Course 12

Risk Management

Risk in SE

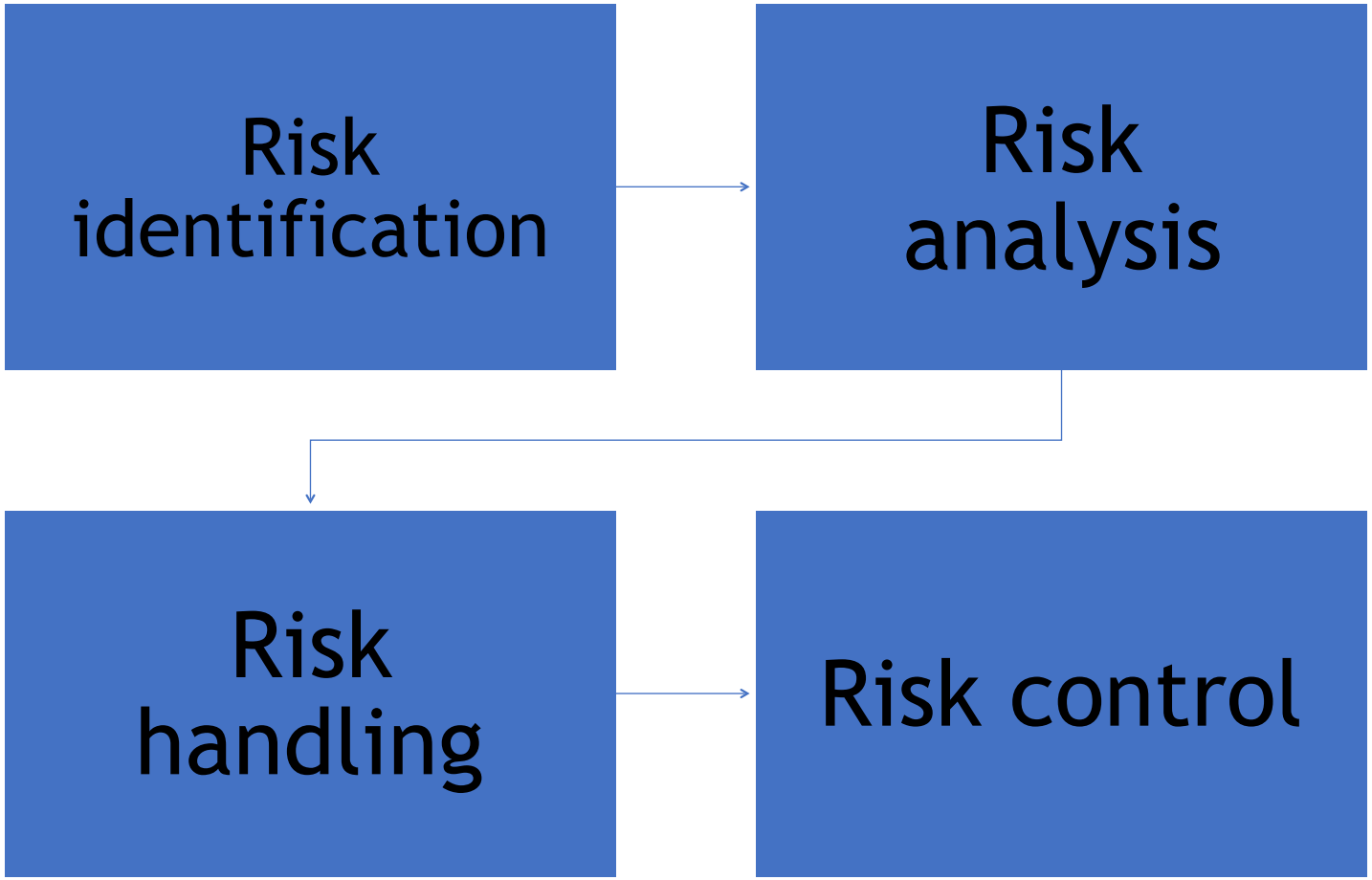
- **Risk = probability of something bad to happen + negative consequences**

- Project Management Body of Knowledge (PMBoK): „ a project is an endeavor to create a product or service.’”

- Software development:
  - Human: high skills
  - Technology

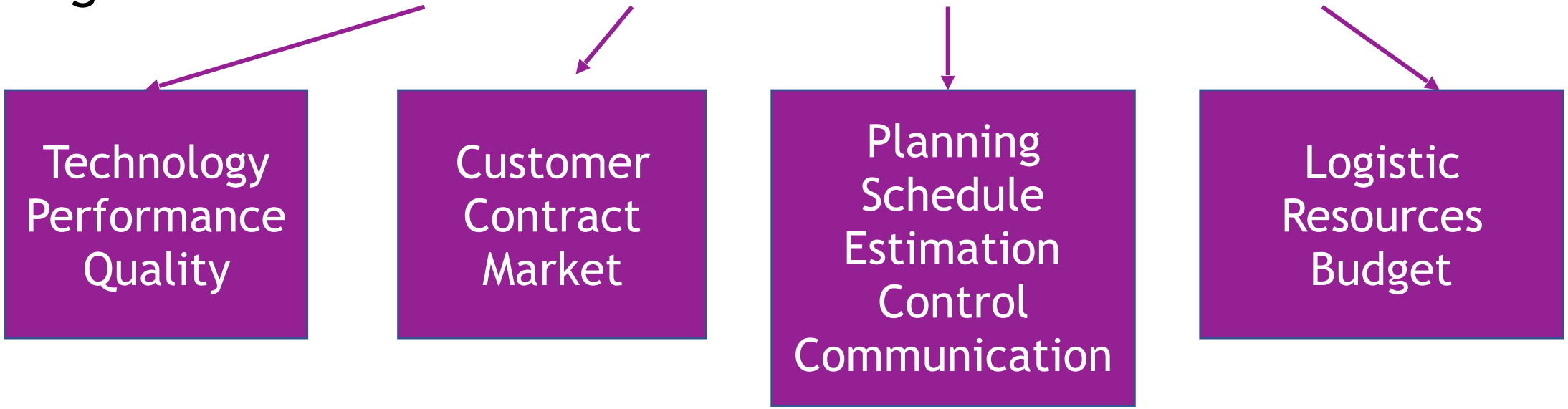
- Risk Analysis and Management - key PM practice

4 steps process



Risk identification

- Identify threats – are they risks?
- From where: risk repository, checklists, expert opinion, project status
- Types of risks: technical, external, project management, organizational



Tools for Risk identification

- SWOT analysis (see course 8)
- FMEA
- Scenario Analysis

FMEA – Failure Mode and Effects Analysis

No	Risk	Potential failure	Potential cause	Probability	Severity	Detection	...

Rating	Meaning
A	Extremely Unlikely (Virtually impossible or No known occurrences on similar products or processes, with many running hours)
B	Remote (relatively few failures)
C	Occasional (occasional failures)
D	Reasonably Possible (repeated failures)
E	Frequent (failure is almost inevitable)

FMEA – Failure Mode and Effects Analysis

No	Risk	Potential failure	Potential cause	Probability	Severity	Detection	...

Rating	Meaning
1	Certain – fault will be caught on test
2	Almost certain
3	High
4	Moderate
5	Low
6	Fault is undetected by Operators or Maintainers

Scenario Analysis

- Define problem
- Gather data
- Separate certainty from uncertainty
- Develop scenario

Example: Pass SQ course

No	Risk	Potential failure	Potential cause	Probability	Severity	Detection	...

Risk analysis / estimation / assesment

Project Objective	C Rating 10	B Rating 50	A Rating 100
Cost	Cost increase > 0 % or > 0 €	Cost increase 5 - 10% or > 50.000 €.	Cost increase > 10 % or > 100.000 €.
Schedule	overall project schedule delay > 0 days	overall project schedule delay > 1 week	overall project schedule delay > 2 weeks *
Scope	Scope decrease barely noticeable	Minor areas of scope are affected	Major areas of scope are affected; scope reduction unacceptable to the client
Quality	Quality reduction barely noticeable	Quality reduction does not affect vital functionality	Quality reduction requires client approval

High probability – (80 % ≤ x ≤ 100%)
Medium-high probability – (60 % ≤ x < 80%)
Medium-Low probability – (30 % ≤ x < 60%)
Low probability (0 % < x < 30%)

Impact Probability Matrix

		Probability			
		1 = high (80% ≤ x ≤ 100%)	2 = medium high (60% ≤ x < 80%)	3 = medium low (30% ≤ x < 60%)	4 = low (0% < x < 30%)
Impact	A=high (Rating 100)	(Exposure – Very High) (Score 100)	(Exposure – Very High) (Score 80)	(Exposure – High) (Score 60)	(Exposure – Moderate) (Score 30)
	B=medium (Rating 50)	(Exposure – High) (Score 50)	(Exposure – Moderate) (Score 40)	(Exposure – Moderate) (Score 30)	(Exposure – Low) (Score 15)
	C=low (Rating 10)	(Exposure – Low) (Score 10)	(Exposure – Low) (Score 8)	(Exposure – Low) (Score 6)	(Exposure – Low) (Score 3)

Back to example – Impact Probability Matrix

Probability / impact	High	Medium high	Medium low	Low
A - high				
B - medium				
C - low				

Lo fa | Hi te ju | Lo fo | High impact, low probability: rare occurrences;

Risk handling / mitigation

- Measures and mechanisms to influence risks

Risk control

- Report
- Monitor
- Risk handling mechanisms

Risk control

- Eliminate the risk: what-if analysis – Excel
- Lower the probability of occurrence
- Lower the impact of risk

- Monitoring: during project
- Audit: metrics at the end of project

Good practices:

- Flexible organization:
  - Postpone decision when more data is available
  - Restructure the project
  - Stage the project
  - Analyze and simulate the effects of decision

Further reading

- https://www.pmi.org/learning/library/risk-analysis-project-management-7070
- https://www.nap.edu/read/11183/chapter/6#24