

UiO • Institutt for informatikk

Det matematisk-naturvitenskapelige fakultet

INF5430

**IT Project Management: Overview, traditional
and agile approaches**

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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

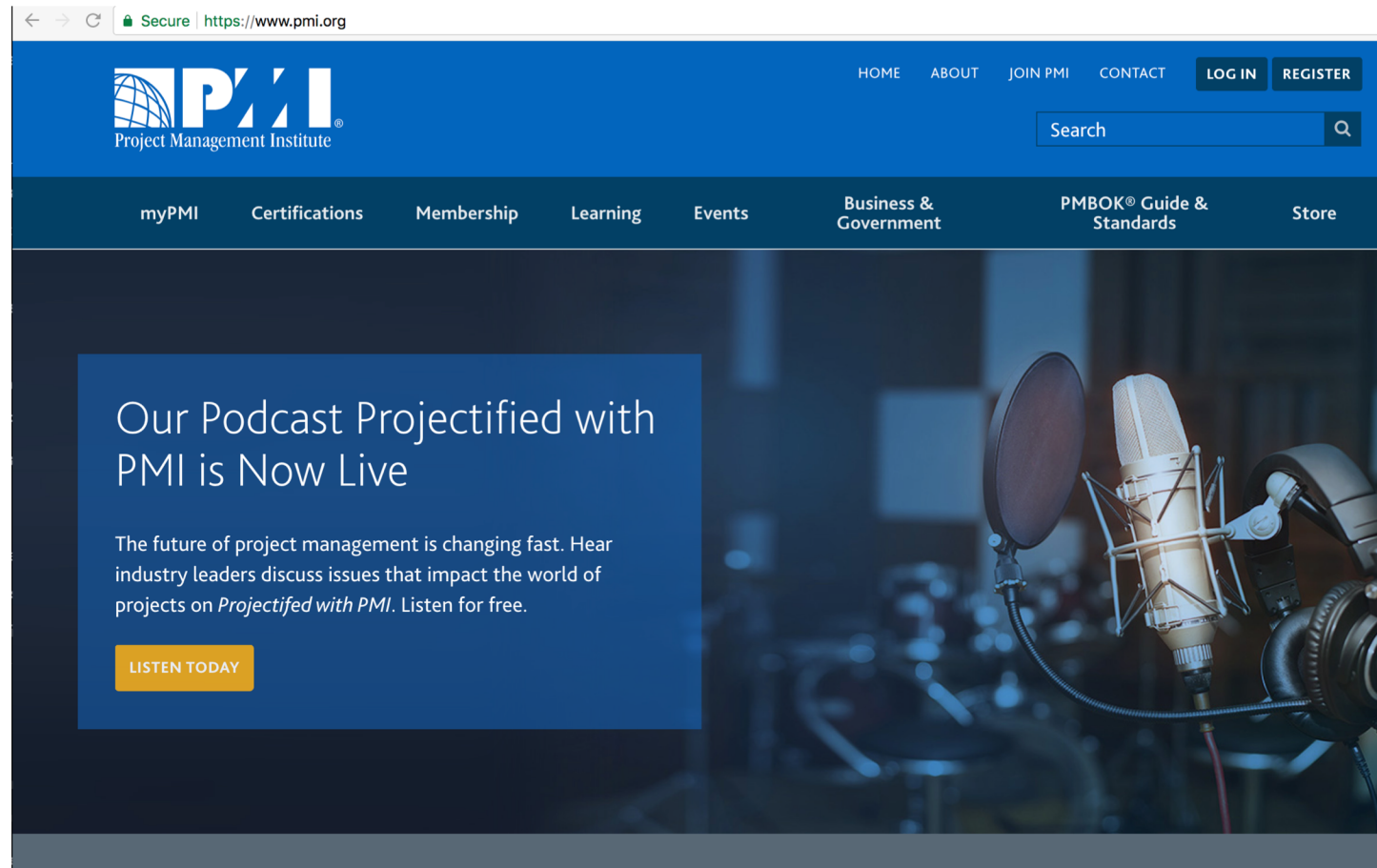
Why organize activities as a project?

- Solve complex tasks that the line organization is not designed to do
 - Example: develop complex information systems in 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

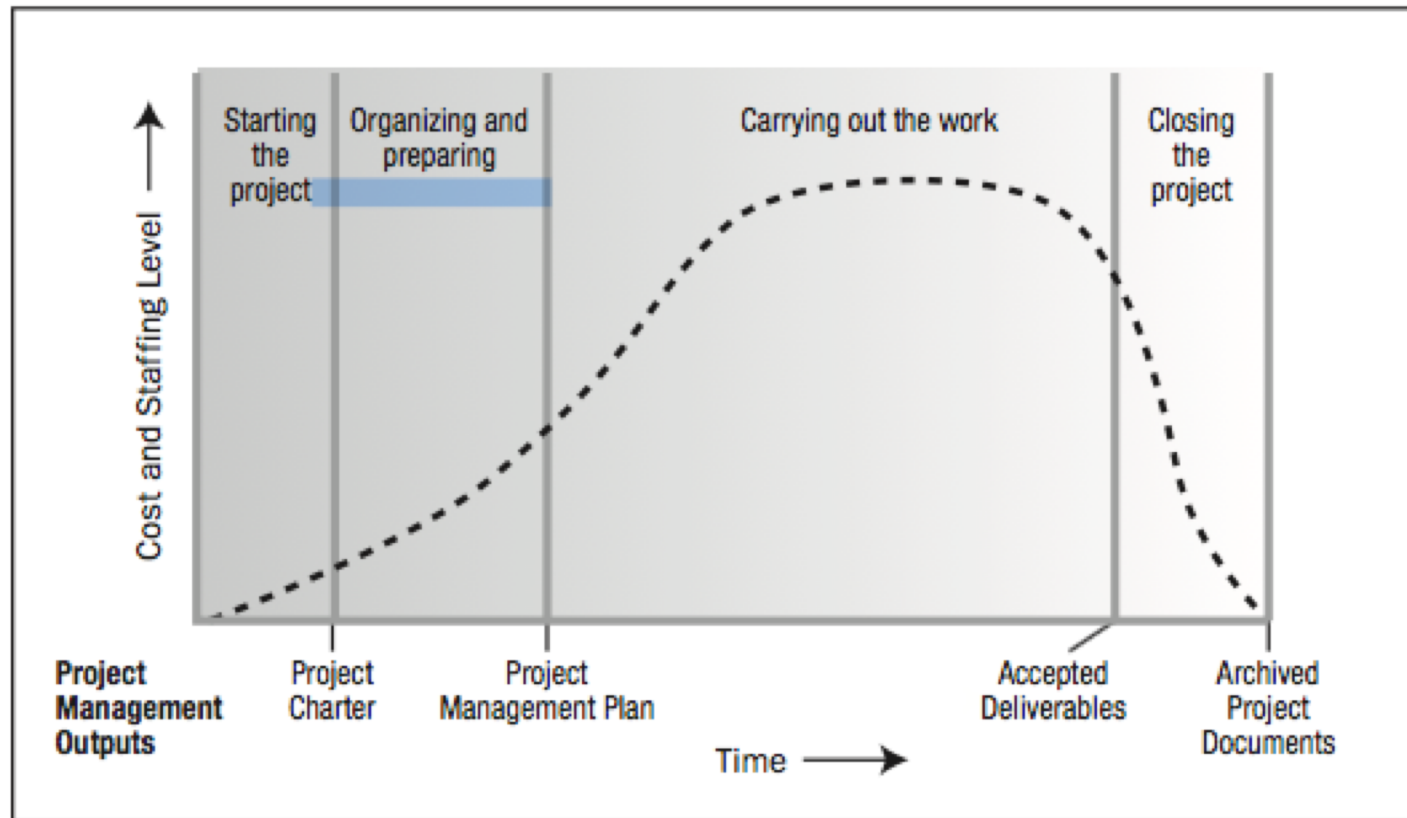
What is project management?

- 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 life cycle



PMI is process-oriented

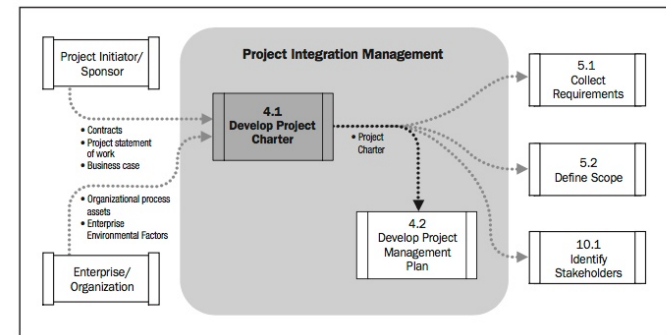


Figure 4-3. Develop Project Charter Data Flow Diagram

Two categories:

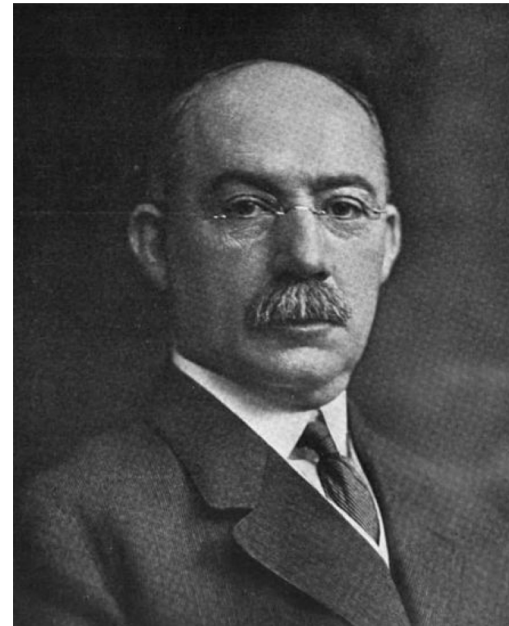
1. **Project management processes** ensure the effective flow of the project throughout its existence.
2. **Product-oriented processes** specify and create the project's product. Product-oriented processes are typically defined by the project life cycle (as discussed in Section 2.1.2) and vary by application area. (PMBOOK Guide p. 37)

The nuts and bolts of project management

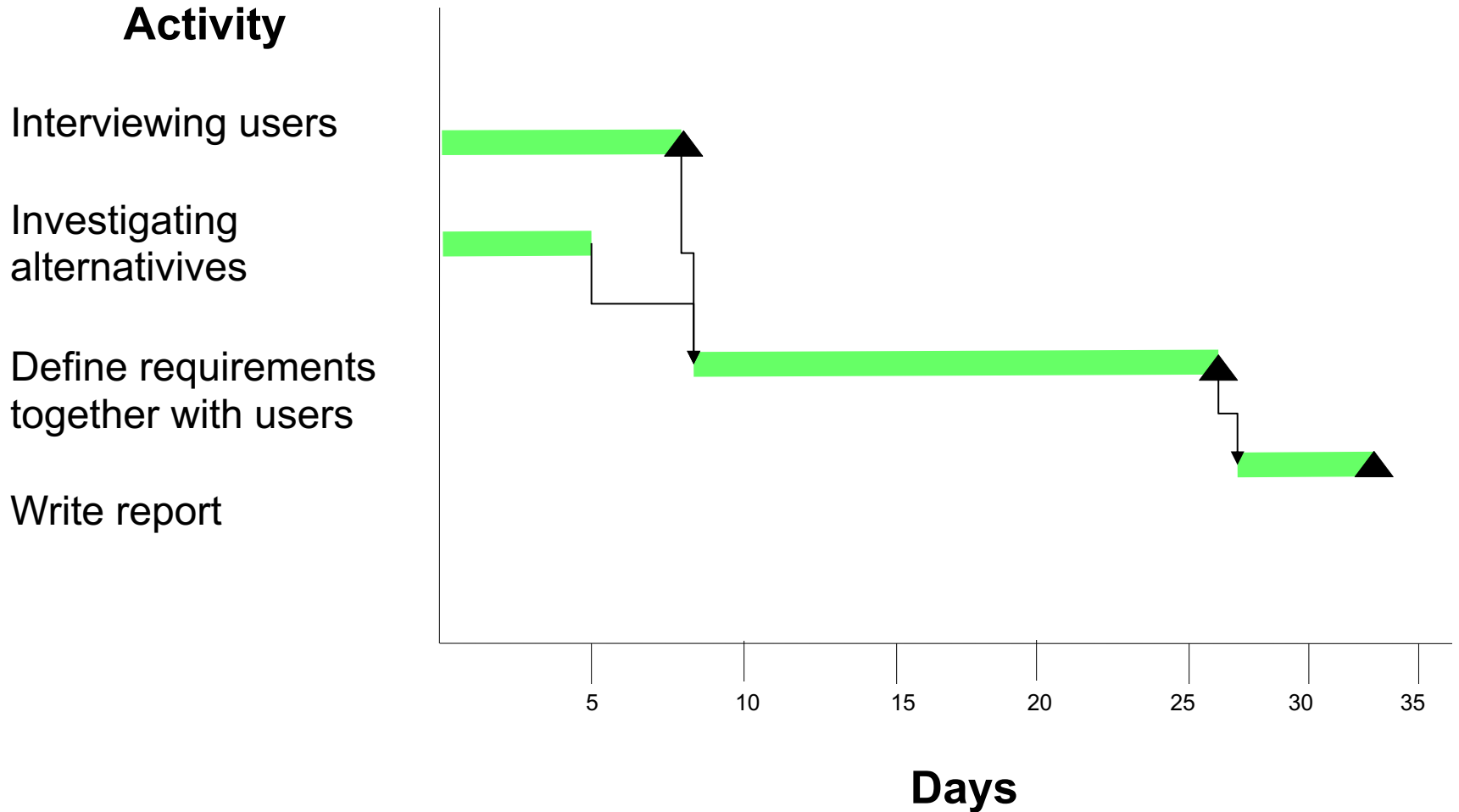
- Project management approaches
- Planning and following up an IT project
- Managing competence, roles and teams in IT projects
- Organizing the project
- Managing the project's stakeholders

Henry Laurence Gantt (1861 –1919)

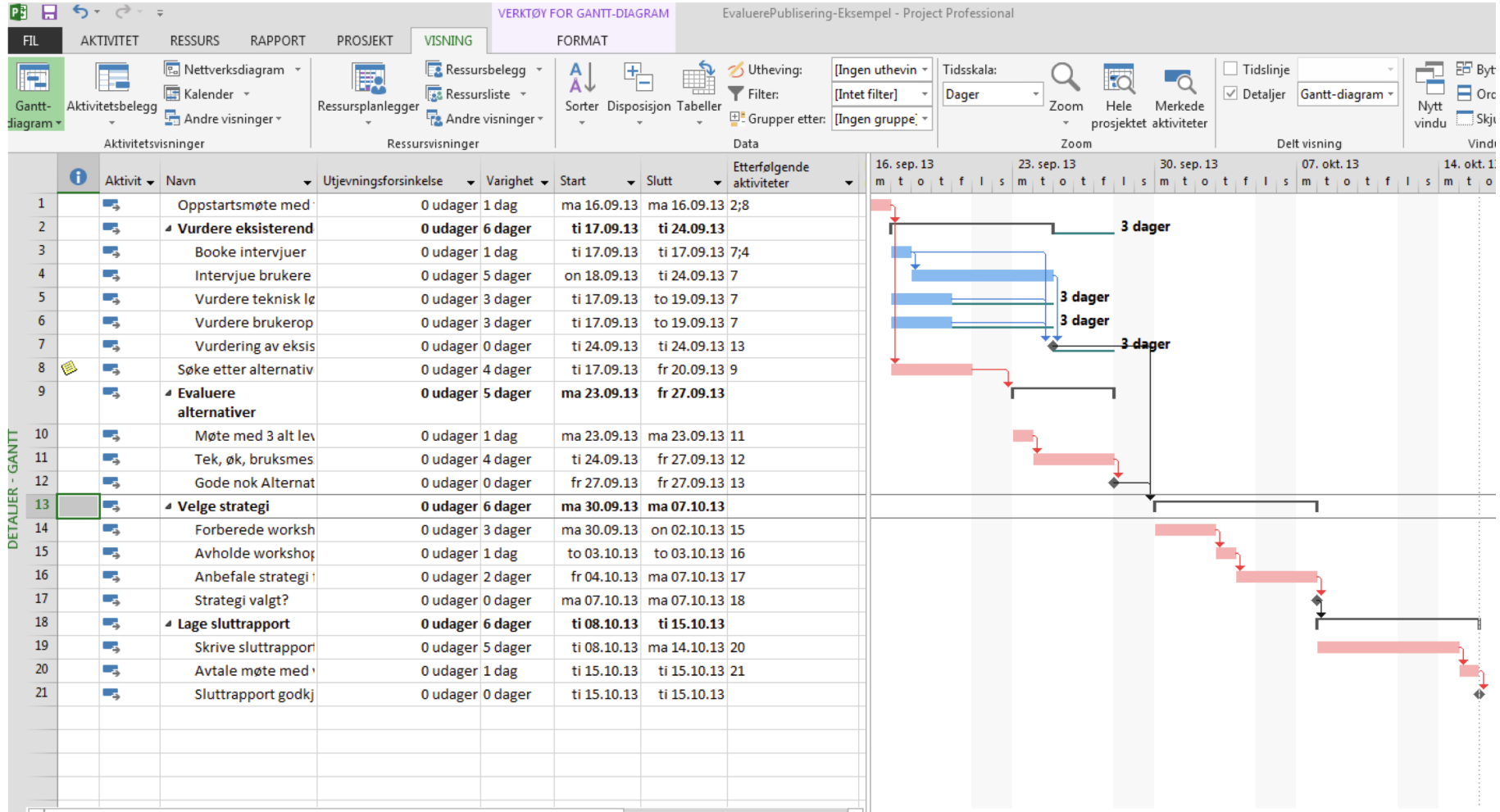
- "Gantt created many different types of charts. He designed his charts so that foremen or other supervisors could quickly know whether production was on schedule, ahead of schedule, or behind schedule."
http://en.wikipedia.org/wiki/Henry_Gantt)



GANTT diagrams



PM-tools: Microsoft Project 2016

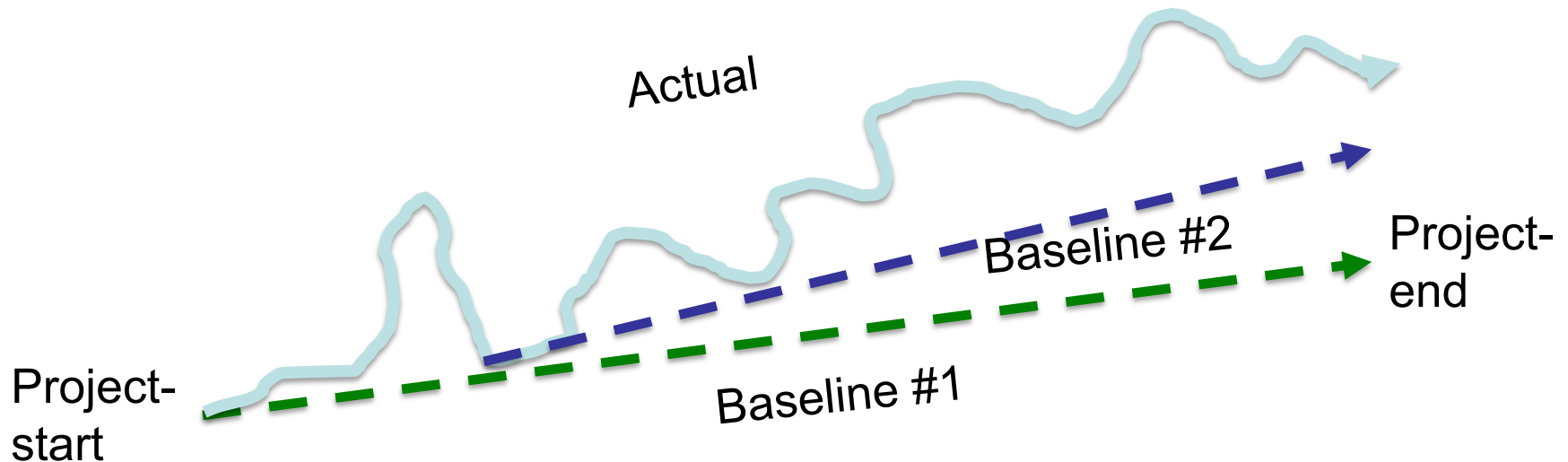


Exercise: Develop a GANTT chart for your IN5430 - IT and Management project

- Include:
 - Main activities
 - Dependencies
 - Milestones
- What is the critical path of your project?
- How can you increase the 'slack' of critical activities?

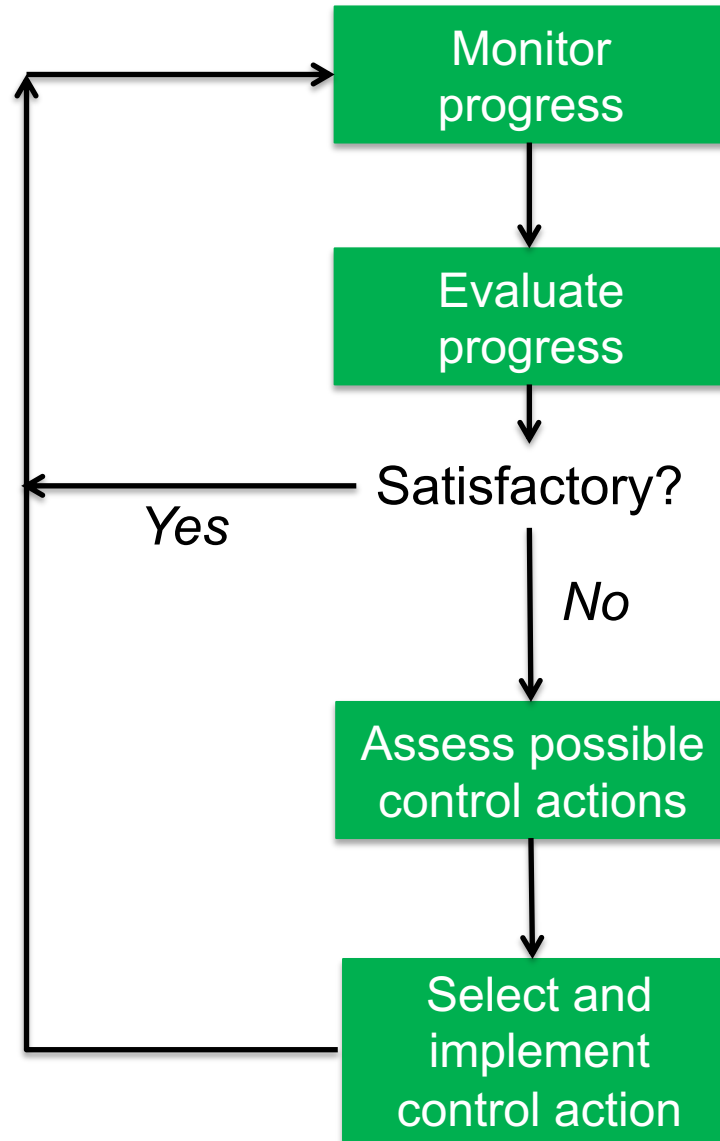
Project baselines

In practice, the project will not exactly follow the plan. If it deviates too much, a new baseline needs to be defined.



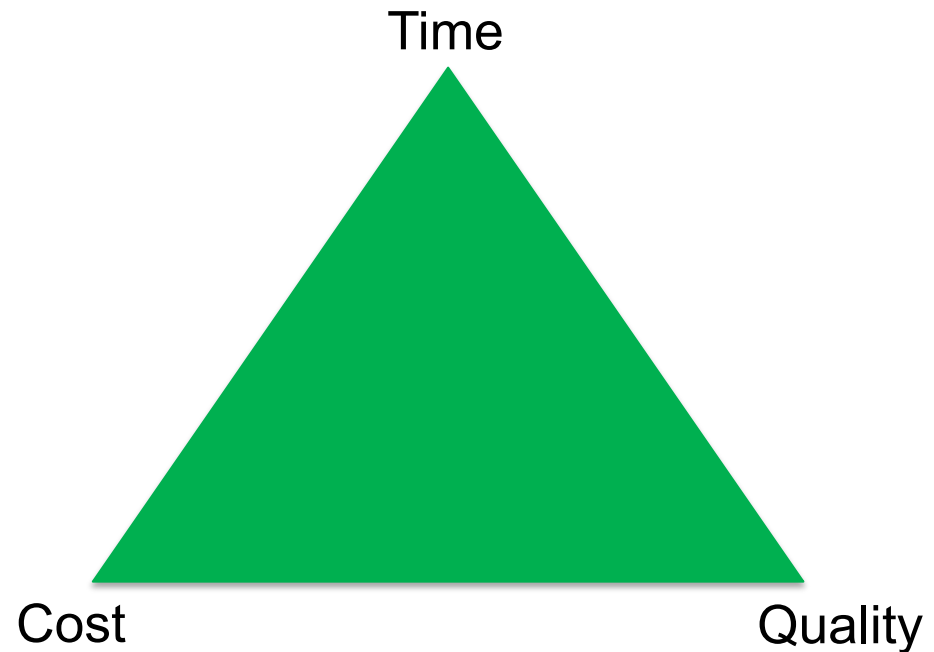
The project manager needs to monitor and control the project in a systematic way (Cadle og Yeates, 2008: s. 208)

Cadle, J., & Yeates, D. (Eds.). (2004). *Project management for information systems*. Pearson education.



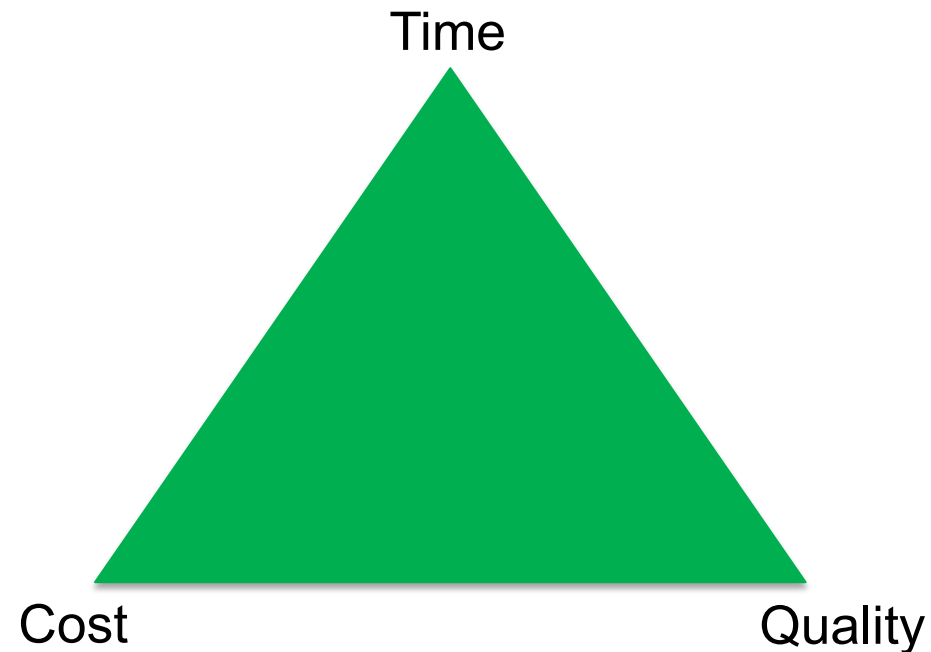
Time/cost/quality triangle

- Project management must balance time, cost and quality.
- Changing one aspect has consequences for the others



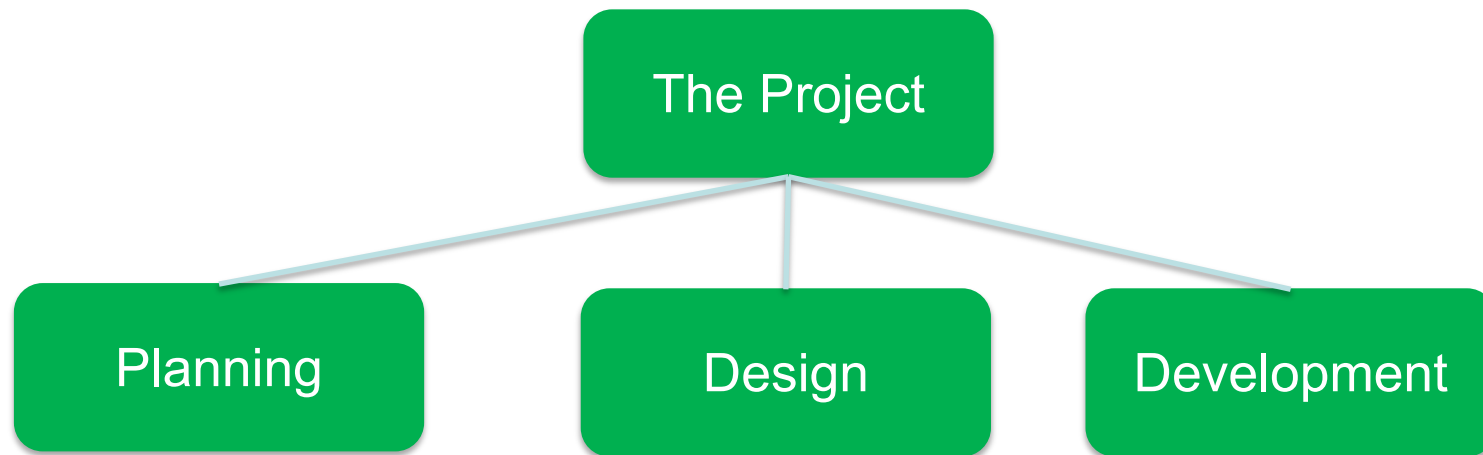
Example: the project has spent too much time (and money) on developing a feature

- 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
- Can mix with other approaches? Spundak (2014)

Špundak, M. (2014). Mixed agile/traditional project management methodology–reality or illusion?. *Procedia-Social and Behavioral Sciences*, 119, 939-948.




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!!!

Black swans have high cost, schedule and benefit risks, which are hidden in the fat tails of ICT portfolios



Risk comparison, Median, in percent

	Black Swans ¹	Projects with cost overrun	Normal projects	Starved projects
Cost overrun	+130 	+47	+0	-75
Schedule overrun	+41 	+38	+24	n/a
Likelihood	18 	28	31	51

- Even if the median cost overrun is low, risk of cost overruns is high
- **Black Swans mean very high cost and schedule risks**
- And all the projects with a downside risk show significant risk

¹ The statistical expectation value does not converge and is infinite

Budzier, A., & Flyvbjerg, B. (2012). Overspend? Late? Failure? What the data say about IT project risk in the public sector. Commonwealth Governance Handbook, 13, 145-157.

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

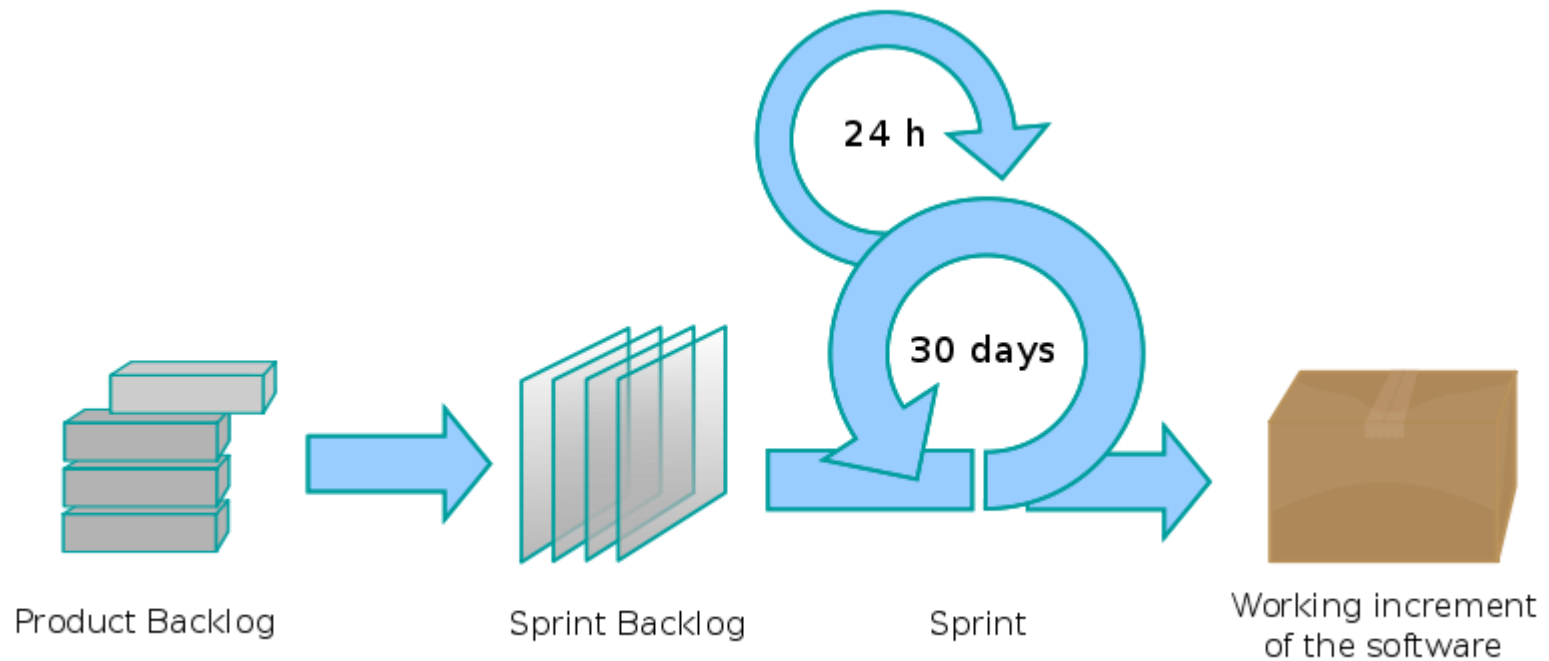
the continual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment.

Conboy, K. (2009). Agility from first principles: Reconstructing the concept of agility in information systems development. *Information Systems Research*, 20(3), 329-354.

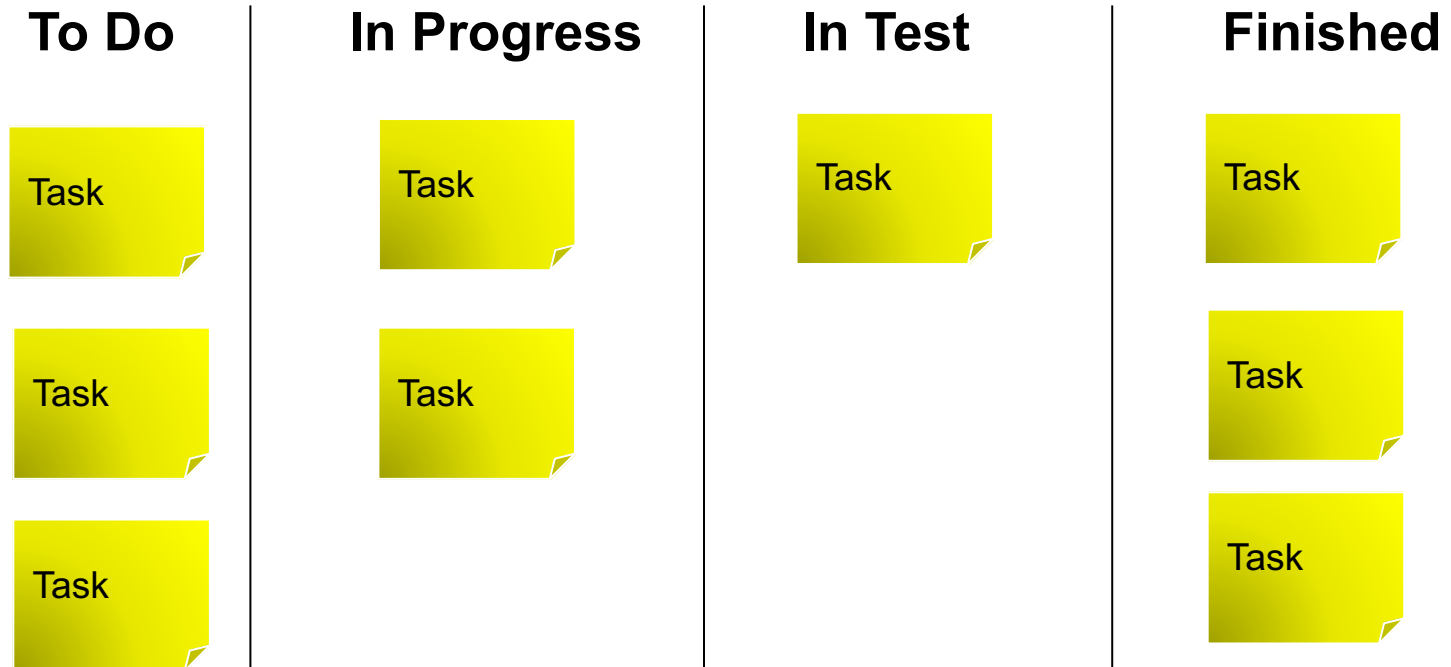
	Traditional	Agile
Fundamental Assumptions	Systems are fully specifiable, predictable, and can be built through meticulous and extensive planning.	High-quality, adaptive software can be developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and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

Nerur, S., Mahapatra, R., & Mangalaraj, G. (2005). Challenges of migrating to agile methodologies. *Communications of the ACM*, 48(5), 72-78.

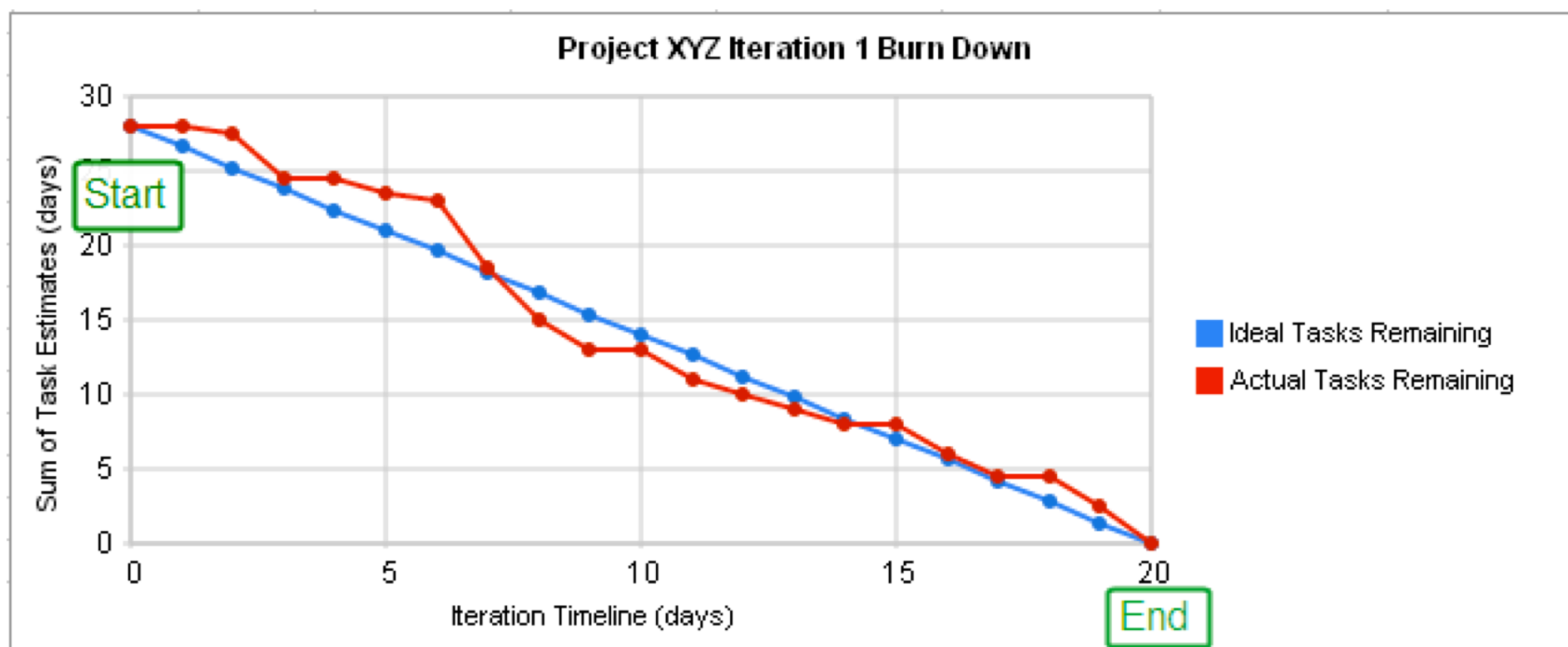
Agile process: Scrum



Agile process: Kanban



Burn-down charts

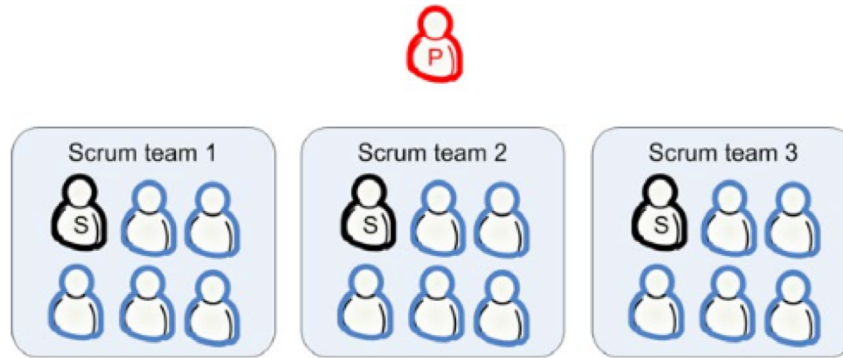


https://en.wikipedia.org/wiki/Burn_down_chart

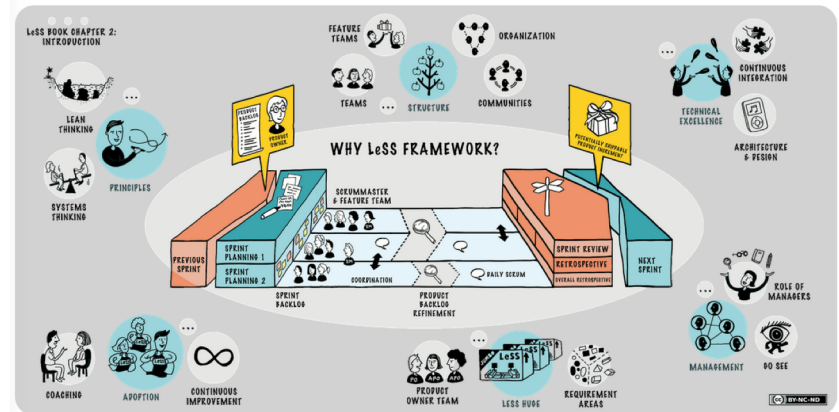
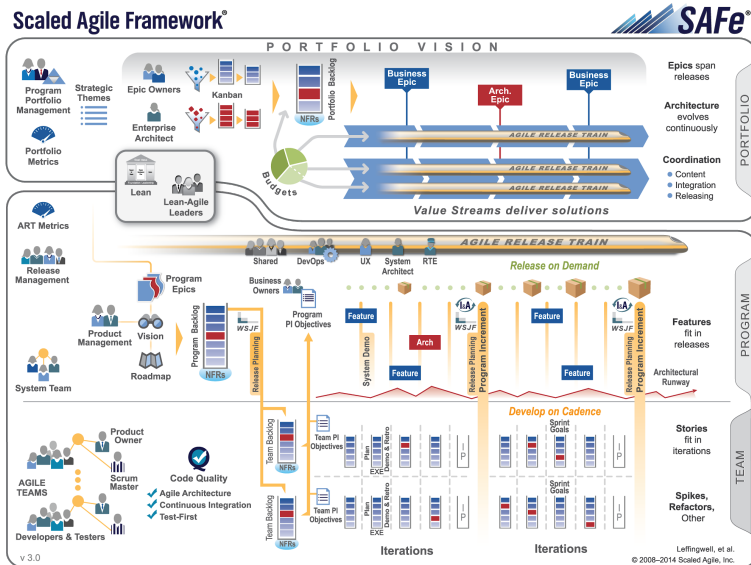
Extensive use of physical artifacts like whiteboards and notes



Agile in larger projects



Kniberg, H., *Scrum and XP from the Trenches: InfoQ*, 2007.



www.less.works

Mixed approaches: Water-Scrum-Fall

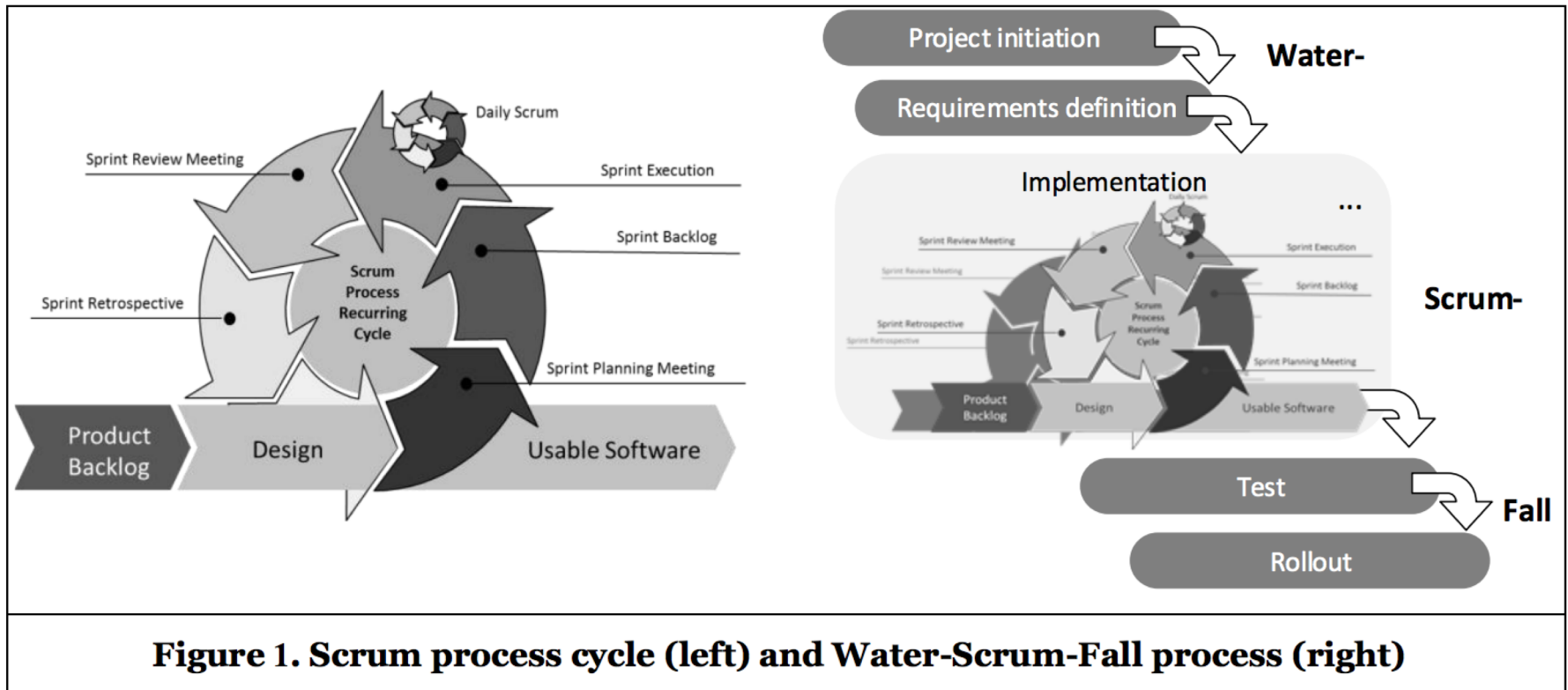


Figure 1. Scrum process cycle (left) and Water-Scrum-Fall process (right)

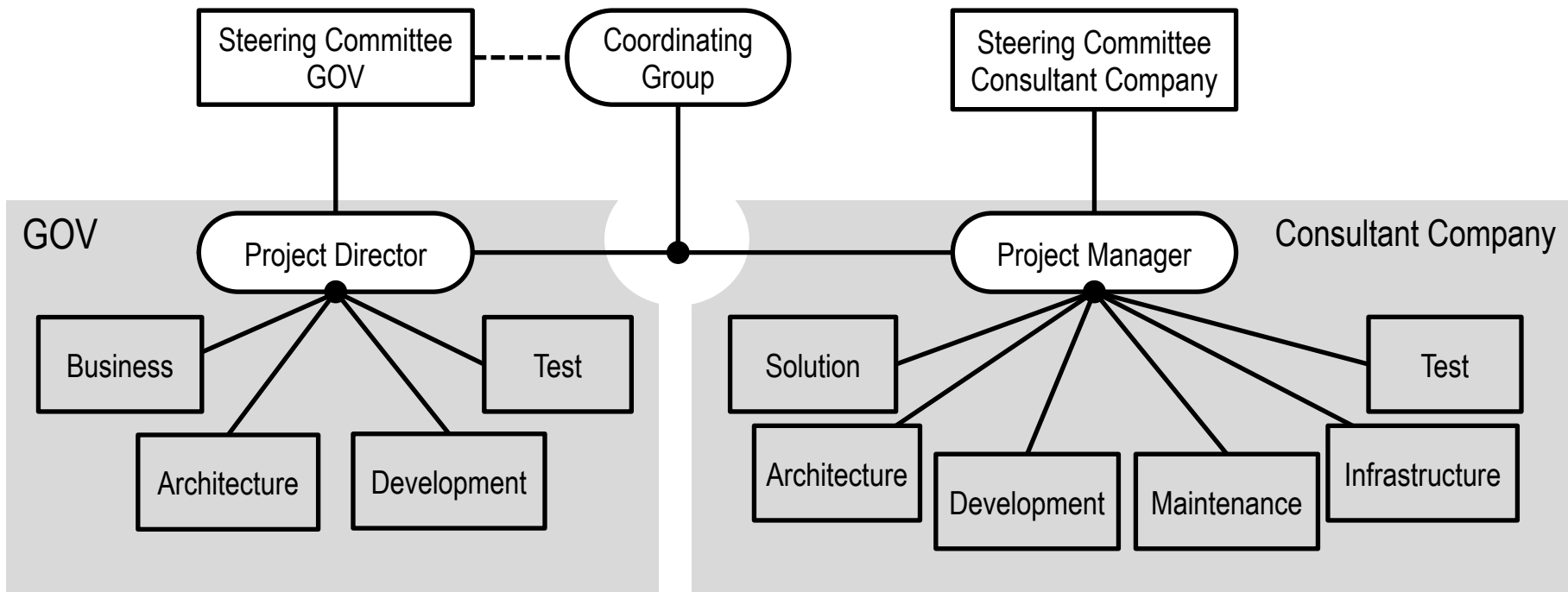
Schlauderer, S., Overhage, S., & Fehrenbach, B. (2015). Widely Used but also Highly Valued? Acceptance Factors and Their Perceptions in Water-Scrum-Fall Projects.

EXAMPLE FROM LARGE- SCALE IT-PROJECT IN PUBLIC SECTOR

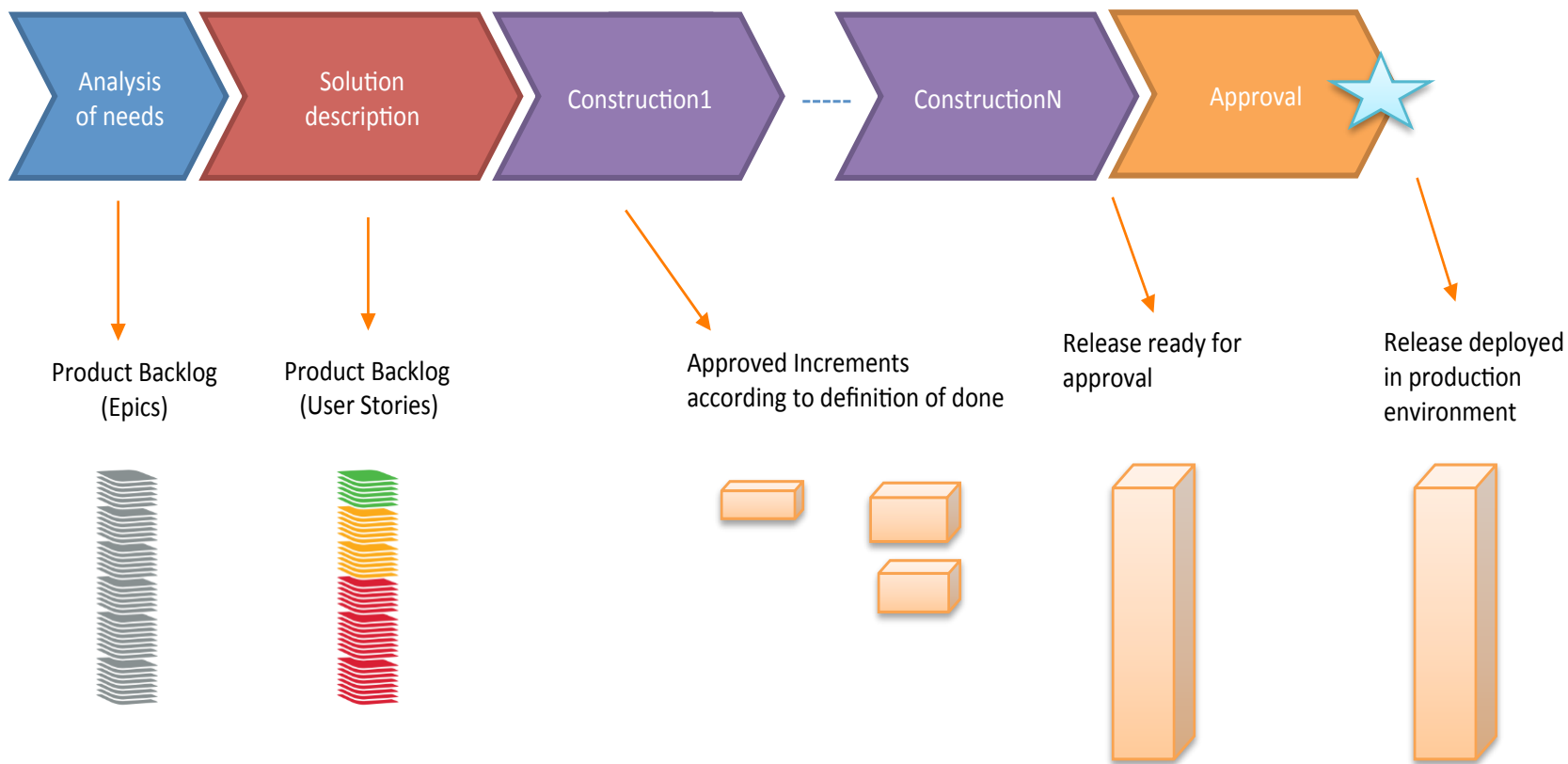
Project set up

- Large-scale public sector project (The ‘Beta project’, see Dingsøy 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.

Organization structure



Phases in a large-scale IT-project



Source:: Kjetil Rød, Sopra Steria

Working on three deliverables in parallel

