INF5430
IT Project Management: Overview, traditional and agile approaches
Knut H. Rolland
Agenda

• What is a project?
• Overview of the PMI project management standard
• Project planning and monitoring techniques (GANTT, dependencies, critical path, work-breakdown structure, baselines, project triangle)
• Agile project management (burn-down charts, artifacts, meetings)
• Example of a large IT-project
What is a project?

• PMI: ”A temporary group activity designed to produce a unique product, service or result”.

• Project characteristics
  – has a start and an end
  – has an organization and steering committee
  – has a clear mandate and goals for what to produce – often referred to as ‘deliverables’
  – has a defined plan of activities, budget, and schedule
Why organize activities as a project?

• Solve complex tasks that the line organization is not designed to do
  – Example: develop a complex information system at hospitals
  – Example: develop a case-handling information system at NAV (Norwegian welfare organization)

• Hire a consulting company in order to have access to appropriate knowledge and competence

• Minimize risk for the organization
What is project management?

• PMI (def): “The application of knowledge, skills and techniques to execute projects effectively and efficiently.”

• Responsible for managing the project in terms of plans, budgets, resources, competencies, and communication with relevant actors (e.g. steering committee, functional manager)

• Basic assumption: If correctly planned and executed, a project will achieve its goals.
The PMI approach

- **Project Management Institute (PMI):**
  The world's leading not-for-profit professional membership association for the project, program and portfolio management profession. Founded in 1969.

- **PMBOK® Guide:**
  "The PMBOK® Guide is the standard for managing most projects most of the time across many types of industries." It describes the project management processes, tools, and techniques used to manage a project toward a successful outcome.

- **Certifications:**
  The future of project management is changing fast. Hear industry leaders discuss issues that impact the world of projects on Projectified with PMI. Listen for free.

06.02.2018
Knut H. Rolland (2018)
Project life cycle
PMI is process-oriented

Two categories:

1. **Project management processes** ensure the effective flow of the project throughout its existence.

2. **Product-oriented processes** specify and create the project’s product. Product-oriented processes are typically defined by the project life cycle (as discussed in Section 2.1.2) and vary by application area. (PMBOOK Guide p. 37)
The nuts and bolts of project management

- Project management approaches
- Planning and following up an IT project
- Managing competence, roles and teams in IT projects
- Organizing the project
- Managing the project’s stakeholders
Henry Laurence Gantt (1861 –1919)

- "Gantt created many different types of charts. He designed his charts so that foremen or other supervisors could quickly know whether production was on schedule, ahead of schedule, or behind schedule.”
  
GANTT diagrams

Activity

Interviewing users

Investigating alternatives

Define requirements together with users

Write report

Days

Knut H. Rolland 2018
Microsoft Project 2013/6
Example

GANTT diagram
Exercise: Develop a GANTT chart for your IN5430 - IT and Management project

• Include:
  – Main activities
  – Dependencies
  – Milestones

• What is the critical path of your project?

• How can you increase the ‘slack’ of critical activities?
Project baselines

In practice, the project will not exactly follow the plan. If it deviates too much, a new baseline needs to be defined.
The project manager needs to monitor and control the project in a systematic way (Cadle og Yeates, 2008: s. 208)

Project management must balance time, cost and quality.

Changing one aspect has consequences for the others.
Example: the project has spent too much time (and money) on developing a feature

- The triangle tells you that if you are still going to deliver on time and budget, you have to reduce quality.
- Quality can imply both non-functional (e.g. Performance, user experience) and functional requirements (features).
Work breakdown structure

- Dividing the project in smaller parts – activities or work packages
- Presented as a hierarchy of activities with increasing details
Traditional approaches - summary

• Focus on management control and planning
• Detailed plans carried out in a waterfall-like fashion
• Hierarchical organizations often with a top-down approach to project governance
• IT-projects: requirements must be defined up-front and not change too much
• See Spundak (2014)
20% of all IT projects are "Black Swans"

- On average, IT projects in public sector perform remarkably well!
- But, large-scale project especially prone to risks and failures
- Projects that implicates standard software are challenging!!!

Agile project management approaches

• Co-located and small teams
• Coordination through physical artifacts as well as software tools
• Close interaction with customer
• Self-managed teams

Final Definition of Agility
the continual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment.

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<thead>
<tr>
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<th>Traditional</th>
<th>Agile</th>
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<tr>
<td><strong>Fundamental Assumptions</strong></td>
<td>Systems are fully specifiable, predictable, and can be built through meticulous and extensive planning.</td>
<td>High-quality, adaptive software can be developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and change.</td>
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<td><strong>Control</strong></td>
<td>Process centric</td>
<td>People centric</td>
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<td><strong>Management Style</strong></td>
<td>Command-and-control</td>
<td>Leadership-and-collaboration</td>
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<td><strong>Knowledge Management</strong></td>
<td>Explicit</td>
<td>Tacit</td>
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<td><strong>Role Assignment</strong></td>
<td>Individual—favors specialization</td>
<td>Self-organizing teams—encourages role interchangeability</td>
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<td><strong>Communication</strong></td>
<td>Formal</td>
<td>Informal</td>
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<tr>
<td><strong>Customer’s Role</strong></td>
<td>Important</td>
<td>Critical</td>
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<td><strong>Project Cycle</strong></td>
<td>Guided by tasks or activities</td>
<td>Guided by product features</td>
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<td><strong>Development Model</strong></td>
<td>Life cycle model (Waterfall, Spiral, or some variation)</td>
<td>The evolutionary-delivery model</td>
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<td><strong>Desired Organizational Form/Structure</strong></td>
<td>Mechanistic (bureaucratic with high formalization)</td>
<td>Organic (flexible and participative encouraging cooperative social action)</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>No restriction</td>
<td>Favors object-oriented technology</td>
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Agile process: Scrum

Product Backlog → Sprint Backlog → Sprint → Working increment of the software

24 h
30 days
# Agile process: Kanban

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<th>To Do</th>
<th>In Progress</th>
<th>In Test</th>
<th>Finished</th>
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Agile in larger projects


[Diagram of Scrum teams and Scaled Agile Framework]

http://www.scaledagileframework.com/

www.less.works
Burn-down charts

https://en.wikipedia.org/wiki/Burn_down_chart
Extensive use of physical artifacts like whiteboards and notes
Mixed approaches: Water-Scrum-Fall

Figure 1. Scrum process cycle (left) and Water-Scrum-Fall process (right)

Schlauderer et al. (2015)
EXAMPLE FROM LARGE-SCALE IT-PROJECT IN PUBLIC SECTOR
Organization structure
Phases in a large-scale IT-project

Analysis of needs

Solution description

Construction1

ConstructionN

Approval

Product Backlog (Epics)

Product Backlog (User Stories)

Approved Increments according to definition of done

Release ready for approval

Release deployed in production environment

Source:: Kjetil Rød, Sopra Steria
Working on three deliverables in parallel
Project set up

- Large-scale public sector project (The ‘Beta project’, see Dingsøyr et al., 2017)
- 5 large scrum teams
  - 2-3 Developers, UX designer, software architect, test responsible, functional responsible
- 3 deliverables over a period of nearly 4 years
- One dedicated integration team
- Additional meetings and roles: Architecture meetings, Bug-board, ready-to-sprint process, Tornado meetings, technical champions.
Complex dependencies

- Coordination mechanisms across teams just as important as coordination mechanisms within teams
- Project manager needed to focus on external stakeholders and coordinate with other projects

“When the other system being developed was down, it almost stopped the entire project. There was a tight coupling between this other system and our project, which we had not accounted for initially. We realized that this system needed to follow the same production schedule as our project – although they were not at all part of the official project.” —Software Architect, GOV

Organization structure is never perfect – needs continuous coordination across teams

• Continuous coordinating:

“By and large [coordination] is ad hoc. It was common practice to just walk over to each other [other teams] to discuss and solve issues there and then. And it was also a common understanding that such issues needed to be solved at once. And if [everyone] did so, this would certainly reduce the frictions between teams.” — Developer, ConsultGroup