Course of
Digital Management Consulting

Agile vs. Waterfall approach. Introductory Concepts

**These slides have been designed
together with Carmine Paragano and Cristina Paternoster**

Prof. Corrado Cerruti

Agile approach. Introductory Concepts

- Waterfall Approach. A General Overview

- Agile Approach. A General Overview

- Agile vs. Waterfall (and hybrid)

Manifesto for agile software development and its principles
https://agilemanifesto.org/
https://agilemanifesto.org/principles.html

Agile Practice Guide – Project Mgmt Institute (Book on sale)
https://www.pmi.org/pmbok-guide-standards/practice-guides/agile

Foundations of Agile - Google
https://www.youtube.com/watch?v=km7n3DI5IWk

Projects and project management

Projects are temporary efforts to create value through unique products, services, and processes. They are made of tasks, activities, and deliverables that must be structured and executed carefully to achieve a desired outcome.

Before an outcome is achieved, each aspect of a project must go through phases of initiation, planning, and execution, along a project management lifecycle.

Project management is the use of specific knowledge, skills, tools and techniques to deliver something of value to people.

Traditional approach: Waterfall

Waterfall is the traditional approach to project mgmt:
- linear and sequential (a new phase starts only when the previous has been completed)
- does not encourage changes during the project lifecycle

Source: adapted from PMI, PMBOK GUIDE
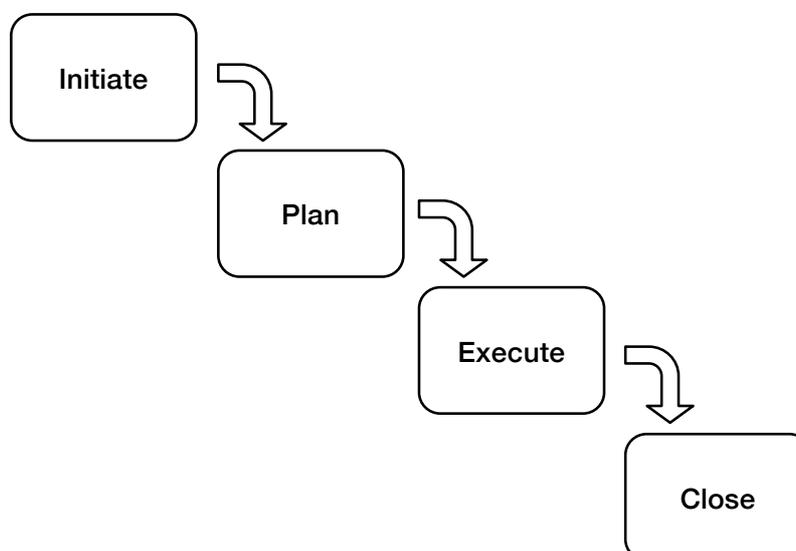
Key areas in project management

Project Integration Management

Project Scope Mgmt	Project Time Mgmt	Project Cost Mgmt	Project QM+HRM+CM+RM ….

Project Integration Management

1. **Develop Project Charter:** the process of developing a document that formally authorizes a project or a phase and documenting initial requirements that satisfy the stakeholder's needs and expectations.

2. **Develop Project Management Plan:** the process of documenting the actions necessary to define, prepare, integrate, and coordinate all subsidiary plans

3. **Direct and Manage Project Execution:** the process of performing the work defined in the project management plan to achieve the project's objectives.

4. **Monitor and Control Project Work:** the process of tracking, reviewing, and regulating the progress to meet the performance objectives defined in the project management plan.

5. **Perform Integrated Change Control: t**he process of reviewing all change requests, approving changes, and managing changes to the deliverables, organizational process assets, project documents, and the project management plan.

6. **Close Project or Phase:** the process of finalizing all activities across all of the Project Management Process Groups to formally complete the project or phase.

Project Scope Management

1. **Collect Requirements:** the process of defining and documenting stakeholders' needs to meet the project objectives.

2. **Define Scope:** the process of developing a detailed descriptions of the project and product.

3. **Create WBS:** the process of subdividing project deliverables and project work into smaller, more manageable components.

4. **Verify Scope:** the process of formalizing acceptance of the completed project deliverables.

5. **Control Scope:** the process of monitoring the status of the project and product scope and managing changes to the scope baseline.

Project Time Management

1. **Define Activities:** the process of identifying the specific actions to be performed to produce the project deliverables.

2. **Sequence Activities :** the process of identifying and documenting relationships among the project activities.

3. **Estimate Activity Resources :** the process of estimating the type and quantities of material, people, equipment, or supplies required to perform each activity.

4. **Estimate Activity Durations:** the process of approximating the number of work periods needed to complete individual activities with estimate resources.

5. **Develop Schedule:** the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule.

6. **Control Schedule :** the process of monitoring the status of the project to update project progress and managing changes to the schedule baseline.

1. **Estimate Costs:** the process of developing an approximation of the monetary resources needed to complete project activities.

2. **Determine Budget:** the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

3. **Control Costs :** the process of monitoring the status of the project to update the project budget and managing changes to the cost baseline.

Source: adapted from PMI, PMBOK GUIDE

Projects characterized by high rates of change, complexity and risk challenge traditional project management approaches which determine the bulk of the requirements upfront and control rigidly any modification through a change request process.

Those projects can be managed more effectively through an agile approach characterized by exploring feasibility in short cycles and adapting quickly as from evaluations and feedbacks.
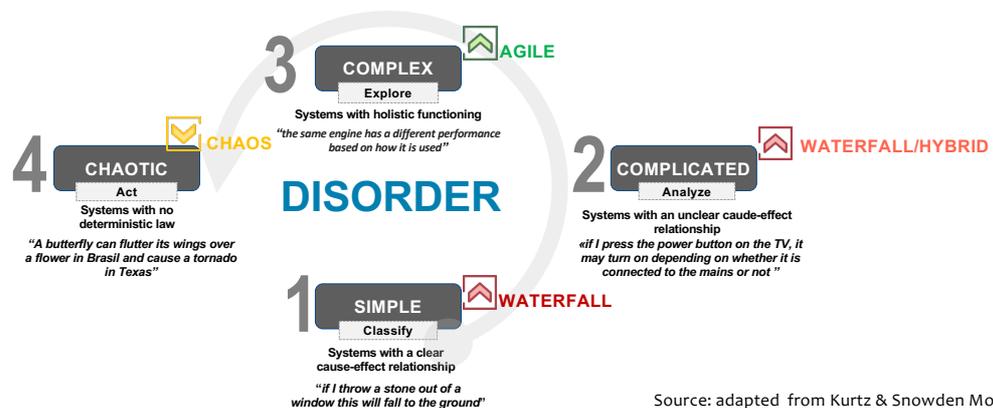

Source: adapted from Kurtz & Snowden Model

The agile approach started in the software industry
with respect to large IT project whose requirements
ended up being too rigid and partially ineffective.

Agility is first of all a Mindset, a "way of thinking", a "way of seeing" things
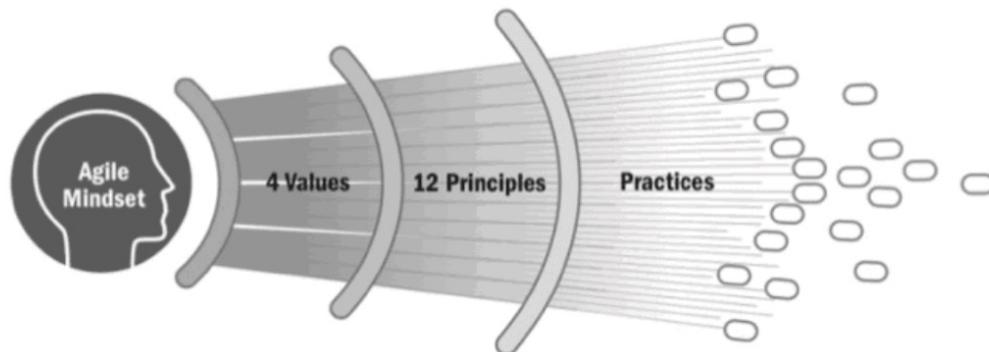
An Agile mindset is a strive towards innovating and steadily delivering more and more *customer* value, getting the work done in small self-organizing *teams*, collaborating together in an interactive *network*.

Such a mindset allows individuals, teams and companies to adapt rapidly to a quickly shifting market scenario.

Source: adapted from PMI, PMBOK GUIDE

Agile values

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

CUSTOMER
C O L L A B O R A T I O N
over contract negotiation

INDIVIDUALS AND
I N T E R A C T I O N S
over processes and tools

RESPONDING TO
C H A N G E
over following a plan

WORKING
S O F T W A R E
over full documentation

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

Source: Adapted from Manifesto for Agile Software Development
https://agilemanifesto.org/

Agile principles

1

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

2

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

3

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

4

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

5

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

6

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

Agile principles

7

Working software is the primary measure of progress.

8

Agile processes promote sustainable development. The sponsor, developers, and users should be able to maintain 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, requirement, 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.

Deloitte. The Agile Landscape v3 — Developed by Christopher Webb

3rd Wave
Business Agility

2nd Wave
Agile Project Management

1st Wave
Agile Software Development

2000   2005   2010   2015   2020   2025   2030

Waterfall vs. agile

1 Waterfall

Sequential Approach,
In stages, «plan» driven

2 Hybrid

Normally, the planning and
requirements gathering phase follows
a waterfall approach, the other
phases follow the Agile methodology

3 Agile

Iterative / incremental
Approach,
«value-vision» driven

Reduction of uncertainty

Ever-changing Requirements
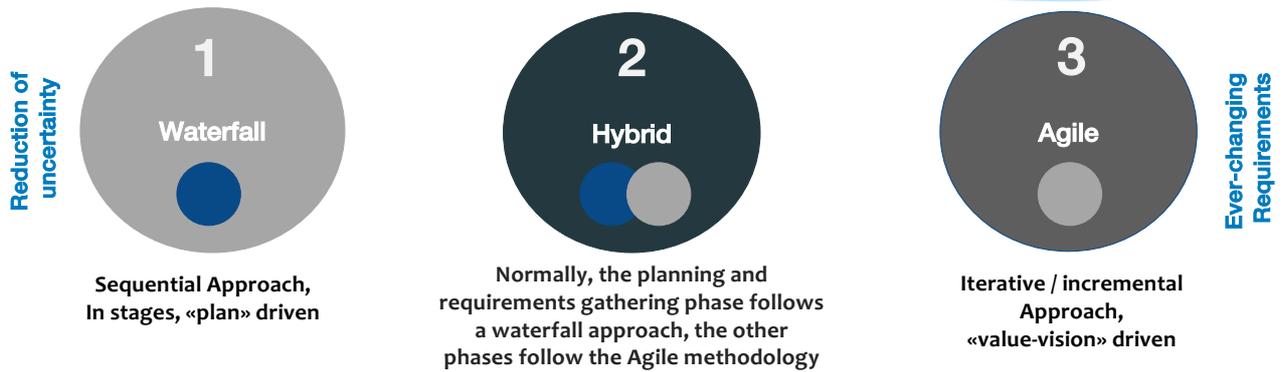
Approach	Requirement	Activities	Delivery
Waterfall	Fixed	Performed once for the entire project	Single delivery
Agile	Dynamic	Repeated until correct	Frequent small deliveries

Waterfall vs. agile

Analyze

Design

Build

Test

Deliver

Waterfall

| Analyze Design Build Test Deliver | Analyze Design Build Test Deliver | *... repeat as needed* | Analyze Design Build Test Deliver |

Iteration-based agile
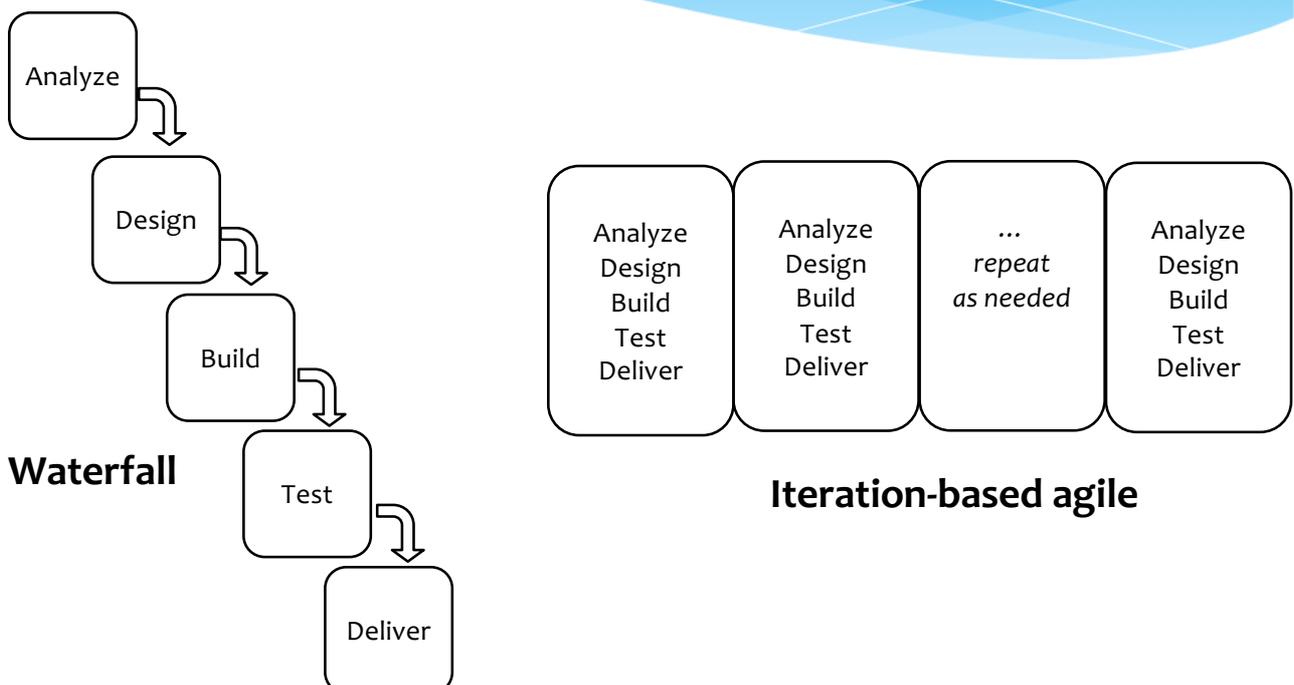
## Waterfall vs. agile

The incremental approach requires a complete and stable conception of the target to be achieved.

.....

1 2 3 4 5

business value

agile

waterfall
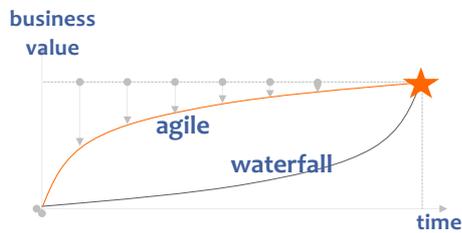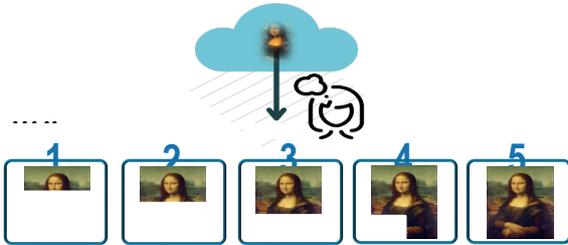
time

The iterative approach involves the "construction" through successive versions, their validation up to the construction of the final result, introducing quality. It allows to work around an idea not completely defined, gradually including changes until the final result.

woman in a pastoral context

1 2 3 4 5
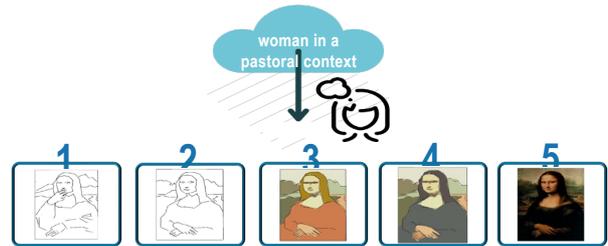
Time & budget vs. Features/Scope

Agile

Constraints

FIXED

Features

Time   Budget

Quality

Quality

Time   Budget

Features

Estimate

FLEXIBLE

Waterfall