

AGILE DEVELOPMENT AND ITS IMPACT ON PRODUCTIVITY

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Achieving Software Excellence

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Topics

- Characteristics of Agile Projects
- Performance Data on Agile Projects
- When to Choose Agile

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- ⇒ • Characteristics of Agile Projects
 - Common View
 - Core Practices
 - Life-cycle Development
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View of Agile Projects

Agile View – Rigid methods have one thing in common, too much is planned in an uncertain environment at project inception.

“XP’ (most common agile methodology) is a lightweight methodology for small-to-medium-sized teams developing software in the face of vague or rapidly changing requirements.”

Kent Beck

Characteristics Overview

<i>Barry Boehm and Richard Turner</i>	Agile	Planned (Traditional)
Application	<i>Changeable</i>	<i>Larger Teams & Projects</i>
Management	<i>Customer Part of Team</i>	<i>Document Plans & Requirements</i>
Technical	<i>Short Increments Many Releases</i>	<i>Voluminous Test Cases and Plans</i>
Personnel	<i>Highly Capable Thrive on Chaos</i>	<i>Specialists who Thrive on Order</i>

Core Practices

- Talent & Skill (Fewer, but Better)
- Active Stakeholder Participation
- Assimilate Change Easily (Plan & Re-plan)
 - Incremental Development
 - Use of Simple Models to Address Requirements
 - Rapid Feedback (Just-in-time Requirements & Design)
 - Frequent Delivery
 - Different Strategies for Different Projects
- Steady Development Rate
- High Quality in Work
- Direct Communication (Daily Scrum, Less Paper)
- Maximize Agility through Model Reuse
- Team in Close Proximity

Agile Manifesto (2001)

We Value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

Life-cycle Development

Requirements, Design and Coding

- Small in Scope
 - Less than 200 Function Points
 - Many less than 100 Function Points
- High Level Business Requirements
- Lack of Formal Documentation
 - System Descriptions
 - Technical Design Documentation
 - Process Models
 - System Architectures
- Team Development
 - Small, Cohesive, Same Work Space
 - Self Organized and Motivated
 - Driven by Team Dynamics vice Formal Process

Life-cycle Development

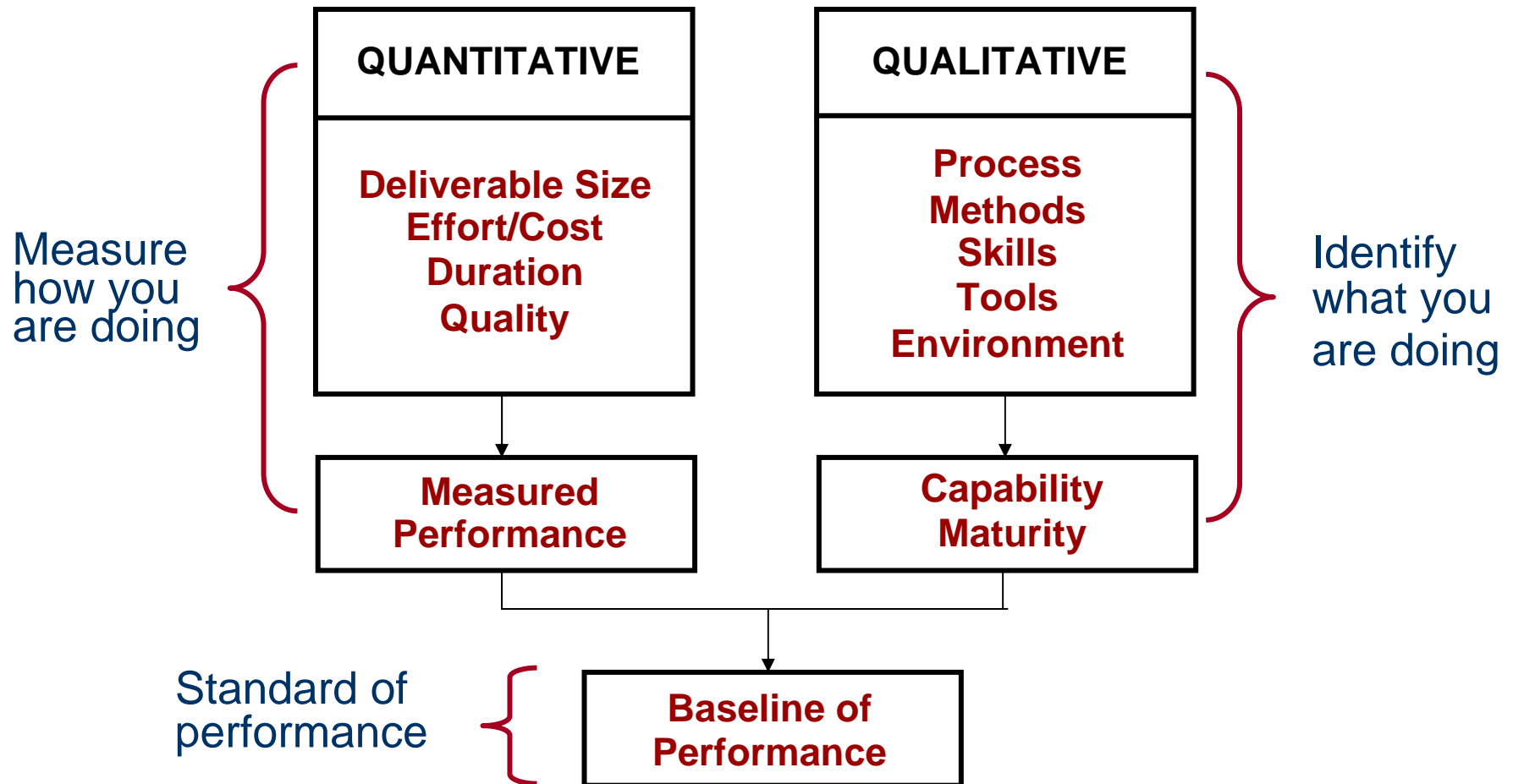
Testing and Implementation

- Effort Not Separate for each Testing Type/Phase
- Testing Occurs Concurrently
- Testing by Developers
- Smaller Deliverables, More Releases

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Use Measurement To Enable Comparisons Between Methods



Utilize Measurement Results In Decision Making

- Improvements resulting from current and future initiatives must be measured
- The basis for measuring improvements may include:
 - Industry data
 - Organizational baseline data
- It is necessary for the organization to put a “**stake in the ground**” relative to current performance level in order to improve development practices

DCG Data Base

Characteristics

Project Type
Platform
Data Base
Method
Language

Complexity Variables

Logical Algorithms	Code Structure
Mathematical Algorithms	Performance
Data Relationships	Memory
Functional Size	Security
Reuse	Warranty

Metrics

Size
Cost
Effort
Duration
Defects

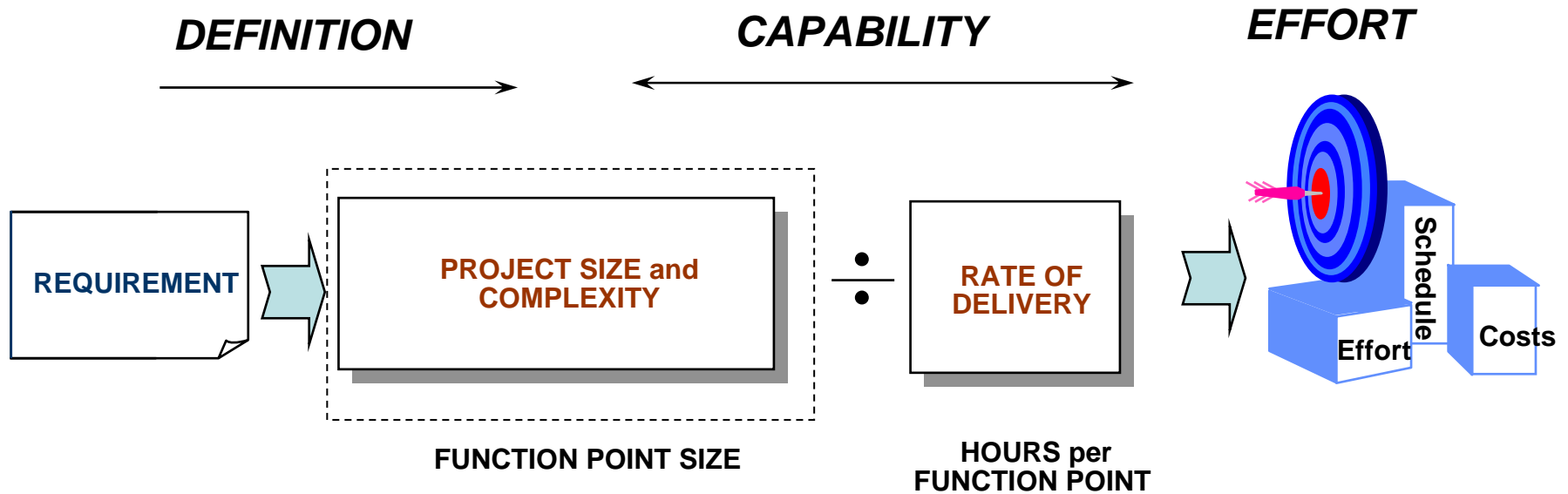
Attributes

Management	}	Process
Definition		Skill Levels
Design		Quality Practices
Build		Measures
Test		
Environment		

Collecting & Reporting

- Identify data set (typically project oriented)
- Collect baseline data
 - Project measures (e.g., effort, size, cost, duration, defects)
 - Project attributes (e.g., skill levels, tools, process, etc.)
- Analyze data
 - Performance comparisons (identification of process strengths and weaknesses)
 - Industry averages and best practices
 - Performance modeling (identify high impact areas)
- Report results

Using Historical Delivery Rates



Hours Per Function Point

Average Hours/Function Point of Recent Enhancement Projects Across Different Platforms from DCG Database for Small Projects

	Traditional	Agile
Client Server	6.5	4.2
Main Frame	8.1	7.0
Web	4.8	3.2
e-business Web	6.6	5.8

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Which Methodology Should I Use?

- Waterfall, Iterative and Spiral Methods
 - Predictive Performance
 - Large Teams
 - Highly Structured Environments
 - Outsourced or Multi-sourced Projects
 - High Financial or Safety Risk
 - Significant Hardware Integration
- Agile Methods
 - Exploratory Projects
 - Small Teams
 - Participative Environments
 - Experienced Personnel
 - Active Business Partners
 - Software Dominant Projects
 - In-sourced Projects
 - High Risk of Unknown Requirements

Do I Choose Agile or a Hybrid?

- Initial arguments for selecting a hybrid (traditional) method.
 - High level of risk
 - Large size of project
 - Specified delivery commitment
 - Organizational environment
- Suggested selection process:
 - Map agile attributes based on organization's tolerance for risk and change
 - Some agile practices can be transplanted to another methodology
 - Leverage best practice processes to augment method chosen

Key Attributes of Agile Projects

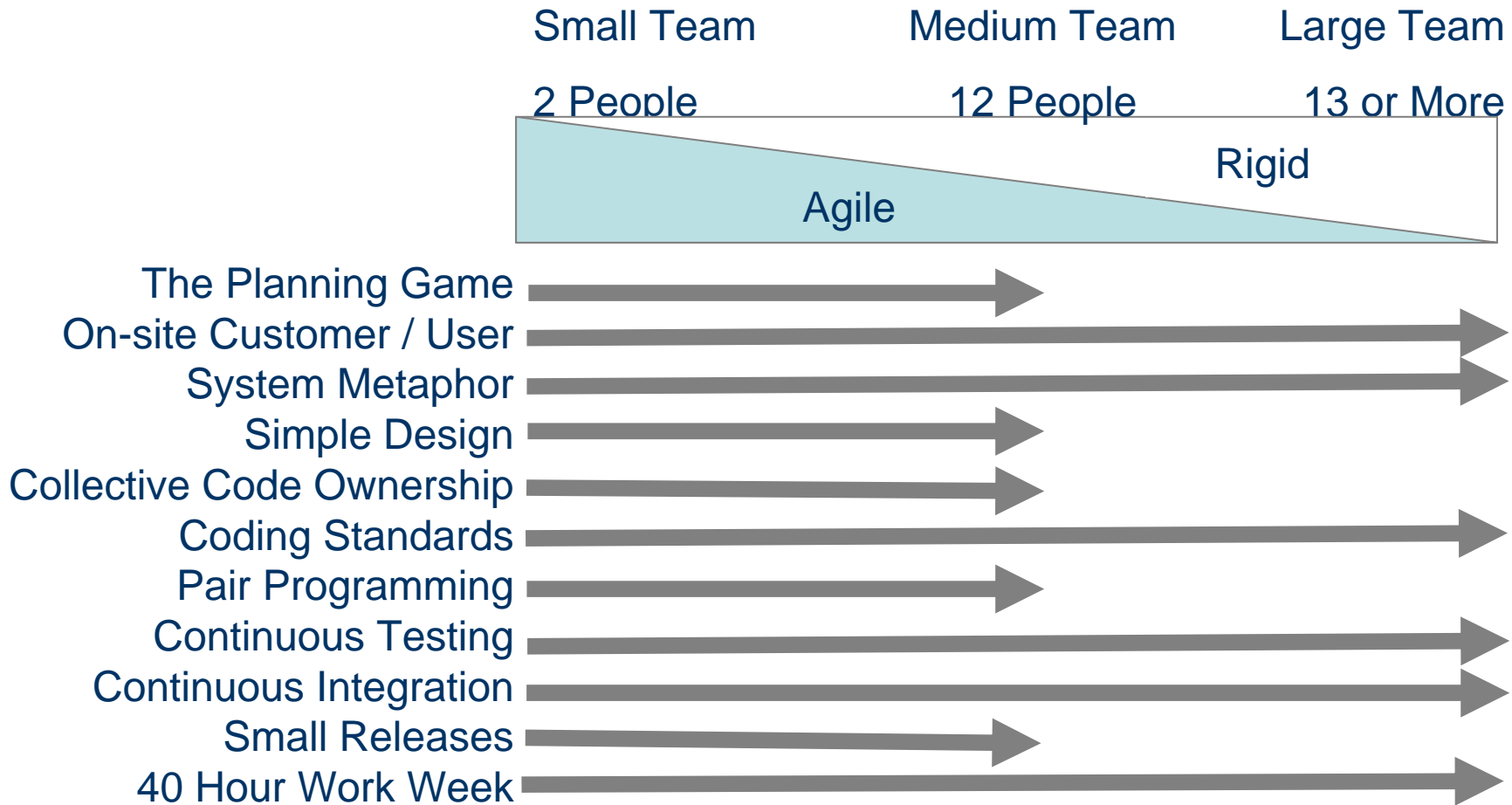
- The Planning Game
- On-site Customer / User
- System Metaphor
- Simple Design
- Collective Code Ownership
- Coding Standards
- Pair Programming
- Continuous Testing
- Continuous Integration
- Small Releases
- 40 Hour Work Week

Key Attributes of Current Agile Methods

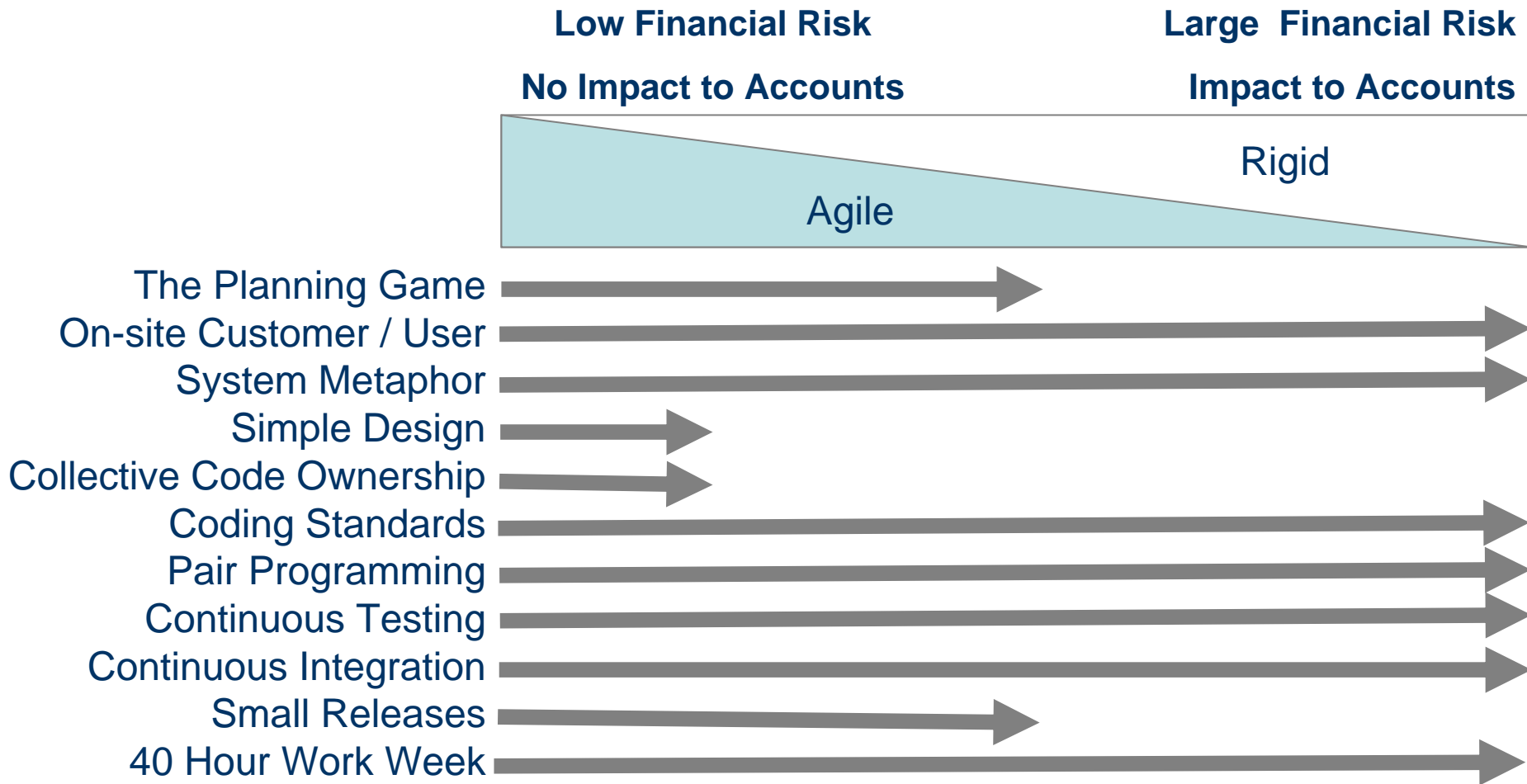
↗ **Well Defined**

↗ **Require Significant
Discipline**

Example: Team Size as a Driver for Hybrid



Example: Financial Risk as a Driver for Hybrid



Conclusions

- Use of Agile methods affects performance outcomes
- Choosing the appropriate methodology will maximize your delivery performance
- Agile performance can be successful

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