Agile Thinking - Introduction

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What is Important in Agile?

- Values
- Principles
- Practices
- Rules

It is important to know **why** things work so that we do not sabotage them (by accident).

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:

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

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

Agile Principles 1/2

Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

Business people and developers must work together daily throughout the project.

Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

Agile Principles 2/2

Working software is the primary measure of progress.

Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

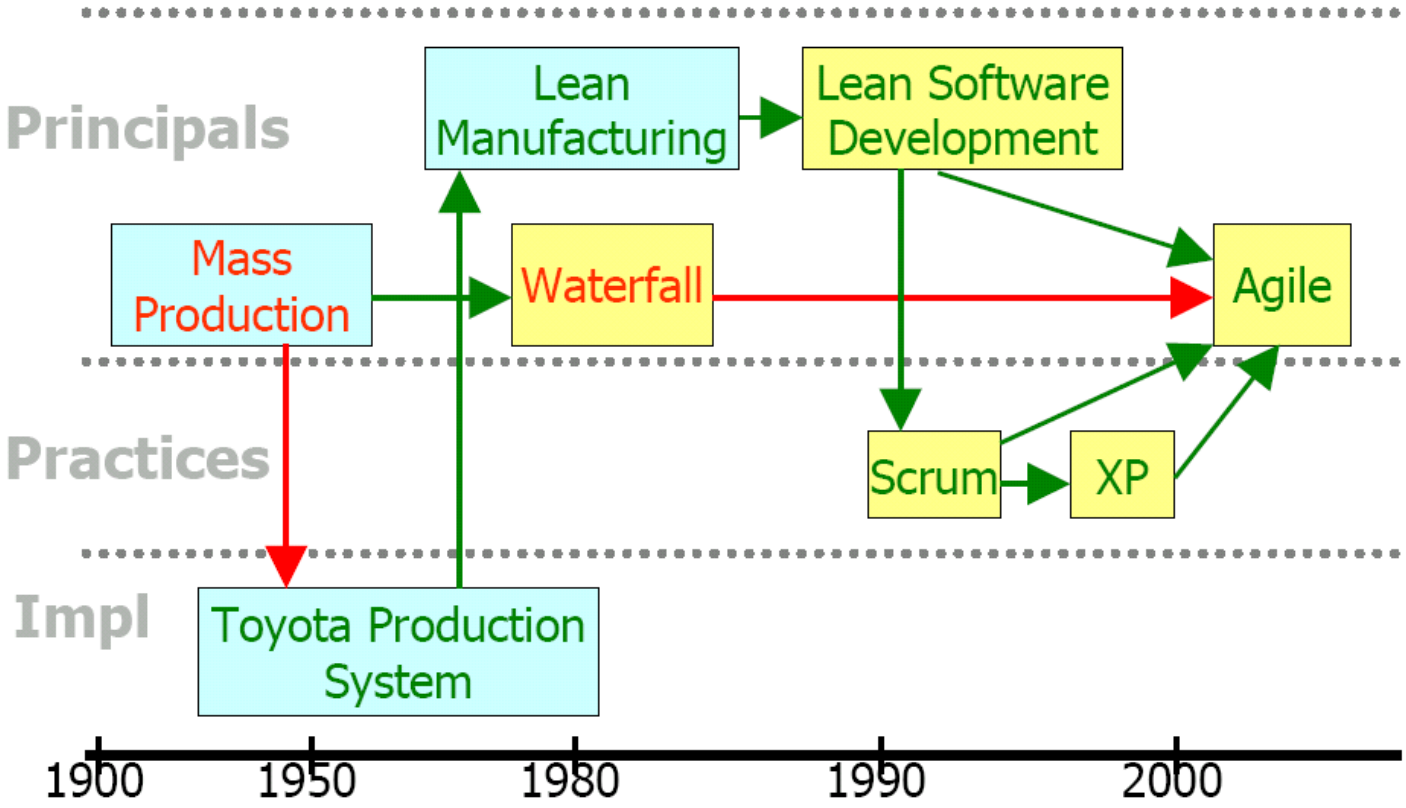
Continuous attention to technical excellence and good design enhances agility.

Simplicity – the art of maximizing the amount of work not done – is essential.

The best architectures, requirements, and designs emerge from self-organizing teams.

At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

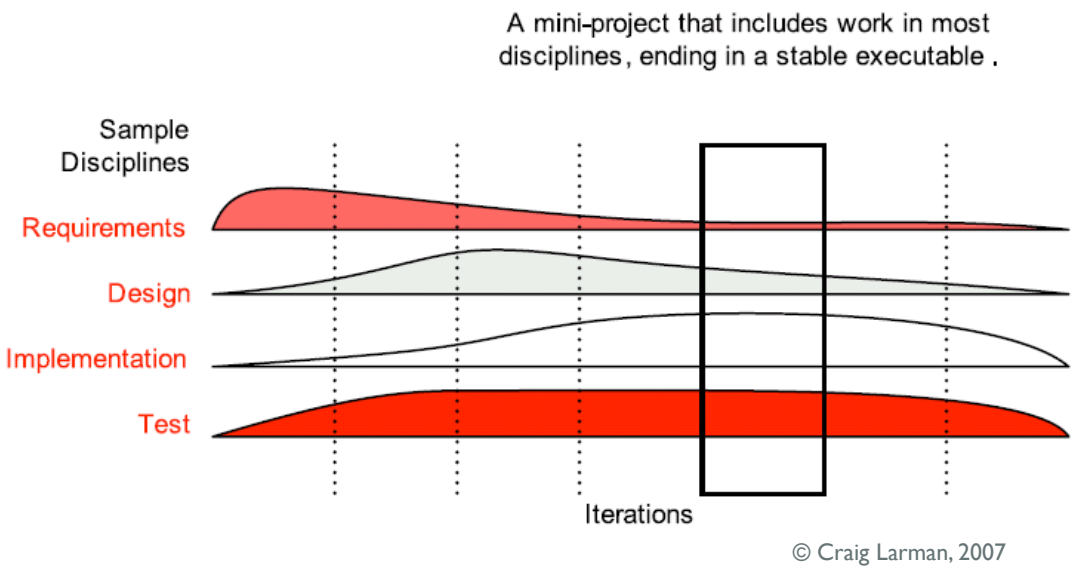
History of Agile



Dr. W. Edward Deming

- Father of Japanese post-war industrial revival and leading quality guru in both Japan and the United States.
- "Our prevailing system of management has destroyed our people. People are born with intrinsic motivation, self-respect, dignity, curiosity to learn, joy in learning... On the job, people, teams, and divisions are ranked, rewarded for the top, punished for the bottom. Management by Objectives, quotas, incentive pay, business plans, put together separately, division by division, cause further loss, unknown and unknowable." *Edward Deming to Senge*
- "I believe that the prevailing system of management is, at its core, dedicated to mediocrity. If forces people to work harder and harder to compensate for failing to tap the spirit and collective intelligence that characterizes working together at its best." *Peter Senge*

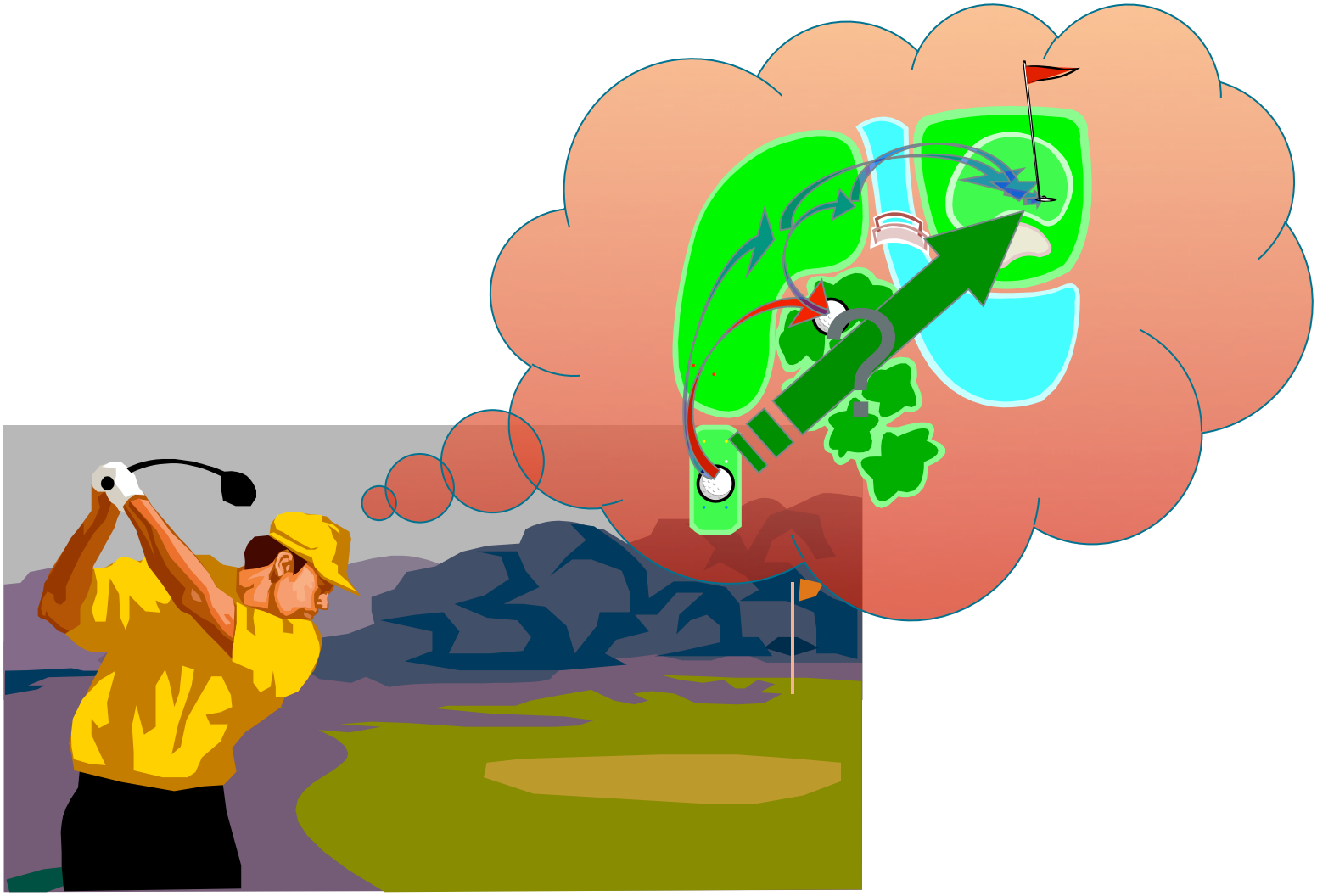
Iterative



Iterative approach allows continuous refinement and change without imposing heavy change processes

- Plans based on previous iterations
  - What did we learn?
  - How have requirements changed since last iteration?
- Development process is adapted based on feedback
  - Practices, tools, communications, ...

Playing Golf?



Incremental

- Each increment expands and extends functionality developed in the previous iteration
- Each increment delivers fully working functionality
  - Do not build castles on quicksand
- Functionality-driven requirements definition
  - Allows delivering complete user stories from each increment
  - Functionality must be split small enough to fit in one increment
- Incremental allows safe implementation as additional functionality is always built on top of working code

The best bang-per-buck risk mitigation strategy we know is incremental delivery

- Tom DeMarco, 2003

Risk and Value Driven

- Focus on reducing risk in early iterations
  - Technical risk, e.g. performance, new technology...
  - Business risk, e.g. key business functionality, usability...
  - Architectural coverage, i.e. cover all key components with early features
- Prioritize features based on business value
  - Initially focus only on the most important ones
  - Focus on key functionality in each feature
  - Get early versions out to users to prove business value and gather feedback

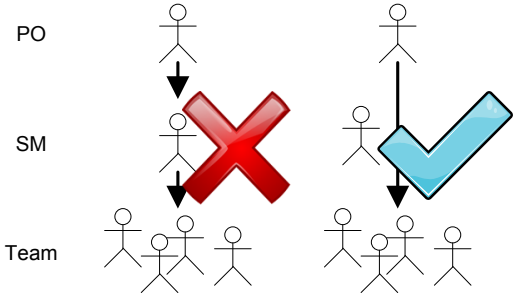
Time-Boxed

- Never extend iteration length to fit scope during sprint
  - Adapt scope
- Try to keep a regular iteration length
  - Needed for velocity, estimation and planning
- During sprints, time, cost and quality are fixed
  - Features are the only flexible variable
- Also time-box releases
  - Communication with stakeholders and users
  - Prioritization of features

People and Communication Driven

Individuals and interactions over processes and tools

- Empower people and teams
  - Commitment and motivation
  - Decisions are made where the work is done
    - Best expertise to make them
- Facilitate communications-rich environment
  - Enable and encourage direct point-to-point and open many-to-many communication
  - Information radiators
  - Group collaboration techniques
  - Feedback and discussion



Exercise: Command and Control

1. Form pairs.
2. Assign one person the boss, the other is the worker.
3. The boss can give the following commands:
   - Go, Stop, Right, Left, Faster, Slower
4. The worker must follow the boss's commands.
5. The boss is responsible for having the worker proceed 60 normal paces (calculated by the boss) within two minutes, from the time "go" is said, until "stop" is said, by the moderator.
6. The boss can command the worker but not touch the worker.

Exercise: Self-Management

- The same exercise as the first one, except now the workers have the authority to decide how they will move. The boss provides support by calculating the paces taken.

- Each worker proceeds 60 normal paces within two minutes, from the time “go” is said, until “stop” is said, by the moderator.

Feature Teams

- Traditional common approaches
  - Component teams, e.g. UI team, database team, engine team, ...
  - Functional teams, e.g. architecture team, development team, testing team, ...
- In this context,
  - Feature != subsystem, module, layer or component
  - Feature == *customer-centric* functionality
- Feature teams are customer needs driven
  - Multidiscipline, since building a full feature will require competences from many areas
  - Responsible for delivering all aspects of a feature
  - Minimizes the waste in hand-offs and context switches
  - The team sees the whole → Quality

Seeing Waste

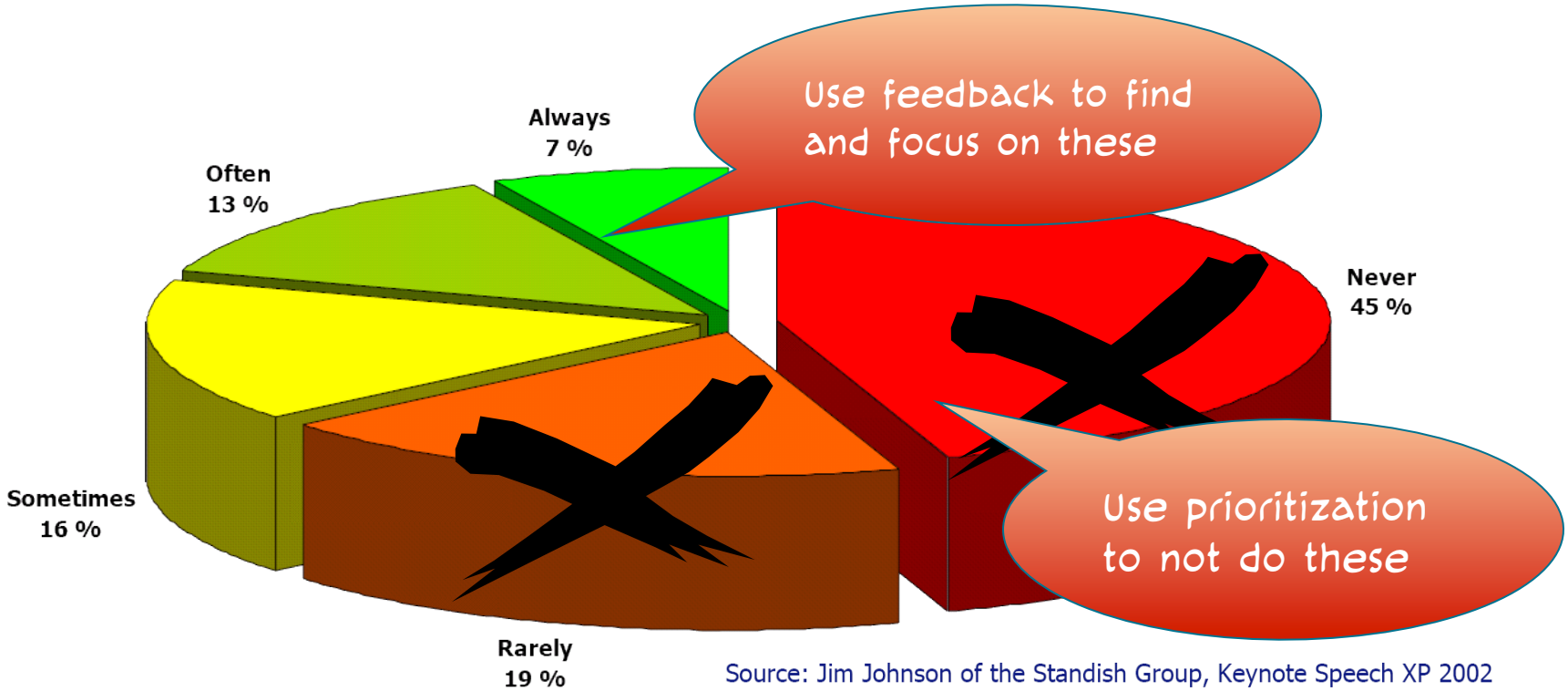
- Understanding and seeing waste is the first step to eliminating it
- Introduced by Lean in manufacturing environment
  - Translated to software development by Tom & Mary Poppendieck [1)]
- ”Maximizing work not done” & ”Penny saved is a penny earned”
  - Most effective way to improve efficiency is to stop doing useless activities

Waste in Software Development

- Unnecessary Requirements & Gold-plating
- Work in Progress
- Extra Steps
- Finding Information
- Defects Not Caught by Tests
- Waiting, Including Customers
- Handoffs

1) http://www.poppendieck.com/papers/LeanThinking.pdf

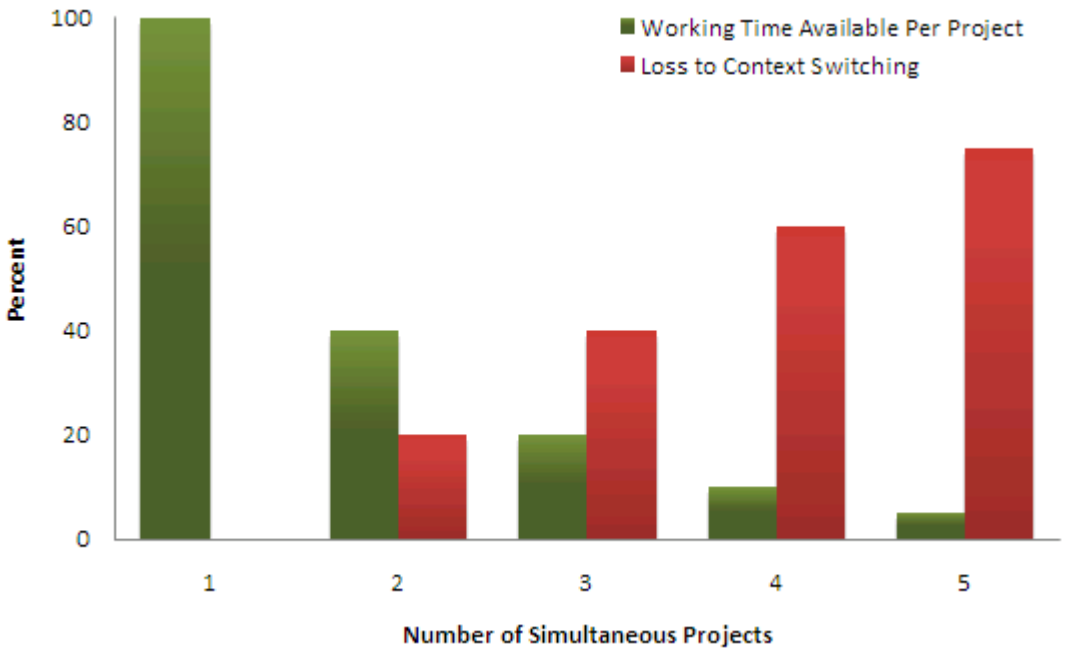
Eliminating Unnecessary Features



Source: Jim Johnson of the Standish Group, Keynote Speech XP 2002

Reducing Waste in Task Switching

- In *Quality Software Management: Systems Thinking*, Gerald Weinberg proposed a rule of thumb to calculate the waste caused by project switching:



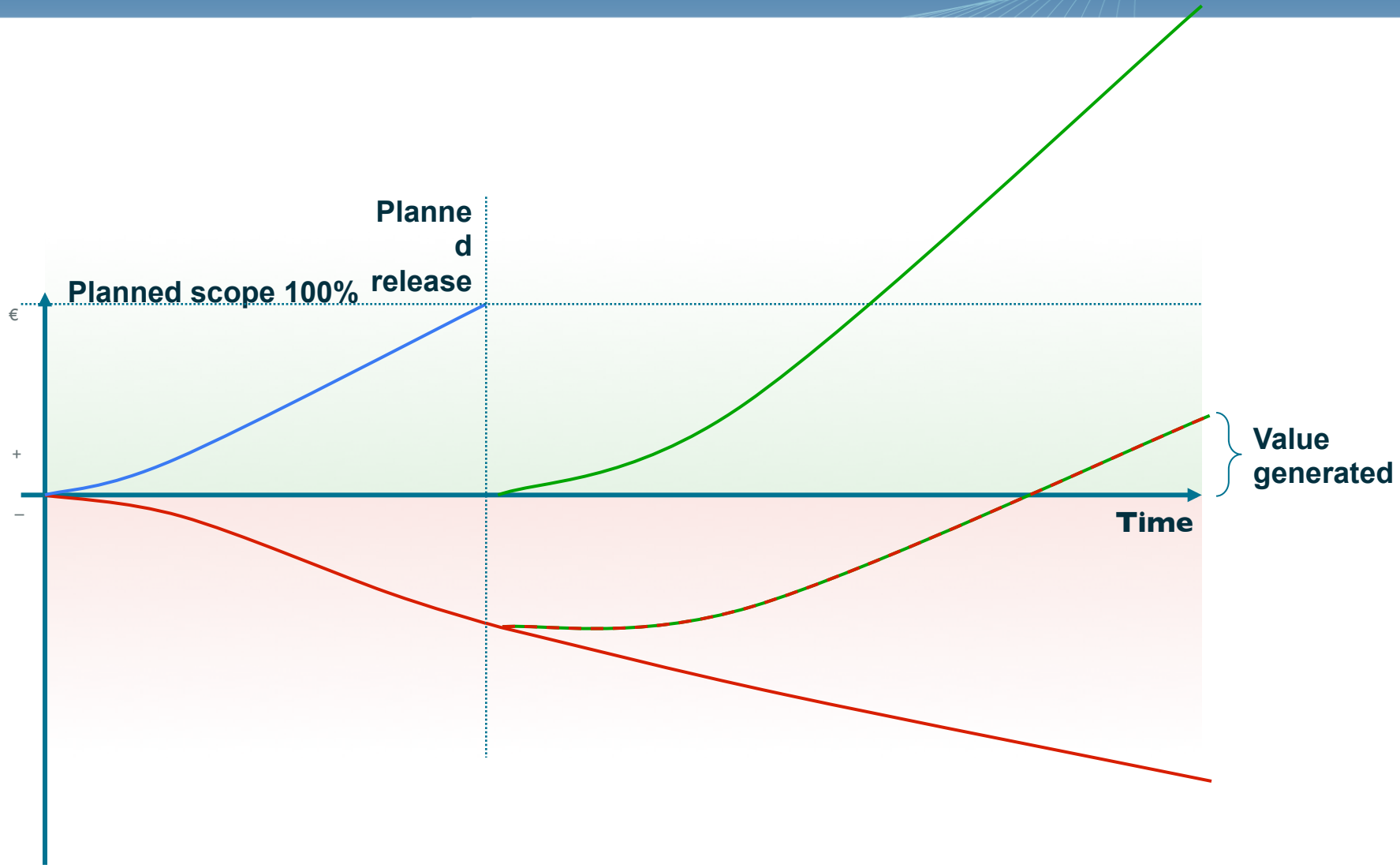
http://www.codinghorror.com/blog/archives/000691.html

This also applies to tasks in sprints, to a degree at least

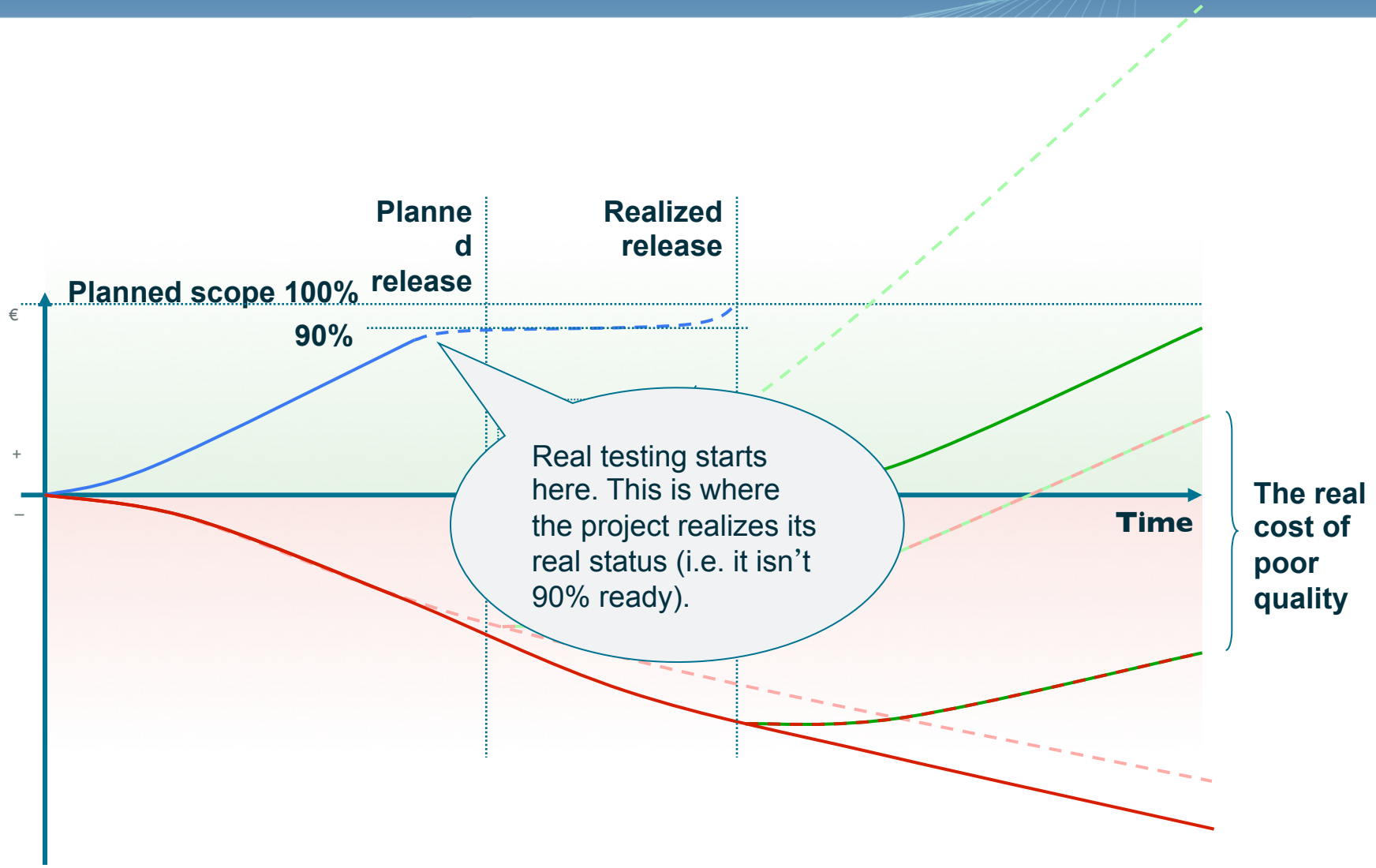
Small Batches and Low Cycle Time

- Queuing theory shows that best throughput (== productivity) can be achieved when small batches travel quickly through the system
- Large features are split to smaller subfeatures
  - Always completeable in one iteration
- Iterations are short
  - Maximum cycle time equals iteration length
- Development tasks are small and the different activities (specification, design, coding, testing, etc.) should be performed concurrently
  - Minimizes throughput time and ensures that each ”step” has a very small ”batch” to work on

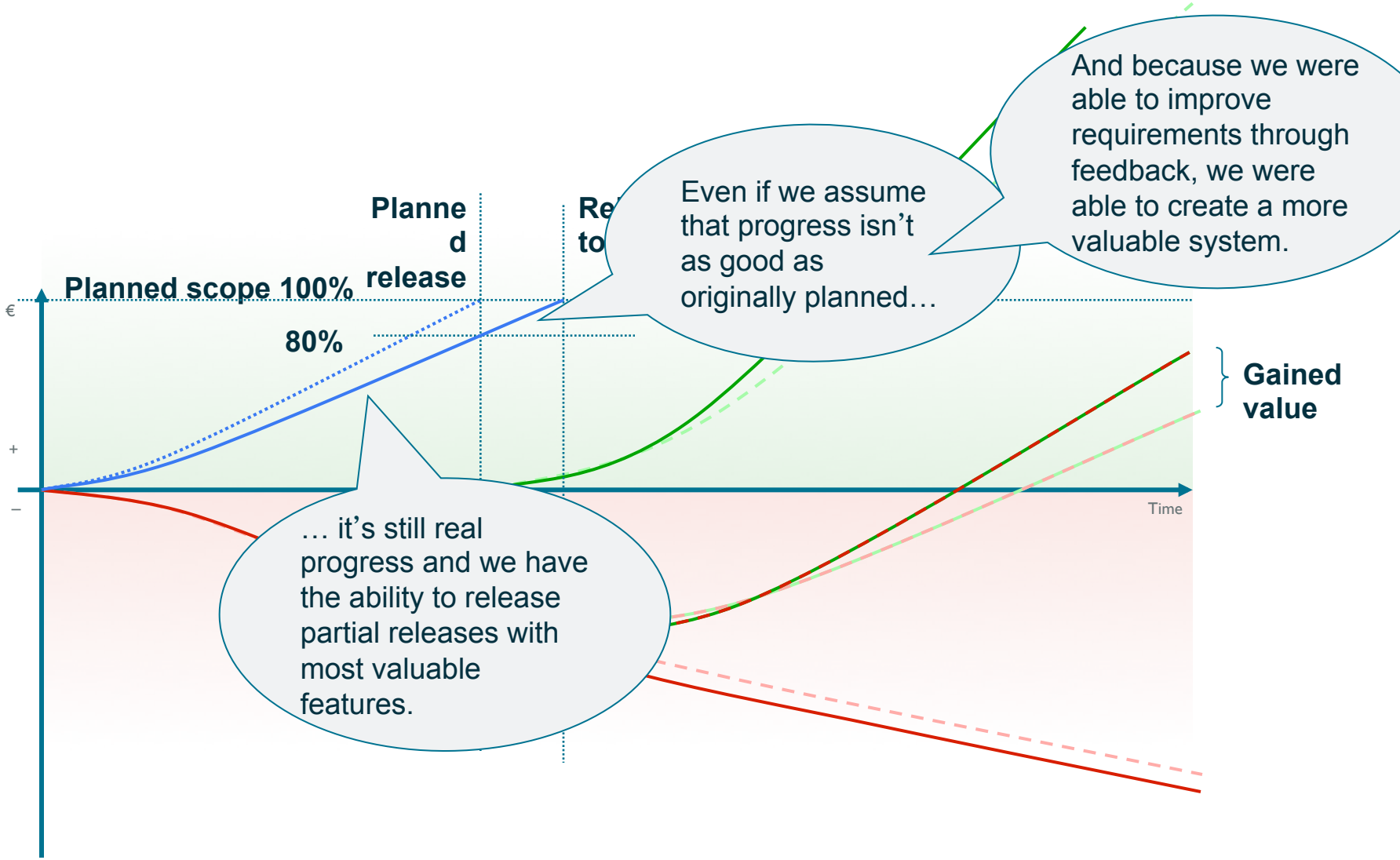
Optimized Value (ROI)



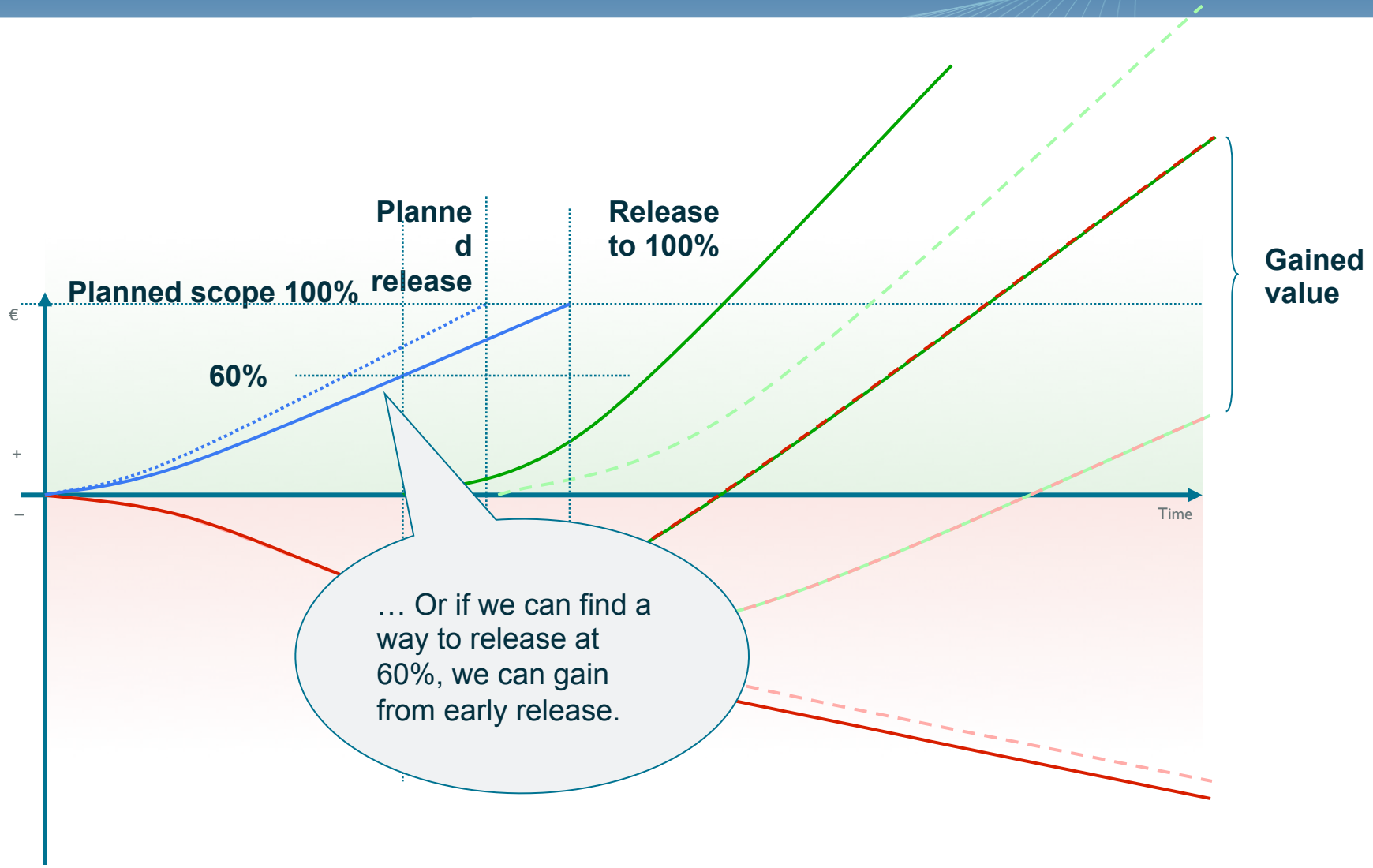
What If… Traditional Challenge



What If… Agile Opportunity #1



What If… Agile Opportunity #2



Obviously, ...

- Measuring and estimating value is difficult
  - Diagrams like these I drew are very difficult in real life
  - Different business benefits behave differently
- Just remember: success and value cannot be managed through costs

What Maximizes Value?

- User research and business analysis
- Competence and motivation of the people involved
- Amount of knowledge generated
  - Highly related with the amount of communication
- Ability to incorporate improvements
  - Highly related with technical quality of the system

Key Challenges

- Agility and Scrum is hard
  - Take it seriously, embrace its values, do also the hard stuff, play by the rules
- Knowing your customers' and users' real needs is hard
  - Understand what is valuable, then prioritize
- Getting the right people involved is hard
  - Get them to spend enough time with the project
  - Find the right suppliers

Why Does It Work?

Two Process Worlds

Predictable Manufacturing	New Product Development
It is possible to first complete specifications, and then build.	Rarely possible to create up-front unchanging and detailed specs.
Near the start, one can reliably estimate effort and cost.	Near the beginning, it is not possible. As empirical data emerge, it becomes

Waterfall

Study – Plan – Act

Iterative

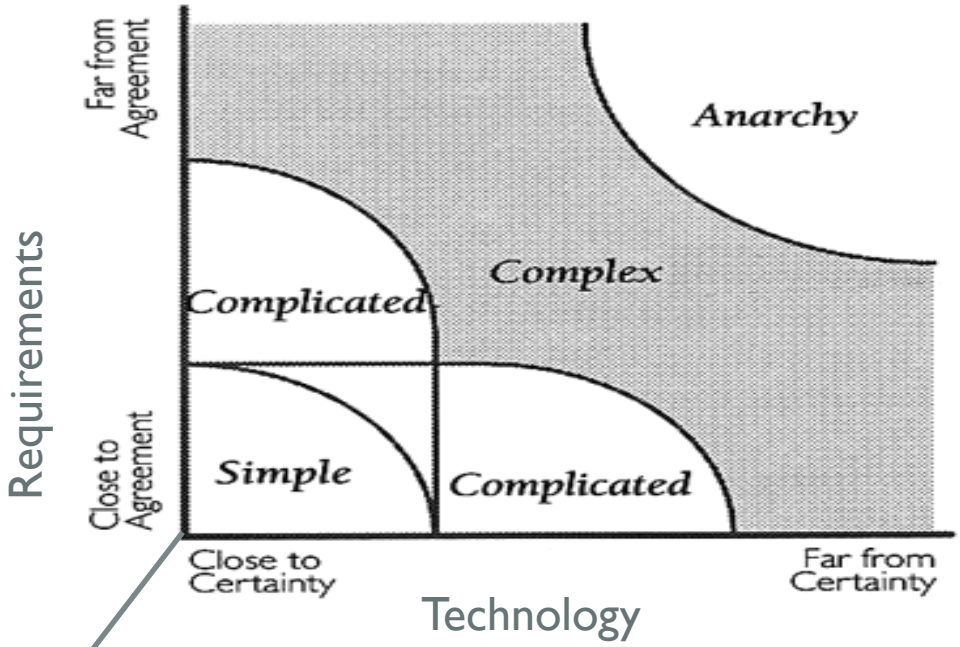
Try – Observe – Adjust

Waterfall model is **fundamentally not suitable** for software development

Why Is Waterfall So Prevalent, Then?

- A historical accident?
  - There is no scientific evidence that waterfall works, and there never was
    - CHAOS report 1995
      - 31% of projects cancelled before completion
      - 53% ran an average of +89% cost overrun
  - The original author was misunderstood
    - Winston Royce was, in fact, a proponent of iterative development
      - Waterfall works only in the simplest of cases, and even then, do it twice
  - The waterfall model was chosen for DOD-STD-2167
    - Even USA Department of Defence never succeeded with the model
      - 75% failed or were never used, only 2% were used without extensive modification
  - The DoD model was adopted in many other international standards
    - The DoD standard was later changed to support iterative, but the damage was done
    - The author of that standard would've chosen otherwise, given the chance to correct that mistake
- A lot of successful iterative development in 50's – 70's
- There is a culture of up-front, inflexible budgeting

Complexity



People

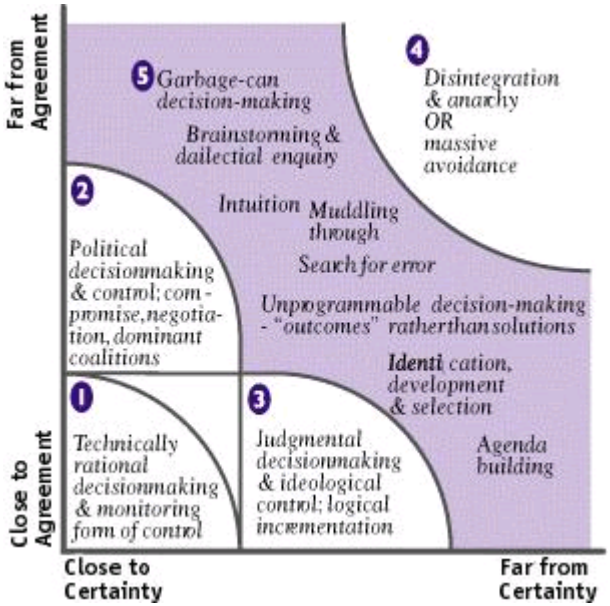
add another level of complexity

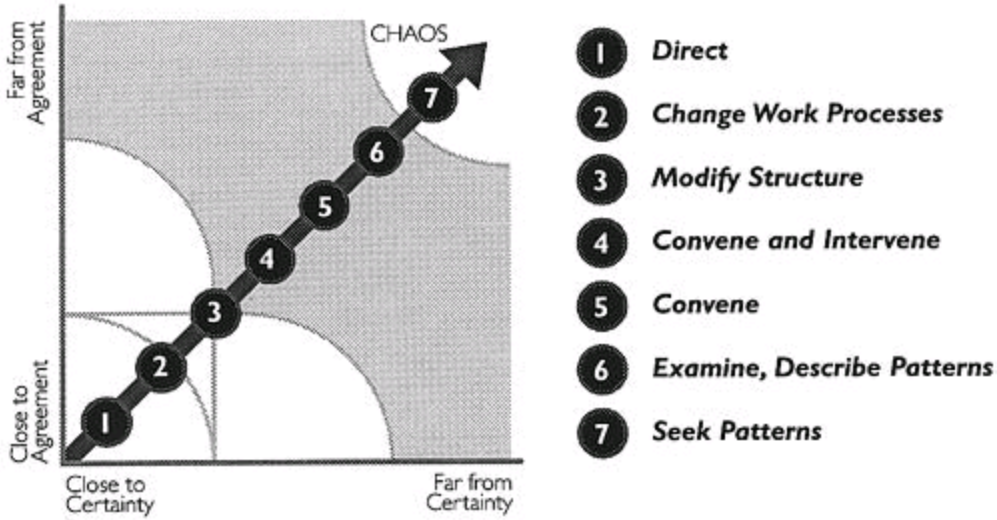
Source: *Strategic Management and Organizational Dynamics* by Ralph Stacey in *Agile Software Development with Scrum* by Ken Schwaber and Mike Beedle.

Cause & Effect (Causality)

Complex Retrospective coherence - software development	**Complicated** Knowable causality - traditional engineering
Chaotic No causality	**Simple** Known causality

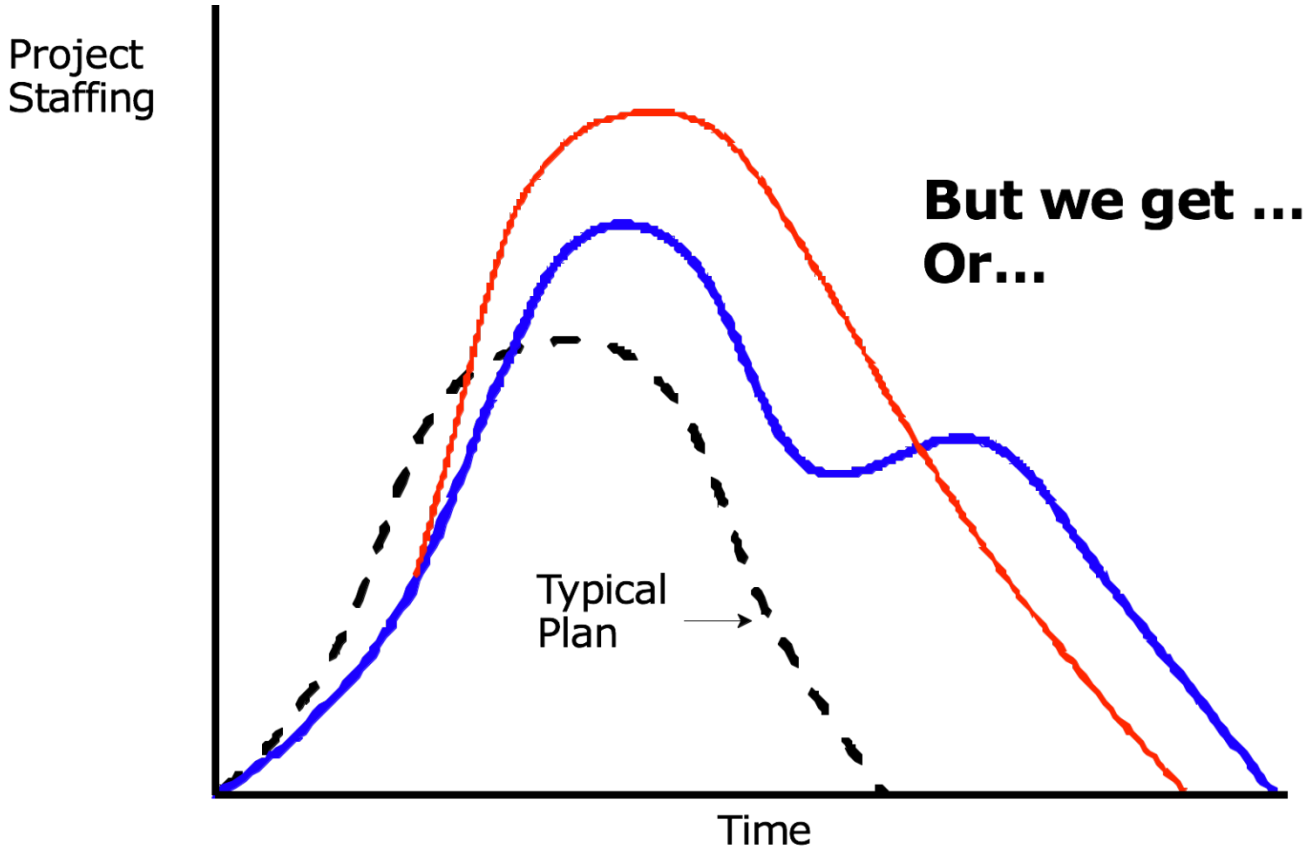
Managing Complexity



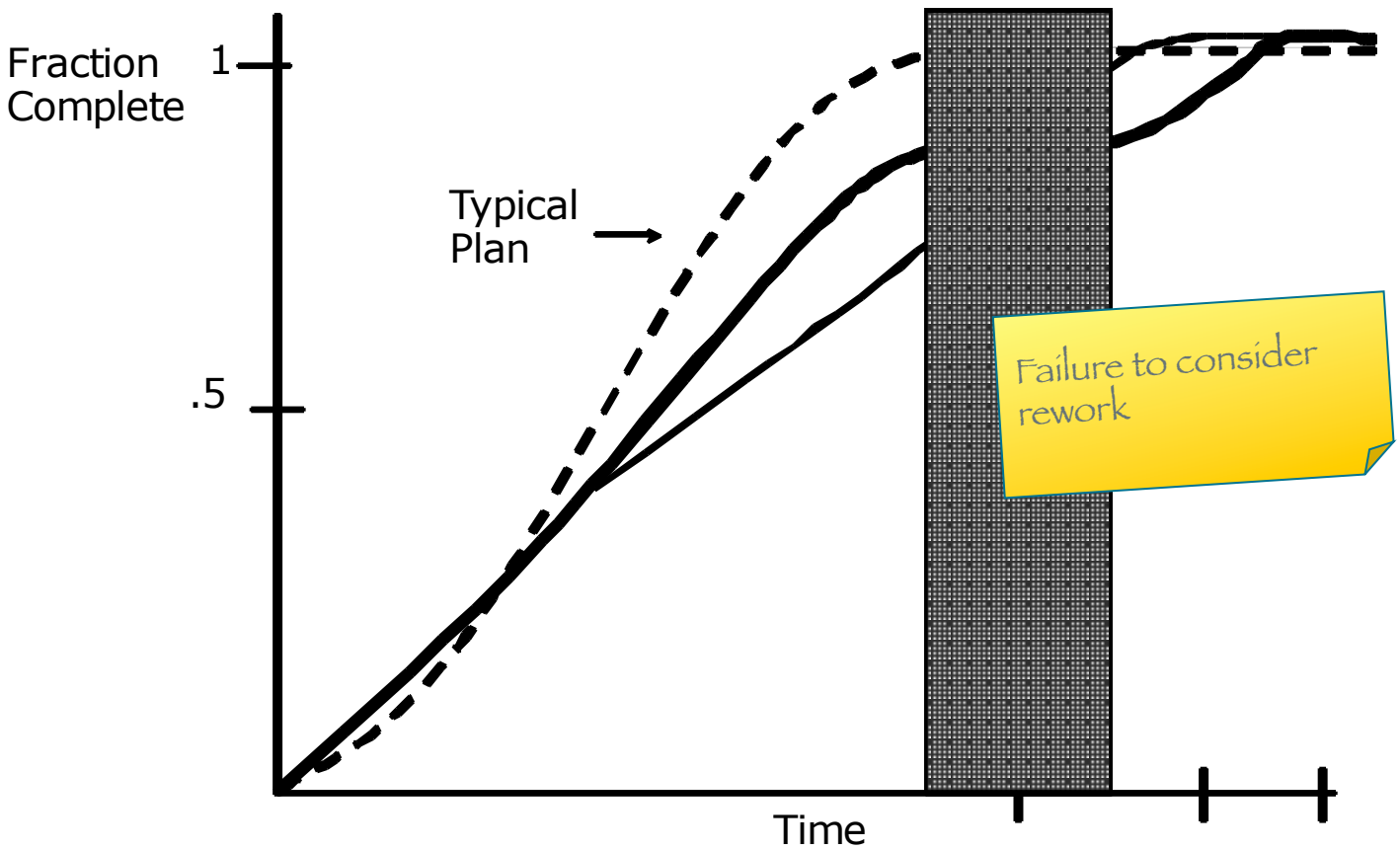


Source: *Strategic Management and Organizational Dynamics* by Ralph Stacey
Copied from http://www.siliconyogi.com/andreas/it_professional/sol/complexsystems/StaceyMatrix.html

Behavior Models on a Project



Lost Year or 90% Syndrome



The question is not
"Are we Agile?"

The question is
"Are we delivering
business value efficiently?"

Agility is a means to an end.

Questions?