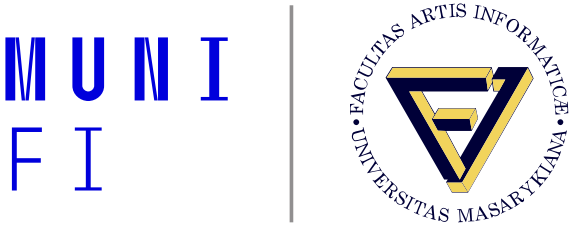

Project Management in IT & Unified Process

PA017 SW Engineering II → Aspects of SW Development Management

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October 4, 2022

Projects in the Czech Republic

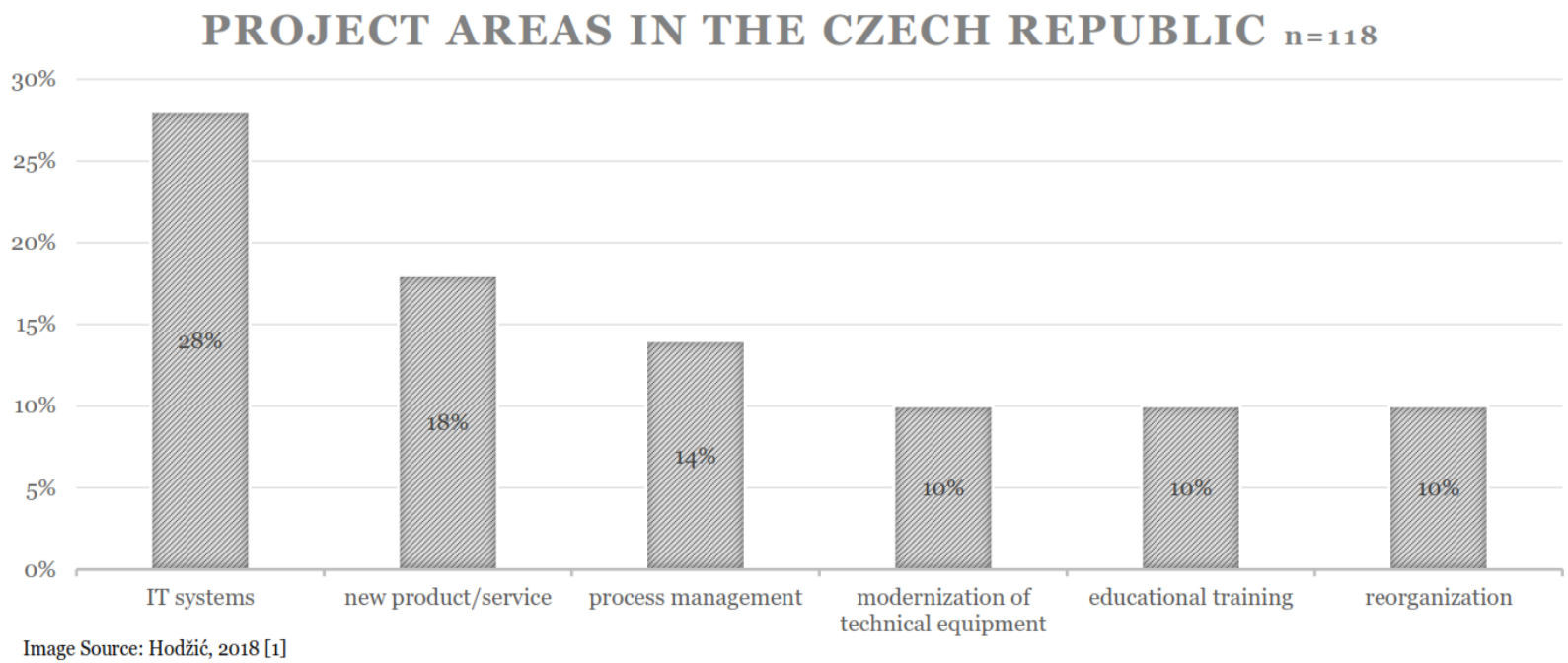


Image Source: Hodžić, 2018 [1]

What is an IT project

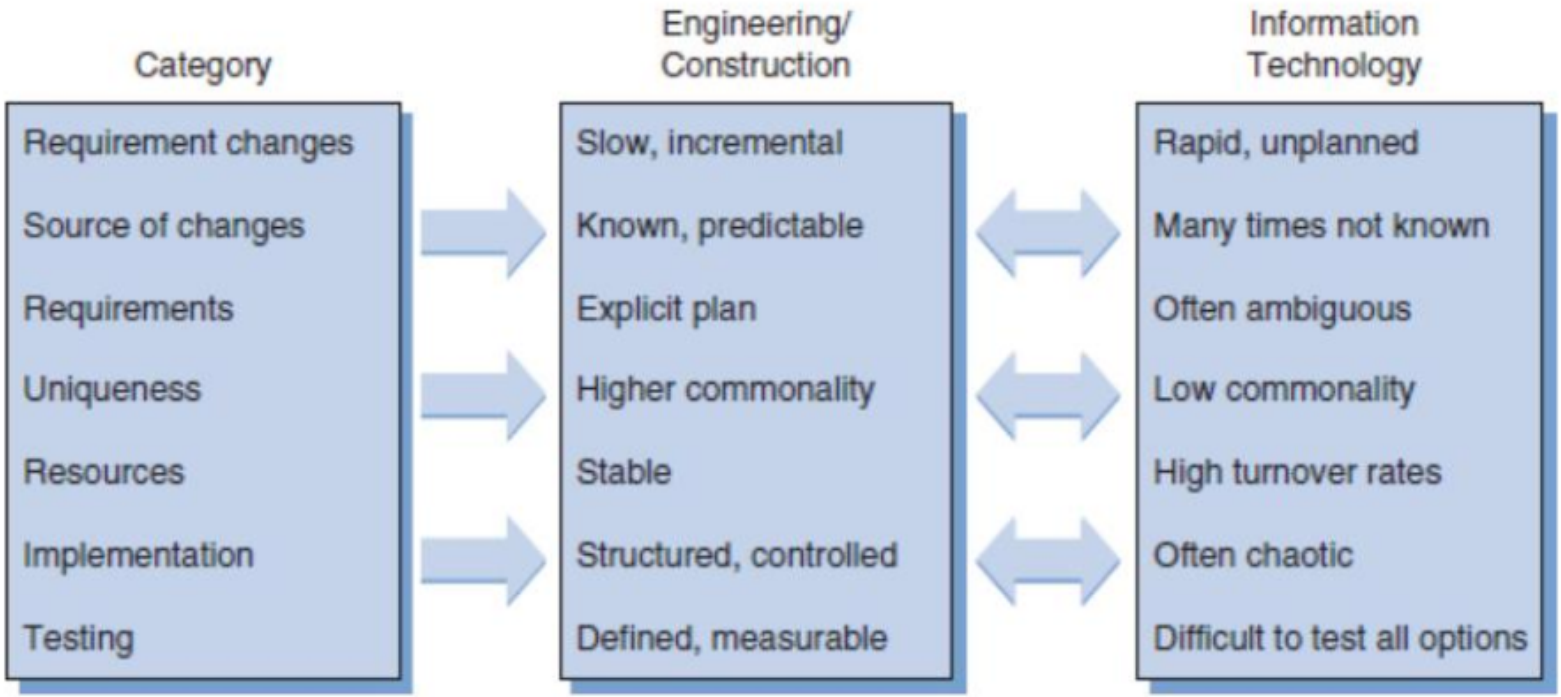
Same as any other project

- Temporary
- Change driven
- Uncertain
- Unique

Difference

- Deliverables are mostly created and operated using **information technology**

IT Projects Characteristics

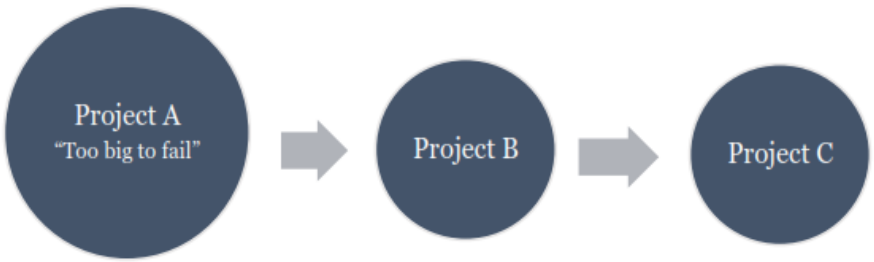


Source: Brewer, 2013 [7]

IT Projects Characteristics

Dependency of Projects in a Portfolio

- Failures within one project can have cascading effect on other projects
- Be aware of which project is critical and may jeopardize others



More on modelling criticality in projects in: Neumaier, 2018 [8]

IT Projects Characteristics

Importance of Risk Management

- Uniqueness, frequent change of requirements, unstable resources = **higher risk of failure**
- Risk management is often underestimated

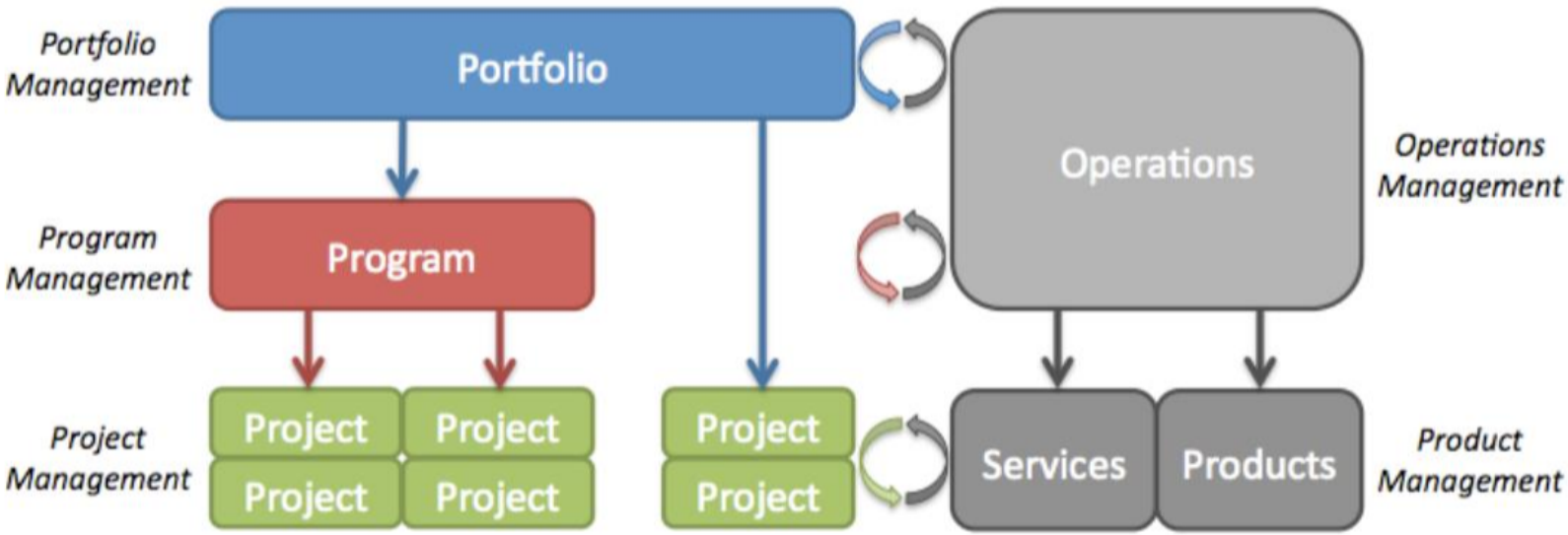
Success rate of SW development projects (n=5000)

	2013	2014	2015
SUCCESFULL	41%	36%	36%
CHALLENGED	40%	47%	45%
FAILED	19%	17%	19%

Source: Chaos report, 2015 [4]

IT Project - The Big Picture

Project's deliverables will become part of **services and products** that require further **management**.



Source: Bernardinelli, 2019 [10]

Service Definition

Service

Means of delivering value to customers by facilitating outcomes customers want to achieve (e.g. sending email), but without the ownership of specific cost (e.g. mail server) and risk (e.g. ageing of certain mailing technology).

ITIL - Information Technology Infrastructure Library

- Best Practices for IT Services Management
- "*What happens before and after an IT Project?*"
- Five Lifecycle Stages
  - Service Strategy
  - Service Design
  - Service Transition
  - Service Operation
  - Continuous Service Improvement
- Each stage consists of processes with clearly defined inputs and outputs

ITIL - When Project's Output is a Service

Service Strategy
What is the strategy and demand for our project's output? What service are we creating or substantially changing? How are finances distributed within services?

Service Design
What are the SLA's and availability rates for running our services? How do we handle risks at the service level? Is out data and products secure and compliant with business policies and legal requirements?

Service Transition
What changes does our project bring to existing services? How do we deploy our software? How do we store and share knowledge gained during our project?

Service Operation
What documentation do we provide for helpdesk? Who will handle incidents, requests and problems? How do we manage identities and access to our system?

Continual Service Improvement
Who will monitor, review, evaluate and update our services once they are running?

Types of IT Projects

- **Software development** – most common IT projects
  - Building an interactive website
  - Adding new feature to finance application
  - Developing a system to track child immunizations
  - Developing communications and collaborations platform for employees
  - Developing fingerprint based ATM system
- **IT Procurement**
  - Selecting and deploying new antivirus software
- **IT network and infrastructure**
  - Improving company's network security
  - Extending wireless internet access across the whole university
- **System Integration**
  - Deploying WordPress, integrated with company's centralized authentication and authorization

Main Approaches to SW Development

Predictive

- More rigid
- Focus on processes
- Fixed scope / requirements
- Thorough upfront planning
- Example: **Unified Process**

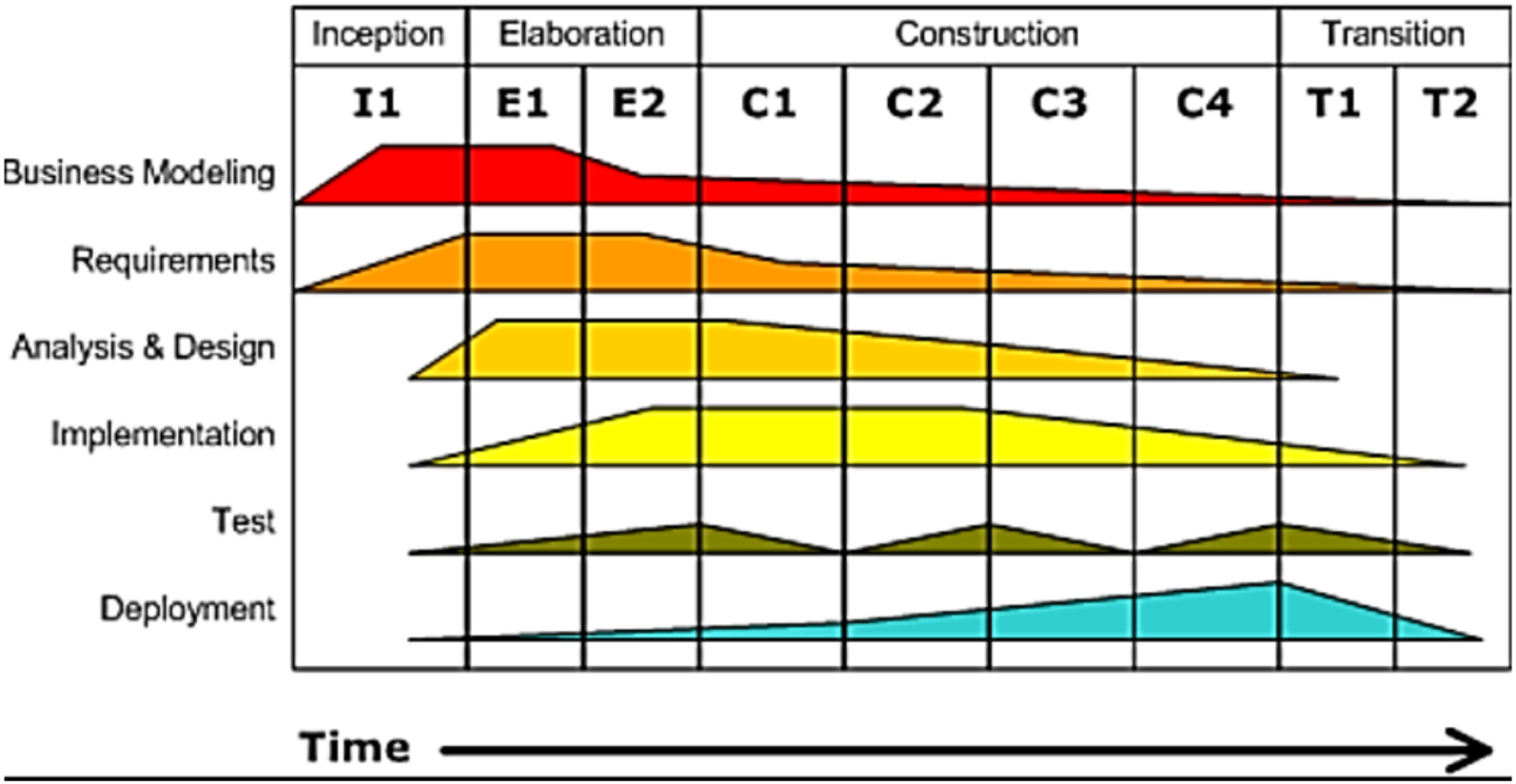
Agile

- Flexible and adaptable
- Focus on people
- Regularly updated requirements
- Minimal upfront planning
- Example: **SCRUM**

Unified Process Overview

- Predictive SW development framework
- Iterative and incremental approach
- Risk driven
- Architecture-centric
- Use-case (requirements) driven

UP Lifecycle

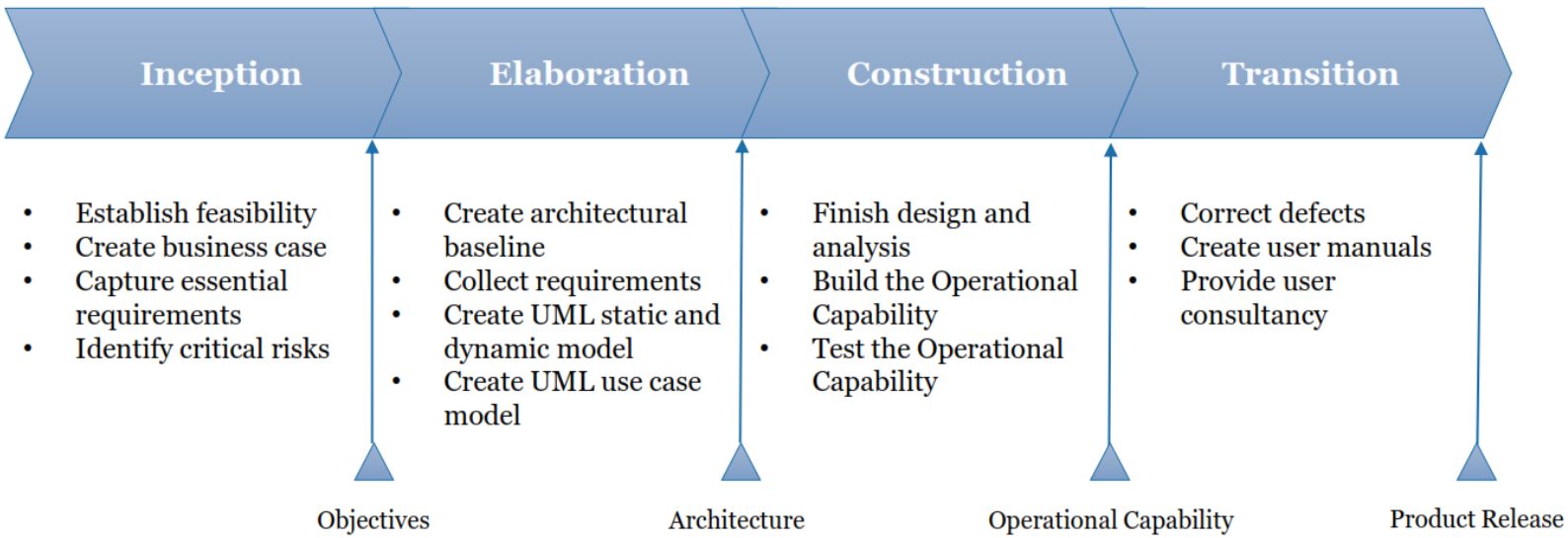


Source: (Arlow, 2005)

UP Iterations

- Each iteration is like a **mini-project**
- It should not last more than **3 months**
- Difference between two consecutive iterations is called **increment**
- Each iteration includes six workflows:
  - Business Modelling
  - Requirements
  - Analysis and Design
  - Implementation
  - Test
  - Deployment (internal or external)
- Iterations are grouped into **phases**

UP Phases


Inception
Elaboration
Construction
Transition
• Establish feasibility
• Create business case
• Capture essential requirements
• Identify critical risks
• Create architectural baseline
• Collect requirements
• Create UML static and dynamic model
• Create UML use case model
• Finish design and analysis
• Build the Operational Capability
• Test the Operational Capability
• Correct defects
• Create user manuals
• Provide user consultancy
Objectives
Architecture
Operational Capability
Product Release

UML Diagrams in UP

Business modelling	Diagram interpretable by stakeholders Modelling costs, revenue, loss factors, exit plan **Activity Diagram**
Requirements Analysis	Modelling user expectations Primary contract between developer and client **Use Case Diagram**
Design	Diagrams that help developer code requirements **Class diagram, Sequence diagram, Collaboration diagram**
Implementation	Diagrams related to OOPL **Class diagram, Object diagram, Component diagram**
Test	**Use Case diagram** for black box testing of all interactions between actors and the system **Class diagram** to detect undesired interaction among classes **Activity diagram** to find alternative process flows
Deployment	Making SW available for use SW and HW needs **Deployment diagram** with physical subsystems and their dependencies

When to Use Unified Process

- most requirements have to be specified upfront
- you need complete control over the process and team
- the development process needs thorough documentation (UML diagrams)

Contracting in Predictive Development

Fixed Time, Fixed Price

Agreement to pay for certain outcome (product) that is clearly defined upfront.

Advantages

- Customer gets product defined in the contract
- No need for customer's supervision during the project

Disadvantages

- Strict deadlines and budget
- Fulfilling change requests is difficult
- Project requires more planning time
- Contract must include a lot of specifics (acceptance criteria, milestones, deadlines, penalties...)

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