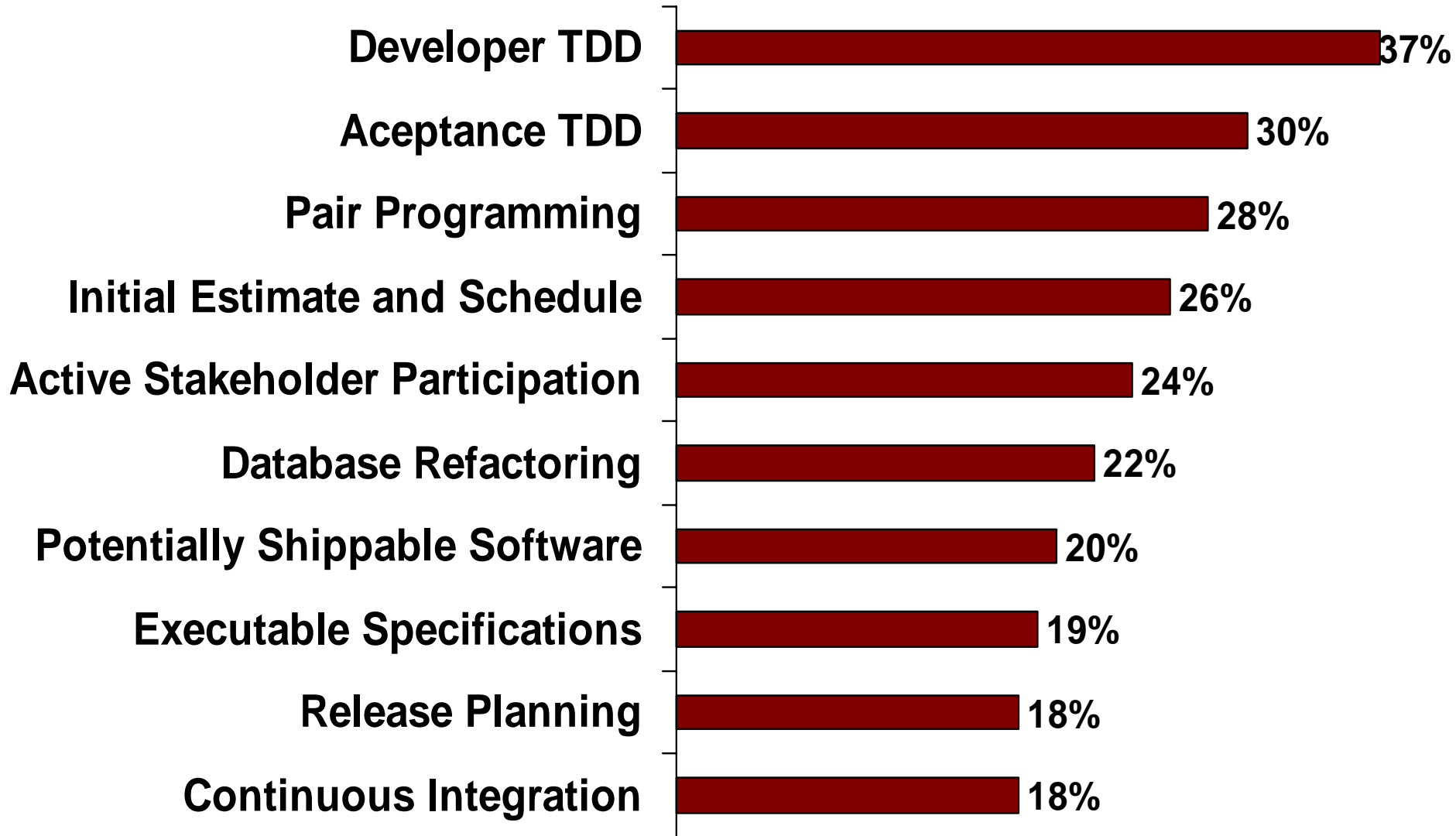
Practices Tried and Abandoned : Top 8 (out of 30)
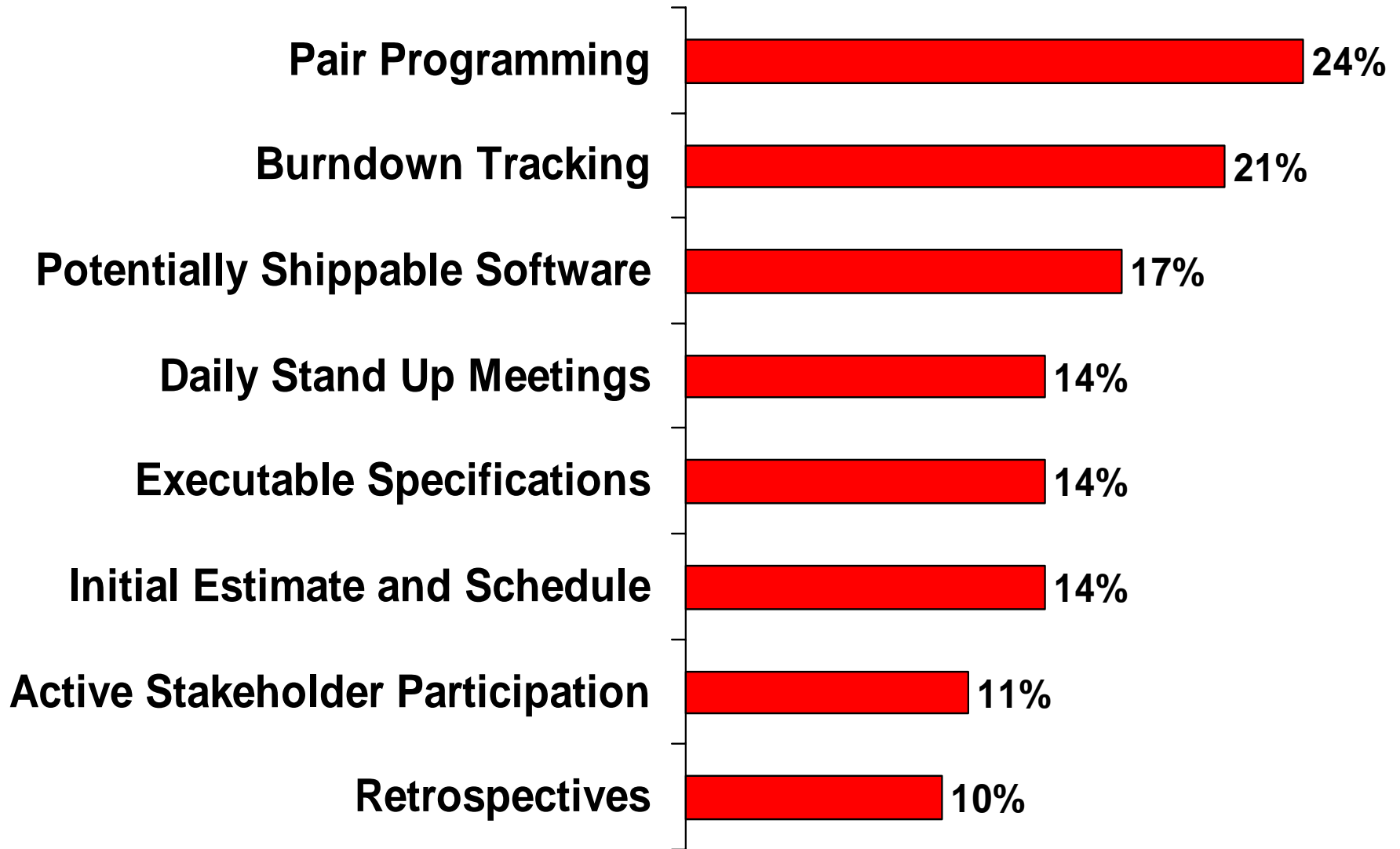
Practice	Percentage
Pair Programming	24%
Burndown Tracking	21%
Potentially Shippable Software	17%
Daily Stand Up Meetings	14%
Executable Specifications	14%
Initial Estimate and Schedule	14%
Active Stakeholder Participation	11%
Retrospectives	10%

Ambysoft 2009 Agile Practices

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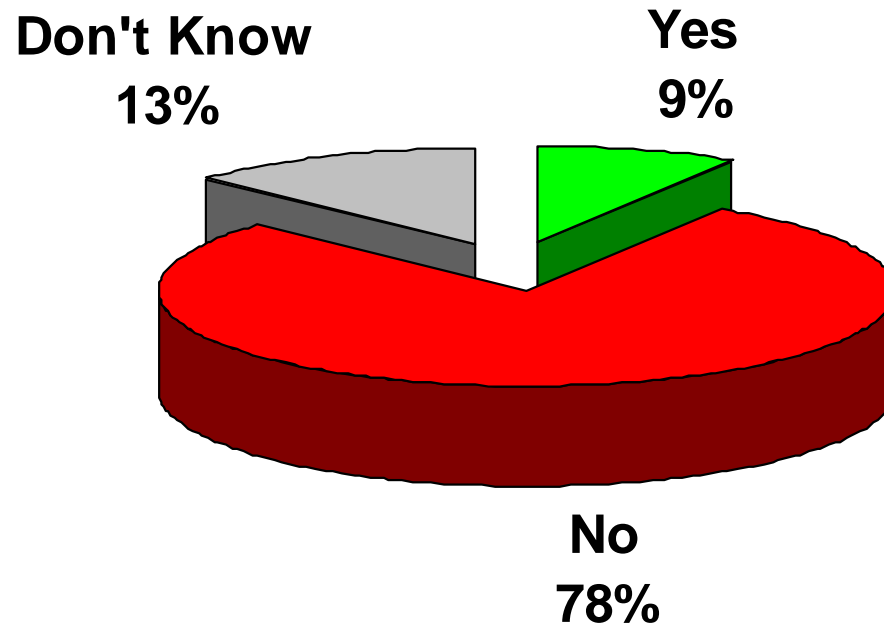- **Parting Thoughts**

What is Agility@Scale?

Team size

Under 10 developers ←→ 1000's of developers

Compliance requirement

Low risk ←→ Critical, Audited

Geographical distribution

Co-located ←→ Global

Disciplined Agile Delivery

Organization distribution (outsourcing, partnerships)

Collaborative ←→ Contractual

Enterprise discipline

Project focus ←→ Enterprise focus

Technical complexity

Homogenous ←→ Heterogeneous, Legacy

Organizational complexity

Flexible ←→ Rigid

Largest Team Size Attempted vs. Successful
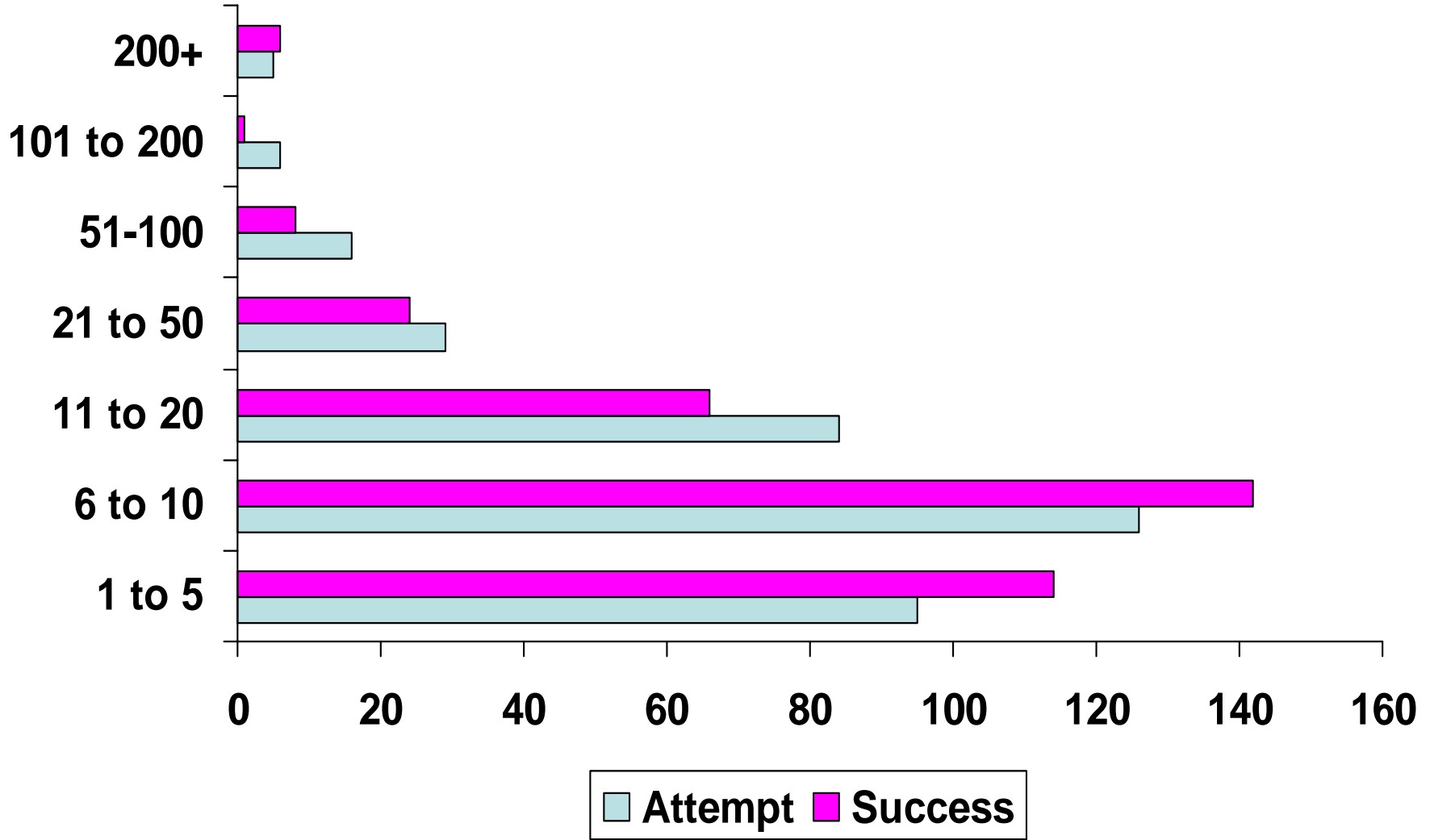
DDJ 2008 Agile Adoption

Does your team have to comply to industry regulations?

Don't Know
7%

Yes
33%

No
60%
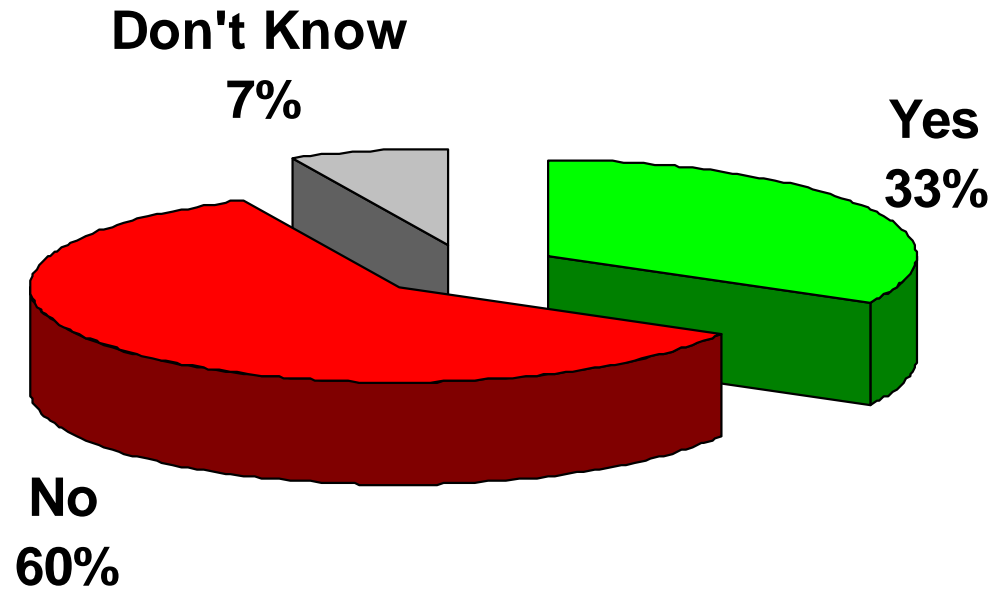
Does your team follow a CMMI compliant agile process?

Don't Know
13%

Yes
9%

No
78%

Ambysoft 2009 Agile Practices

How distributed were the IT people on your team?
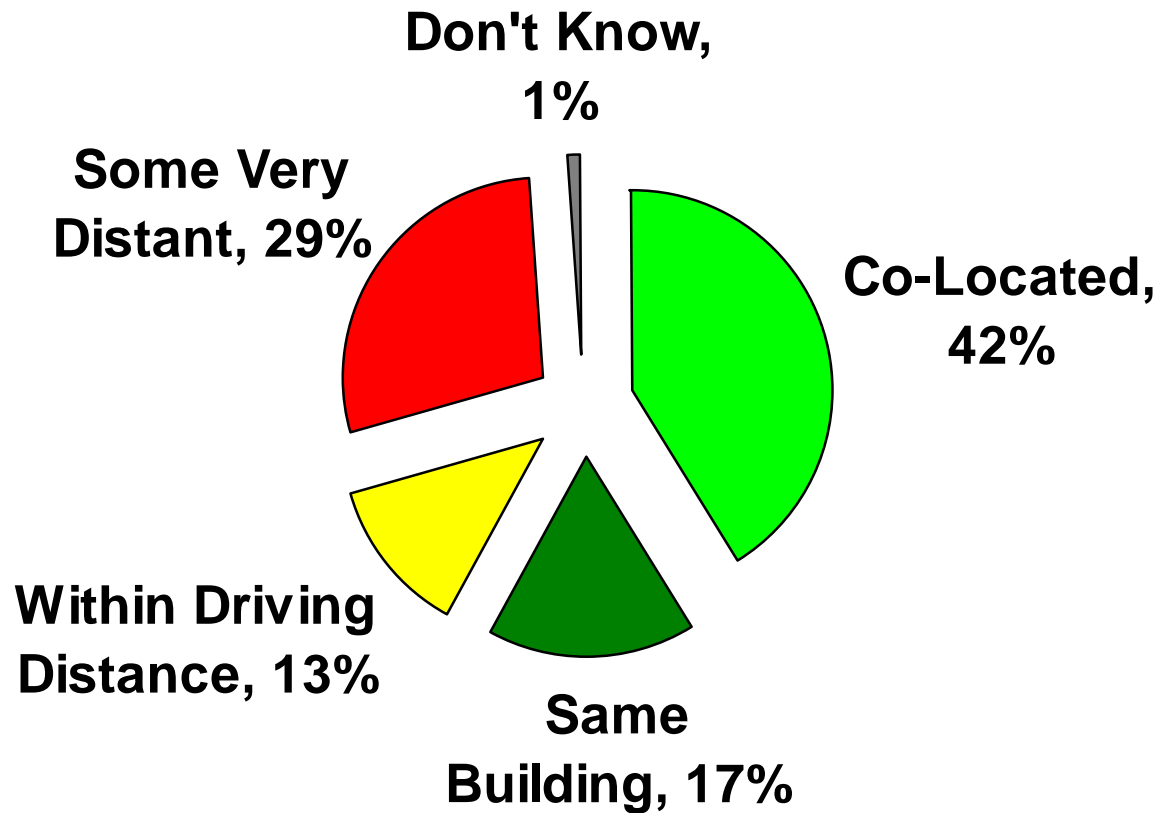
Don't Know, 1%

Some Very Distant, 29%

Co-Located, 42%

Within Driving Distance, 13%

Same Building, 17%

Ambysoft 2009 Agile Practices

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What percentage of your development teams have adopted agile techniques?
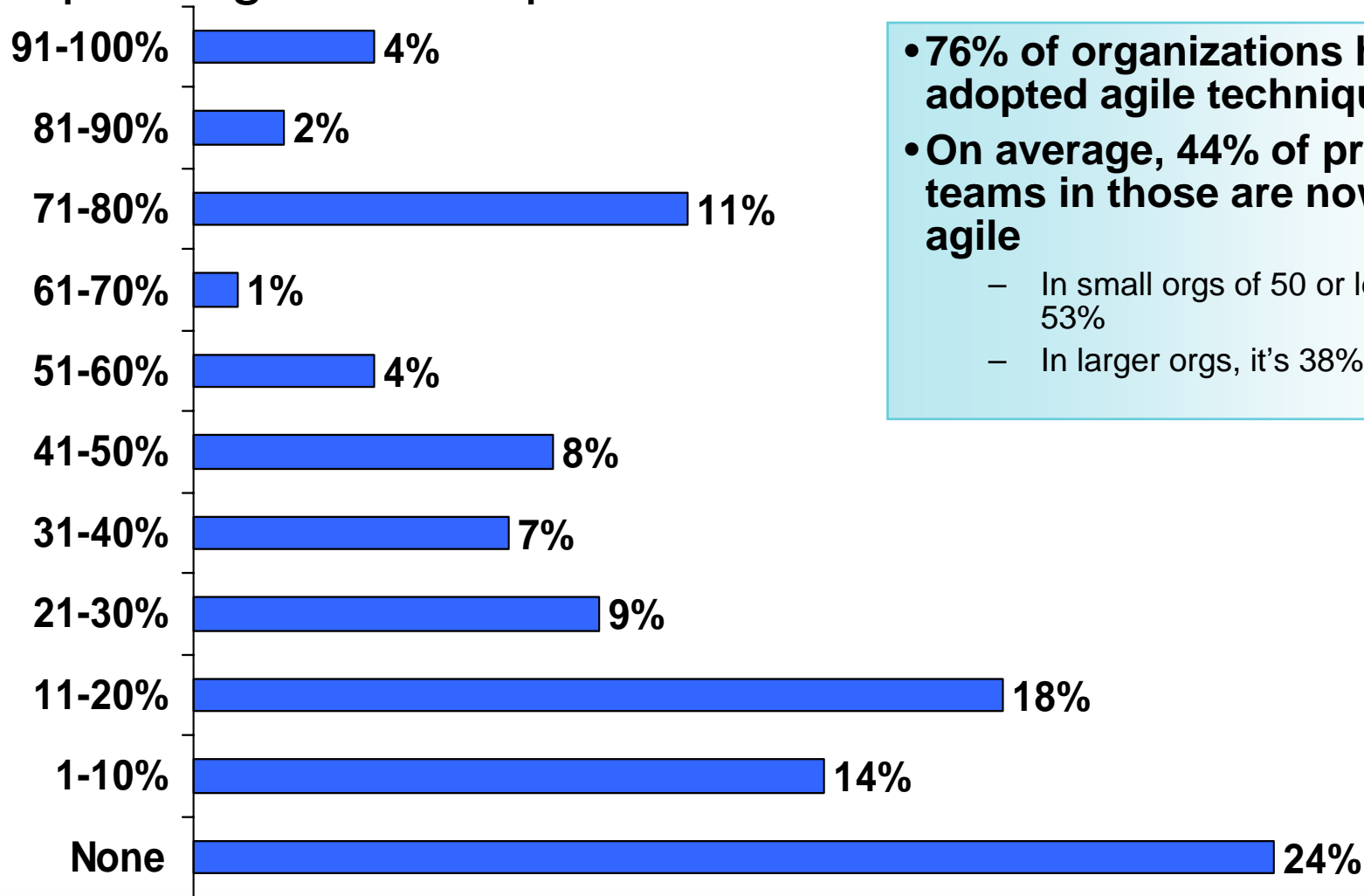
- **76% of organizations have adopted agile techniques**
- **On average, 44% of project teams in those are now doing agile**
  - In small orgs of 50 or less IT, it's 53%
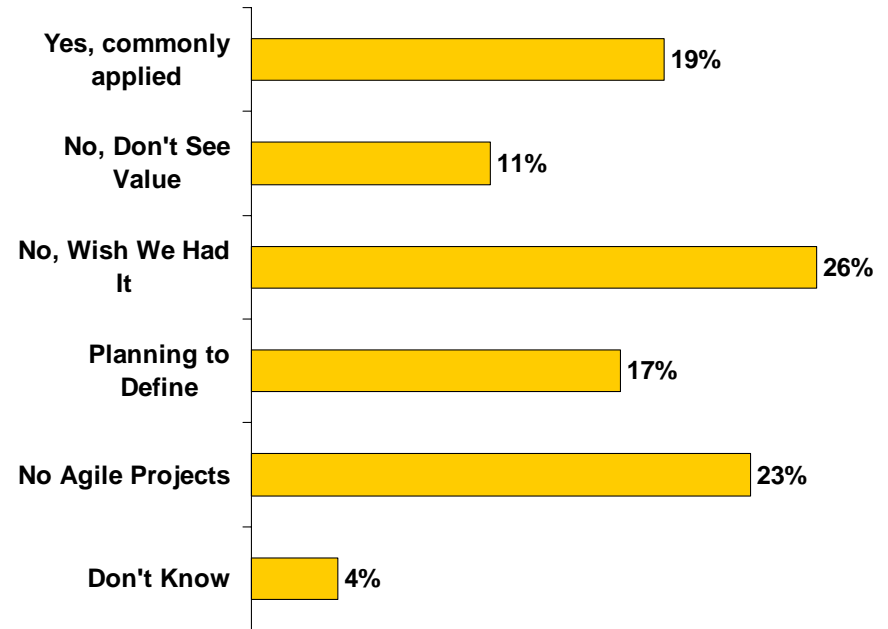 - In larger orgs, it's 38%

Range	Percentage
91-100%	4%
81-90%	2%
71-80%	11%
61-70%	1%
51-60%	4%
41-50%	8%
31-40%	7%
21-30%	9%
11-20%	18%
1-10%	14%
None	24%

Number of Agile Projects Run

Bar chart showing:
- 51+: 6%
- 21 to 50: 5%
- 11 to 20: 8%
- 6 to 10: 19%
- 1 to 5: 45%
- Pilot: 18%
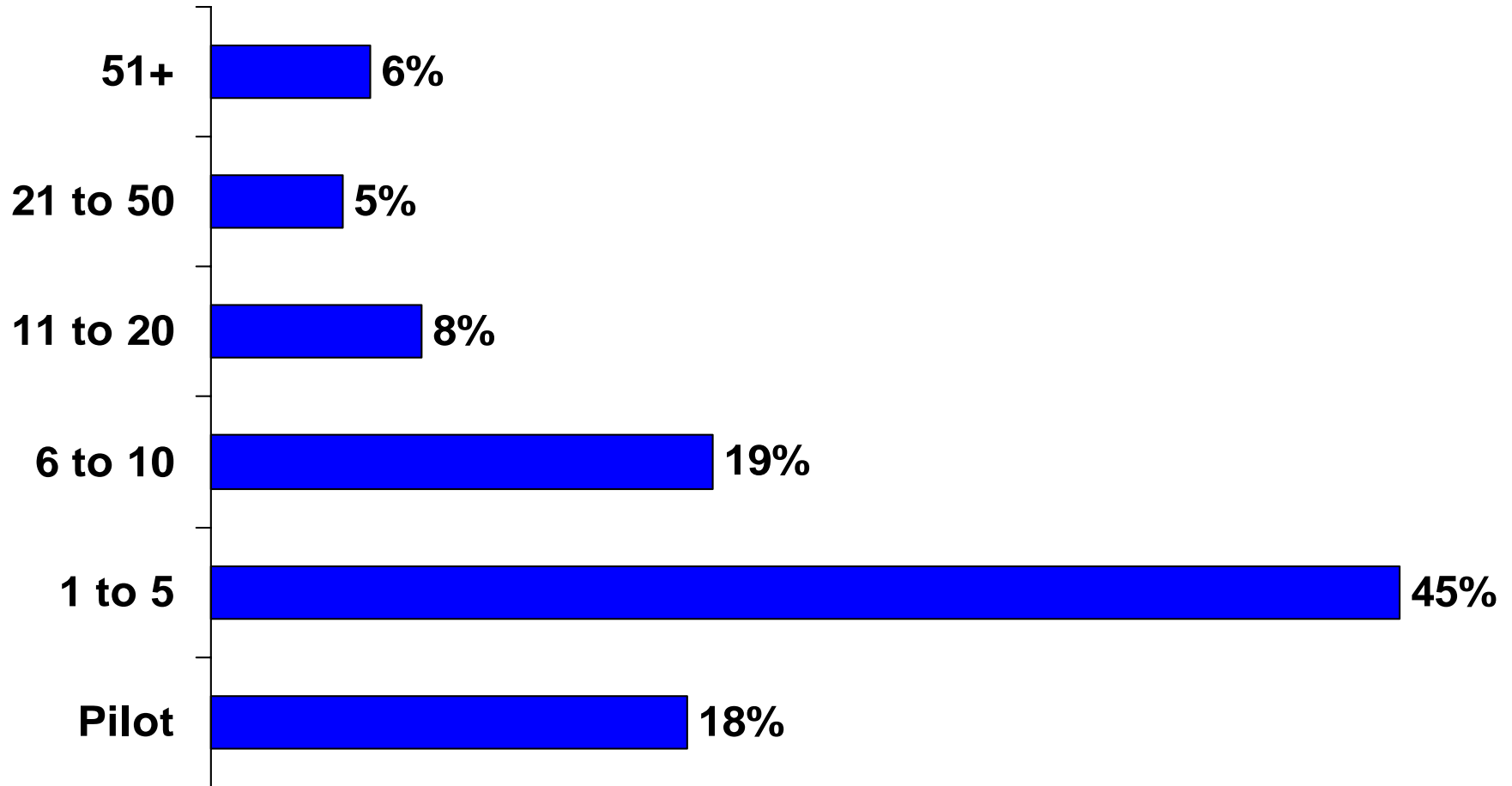
DDJ 2008 Agile Adoption

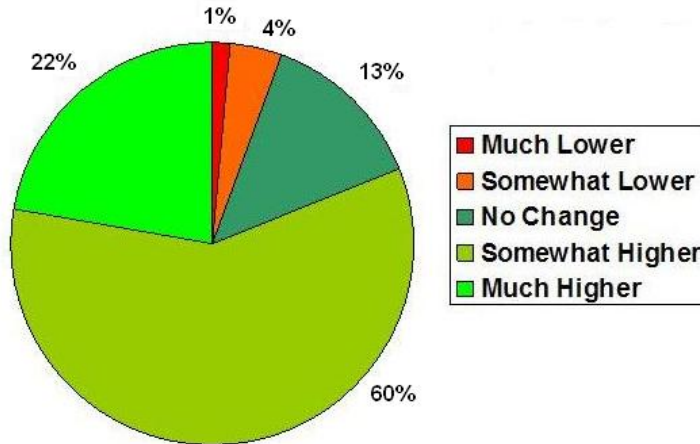# Criteria to determine if a team is agile

Disciplined agile teams:

- **Produce working software on a <u>regular basis</u>.**
- **Do <u>continuous</u> regression testing, and better yet take a Test-Driven Development (TDD) approach.**
- **Work <u>closely</u> with their stakeholders, ideally on a daily basis.**
- **Are self-organizing, and disciplined teams work within an <u>appropriate</u> governance framework.**
- **<u>Regularly</u> reflect, and <u>measure</u>, on how they work together and then act to improve on their findings in a <u>timely</u> manner.**
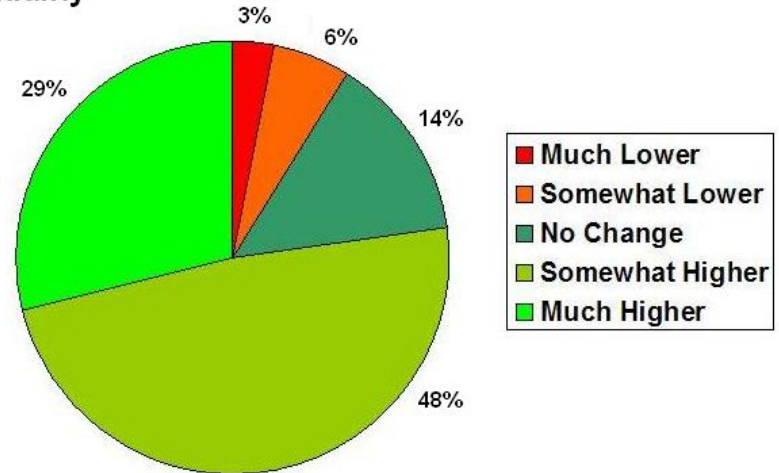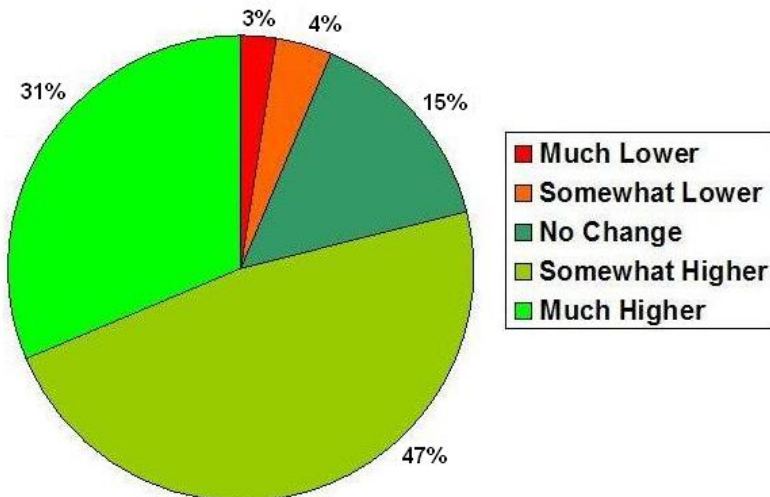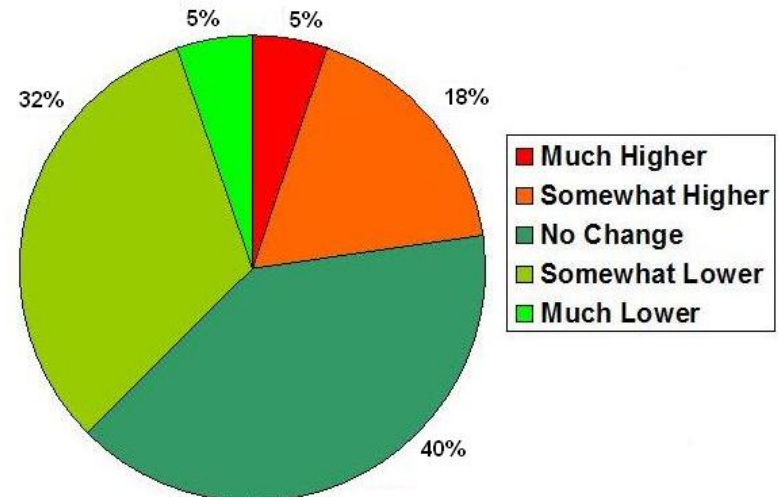
Category	Percentage
Yes, commonly applied	19%
No, Don't See Value	11%
No, Wish We Had It	26%
Planning to Define	17%
No Agile Projects	23%
Don't Know	4%

Ambysoft 2009 Governance

Why Agile? Because it Works!

Productivity
- Much Lower
- Somewhat Lower
- No Change
- Somewhat Higher
- Much Higher

1% 4% 13% 22% 60%

Quality
- Much Lower
- Somewhat Lower
- No Change
- Somewhat Higher
- Much Higher

3% 6% 14% 29% 48%

Business Stakeholder Satisfaction
- Much Lower
- Somewhat Lower
- No Change
- Somewhat Higher
- Much Higher

3% 4% 15% 31% 47%

Cost of System Development
- Much Higher
- Somewhat Higher
- No Change
- Somewhat Lower
- Much Lower

5% 5% 18% 32% 40%

DDJ 2008 Agile Adoption

Project success rates

Left chart:
- Iterative — 71%
- Agile — 70%
- Traditional — 66%
- Ad-Hoc — 62%

Right chart:
- Quality: Agile 4.9, Iterative 5.0, Traditional 2.3, Ad-Hoc 0.4
- Functionality: Agile 6.0, Iterative 5.6, Traditional 1.8, Ad-Hoc 2.7
- Money: Agile 3.9, Iterative 3.0, Traditional 0.2, Ad-Hoc 0.8
- Time: Agile 4.4, Iterative 4.0, Traditional 0.8, Ad-Hoc 0.8

Legend:
- Agile
- Iterative
- Traditional
- Ad-Hoc
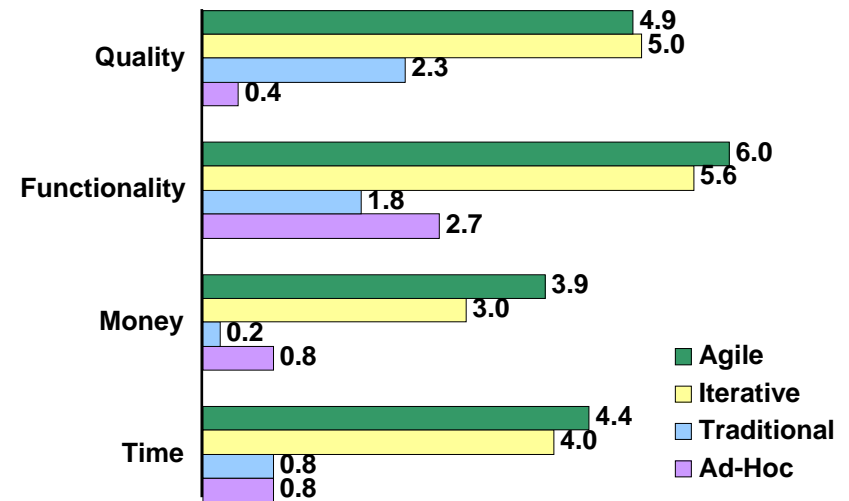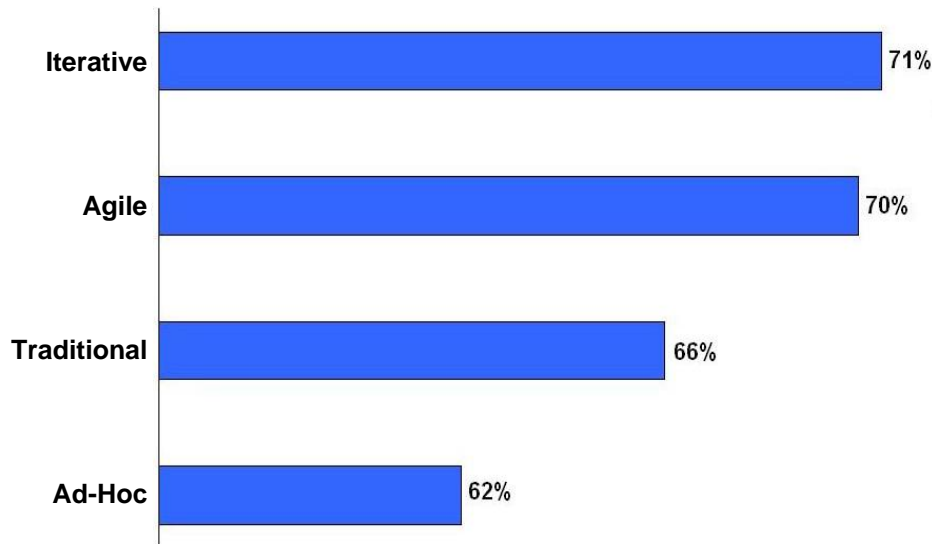
Bottom Line: **Agile teams produce higher quality work, are quicker to deliver, are more likely to deliver the right functionality, and more likely to provide greater ROI than traditional teams**

Agile project success rates: the effect of distribution

70% — Average (blue)

79% — Co-Located (green)

73% — Near Located (yellow)

55% — Far Located (red)

Legend:
- ■ Average
- ■ Co-Located
- ■ Near Located
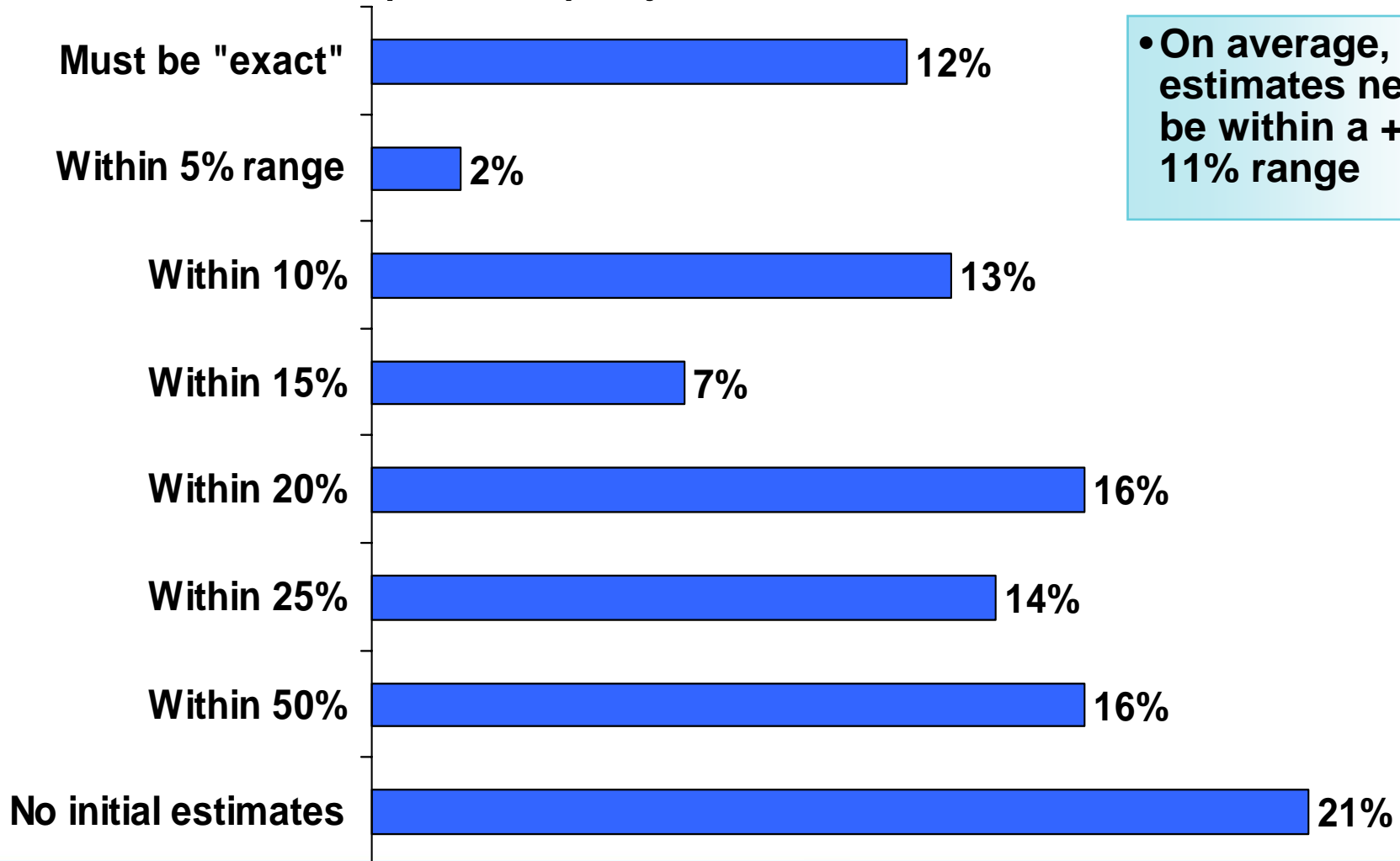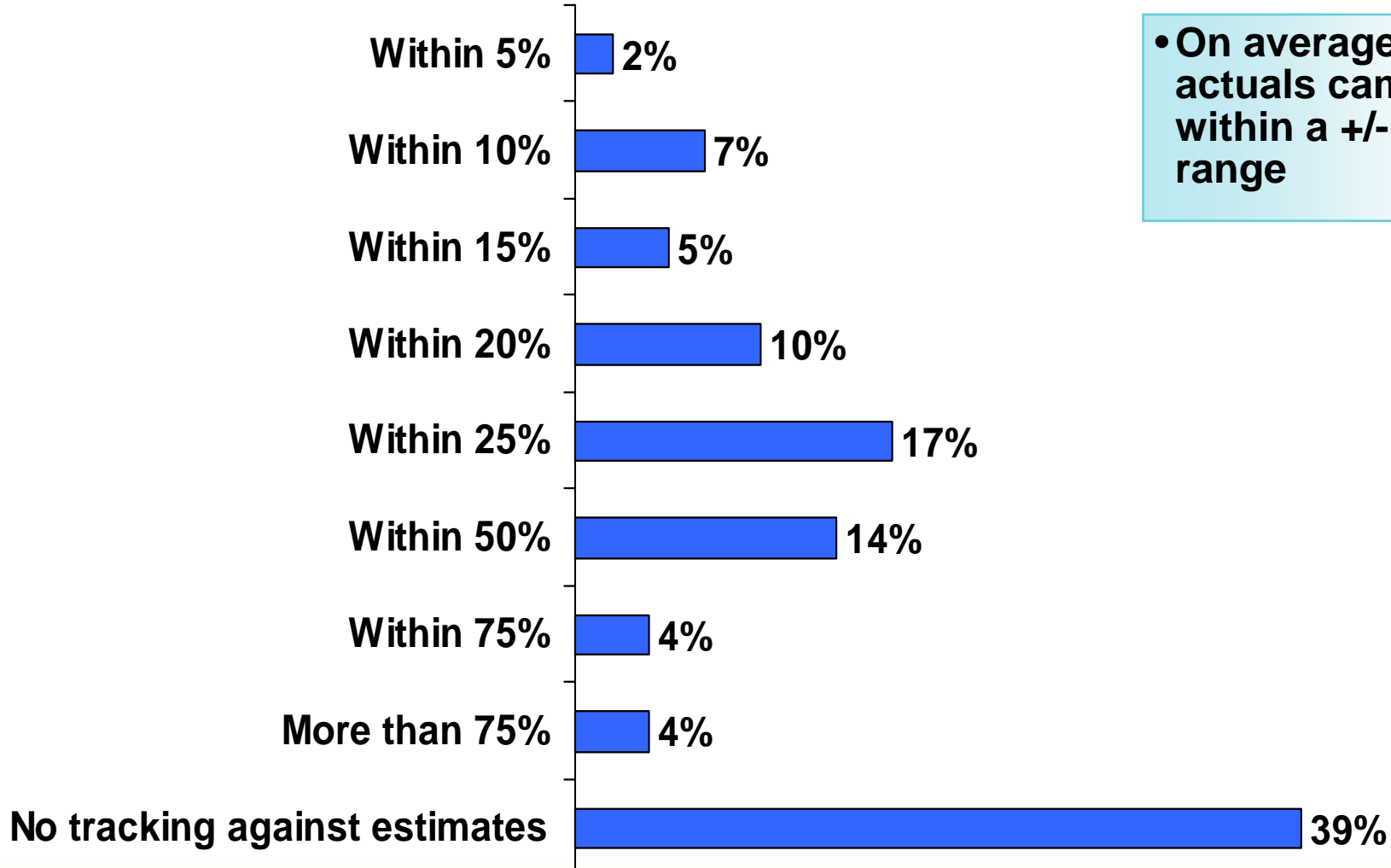- ■ Far Located
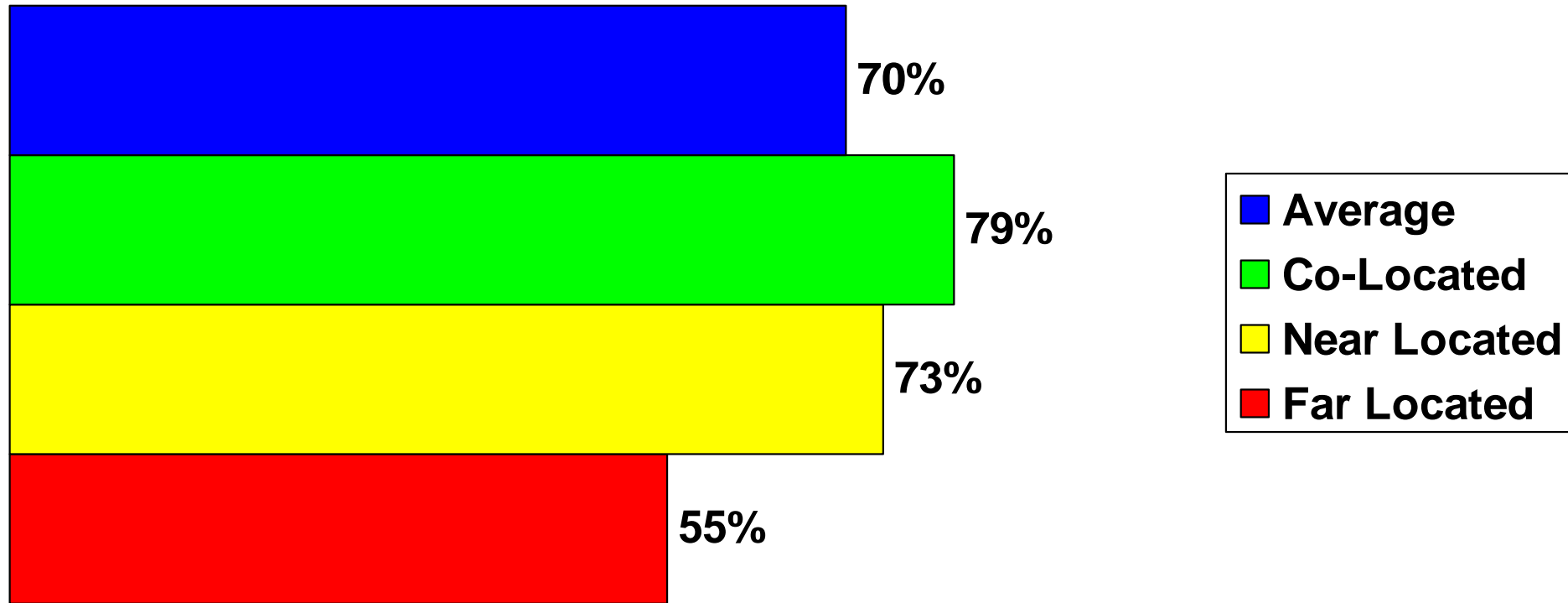
DDJ 2008 Project Success

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An organization's typical approach to initial estimates on software development projects

Category	Value
Must be "exact"	12%
Within 5% range	2%
Within 10%	13%
Within 15%	7%
Within 20%	16%
Within 25%	14%
Within 50%	16%
No initial estimates	21%

- **On average, estimates need to be within a +/- 11% range**

DDJ State of the IT Union July 2009

On average, the actual costs of software development projects compared to estimates

Category	Percentage
Within 5%	2%
Within 10%	7%
Within 15%	5%
Within 20%	10%
Within 25%	17%
Within 50%	14%
Within 75%	4%
More than 75%	4%
No tracking against estimates	39%

- **On average, actuals came in within a +/- 19% range**

DDJ State of the IT Union July 2009

Approach to Initial Estimation

9%	No initial estimate at all
7%	High-level estimate based on traditional estimation technique
27%	High-level estimate based on agile estimation technique
38%	High-level estimate based on reasonable guess of experienced person(s)
4%	Detailed estimate based on traditional estimation technique
6%	Detailed estimate based on agile estimation technique
7%	Detailed estimate based on reasonable guess
3%	Don't know

Ambysoft 2009 Agile Project Initiation: Interim Results

Strategies which project teams use to stay out of trouble or when in trouble to help get them out of it

- **"Questionable" strategies:**
  - 18% pad the budget
  - 63% de-scope towards the end of the project to meet deadline
  - 34% ask for extra funds to complete the projects
  - 72% extend the schedule to deliver promised scope
  - 39% avoid scope creep wherever possible via a "change control/management" process
  - 10% change the original estimate to reflect the actuals
  - 18% change the original schedule to reflect the actuals

- **Ethical strategies:**
  - 12% take a "stage gate" approach to funding
  - 13% have a flexible budget from the beginning of the project
  - 26% have a flexible schedule from the beginning of the project
  - 32% have flexible scope from the beginning of the project

How long did it take your project team to get started? (Average: 3.8 weeks)

Category	Percentage
<1 Week	8%
1 Week	10%
2 Weeks	15%
3 Weeks	13%
4 Weeks	18%
5-6 Weeks	10%
7-8 Weeks	3%
> 8 Weeks	10%
Don't Know	12%
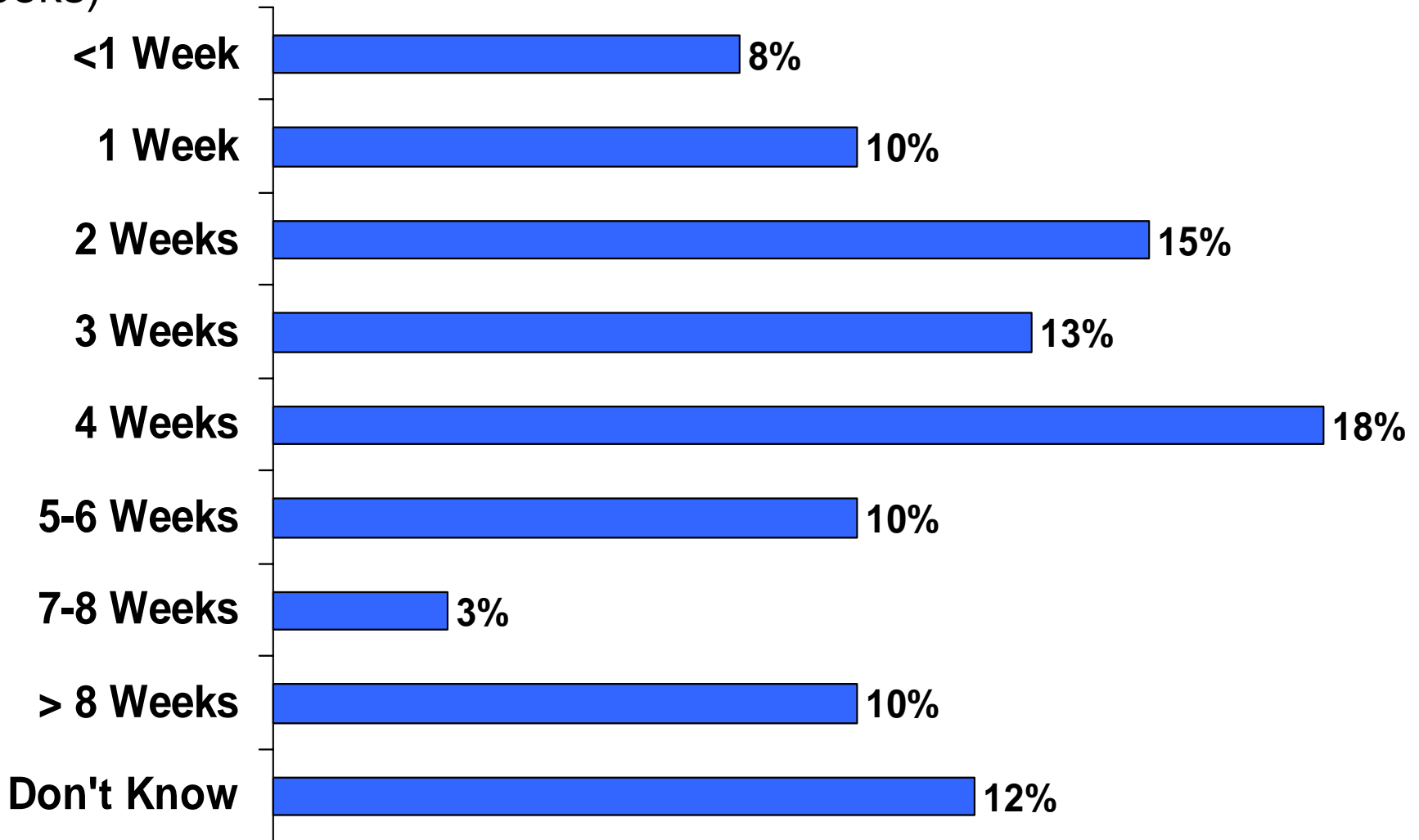
Ambysoft 2009 Agile Project Initiation: Interim Results

Justifying Agile Projects

Show Technical Feasibility	60%
Show Stakeholder Concurrence	59%
Estimate ROI	34%
Show Operational Feasibility	29%
Considered Commercial Packages	17%
Considered Offshoring	11%
Estimate NPV	7%
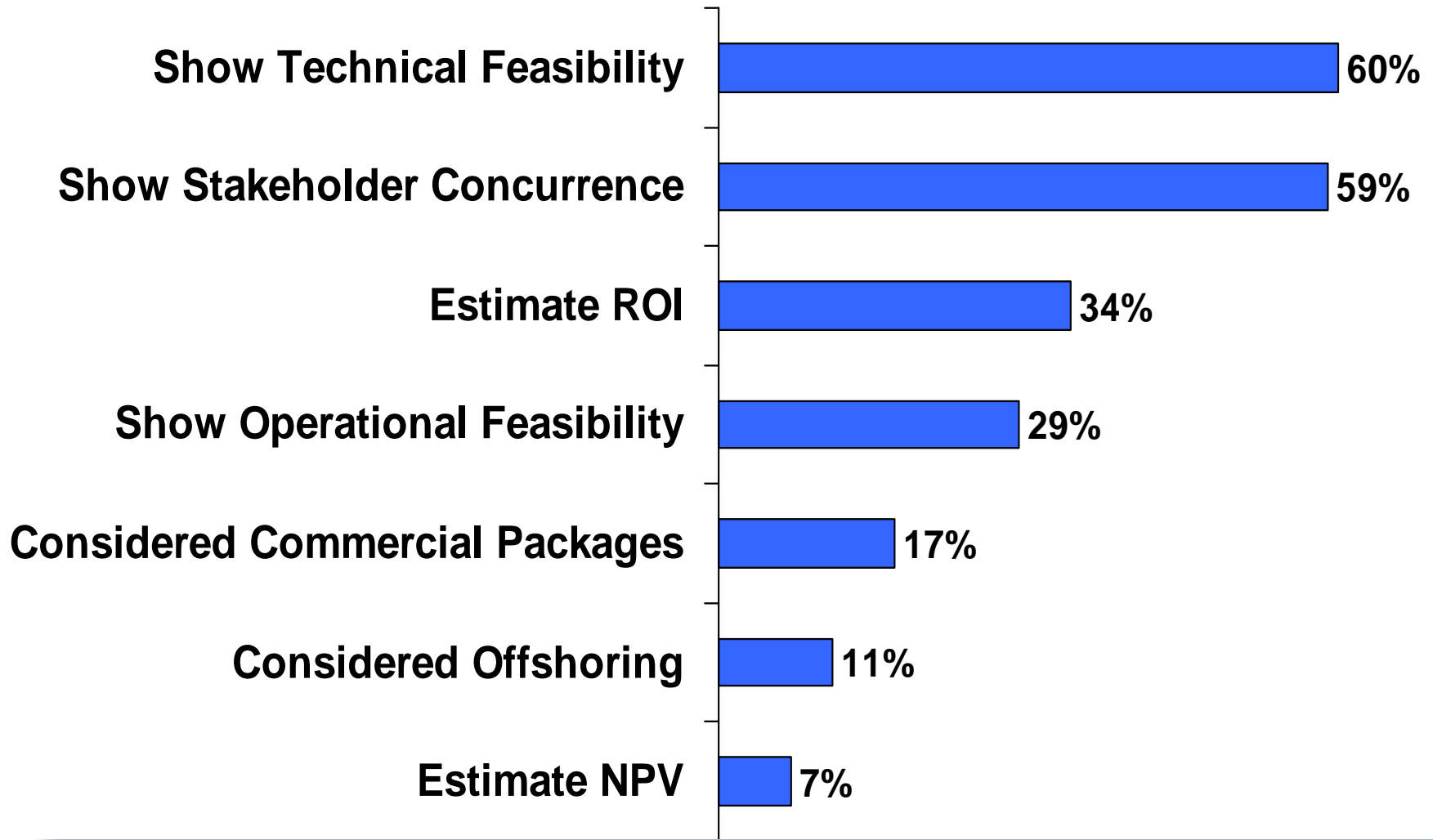
Ambysoft 2009 Agile Project Initiation: Interim Results

Length of Iterations (% respondents)
82% have iterations between 1 and 4 weeks in length
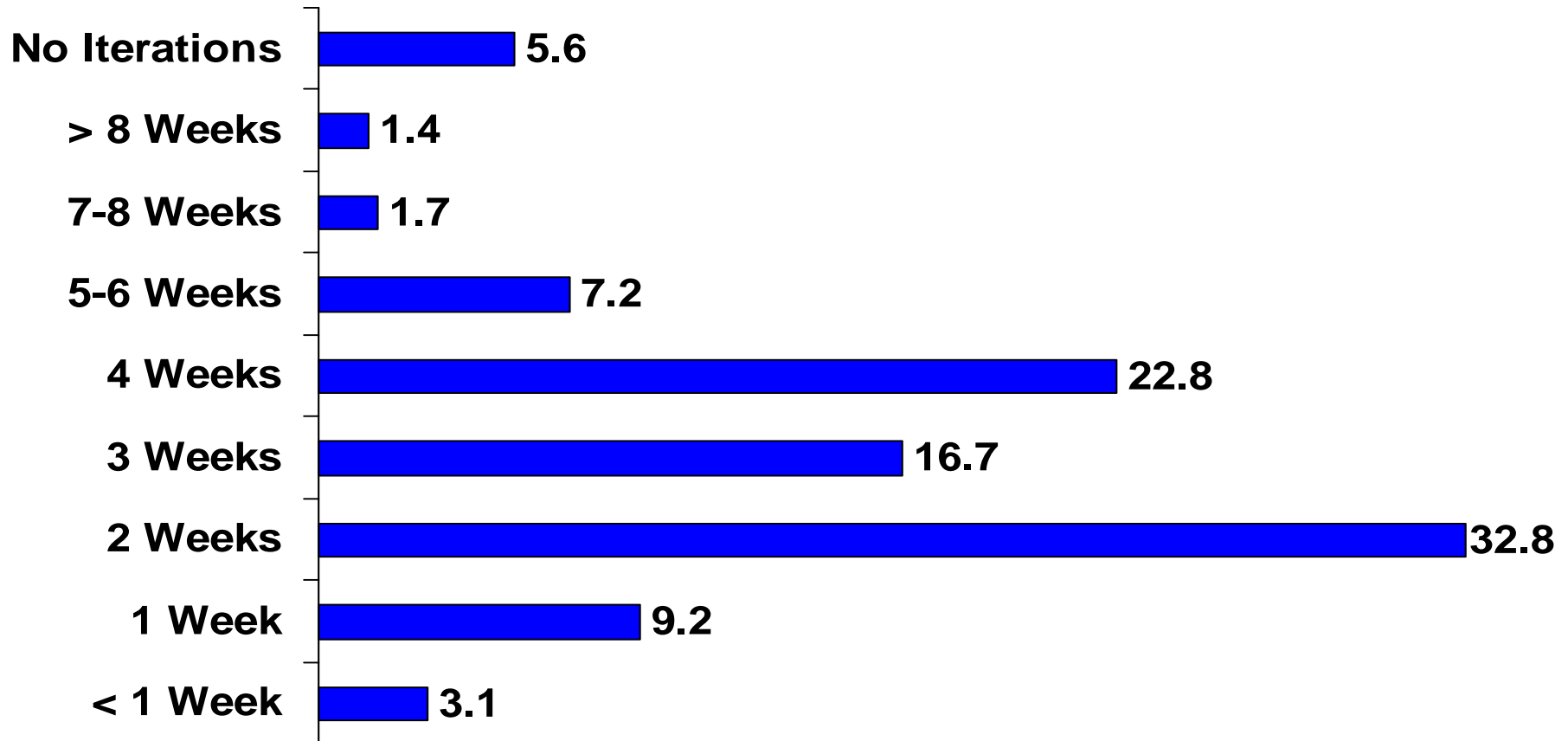
Category	Value
No Iterations	5.6
> 8 Weeks	1.4
7-8 Weeks	1.7
5-6 Weeks	7.2
4 Weeks	22.8
3 Weeks	16.7
2 Weeks	32.8
1 Week	9.2
< 1 Week	3.1

DDJ 2008 Agile Adoption

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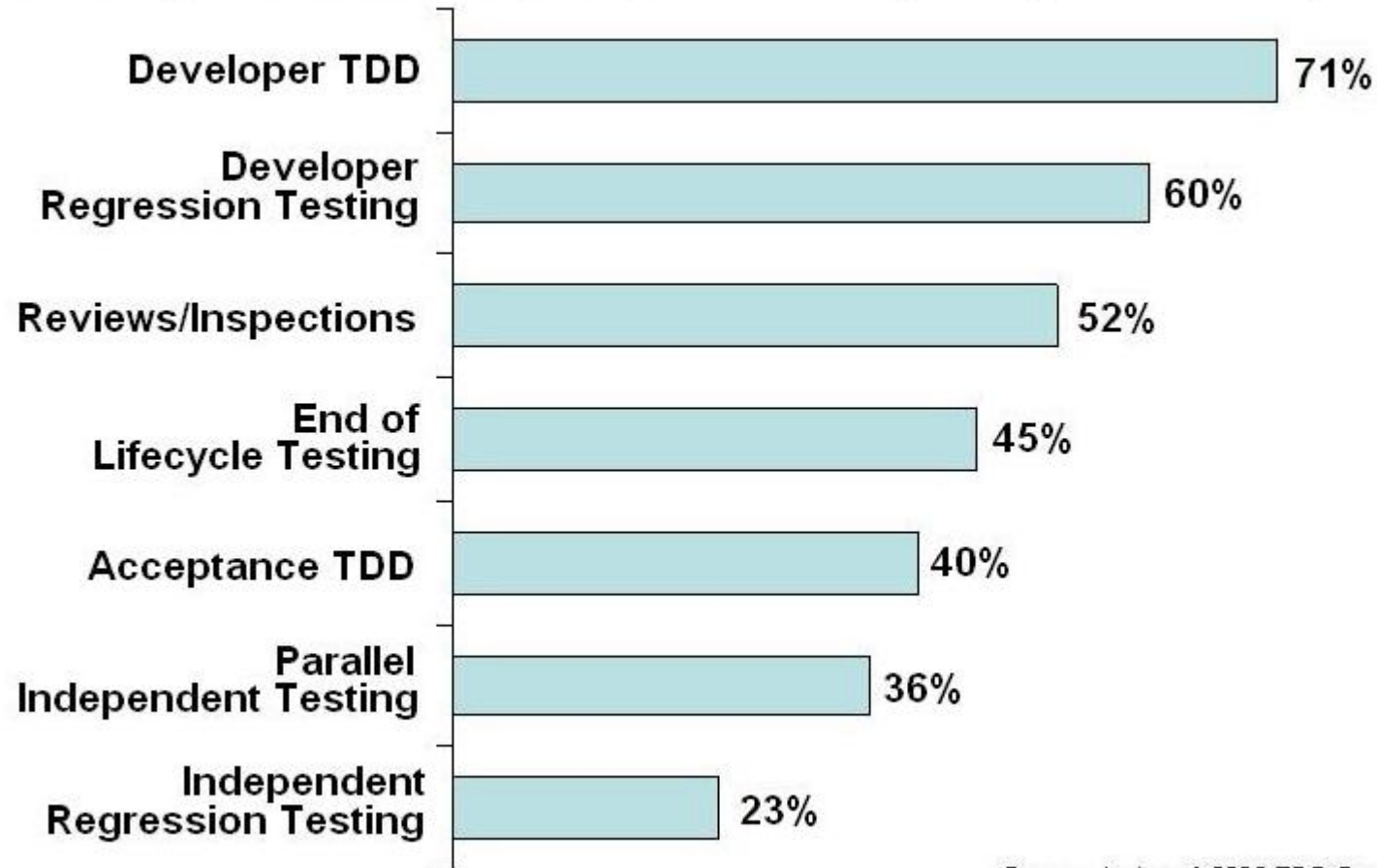- **Communication**
- **Parting Thoughts**

How would you rate your IT governance program?

Are rights and responsibilities (R&R) defined for various groups within your organization?

Ambysoft 2009 Governance

Do your project teams collect metrics to enable project monitoring by senior management?
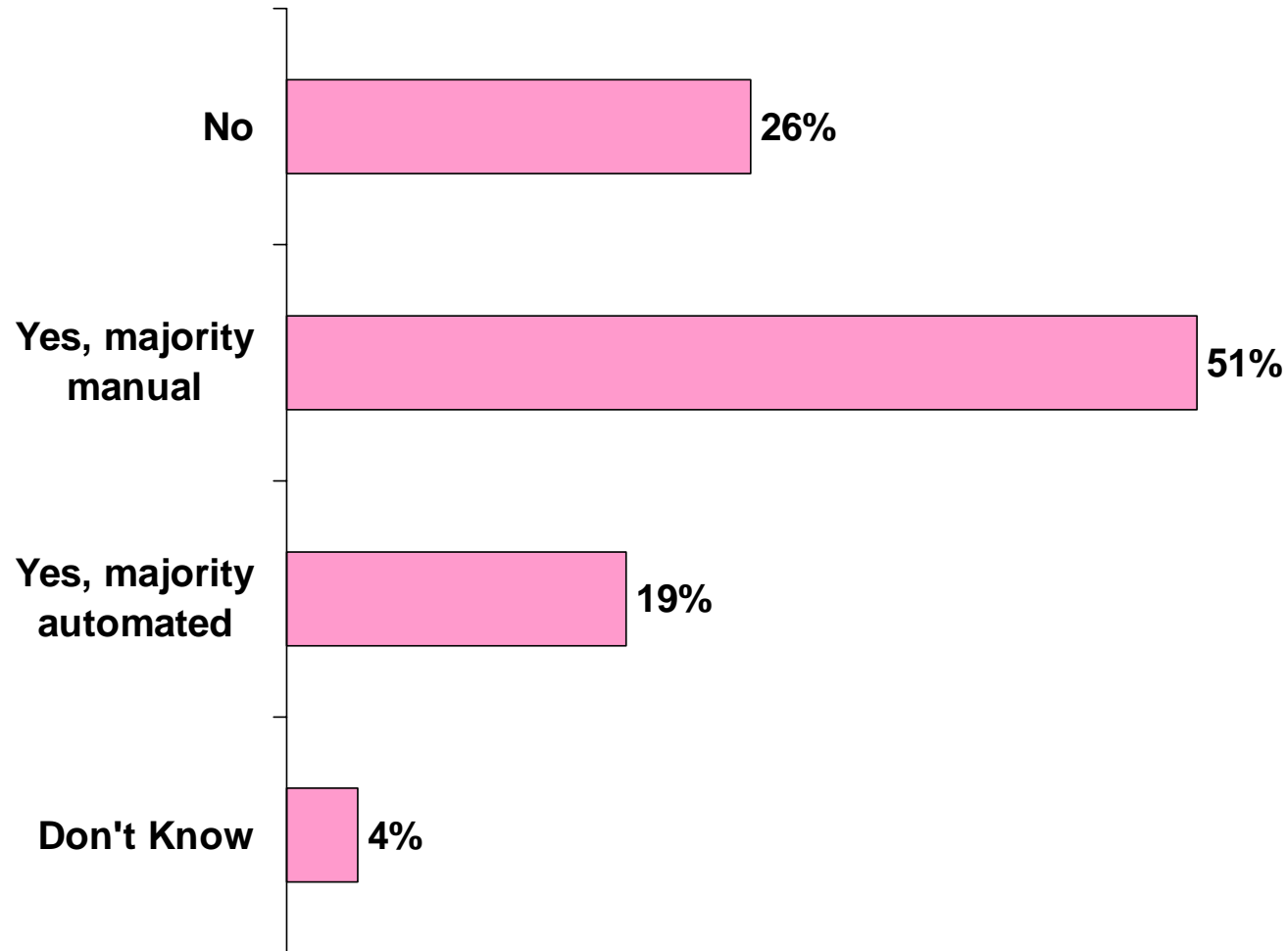
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Development Practices

- **Coding Standards (2.30)**
- **Collective Code Ownership (1.97)**
- **Continuous integration (1.94)**
- **Database standards (1.86)**
- **UI standards (1.65)**
- **Pair programming (-1.34)**

Ambysoft 2008 Practices and Principles

Testing/Validation Practices Amongst Agile Developers

Practice	Percentage
Developer TDD	71%
Developer Regression Testing	60%
Reviews/Inspections	52%
End of Lifecycle Testing	45%
Acceptance TDD	40%
Parallel Independent Testing	36%
Independent Regression Testing	23%

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Source: Ambysoft 2008 TDD Survey
www.ambysoft.com/surveys/tdd2008.html

Ambysoft 2008 Test Driven Development

Quality Practices

- **Code Refactoring (1.79)**
- **UI Testing (1.54)**
- **Automated Developer Testing (1.08)**
- **TDD (-0.08)**
- **UI Refactoring (-0.22)**
- **Database refactoring (-0.31)**
- **Automated Acceptance Testing (-0.87)**
- **Database regression testing (-1.03)**
- **Executable Specs (-1.43)**

Which organizational conventions/guidelines do development teams conform to?
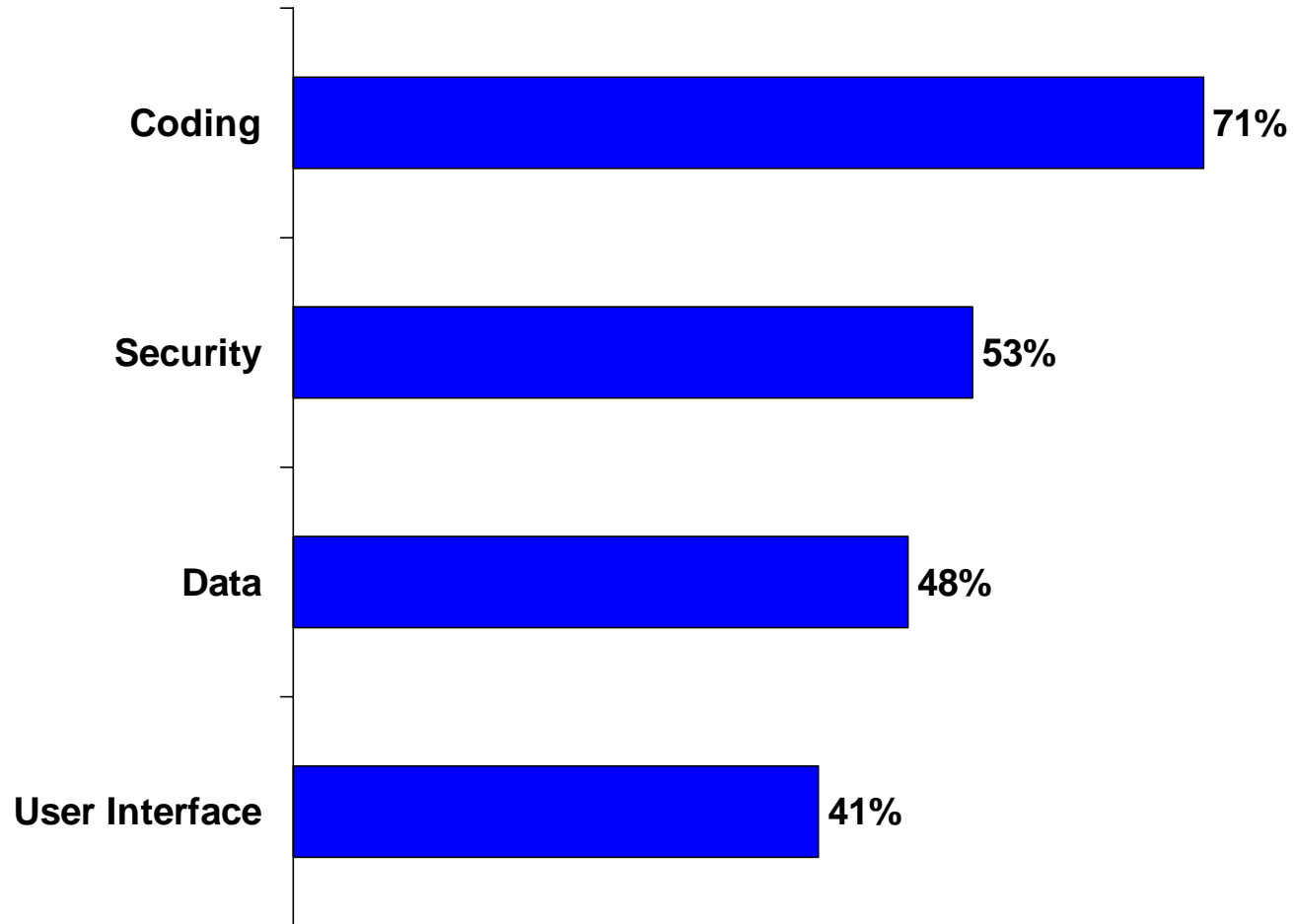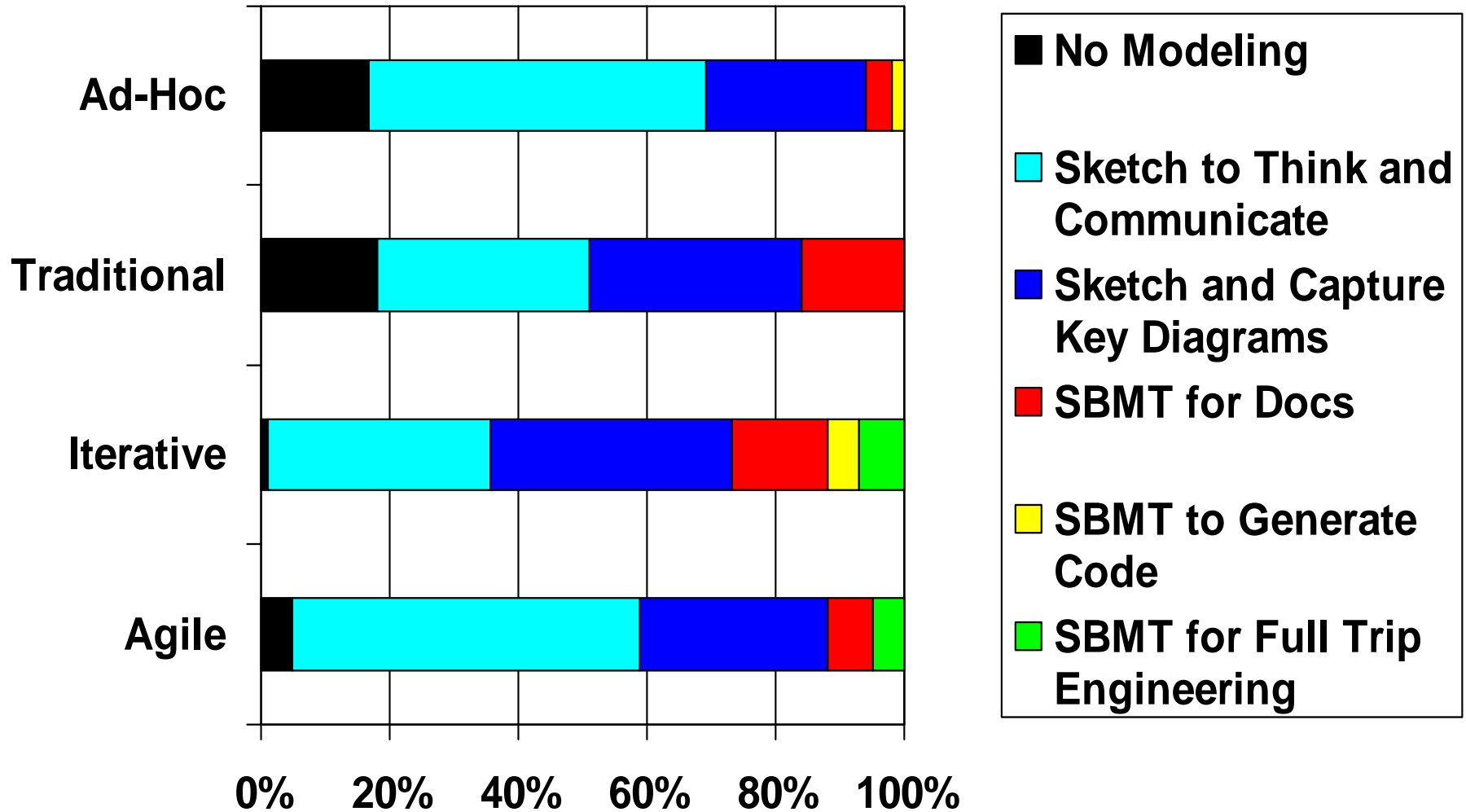
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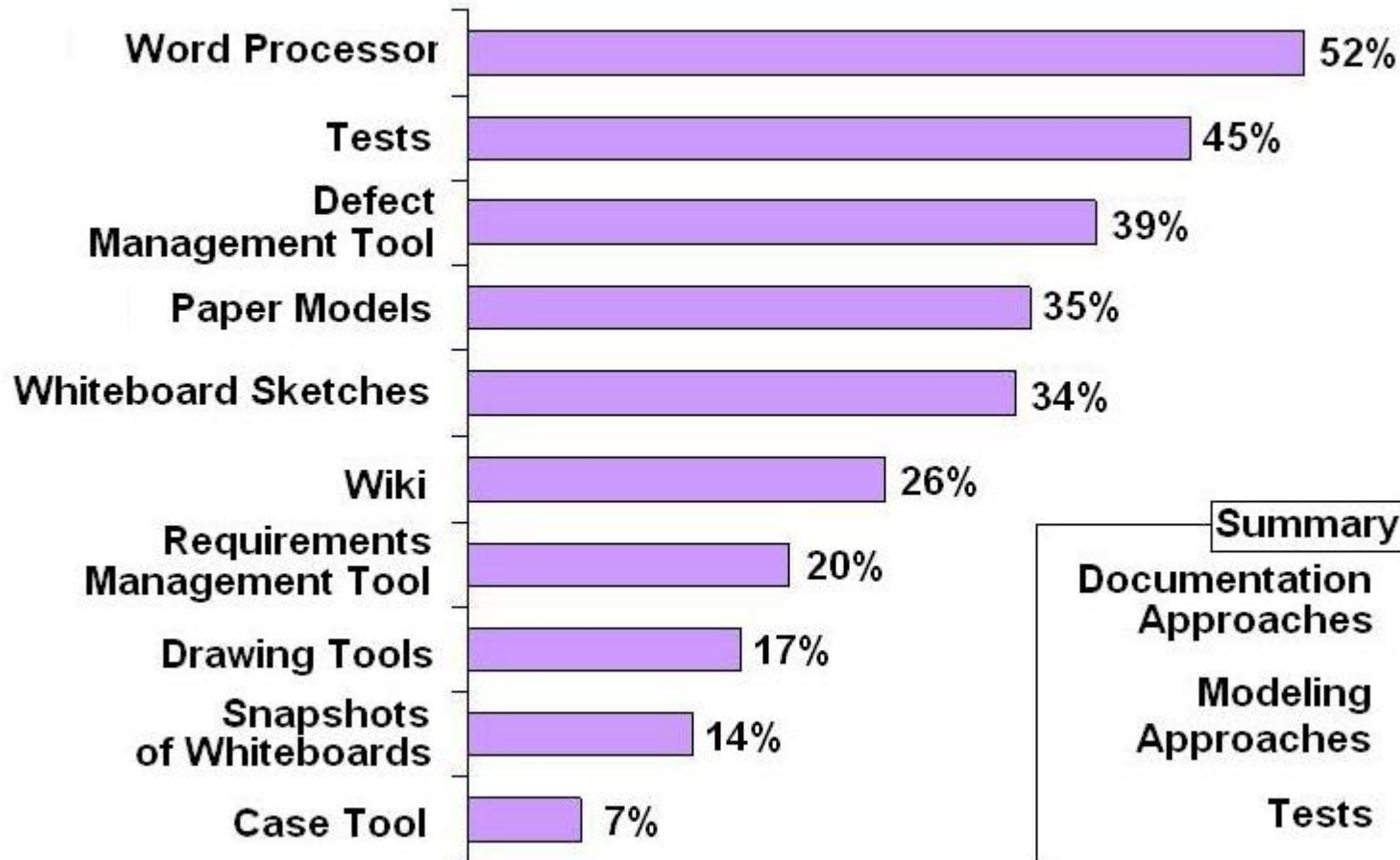- **Communication**
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Initial Modeling

- **93% of respondents indicated that their team did some sort of up-front initial requirements modeling.**

- **90% of respondents indicated that their team did some sort of up-front initial architecture modeling.**

Primary Approach to Modeling

Legend:
- ■ **No Modeling**
- ■ **Sketch to Think and Communicate**
- ■ **Sketch and Capture Key Diagrams**
- ■ **SBMT for Docs**
- ■ **SBMT to Generate Code**
- ■ **SBMT for Full Trip Engineering**

Categories: Ad-Hoc, Traditional, Iterative, Agile

Axis: 0%, 20%, 40%, 60%, 80%, 100%

Requirements Capture Practices Amongst Agile Developers

Practice	Percentage
Word Processor	52%
Tests	45%
Defect Management Tool	39%
Paper Models	35%
Whiteboard Sketches	34%
Wiki	26%
Requirements Management Tool	20%
Drawing Tools	17%
Snapshots of Whiteboards	14%
Case Tool	7%

Summary

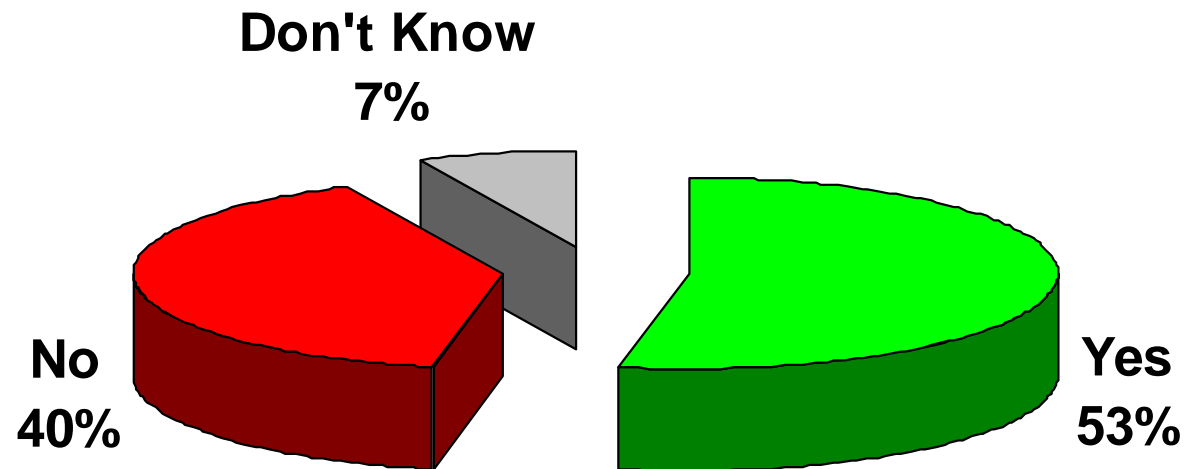|	
Documentation Approaches	85%
Modeling Approaches	53%
Tests	45%

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Source: Ambysoft 2008 TDD Survey
www.ambysoft.com/surveys/tdd2008.html

Ambysoft 2008 Test Driven Development

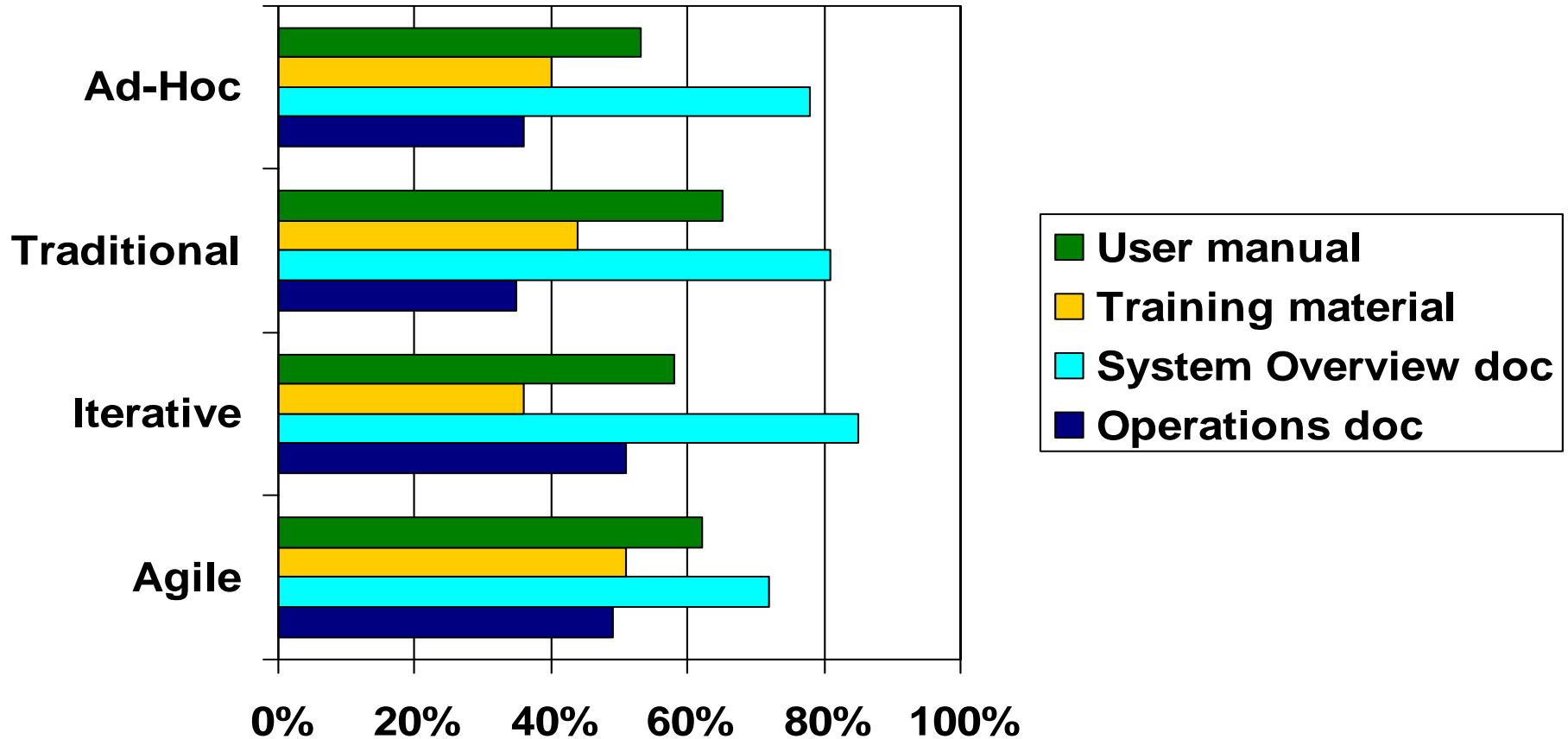# Modeling vs TDD: Primary Strategy for Requirements Specification Is/Was (%)

Legend:
- Ad-Hoc
- Traditional
- Iterative
- Agile

Categories:
- High-Level Diagrams
- Detailed Diagrams
- Detailed Docs
- Acceptance Tests

X-axis: 0, 10, 20, 30, 40, 50, 60
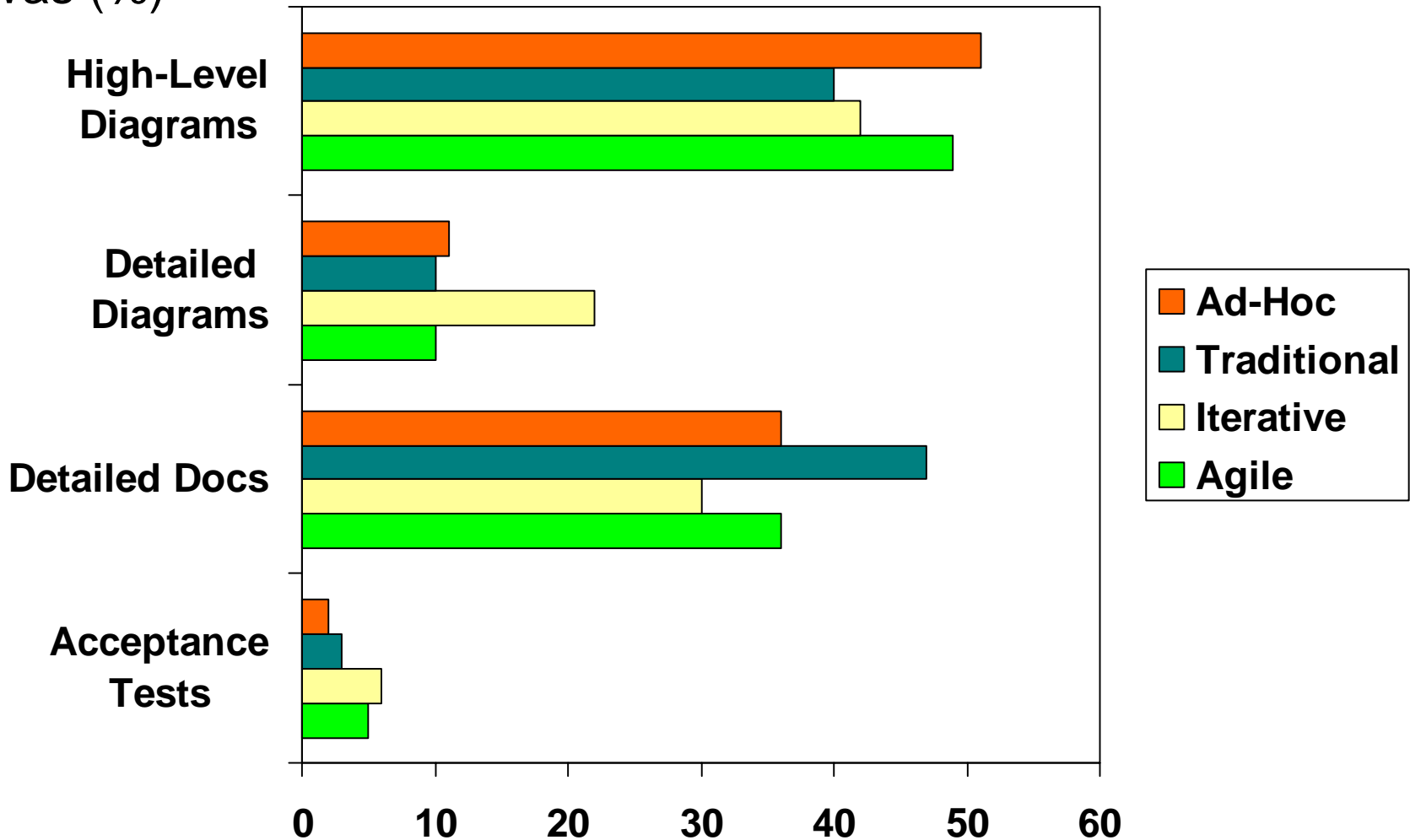
Design Capture Practices Amongst Agile Developers
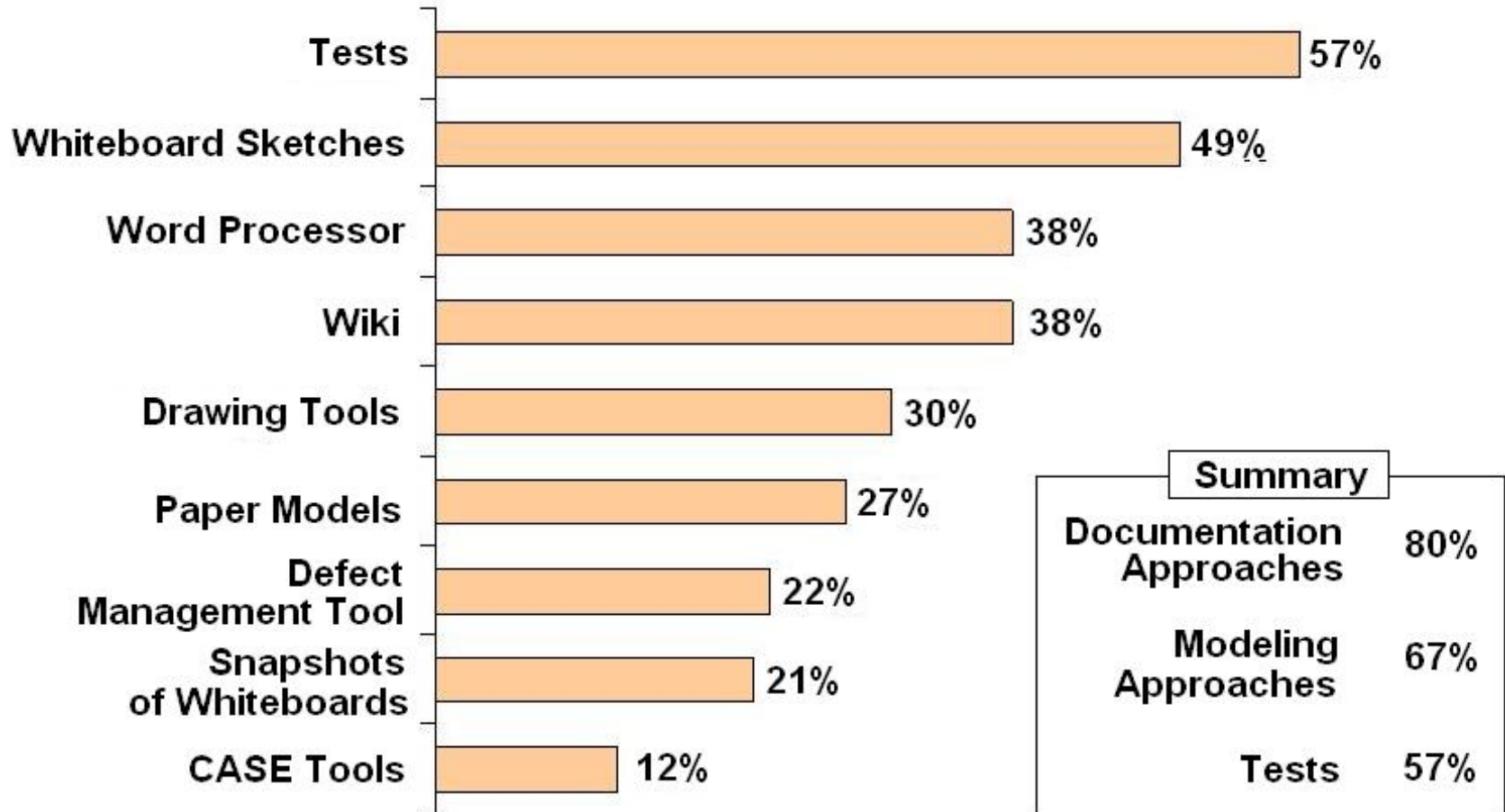
Practice	Percentage
Tests	57%
Whiteboard Sketches	49%
Word Processor	38%
Wiki	38%
Drawing Tools	30%
Paper Models	27%
Defect Management Tool	22%
Snapshots of Whiteboards	21%
CASE Tools	12%

Summary	
Documentation Approaches	80%
Modeling Approaches	67%
Tests	57%

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Source: Ambysoft 2008 TDD Survey
www.ambysoft.com/surveys/tdd2008.html

Ambysoft 2008 Test Driven Development

Modeling vs TDD: Primary Strategy for Arch/Design Specification Is/Was (%)
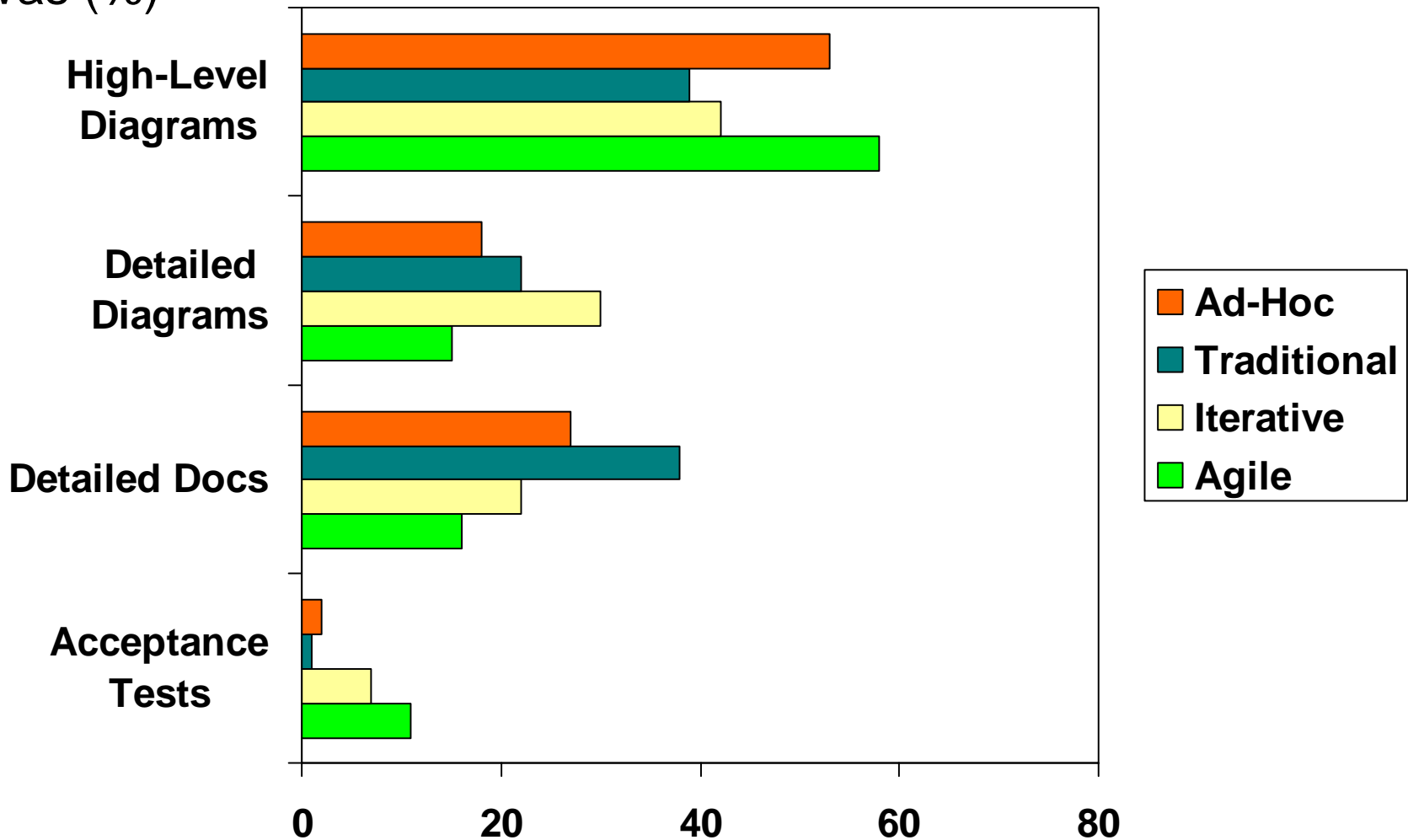
Did you need to produce a vision document (or similar) as part of project initiation?

Percentage of Teams Creating Deliverable Documentation

Legend:
- **User manual** (green)
- **Training material** (yellow)
- **System Overview doc** (cyan)
- **Operations doc** (dark blue)

Categories: Ad-Hoc, Traditional, Iterative, Agile

X-axis: 0% 20% 40% 60% 80% 100%

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Effectiveness of Communication Strategies
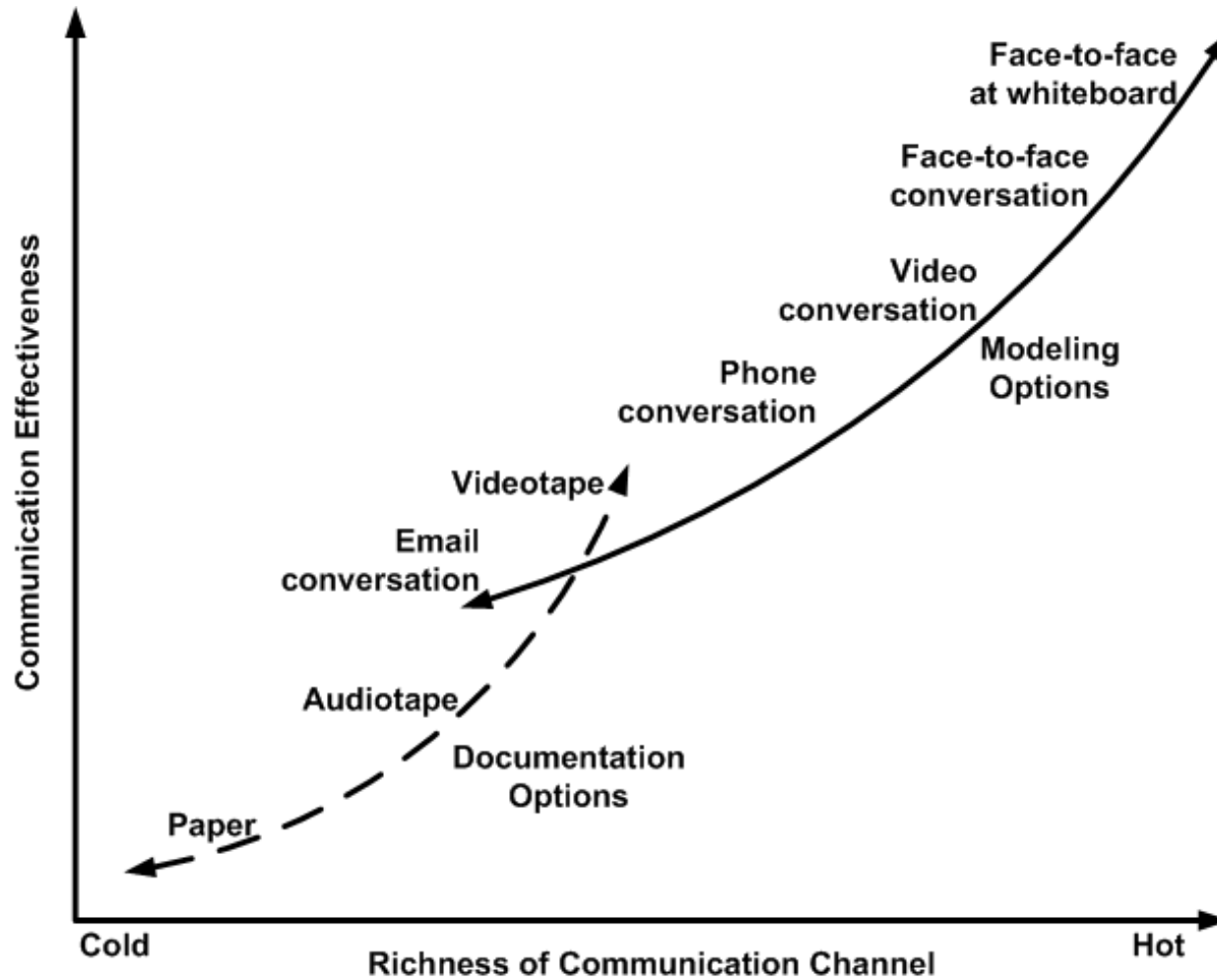
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Original Diagram Copyright 2002 Alistair Cockburn

Effectiveness of Communication Strategies
(bigger the number the better)

	Within Team	With Stakeholders
Face to face (F2F)	**4.25**	**4.06**
F2F at Whiteboard	**4.24**	**3.46**
Overview diagrams	**2.54**	**1.89**
Online chat	**2.10**	**0.15**
Overview documentation	**1.84**	**1.86**
Teleconference calls	**1.42**	**1.51**
Videoconferencing	**1.34**	**1.62**
Email	**1.08**	**1.32**
Detailed Documentation	**-0.34**	**0.16**

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Question the Rhetoric

- **There appears to be a difference between what people say they are doing and what they are doing**
- **Many of the concerns that the traditional community has regarding agile don't appear to hold true**
- **There are many unfounded beliefs in both the traditional and the agile communities**
- **In the end, you need to identify what works well for you ➔ Every organization is different**

Why IBM?

- **Our integrated tooling based on the Jazz platform enables disciplined agile software development**
- **Our Measured Capability Improvement Framework (MCIF) service offering helps organizations to successfully improve their IT practices in a sustained manner**
- **We are one of the largest agile adoption programs in the world**
- **We understand the enterprise-level issues that you face**
- **We scale from pilot project consulting to full-scale agile adoption**
- **Our Accelerated Solutions Delivery (ASD) practice has years of experience delivering agile projects at scale**

Thank You

DDJ 2006 Agile Adoption

- **Used Dr. Dobb's Journal and Software Development mailing lists**
- **4232 Respondents**
- **March 2006**

DDJ 2006 Data Quality

- **Sent out to ~28,000 people on DDJ mailing list**
- **September 2006**

- **1137 respondents:**
  - 51% were developers, 24% were in management
  - 37% had 10-20 years IT experience, 34% had 20+ years
  - 78% worked in commercial firms
  - >98% from North America

DDJ 2007 Agile Adoption

- **March 2007**
- **Advertised in Editor's blog on www.ddj.com**

- **781 respondents:**
  - 52% were developers, 22% were in management
  - 40% had 10-20 years IT experience, 33% had 20+ years
  - 33% worked in orgs of 1000+ people
  - 85% worked in commercial firms

DDJ 2007 Project Success

- **August 2007**
- **Email sent to DDJ mailing list**

- **586 respondents**
  - 54% were developers/modelers, 30% were in management
  - 73% had 10+ years in IT
  - 13% worked in orgs of 1000+ IT people
  - 84% worked in commercial firms
  - 69% North American, 18% European
- **Overall goal was to explore how IT professionals define project success.**

DDJ 2008 Process Framework

- **January 2008**
- **Email sent to DDJ mailing list and posting in Editor's blog**

- **339 respondents**
  - 40% were developers, 20% were in management, 22% architects
  - 78% had 10+ years in IT
  - 17% worked in orgs of 1000+ IT people
- **Overall goal was to explore adoption and success rates of various process frameworks such as CMMI, COBIT, ITIL, …**

DDJ 2008 Agile Adoption

- **February 2008**
- **Message sent out to DDJ mailing list**

- **642 respondents:**
  - 54.8% were developers, 29.4% were in management
  - 41.6% had 10-20 years IT experience, 37.2% had 20+ years
  - 37.7% worked in orgs of 1000+ people
  - 71% worked in North America, 17% in Europe, 4.5% in Asia

DDJ 2008 Modeling and Documentation

- **July 2008**

- **Message sent out to DDJ mailing list and advertised on www.ddj.com**

- **279 respondents:**
  - 54.8% were developers, 25.4% were in management
  - 33.3% had 10-20 years IT experience, 41.6% had 20+ years
  - 41.7% worked in orgs of 1000+ people
  - 61.5% worked in North America, 24.5% in Europe, 5.4% in Asia

Ambysoft 2008 Practices and Principles

- **July 2008**
- **Message sent out to several agile Yahoo groups mailing lists (extremeprogramming, agilemodeling, agiledatabases, scrumdevelopment, testdrivendevelopment)**

- **337 respondents:**
  - 36.9% were developers, 36.9% were in management
  - 42% had 10-20 years IT experience, 17.3% had 21+ years
  - 31.3% worked in orgs of 1000+ people
  - 57.3% worked in North America, 22.7% in Europe, 7.2% in Asia

Ambysoft 2008 Test Driven Development

- **October 2008**
- **Email sent to testdrivendevelopment@yahoogroups.com and extremeprogramming@yahoogroups.com mailing lists**

- **121 respondents**
  – 74% were developers/modelers, 15% were in management
  – 52% had 10+ years in IT
  – 22% worked in orgs of 1000+ people

DDJ 2008 Project Success

- **December 2008**
- **Email sent to DDJ mailing list**

- **279 respondents**
  – 59% were developers/modelers, 25% were in management
  – 80% had 10+ years in IT
  – 16% worked in orgs of 1000+ IT people

Ambysoft 2009 Agile Certification

- **April 2009**
- **Email sent to several agile mailing lists**

- **102 respondents**

Ambysoft 2009 Governance

- **May 2009**
- **Email sent to the Ambysoft announcements list (ambysoft@yahoogroups.com) which had 895 subscribers at the time**
- **62 respondents, 53 completed the survey**
- **41% were developers/modelers/data professionals, 29% were in management**
- **74% had 10+ years in IT**
- **27% worked in orgs of 500+ IT people**
- **52% North American, 27% European**
- **Overall goals were to explore what people thought about IT governance and to find out what was happening in various orgs**

Ambysoft 2009 Project Initiation: Interim Results

- **Warning! Survey still running, so reported results are interim!**

- **August 2008**
- **Message sent out to several agile Yahoo groups mailing lists (extremeprogramming, agilemodeling, agiledatabases, scrumdevelopment, testdrivendevelopment)**

- **Data, summary, and slides downloadable from www.ambysoft.com/surveys/**
- **141 respondents (as of Aug 6):**
  - 21% were developers, 44% were in management or leadership roles
  - 38% had 10-20 years IT experience, 28% had 21+ years
  - 57% worked in North America, 28% in Europe, 9% in Asia Pacific
  - 27% had 3-4 years of agile experience, 27% had 5 or more years

Ambysoft 2009 Agile Practices

- **July 2009**
- **Message sent out to several agile Yahoo groups mailing lists (extremeprogramming, agilemodeling, agiledatabases, scrumdevelopment, testdrivendevelopment)**

- **Data, summary, and slides downloadable from www.ambysoft.com/surveys/**
- **123 respondents:**
  - 31% were developers, 48% were in management or leadership roles
  - 43% had 10-20 years IT experience, 29% had 21+ years
  - 58% worked in North America, 21% in Europe, 12% in Asia Pacific
  - 27% had 3-4 years of agile experience, 39% had 5 or more years

DDJ State of the IT Union July 2009

- **July 2009**
- **Email sent to DDJ mailing list**
- **Data, summary, and slides downloadable from www.ambysoft.com/surveys/**
- **125 respondents**
  - 50% were developers, 19% were in management
  - 70% had 10+ years in IT
  - 11% worked in orgs of 1000+ IT people
  - 93% worked in commercial firms
  - 58% North American, 26% European, 10% Asia Pacific