



Can Your Project's Organization be Agile?

PM.2204
Can Your Project's Organization Be Agile?

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Presentation Objective

- This presentation will discuss how to successfully implement specific elements of agile that can add value to your projects
- This presentation will
 - Explain the differences between agile and waterfall life cycles, and when to use each model
 - Describe planning and team organization on agile projects
 - Explain how to successfully utilize some useful agile tools and techniques

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TOPIC 1
HOW AGILE CAME INTO EXISTENCE

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Waterfall Life Cycle Model

Four sequential phases

1. **Ideation** – overall requirements are given, and the project team assesses alternative concepts for performing the project and selects an optimal performance strategy
2. **Planning** – the project team develops project plans that address the strategic requirements and selected performance strategy
3. **Execution** – The plans are implemented through the execution of planned project activities
4. **Closure** – the asset or deliverable is reviewed, tested, verified, validated, and turned over to the customer

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What Clients Want Today

- TCM waterfall life cycle model has been effective for construction projects, but it is not in alignment with the evolving expectations of clients
- PMI® has done extensive market research with global companies to identify the project management skills employers need to deliver better results
- Result is the talent triangle
 - Technical skills
 - Leadership skills
 - Strategic and Business Management skills

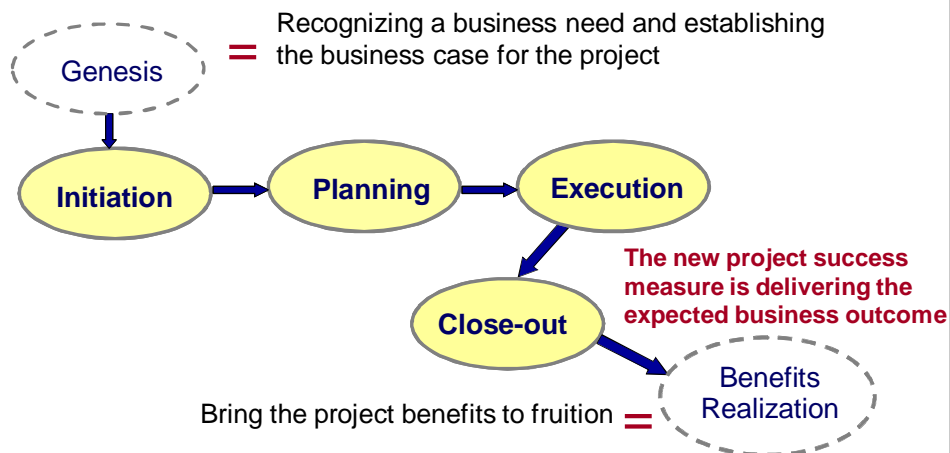


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The Complete Waterfall Project Life Cycle

Implication from this research is that clients want project personnel to have a business focus



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The Problem with Waterfall



- In 1970, Dr. Winston Royce stated there was risk in a single-pass approach for large software development projects and suggested an iterative approach
- In 1995, the Standish Group published data on the failure rate of software projects using waterfall methods
 - 16% of the projects came in on time and on budget
 - 31% of the projects were cancelled
 - 53% were >189% of the original budget
- Other studies were done over the years for both product and software development, with the same dismal results

The times were ripe for change, and project teams experimented with iterative life cycle methods

What is Agile?

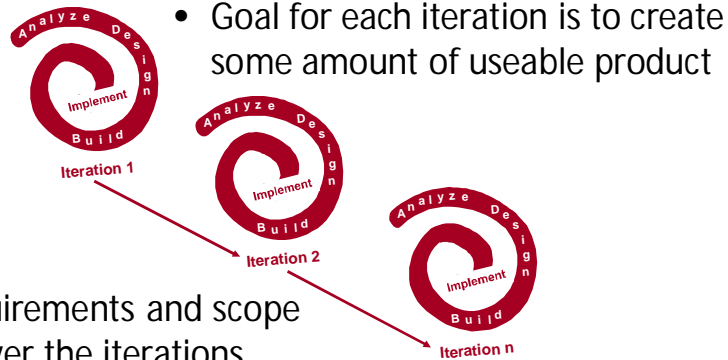


- **Agile definition:** *iterative project methodologies where the requirements and solution evolve through close collaboration between the team and client*

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Iterative Life Cycle Model

- Also called incremental development or agile, the basic idea is to do "mini-projects", also called cycles, sprints, or iterations, lasting typically 2-4 weeks



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HOW TO BUILD A MINIMUM VIABLE PRODUCT

The Wrong Way



The Right Way



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TOPIC 3

DIFFERENCES BETWEEN
AGILE & WATERFALL
LIFE CYCLE

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Waterfall and Agile Differences 

Waterfall = plan-driven	Agile = change-driven
Waterfall	Agile
Requirements established early in project	Requirements evolve over the project life
Waterfall phases are typically sequential	Mini-life cycles of 2-4 weeks typically used
Product delivered at the end of the project	Product delivered at the end of each iteration
Entire project is planned early	Limited early planning, detailed planning done for the next iteration
Formally organized team lead by a project manager	Self-managed team with no project manager
Change management process used	No change management since changes are expected & welcomed

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Incremental Waterfall with Overlapping Phases


Incremental waterfall model can be used to closely mirror the advantages of faster delivery of useable product with the agile approach

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When to Use Waterfall or Agile

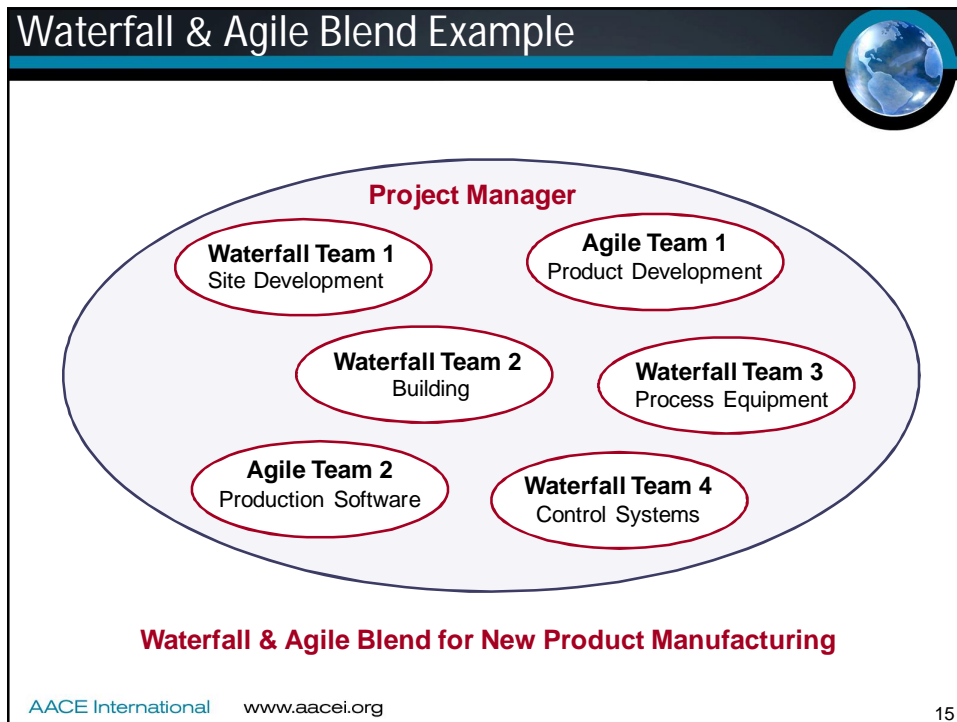
Waterfall	Agile
Well-established business processes	Exploring new business processes
Requirements can be defined early in the project	Requirements will evolve over the life of the project
Significant interfacing with legacy systems	Experimental approach is needed to find a solution
Client decisions involve numerous people	Client empowers a person to make project decisions
Team works best under a traditional team structure	Experienced team that can self-manage the project work


Must have all of these to make agile work

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TOPIC 4
THE PROJECT TEAM & PLANNING
ON AGILE PROJECTS

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Three Primary Roles




Business Knowledge



PRODUCT OWNER/CUSTOMER

- Sets the Vision and Product Roadmap
- Manages and Owns Product Backlog
- Prioritizes Backlog by Business Value
- Determines Acceptance Criteria
- Communicates


Process Knowledge



Scrum Master/Coach

- Team Process Conscience
- Organizer/Facilitator
- Remove Impediments
- Coaches Team
- Liaison to Stakeholders
- Updates Information Radiators
- Communicates

Technology Experts




DEVELOPMENT TEAM

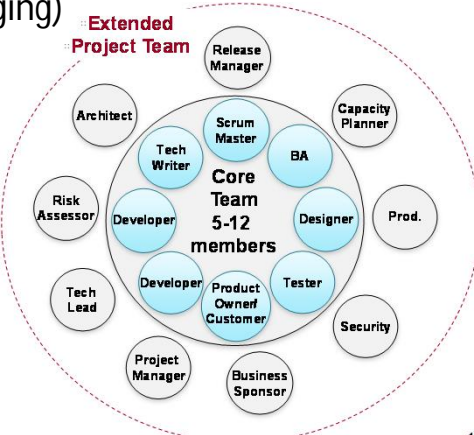
- Cross-functional
- Self-organizing
- Estimates the Work
- Creates a Plan for the Iteration
- Commits to the Work
- Demonstrates Working Product for Feedback
- Communicates

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Characteristics of Agile Teams



- Focused (100% to project)
- Ideally co-located
- Cross-functional
- Self-organizing (self-managing)
- Empowered
- Collaborative
- Close to customer
- 5 to 12 team members



The diagram shows a central 'Core Team' of 5-12 members. Roles within the Core Team include: Release Manager, Scrum Master, BA, Capacity Planner, Prod., Designer, Tester, Product Owner/Customer, Developer, Tech Writer, and Architect. Roles in the Extended Project Team include: Risk Assessor, Tech Lead, Project Manager, Business Sponsor, and Security.

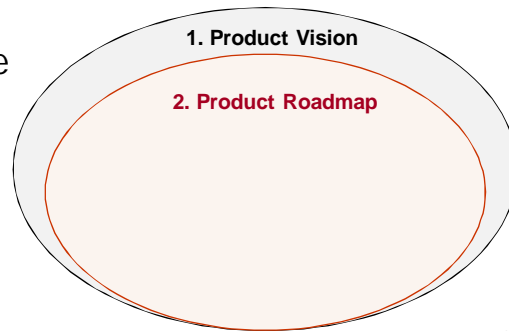
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The Five Levels of Agile Planning



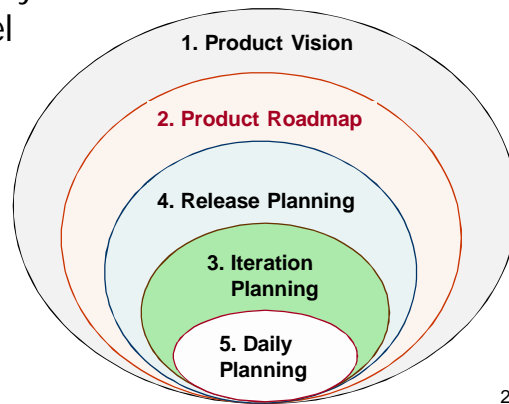
1. **Product Vision** – this is what a new product or the next product version should look like
2. **Product Roadmap** – this is a high-level chronological depiction of how the product will be brought to market - includes any construction projects needed to make, store and/or distribute the new product



The Five Levels of Agile Planning



3. **Release Planning** – close to a project plan; includes the preliminary list of features to be included with each release and a high-level schedule
4. **Iteration Planning** – work for the next iteration & and product functionality that will be delivered is planned at a detail level
5. **Daily Planning** – work accomplished, work being done, obstacles/issues



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TOPIC 6
AGILE ESTIMATION TECHNIQUES

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Fibonacci Numbers



- Human perception: as things get bigger, our ability to perceive differences in size decreases
- When estimating, teams can't tell the difference between a 49 hour work effort and a 57 hour work effort
- Idea is to use Fibonacci numbers to estimate 'relative size' of work, called **story points**: 1, 2, 3, 5, 8, 13, 21, 34, 55, etc.
- Reason: Fibonacci sequence, when used to estimate, increases at about the same rate humans are able to easily perceive differences

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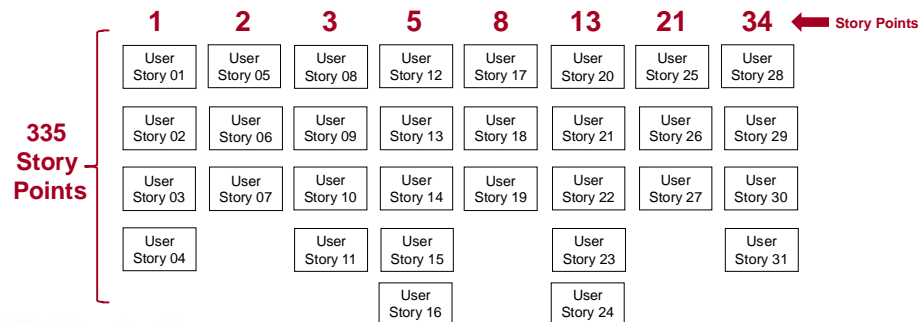
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Agile Estimating with Fibonacci Numbers



1. Arrange user stories by relative size (smallest on left), then number starting with 1, 2, 3, 4, etc.
2. Smallest user story = 1 story point
3. Team scans to right, finds user story twice the work = 2
4. Repeat step 3 until each user story has an assigned value
5. Group stories under each number as shown below



Estimating Velocity & Iterations

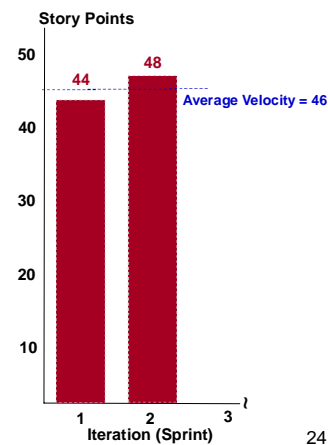


- Velocity = the average number of story points completed per sprint = 46

- 'Ideal' # of project iterations = $335 / 46 \sim 8$

But typically only 60-80% of the user stories are uncovered early in the project...

- 'Expected' # of project iterations = $(335/0.6) / 46 \sim 12$



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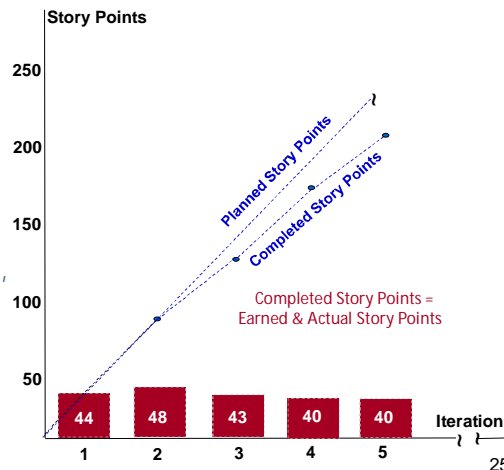
Velocity Histogram with Cumulative



- Can plot both incremental and cumulative story points, both planned and completed – but...

Completed Story Points = Earned = Actual

- If story points converted to hours, can plot planned, earned & actual, but the problem:
 - Until velocity stabilizes the conversion of story points to hours will keep changing
 - As new user stories are added, the number of project story points will keep changing



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CONCLUSION

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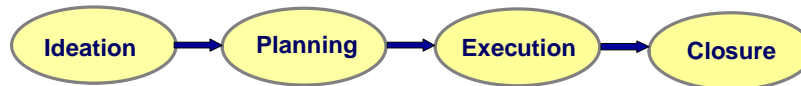
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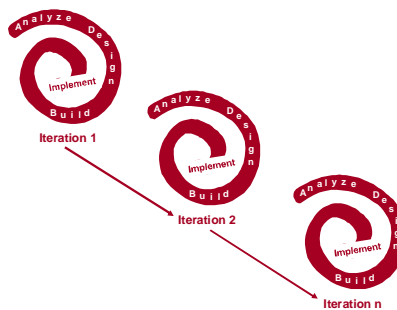
Waterfall vs. Agile Difference



- Waterfall is plan-driven; requirements are baselined early in the project, and a project plan is prepared to meet the requirements



- Agile methodologies are change-driven; requirements and scope evolve over the project life, and increments of product are delivered in short time-frame boxes



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Can Construction Projects Be Agile?



- Agile *cannot* be used for an entire construction project, but can be applied to part of a project such as developing production control software for a new manufacturing facility
- An incremental waterfall model can be used to closely mirror the advantages of faster delivery of useable product with the agile approach
- There are agile concepts that can add value on construction projects, such as the use of Fibonacci numbers and planning poker for estimating

Summary: you can't do an entire construction project using an agile life cycle, but your projects organization can become more agile!

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QUESTIONS/COMMENTS?

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