IT Project Management

Lecture 1 – Introduction

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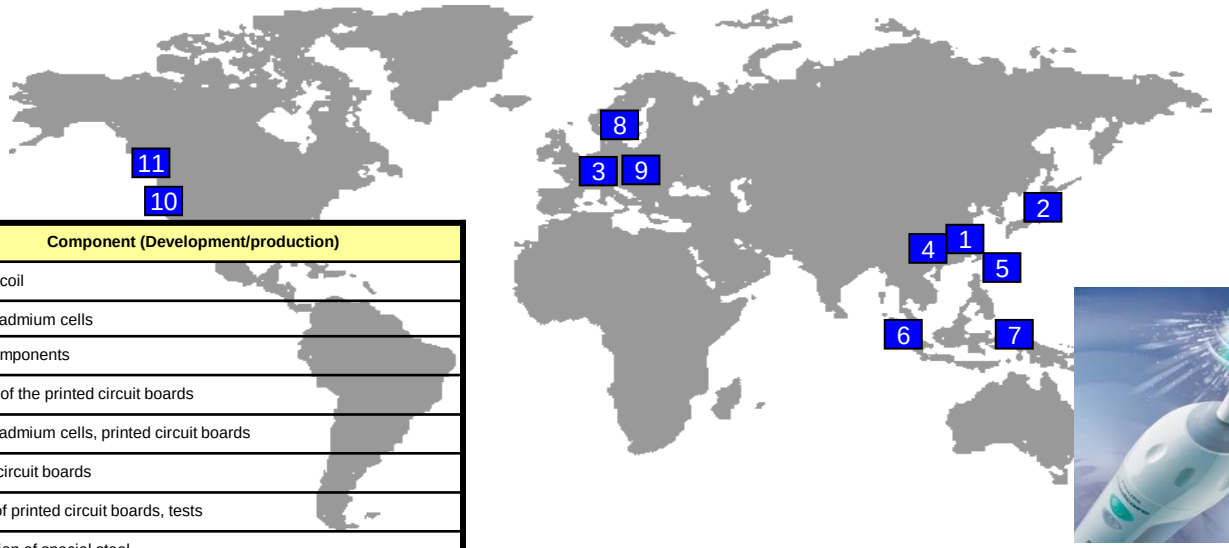
Example

- World wide distributed product development and production of an electric toothbrush



No.	Location	Component (Development/production)
1	Shenzen (China)	Copper coil
2	Tokio (Japan)	Nickel cadmium cells
3	Rambouillet (France)	Load components
4	Zhunai (China)	Etching of the printed circuit boards
5	Taipei (Taiwan)	Nickel cadmium cells, printed circuit boards
6	Kuala Lumpur (Malaysia)	printed circuit boards
7	Manila (Philippines)	Solder of printed circuit boards, tests
8	Sandviken (Sweden)	Production of special steel
9	Klagenfurt (Austria)	Pre-cutting of the steal, plastic parts
10	Snoqualmie (USA)	Assembly of the plastic parts
11	Seattle (USA)	Package

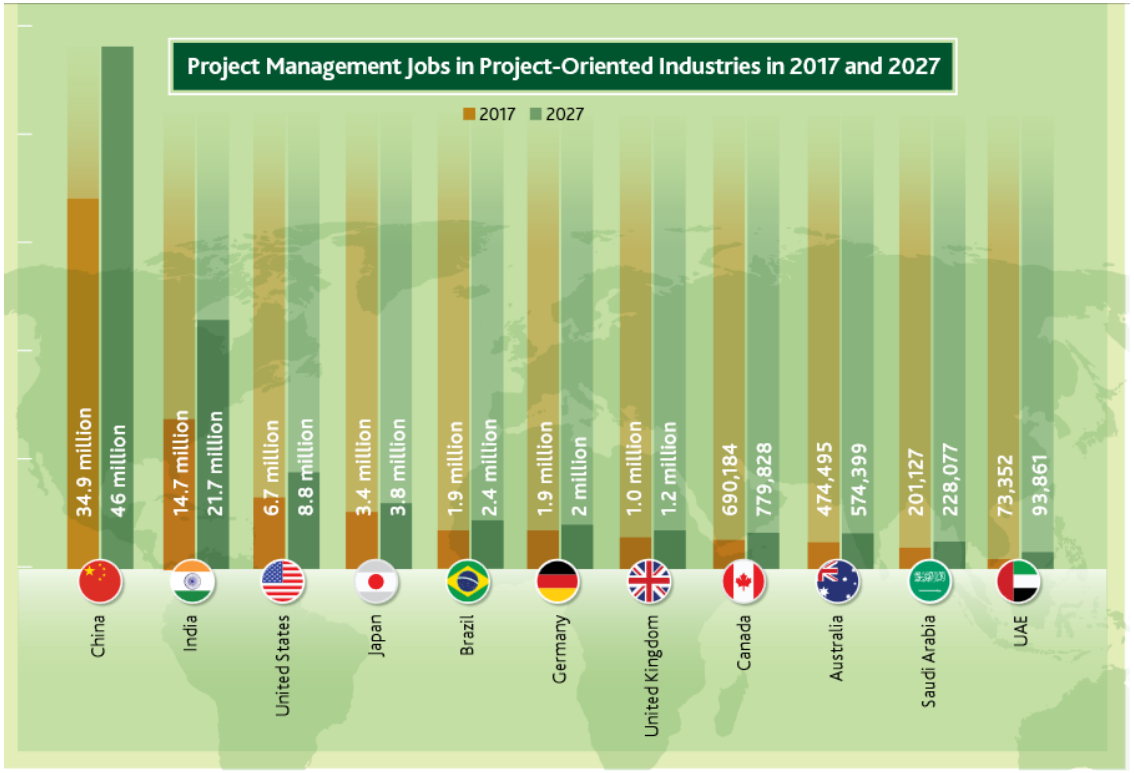
Philips Sonicare Elite 7000

***Source**: Daud Alam, 2016. Produktdatenmanagement (PDM), Vorlesungsunterlagen, University of Pforzheim*

Importance

- Project management get's more and more important in business live
  - Project activities in daily working live of an engineer increased from 9 % to 16 % [ES09]
  - The demand for project management specialists keeps growing [Bat19]
  - Data by PMI predicts exponential growth for the next decade for the need of project management professionals [PMI17a]

Importance



By 2027, employers will need **87.7 million** individuals working in project management oriented roles

Source: [PMI17a]

Importance

- Challenges
  - growing complexity of projects,
  - availability and use of resources.
- Future project management
  - application of agile methods in addition to classic PM methods,
  - artificial intelligence,
  - digitalization,
  - permanent change,
  - cost pressure,
  - globalization.
- Potentials
  - virtual teams,
  - intercultural teams.

Source: [Bat19]

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Definitions

- Different organizations care about project management and project management methods, like, e.g.,
  - International Project Management Association [IPMA20], who defined the IPMA Competence Baseline (ICB), basis for certification programs
  - Project Management Institute [PMI20] who defined the “Guide to the Project Management Body of Knowledge (PMBOK Guide)” [PMI17]
  - UK Government and Axelos concerning PRINCE2 [axe20]
- Different organization use different definitions

Definitions

- What is a project?
  There is no distinct definition, proposals:
  A ***project*** is a
  - unique, transient endeavour undertaken to achieve planned objectives [apm20]
  - temporary endeavor undertaken to create a unique product, service, or result [Wik20] [Pmi04]
  - temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case [axe20]

Definitions

- What is a project?
  Characteristics of a project are thus:
  - Defined goal
  - There is a start and an end
  - Temporary
  - Handles something completely new
  - Unique
  - Complex
  - Trans-sectoral
  - Limited resources are available

Definitions

- What is ***project management***?
  - The application of processes, methods, knowledge, skills and experience to achieve the project objectives [apm20]
  - The complete set of tasks, techniques, tools applied during project execution [DIN 69901-5:2009-01]
  - The planning, delegating, monitoring and control of all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risk [axe20]

Definitions

- What is project management?
  - *'At its most fundamental, project management is about people getting things done.'*

    Dr. Martin Barnes, APM President 2003-2012
- Core activities in project management
  - Guiding the project team
  - Planning milestones
  - Main contact for the principal/ conduct negotiations
  - Decision about tools and methods
  - Reporting

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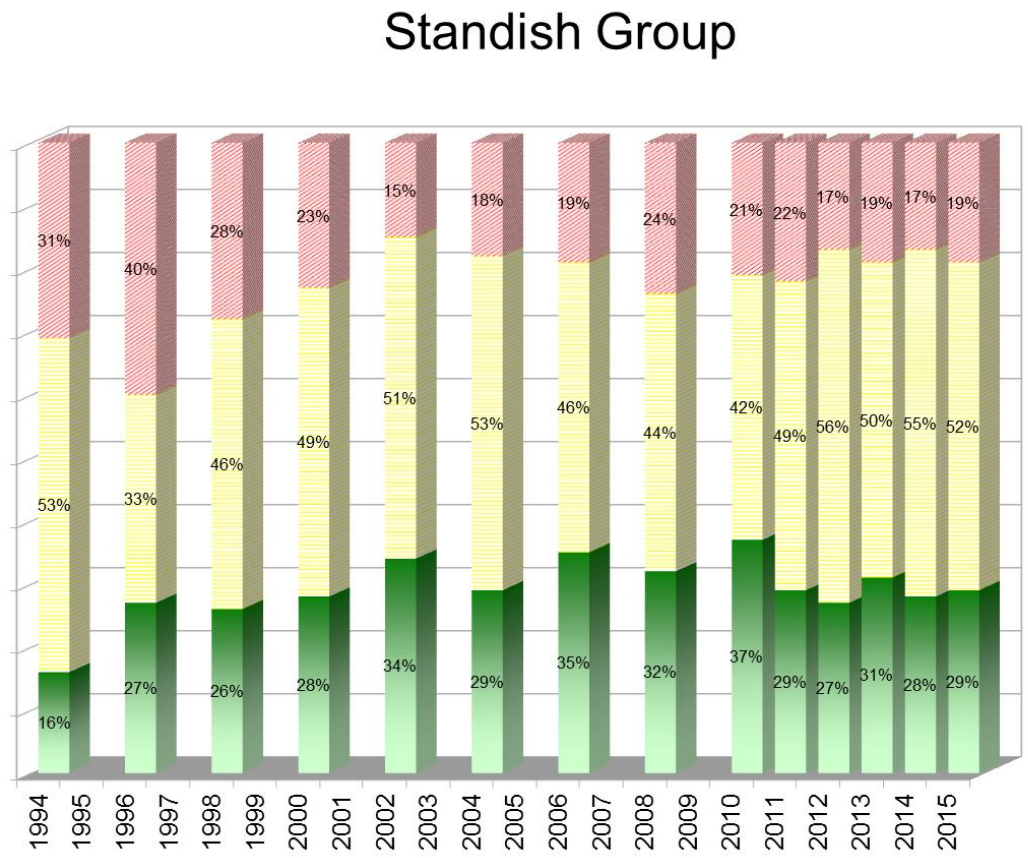
Successful Projects



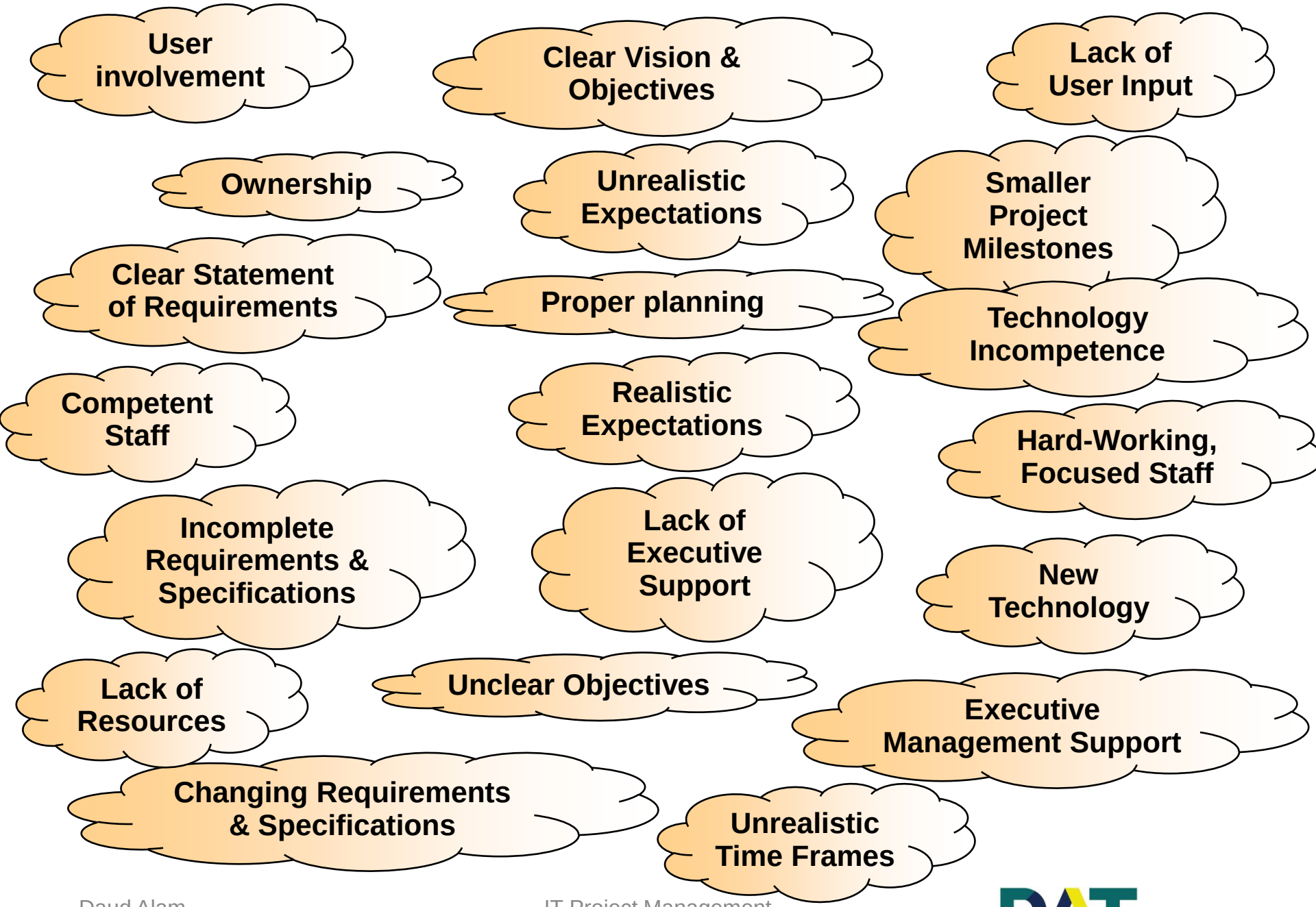
Results of IT-Projects [Wik20a], [HW15]

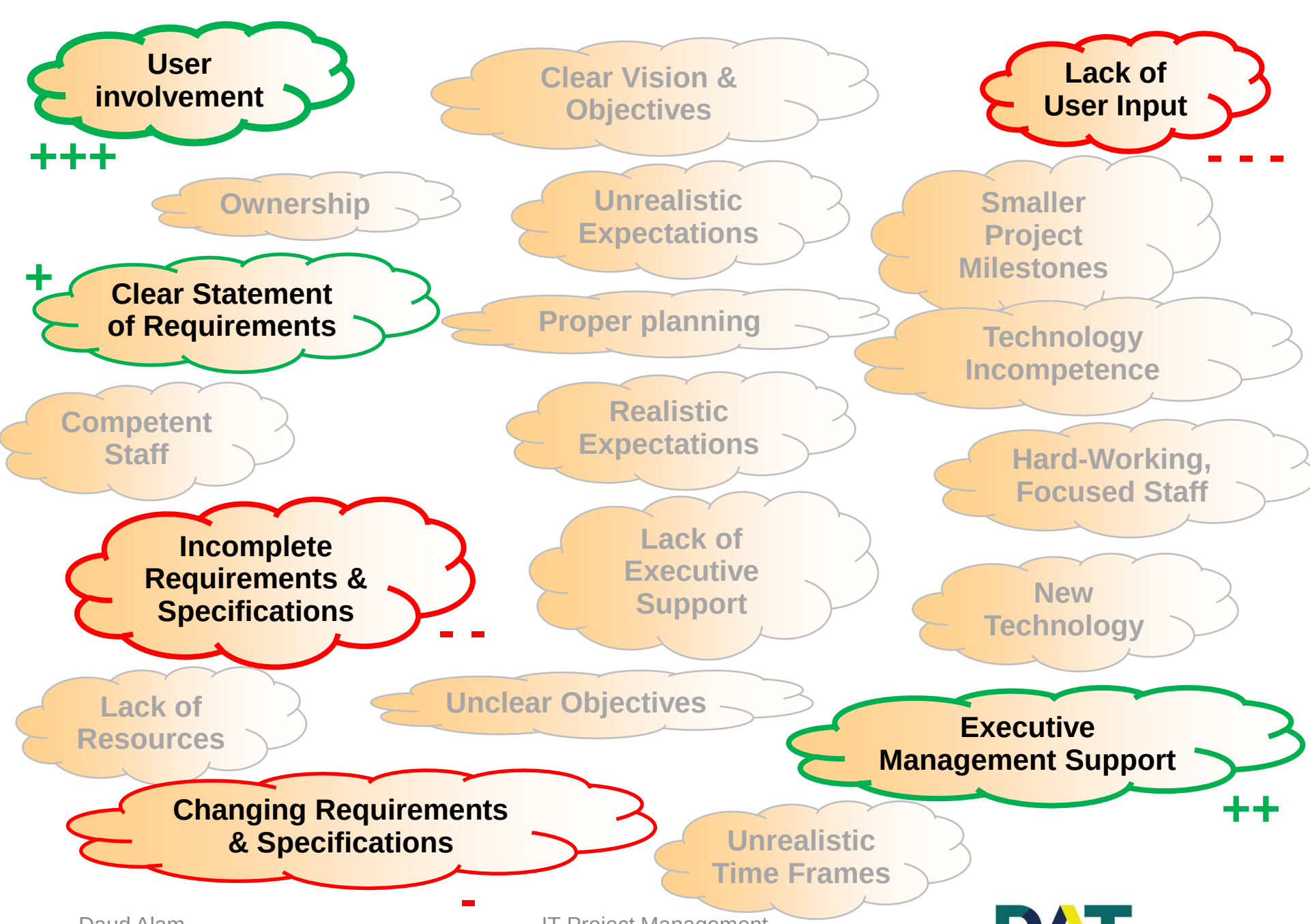
The project is cancelled at some point during the development cycle.

Cost or time overruns or didn't fully meet the user's needs

Project is completed on-time and on-budget, with all features and functions **as initially** specified.

New definition of success factors since 2011: On time, on budget with a **satisfactory result** [HW15]


User involvement
Clear Vision & Objectives
Lack of User Input
Ownership
Unrealistic Expectations
Smaller Project Milestones
Clear Statement of Requirements
Proper planning
Technology Incompetence
Competent Staff
Realistic Expectations
Hard-Working, Focused Staff
Incomplete Requirements & Specifications
Lack of Executive Support
New Technology
Lack of Resources
Unclear Objectives
Executive Management Support
Changing Requirements & Specifications
Unrealistic Time Frames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- -
Lack of Executive Support
New Technology
Lack of Resources
Unclear Objectives
Executive Management Support
++
Changing Requirements & Specifications
-
Unrealistic Time Frames

Successful Projects

Project Success Factors [SG14]	% of Responses
1. User Involvement	15.9 %
2. Executive Management Support	13.9 %
3. Clear Statement of Requirements	13.0 %
4. Proper Planning	9.6 %
5. Realistic Expectations	8.2 %
6. Smaller Project Milestones	7.7 %
7. Competent Staff	7.2 %
8. Ownership	5.3 %
9. Clear Vision & Objectives	2.9 %
10. Hard-Working, Focused Staff	2.4 %
Other	13.9 %

Successful Projects

Project Challenged Factors [SG14]	% of Responses
1. Lack of User Input	12.8 %
2. Incomplete Requirements & Specifications	12.3 %
3. Changing Requirements & Specifications	11.8 %
4. Lack of Executive Support	7.5 %
5. Technology Incompetence	7.0 %
6. Lack of Resources	6.4 %
7. Unrealistic Expectations	5.9 %
8. Unclear Objectives	5.3 %
9. Unrealistic Time Frames	4.3 %
10. New Technology	3.7 %
Other	23.0 %

Contents

Process Models

- Different process models and standards have been deployed – on international level
  - ***Project Management Body of Knowledge (PMBOK-Guide)*** [PMI17]
    Standard of the US American
    Project Management Institute (PMI) [PMI20]
  - ***PRINCE2***
    Originally PRINCE (acronym for **PR**ojects **IN** **C**ontrolled **E**nvironments) was a standard by the British government for IT project management. The further development to PRINCE2 is de facto standard for project management in Great Britain, but used in other countries as well [axe20].

Process Models

- Different process models and standards have been deployed – on international / national level
  - ***IPMA Competence Baseline (ICB)*** [IPMA20]
    - The ICB is a common framework to ensure that consistent and harmonized standards are used
    - National cultural differences are addressed in National Competence Baselines by adding specific competence elements and content to the ICB

Process Models

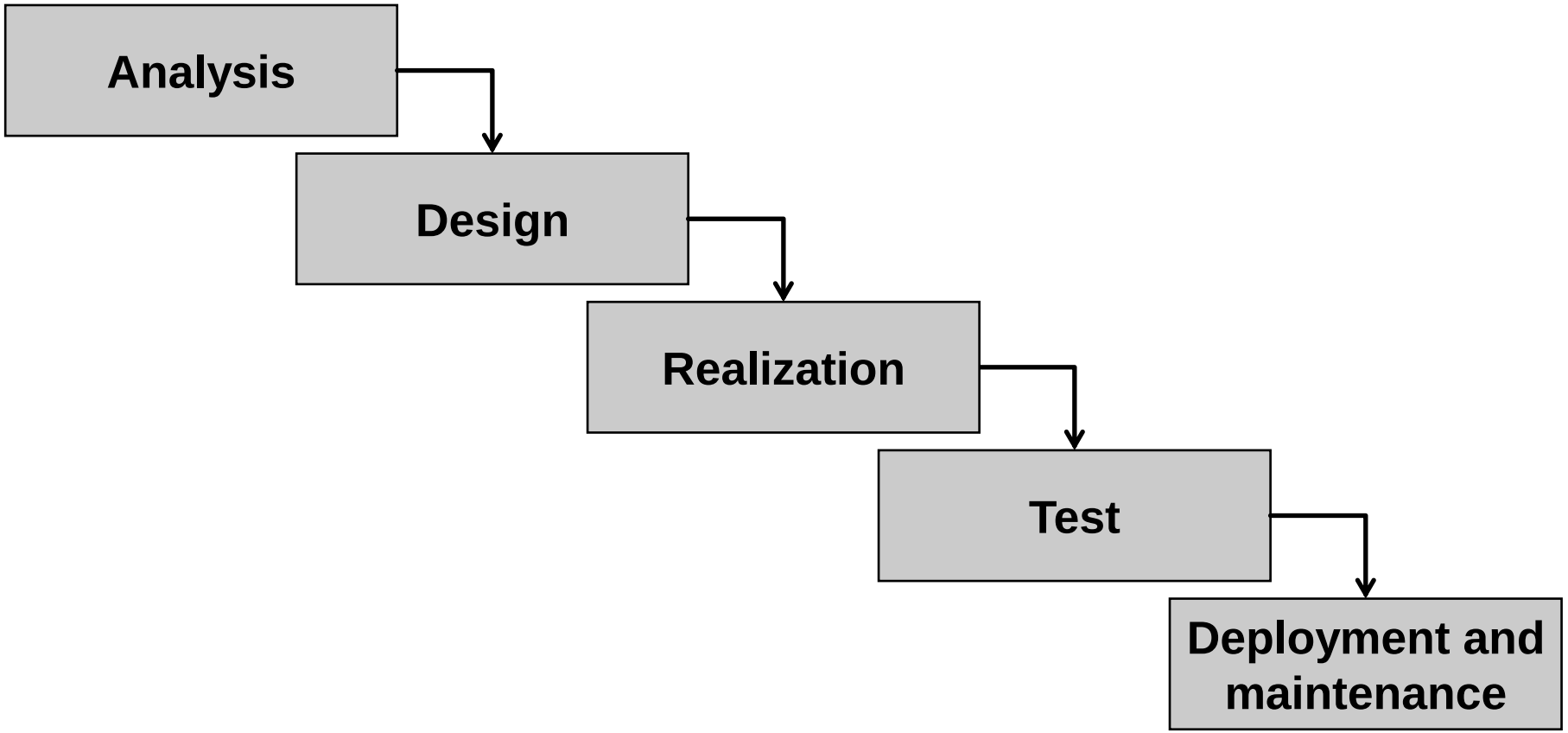
- Different process models and standards have been deployed – on company level.
  Examples
  - ITPM at BMW Group [Pri06]
  - Houston at Daimler AG [Gor10]
  - Project Management Excellence at Siemens AG [Sie11]

Process Models

- Different process models and standards have been deployed – for different domains. Example for IT
  - Waterfall model
  - V-Model
  - Rational Unified Process (RUP)
  - Scrum

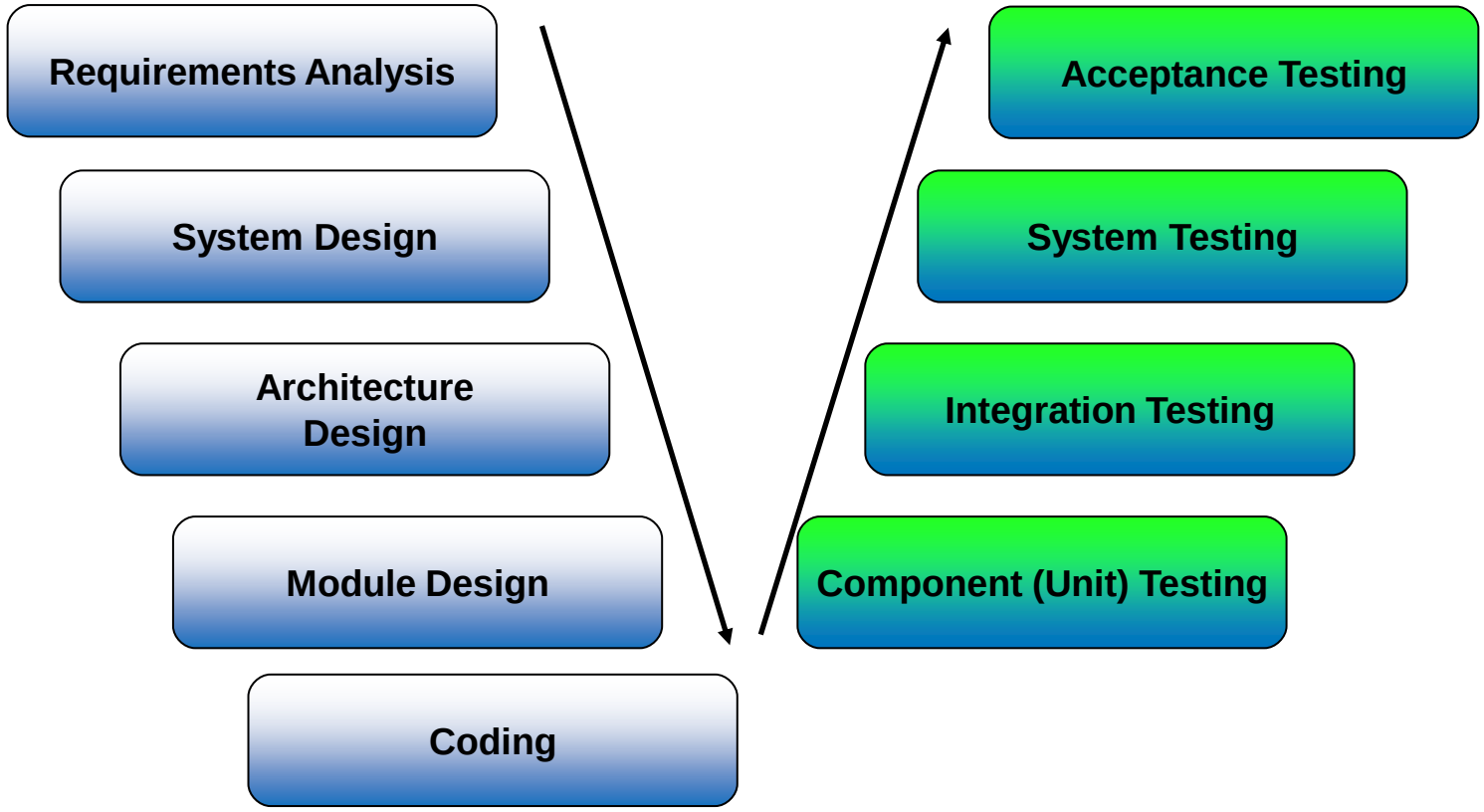
Process Models

– Waterfall model [Roy70]



Process Models

– V-Model [Bun18]



Process Models

– Rational Unified Process (RUP) [JBR99]

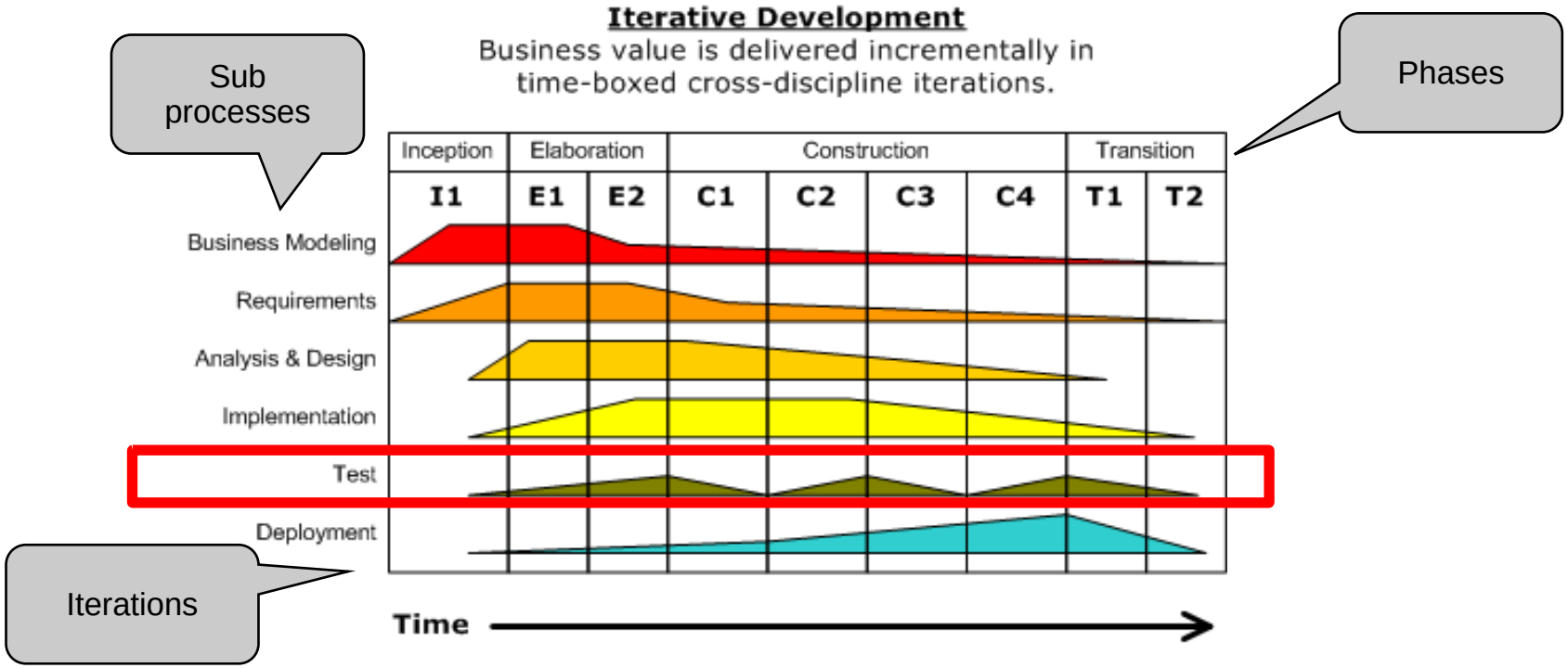


Image source: https://upload.wikimedia.org/wikipedia/commons/1/19/Development-iterative.png

Process Models

– Scrum [SchS18]

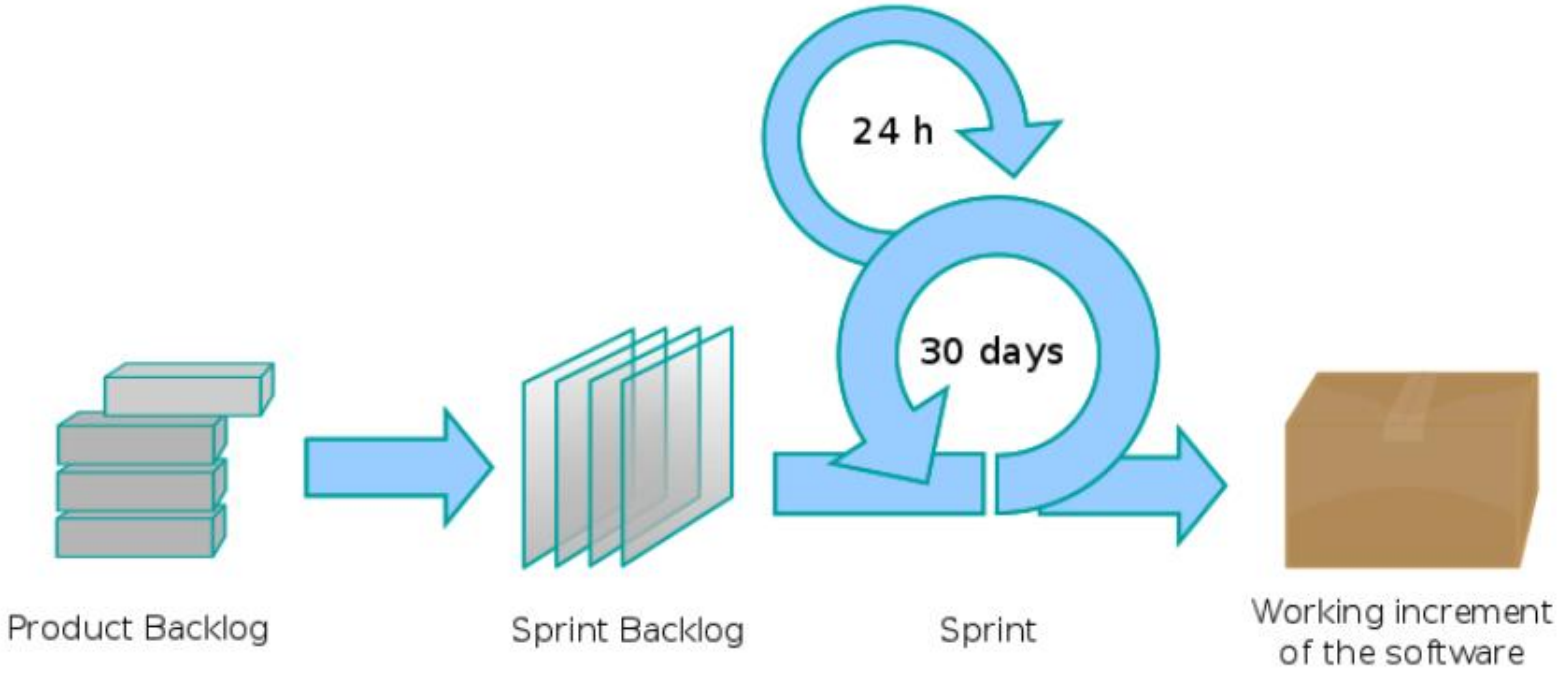


Image source: https://en.wikipedia.org/wiki/File:Scrum_process.svg

Process Models

- Why process models and standards?
  - To ensure in an organization continuous project management quality in using same procedures and similar documentation methods
  - To be considered: Projects are different concerning topic, size, objectives, and scope
  - Tailoring should help to adapt the process model on project specific needs

Process Models

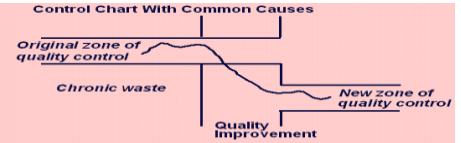
- ***CMMI (Capability Maturity Model Integration)***
  - Process model to improve processes in organizations
  - Framework of best practices
  - Developed by experts from industry, government, and the Software Engineering Institute (SEI) at Carnegie Mellon University (CMU), USA
  - CMMI models provide guidance for developing or improving processes that meet the business goals of an organization.
  - Defines five “Maturity Levels”

Process Models

CMMI maturity levels

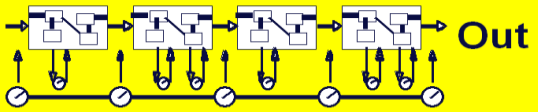
5 Focus on process improvement

"Optimizing"



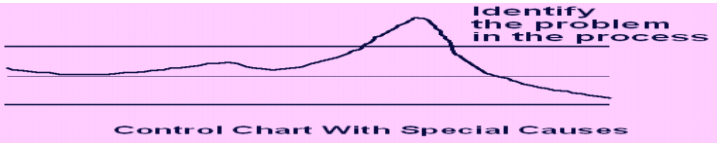
4 Processes measured and controlled

"Quantitatively Managed"



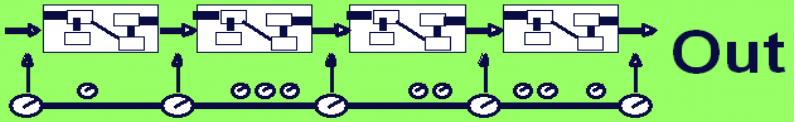
3 Processes characterized, fairly well understood

"Defined"



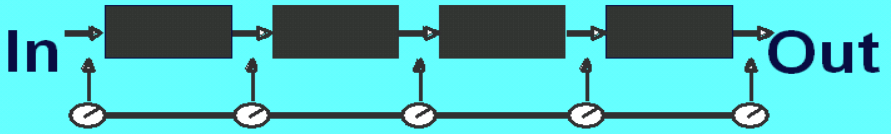
2 Projects can repeat previously mastered tasks

"Managed"



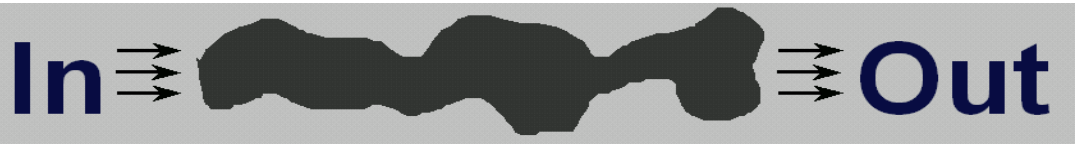
1 Processes unpredictable and poorly controlled

"Performed"



0 Processes dependent on "Heroes"

"Incomplete"



Process Models

- Evaluation
  - Process models are tools
  - The maturity level of an organization and the usage of defined project management processes
    - ➢ does not guarantee successful projects, but
    - ➢ increases the probability to execute a project successfully.

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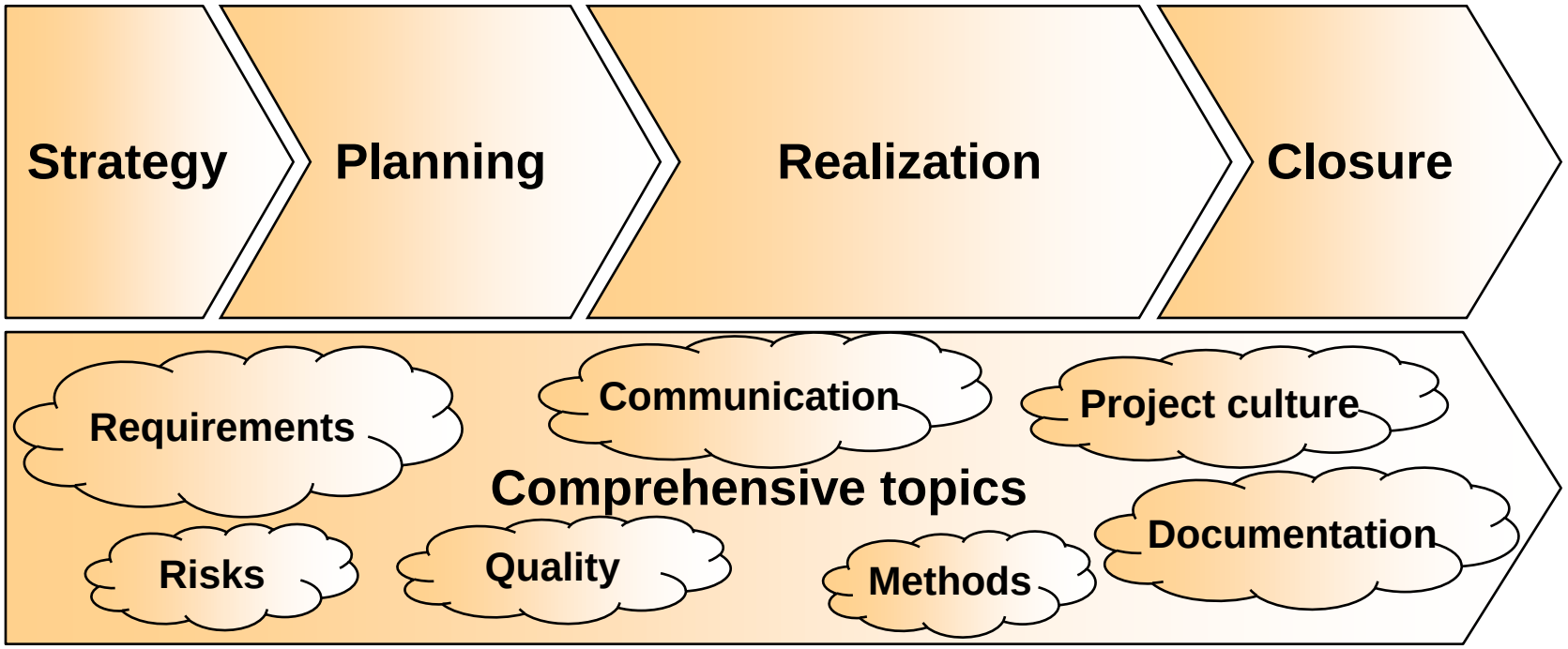
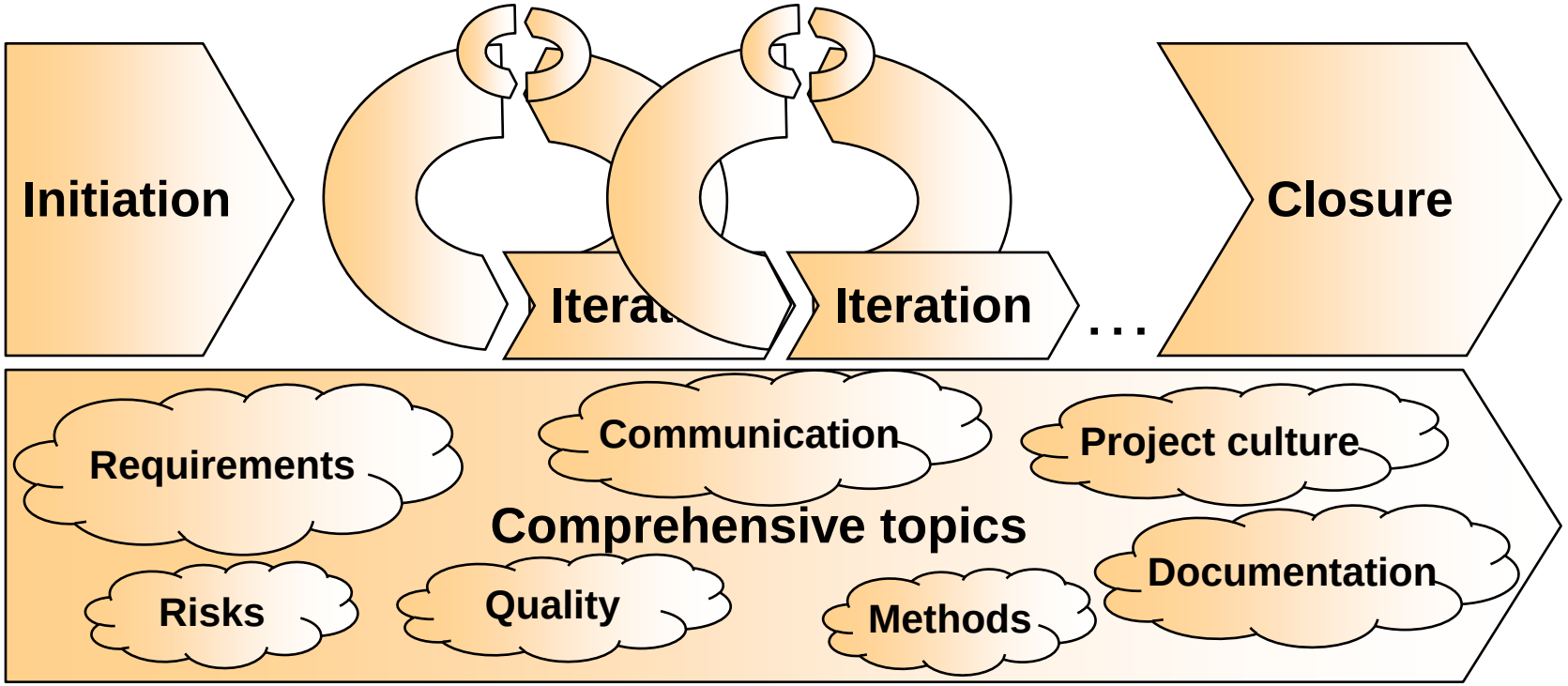
Overview

- Classical approach



Overview

- Agile approach



Overview

- Comprehensive topics
  - Projects consist of comprehensive topics like requirements, project culture, communication, documentation, quality, and risk management
  - Additionally there are methods
  - These topics are important during different or all project phases

Overview

- Project phases – Classical approach
  - A project phase is a “chronological sequence of a project, separated against other phases” because of matter of facts.“ [DIN 69901-5:2009-01]
  - No unique differentiation concerning project phases, most sources define at least three phases
    - Planning
    - Execution
    - Closure
  - Additionally a phase “Strategy” could be defined. After a project order the project is in operation.
  - Project phases are typically separated by milestones

Overview

- Project phases – Classical approach
  - Boundaries between project phases are not fix
  - Example:
    - “Requirements specification documents" and “Technical specification documents“ are often required in
      - bigger projects,
      - projects with internal and external partner,
      - classical sectors like automotive, energy, and logistics.
    - These topics will be discussed in the strategy phase, but could be considered in practice in the planning or even execution phase as well.

Overview

- Project phases – Agile approach
  - Iterative and incremental development models [ISTQB20G]
    - ***Iterative development model***:
      A type of software development lifecycle model in which the component or system is developed through a series of **repeated cycles.**
    - ***Incremental development model***:
      A type of software development lifecycle model in which the component or system is developed through a series of **increments.**

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5. Overview
6. Summary

Summary

- Project management importance increases – world wide
- A project is distinguished by an aim with restrictions
  - temporal,
  - financial, and
  - personnel.
- *“Project management is about people getting things done”*
- Successful projects involved user, got executive management support, and had clear requirements
- Project management process models to support projects
- Projects have
  - project phases,
  - comprehensive topics like communication and requirements – important over the complete project lifecycle.