# Introduction to Agile Software Development

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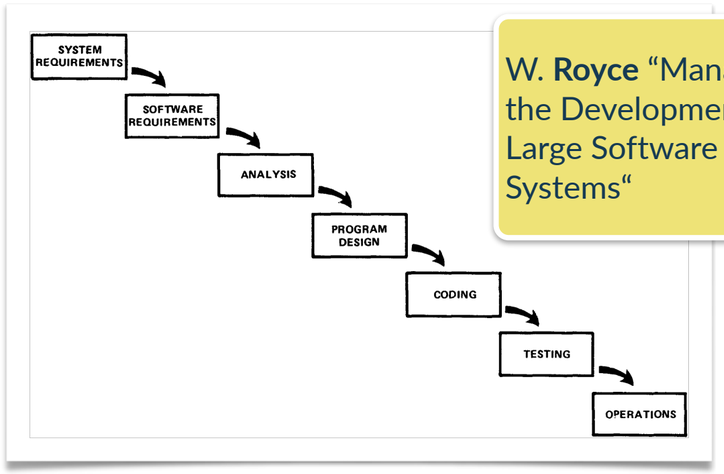
Head of Research

Agile Development is **adaptive** rather than predictive; **people-oriented** rather than process-oriented.

Martin Fowler

# Agile, a bit of history

# Specify-then-build approach (a.k.a, waterfall)




W. **Royce** “Managing the Development of Large Software Systems“

Barry Boehm
**Software Engineering**

Department of Defense
**DoD-Std-2167**

1960 1970 1980 1990 2000

# Specify-then-build approach (a.k.a, waterfall)

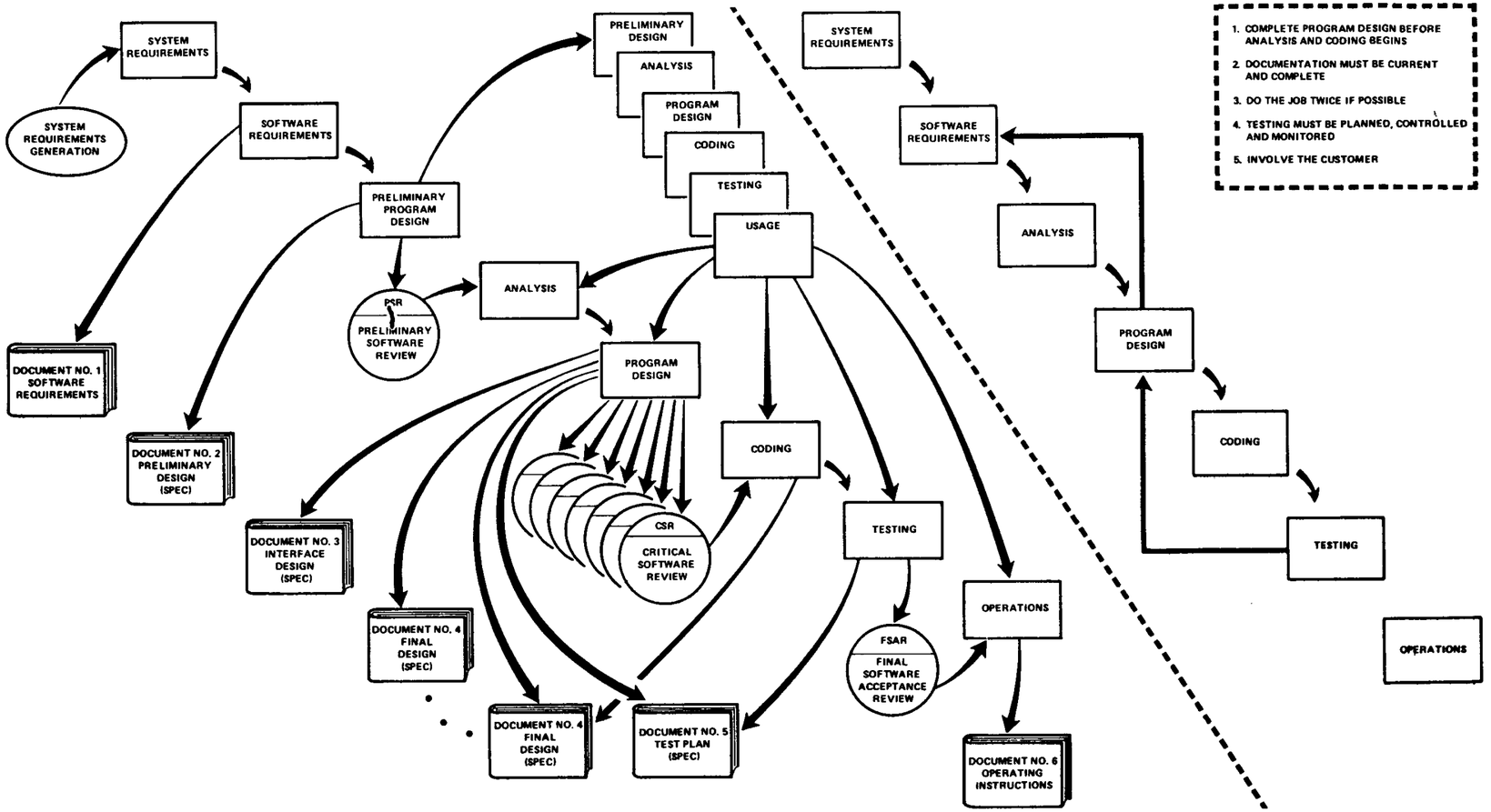



Figure from “Managing the Development of Large Software Systems”.

Figure 10. Summary

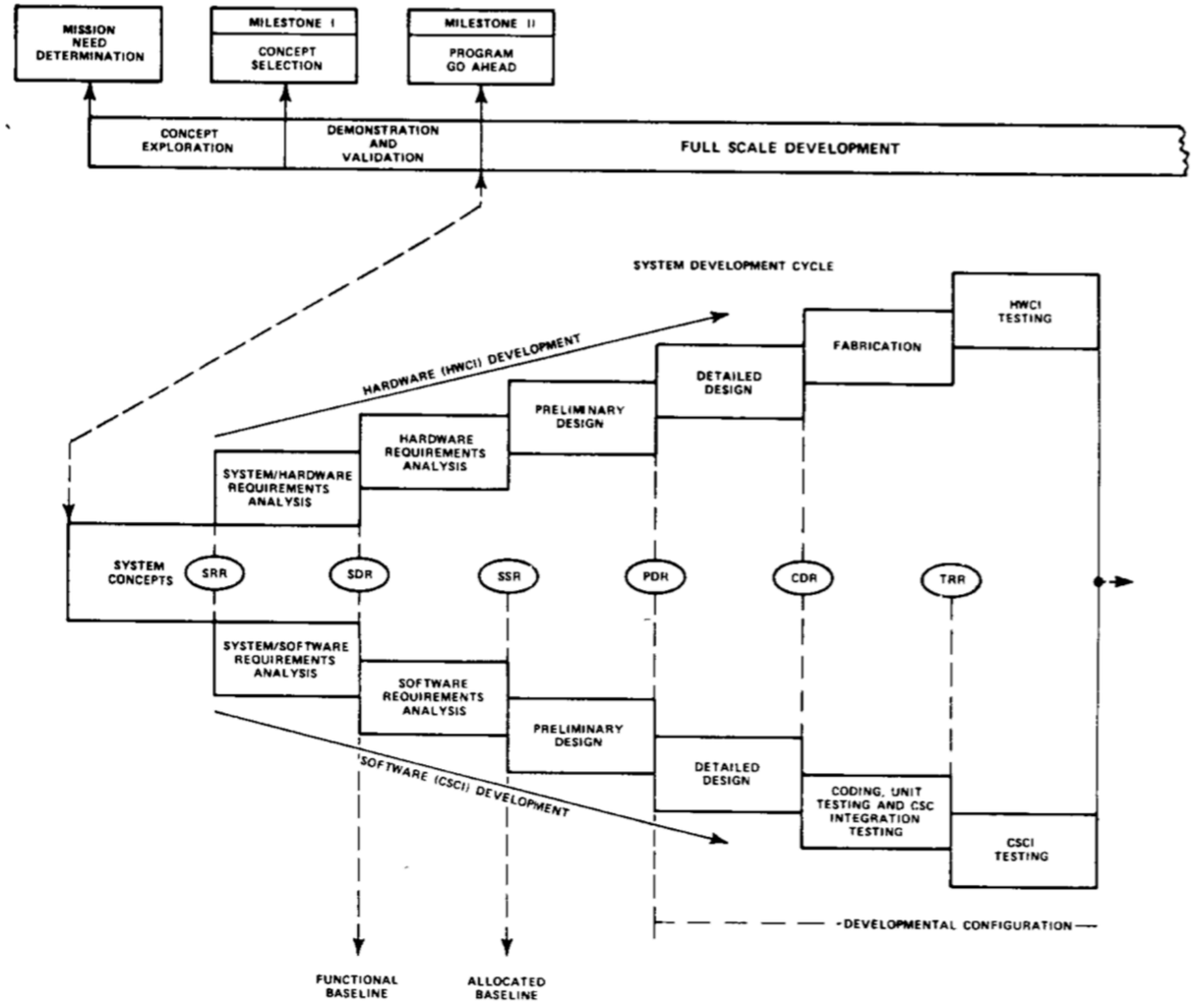



**FIGURE 1. System development cycle within the system life cycle.**

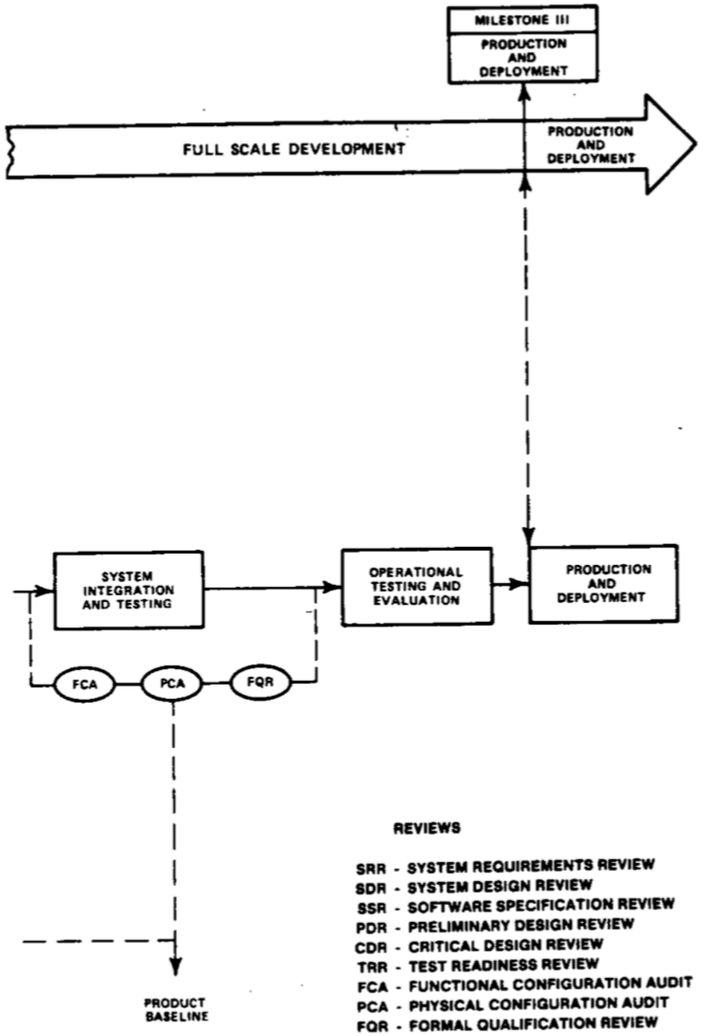
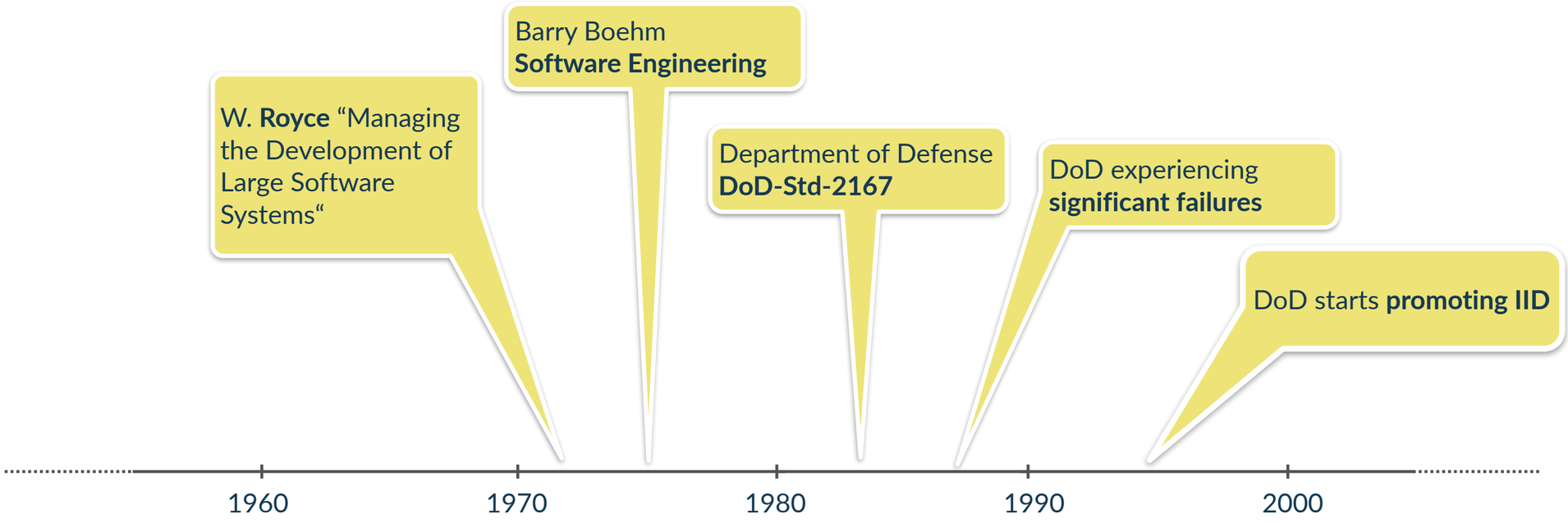



**FIGURE 1. System development cycle within the system life cycle. (continued)**

Figure from “DoD-Std-2167”.

# Specify-then-build approach (a.k.a, waterfall)



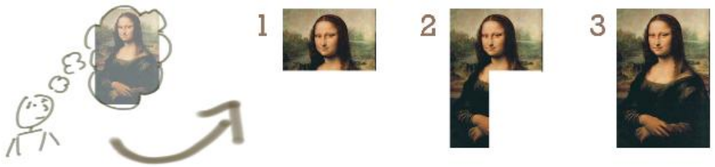
# Why did projects fail?

1987 report of the Defense Science Board Task Force on Military Software.

> Directive 5000.29 not only does not encourage this best modern practice, it essentially forbids it. We recommend that it be revised immediately to mandate and facilitate early prototyping before the baseline specifications are established (Rec. #23).
>
> DoD-STD-2167 likewise needs a radical overhaul to reflect best modern practice. Draft DoD-STD-2167A is a step, but it does not go nearly far enough. As drafted, it continues to reinforce exactly the document-driven, specify-then-build approach that lies at the heart of so many DoD software problems.

# Iterative and Incremental Development

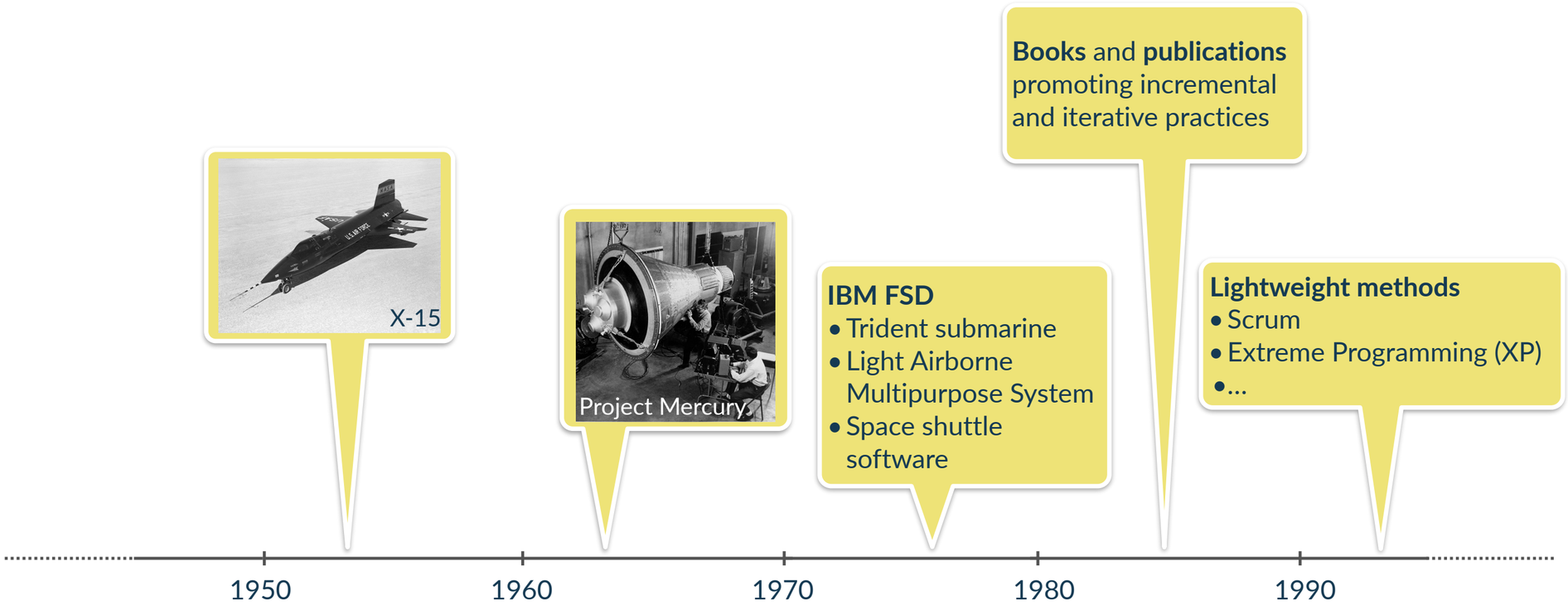
**Iterate** to evaluate and make changes to what you've already made




**Increment** to make additions

The two tactics can be **conjoined**

# Iterative and Incremental Development

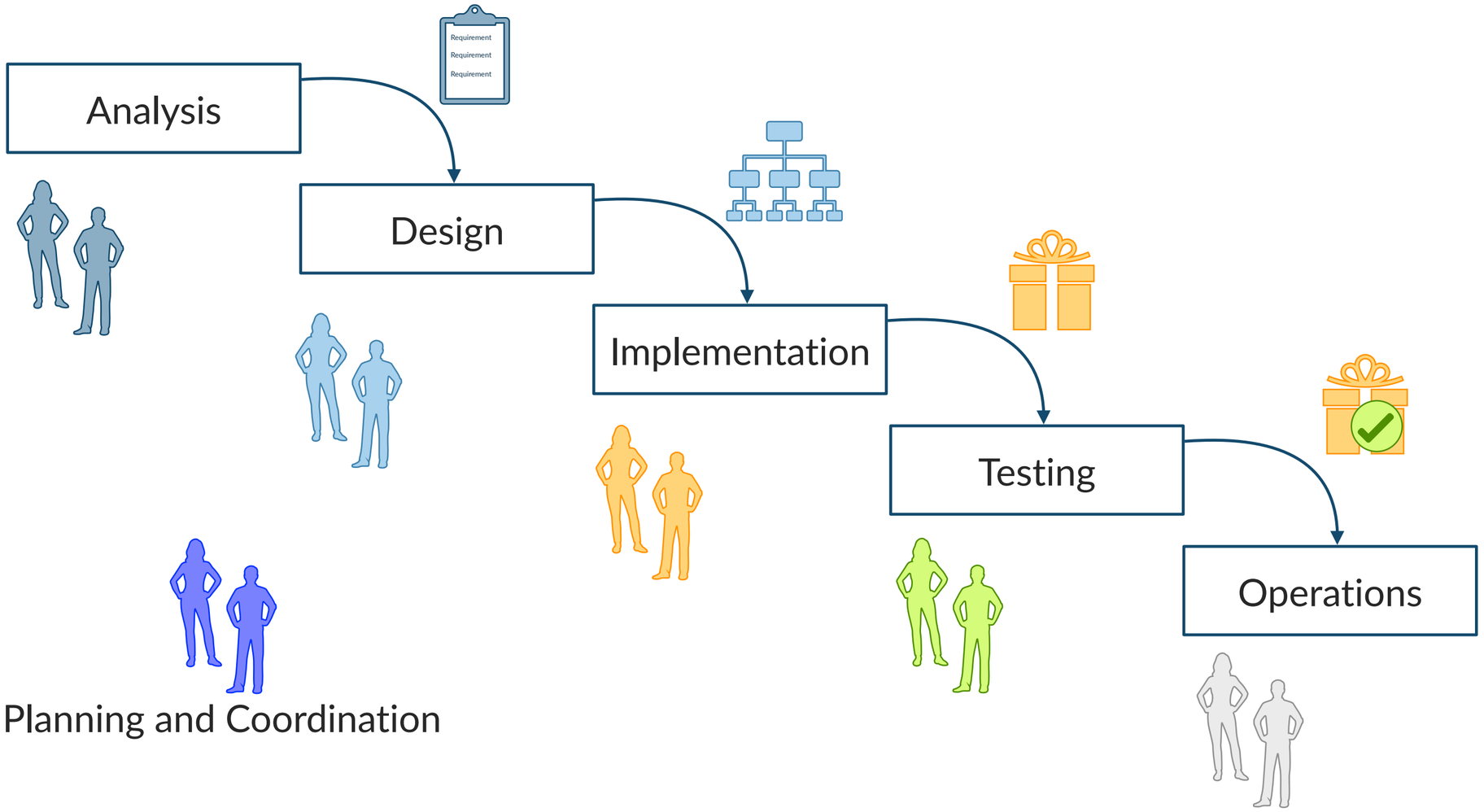


# Manifesto for Agile Software Development

Utah, 2001. A group of 17 experts (with different backgrounds) met to discuss the growing field of what used to be called lightweight methods.

- Captures common ground about software development
- Sets out the values and principles of these lightweight methods
- Covers technical, organizational and people aspect of software development

# Specify-then-build approach and People



# Manifesto for Agile Software Development

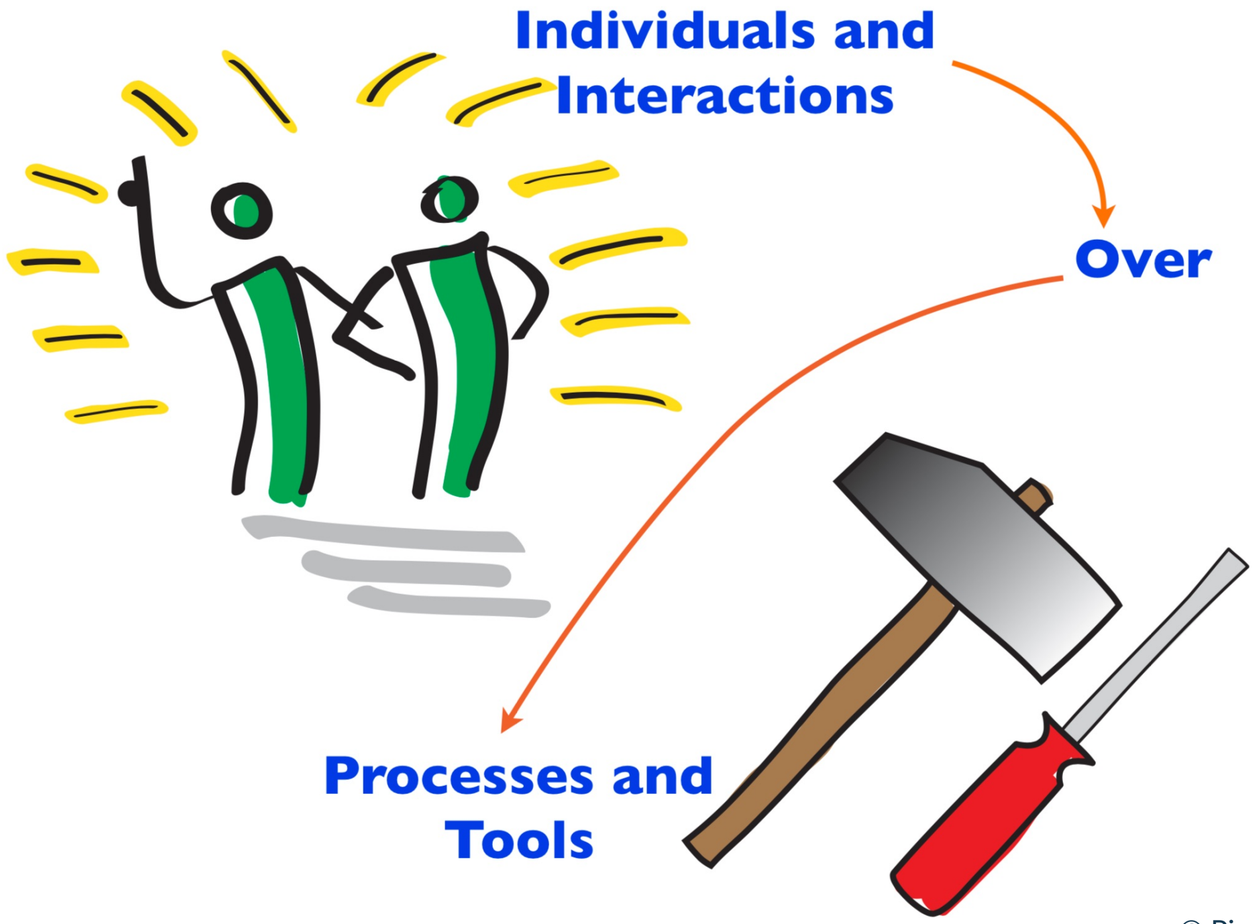
We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

[X over Y]

That is, while there is value in the items on the right, we value the items on the left more.

# We value...

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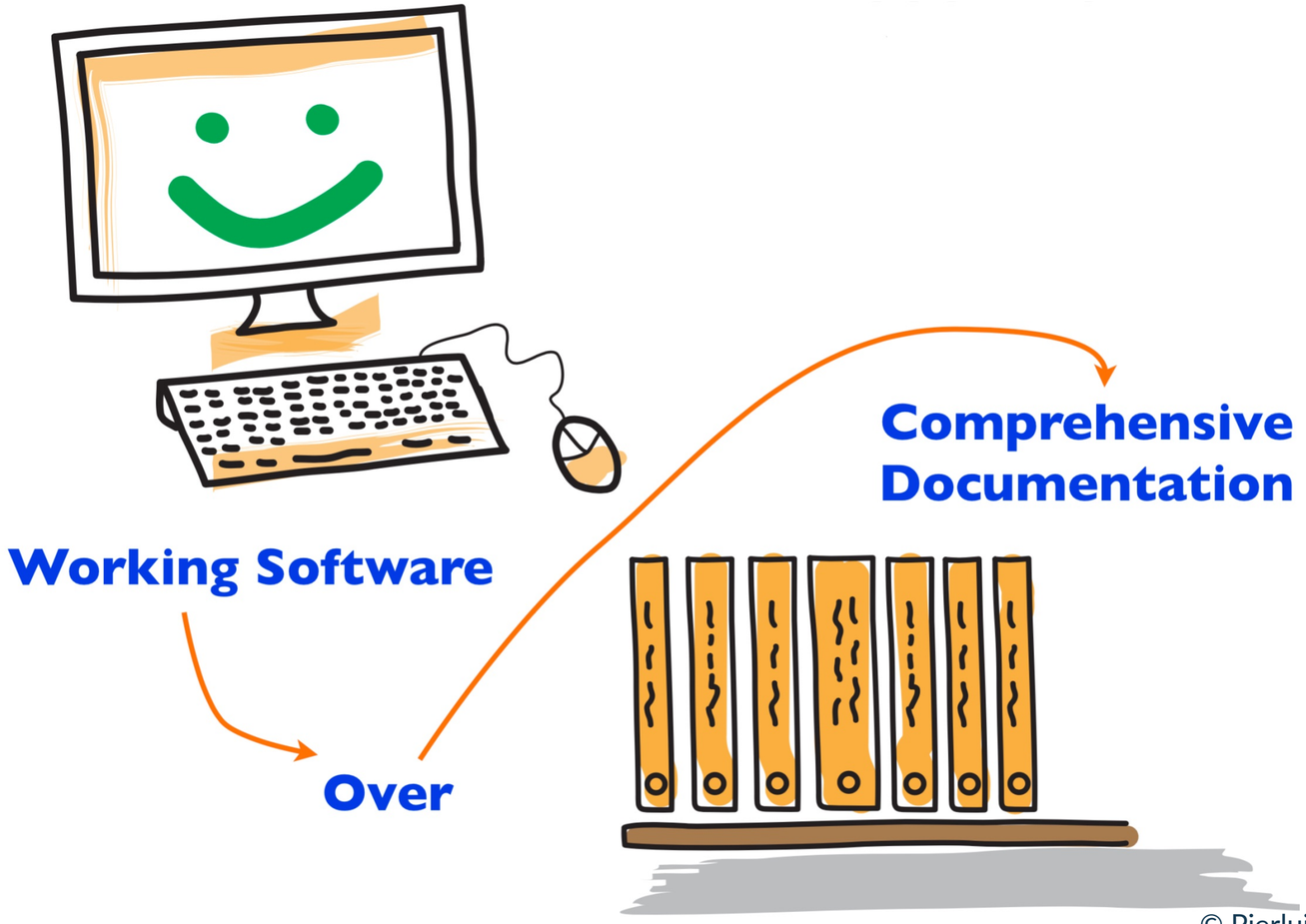
# We value…

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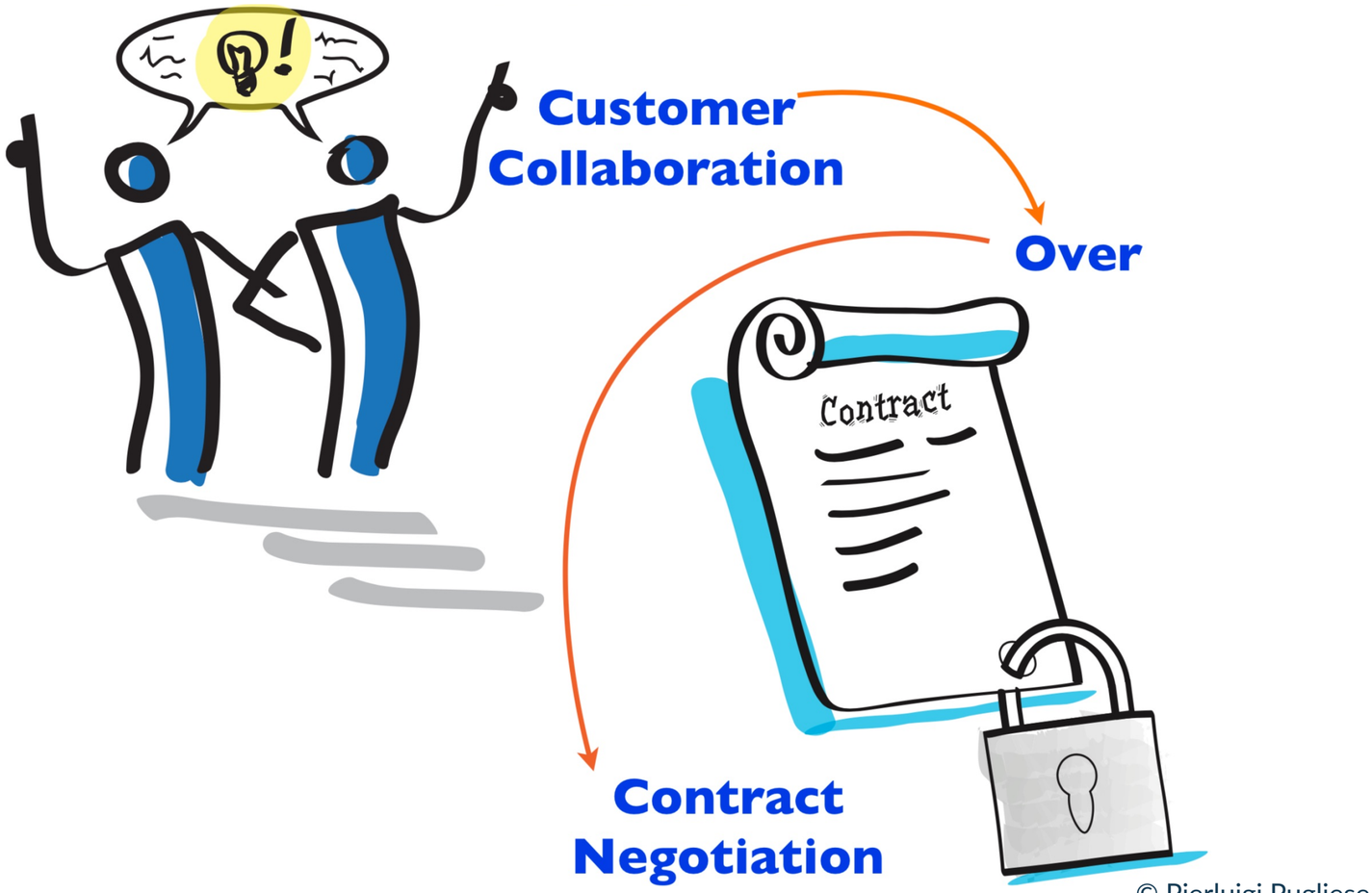
# We value...

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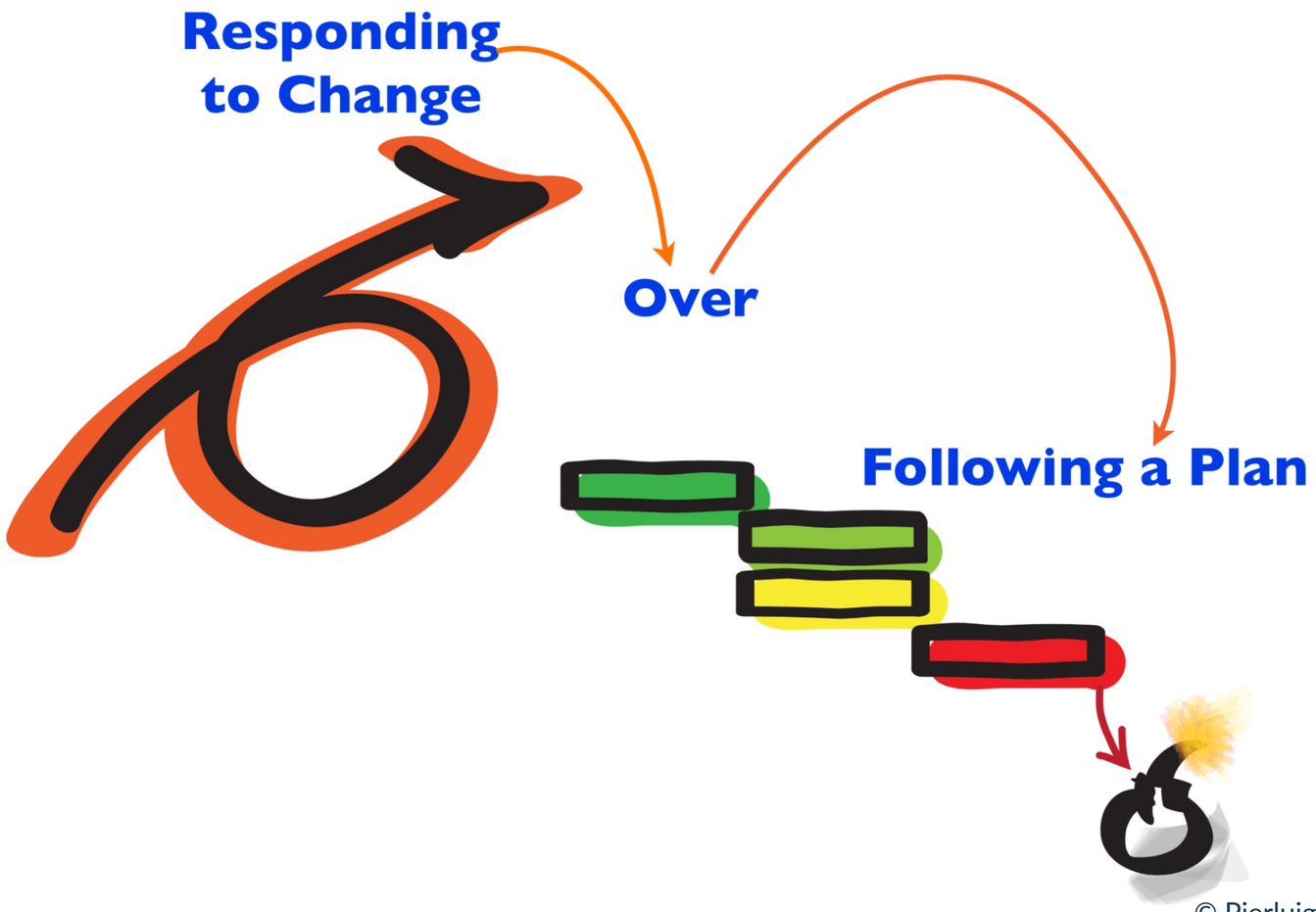
# We value…

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# Agile Manifesto Principles

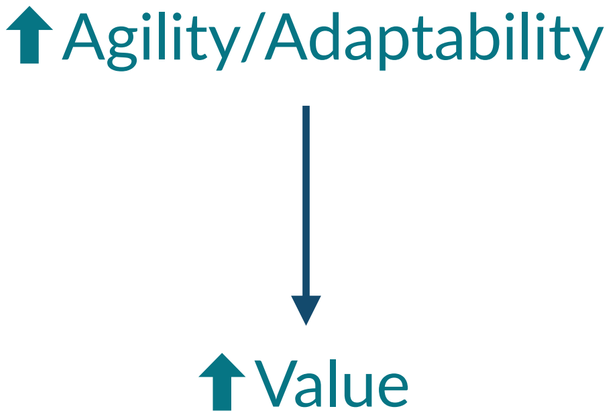
| | | | |
|---|---|---|---|
| 1 | Our highest priority is to satisfy the customer through early and continuous delivery of valuable software. | 4 | Business people and developers must work together daily throughout the project. |
| 2 | Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage. | 5 | Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done. |
| 3 | Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale. | 6 | The most efficient and effective method of conveying information to and within a development team is face-to-face conversation. |

# Agile Manifesto Principles

| | | | |
|---|---|---|---|
| 7 | Working software is the primary measure of progress. | 10 | Simplicity – the art of maximizing the amount of work not done – is essential. |
| 8 | Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely. | 11 | The best architectures, requirements, and designs emerge from self-organizing teams. |
| 9 | Continuous attention to technical excellence and good design enhances agility. | 12 | At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly. |

# Characteristics of Agile

# Adaptability



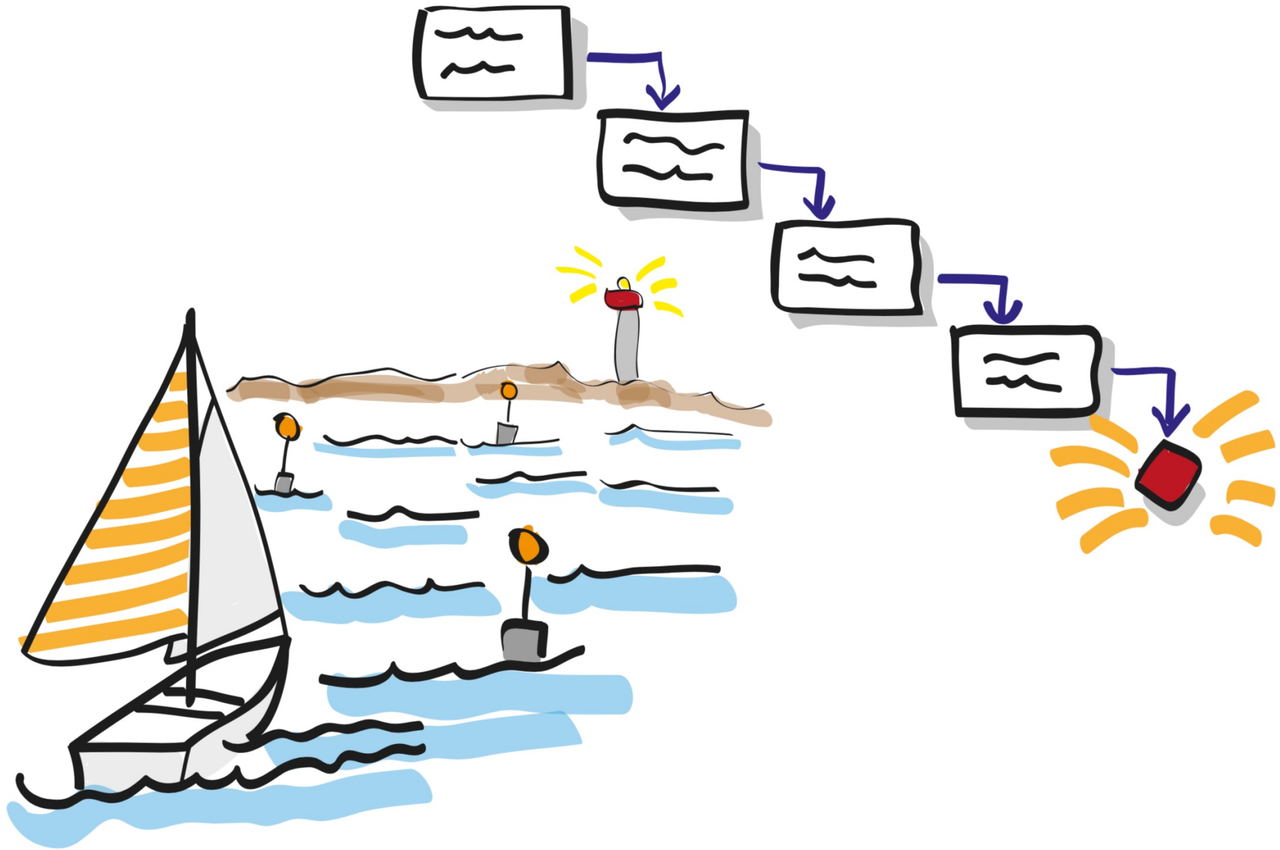

Adaptability as a driver for value.

Agility ≠ Fast

Agility ≠ Cheap

Fast and cheap are not goals for Agile.

# Empirical Vs Defined Process



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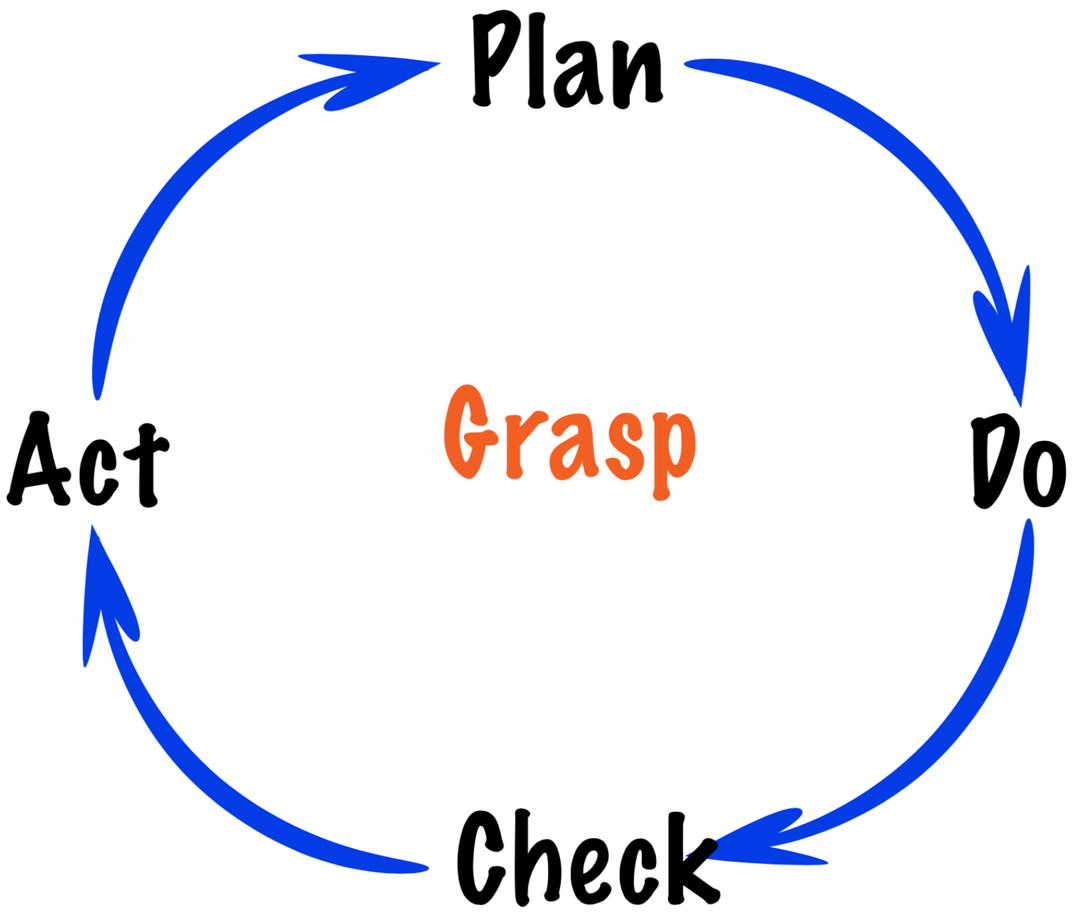
# Continuous Improvement

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# Quick introduction to Scrum

# Takeuchi and Nonaka

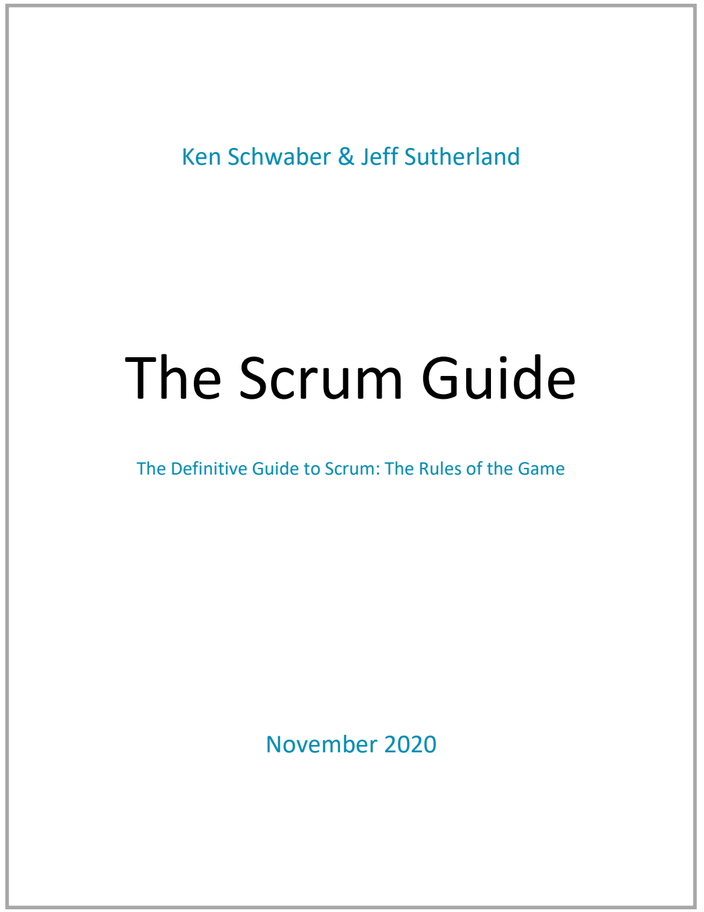
“The New New Product Development Game”

- Used the term Scrum
- Referred to the game of rugby to stress the importance of teams
- Their research showed that teams requires autonomy to achieve excellence

# Scrum is…

A lightweight framework that helps people, teams and organization generate value through adaptive solutions to complex problems.

- Simple and purposefully incomplete
- Founded on empiricism and lean thinking
- Iterative and incremental approach
- Cross-functional and self-managing team

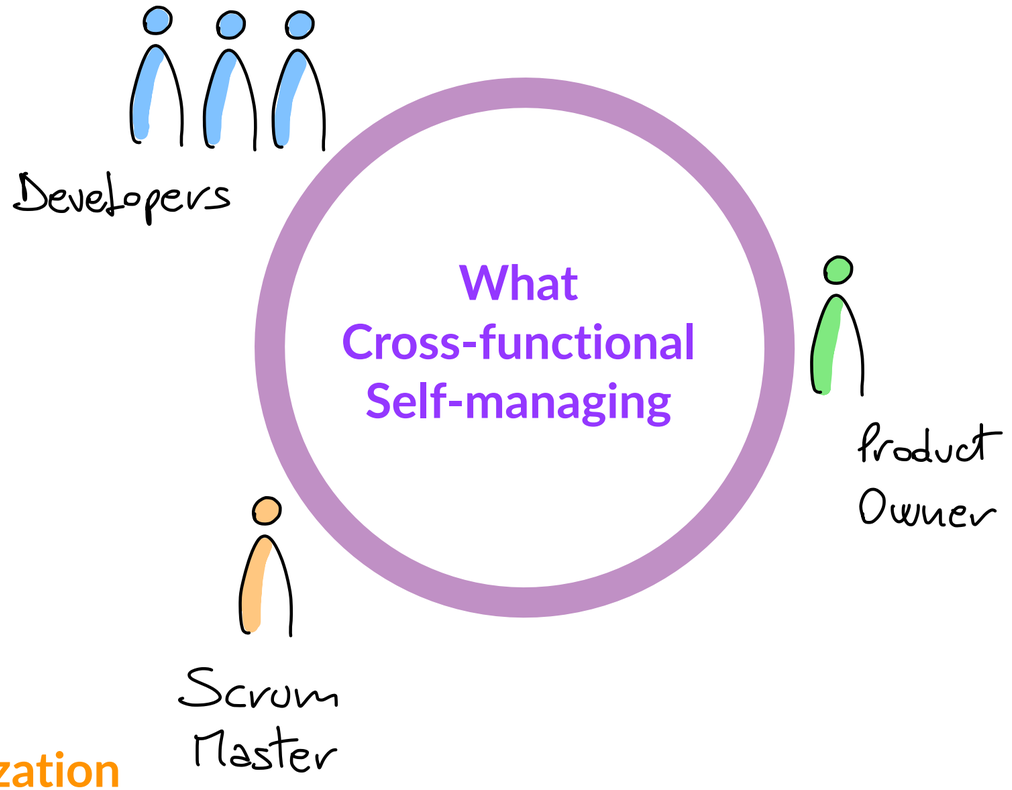


Scrum makes visible the relative efficacy of your current management, environment and work techniques, so that improvements can be made.

Ken Schwaber and Jeff Sutherland - The Scrum Guide™

# Scrum Team

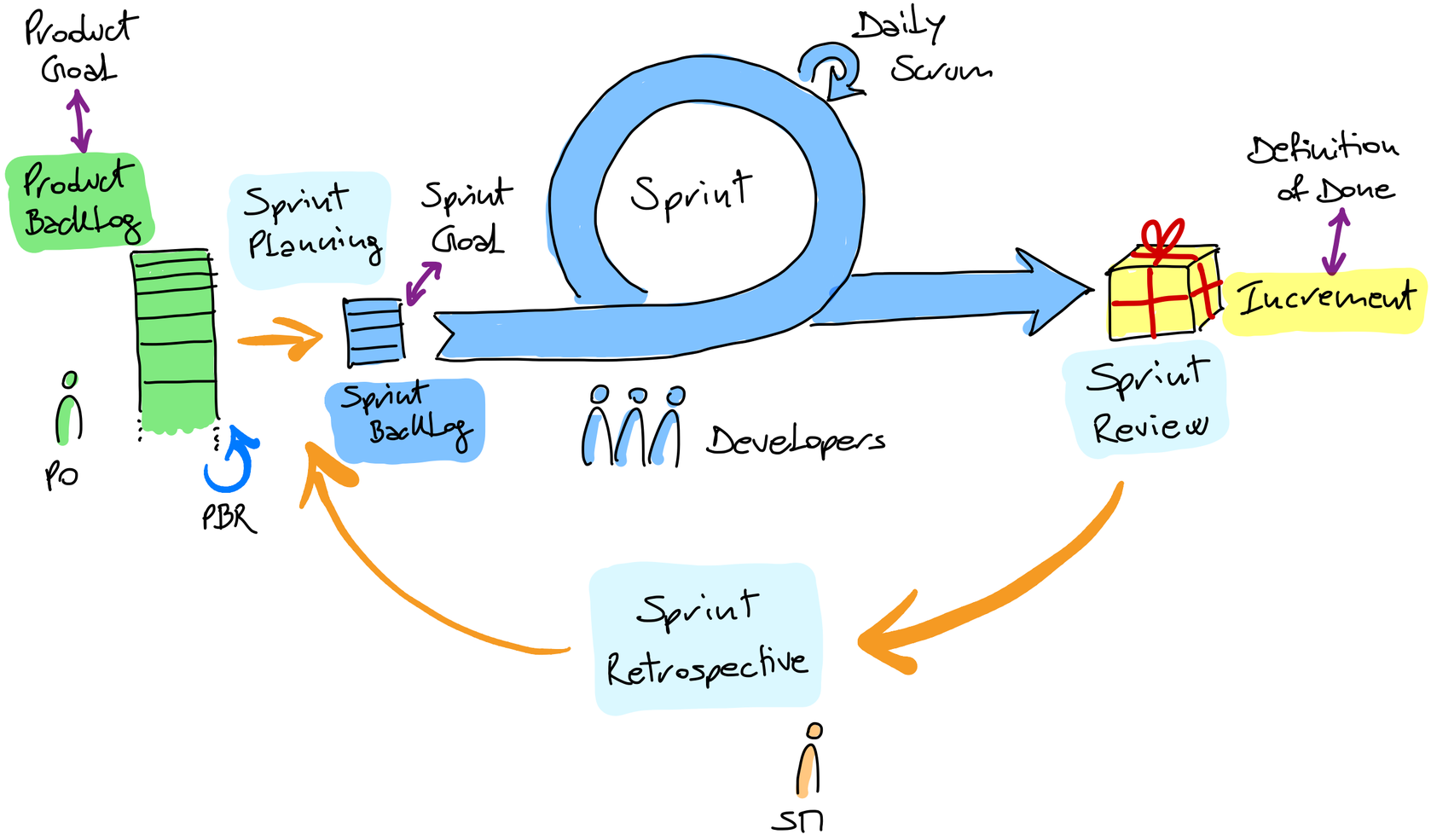
How
Whole product focus
Quality




Why
Return on investment
Business decisions

Scrum
Team
Organization

# Events and Artifacts



# References

**Agile Manifesto**
https://agilemanifesto.org

**Scrum Guide**
Jeff Sutherland, Ken Schwaber
https://scrumguides.org