

For the Change Makers

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Lecture 4: Risk Analysis & Management

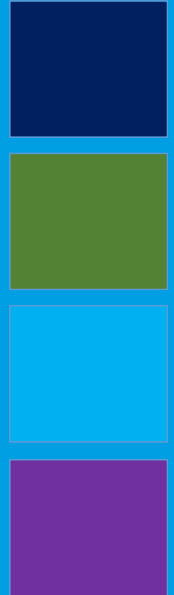
Learning outcomes

Define risk in relation to projects

Understand risk management

Identify and quantify project risks

Discuss mitigating solutions



Projects and risk

Projects are subject to higher levels of **uncertainty** for several reasons:

- they are unique/one-off
- project organisations are often temporary
- they are about change



Making assumptions can have serious consequences...



But change may also be positive...

- 'A **positive risk** event that, if it occurs, will have a beneficial effect on achievement of objectives.'
(APM 2016)

- 'An **opportunity** can be defined as an uncertain event or set of conditions that, if it occurs, would benefit the project or business.'

(Hillson, 2002: 18)



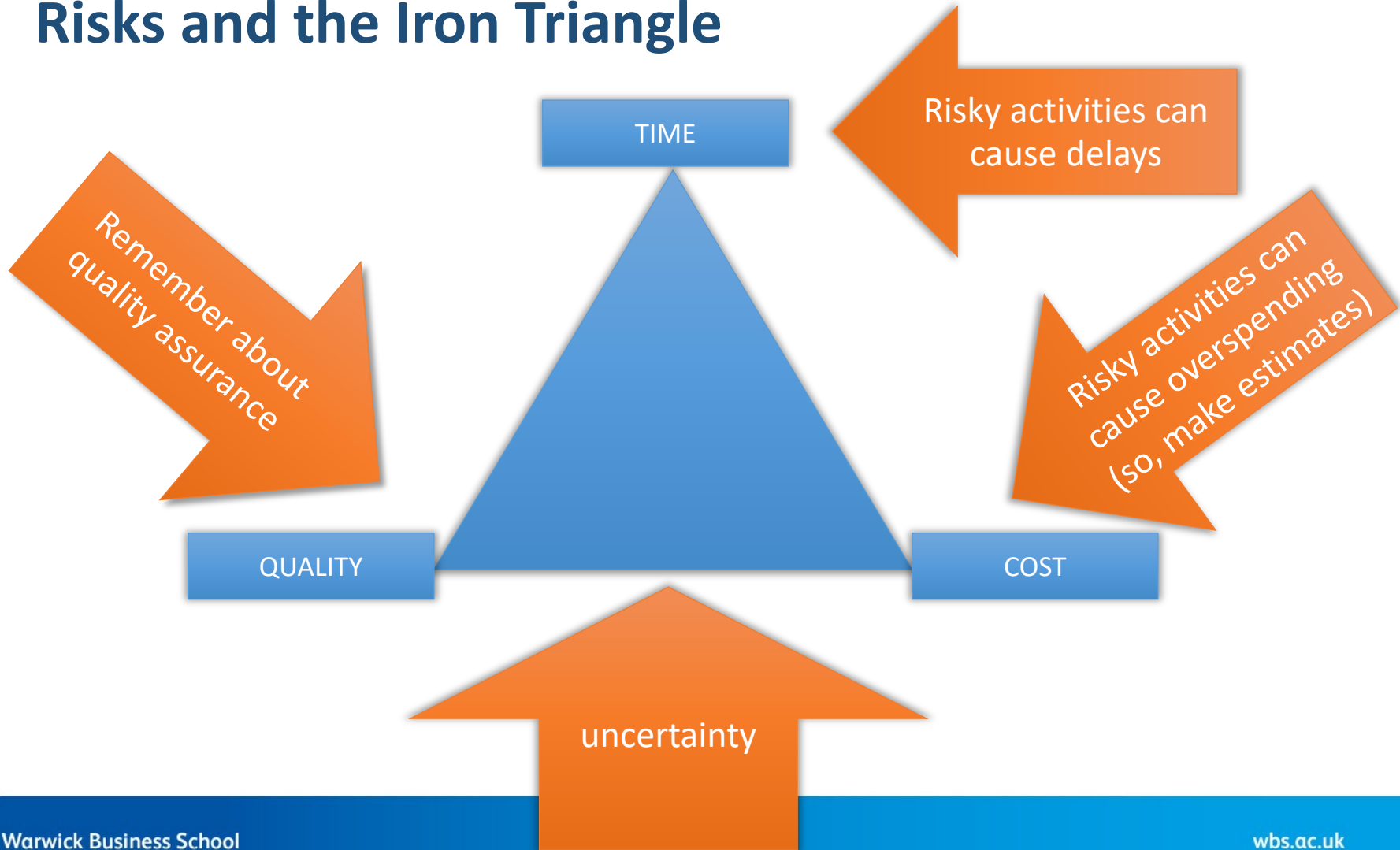
What is risk?

“Project risk is an **uncertain event** or **condition** that, if it occurs, has a positive or negative effect on one or more project objective.”

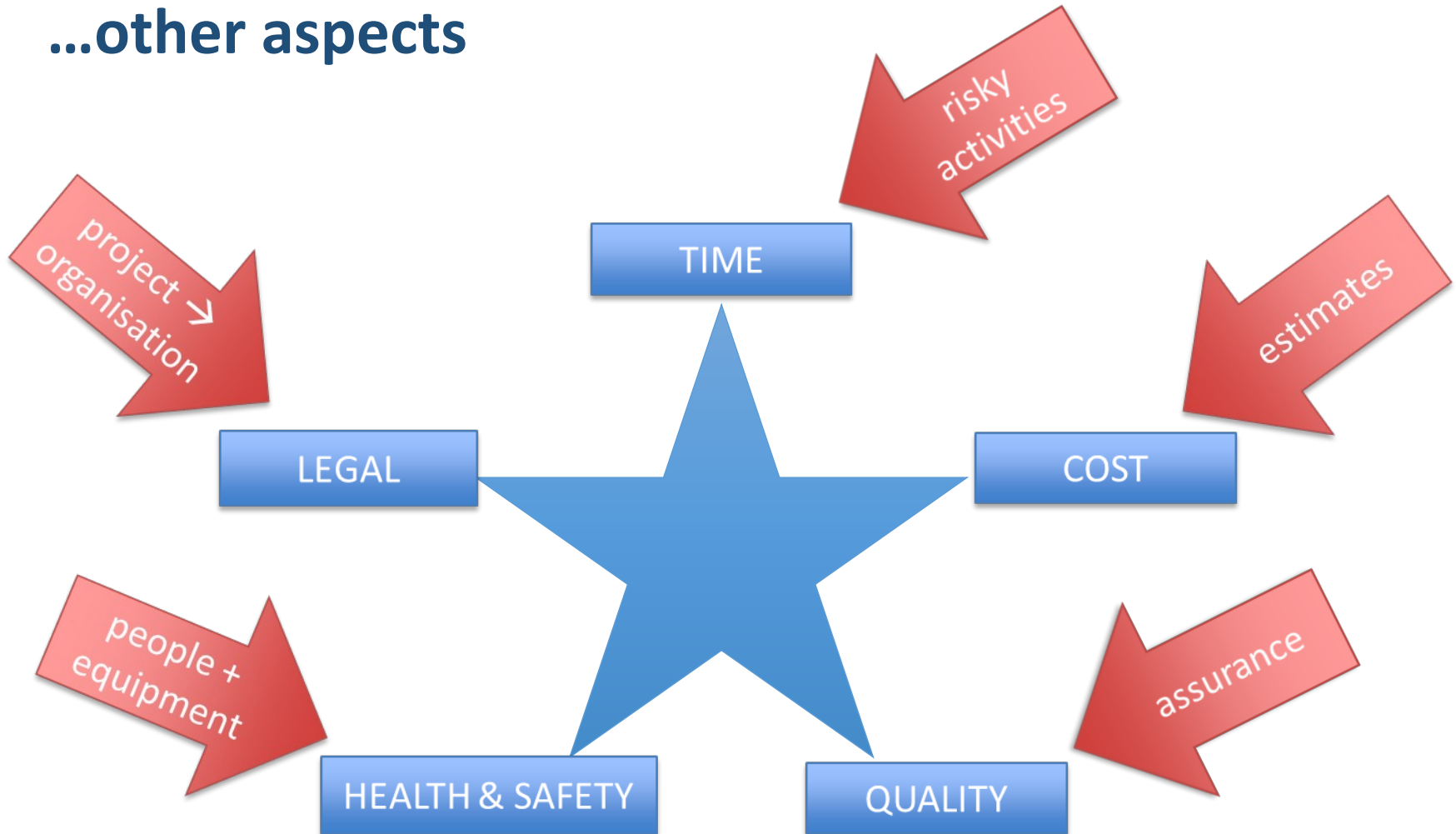
(PMI 2017)



Risks and the Iron Triangle



...other aspects



Three steps of Risk Management

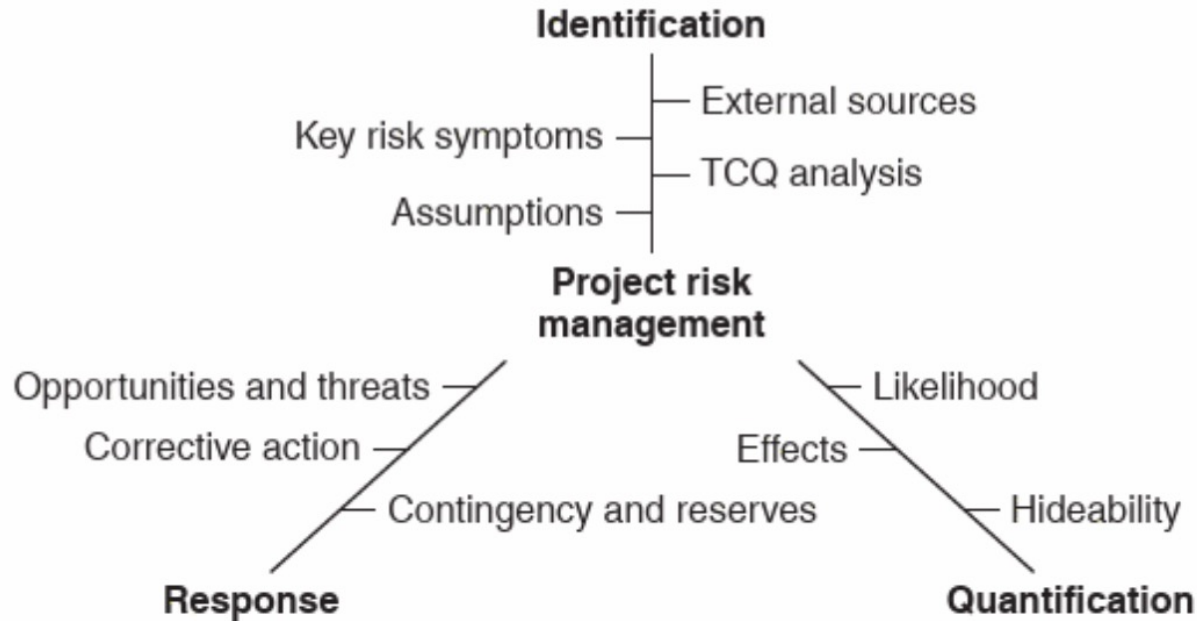
1. Identification
2. Quantification / Analysis
3. Mitigation / Response



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Project risk management



(Maylor and Turner 2022: 246)

Identifying risks

Sources of risks: internal and external

Internal: Risks related to the **project** identified through:

- knowledge of project
- expertise of team and project stakeholders
- previous similar projects

External: Risks residing in the wider **external environment**

- consult widely to gather intelligence
- understanding of project relationship to external environment
- external knowledge repositories



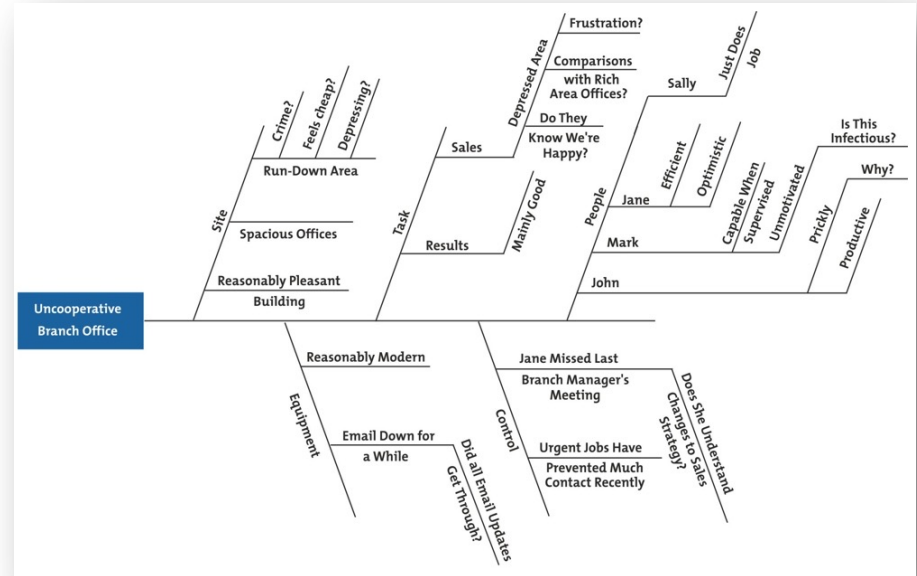
People can be sources of risks too...



Using a fishbone diagram

Allows you to 'reverse engineer' a potential risk.

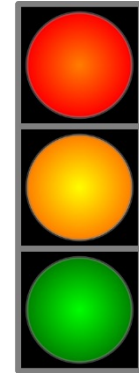
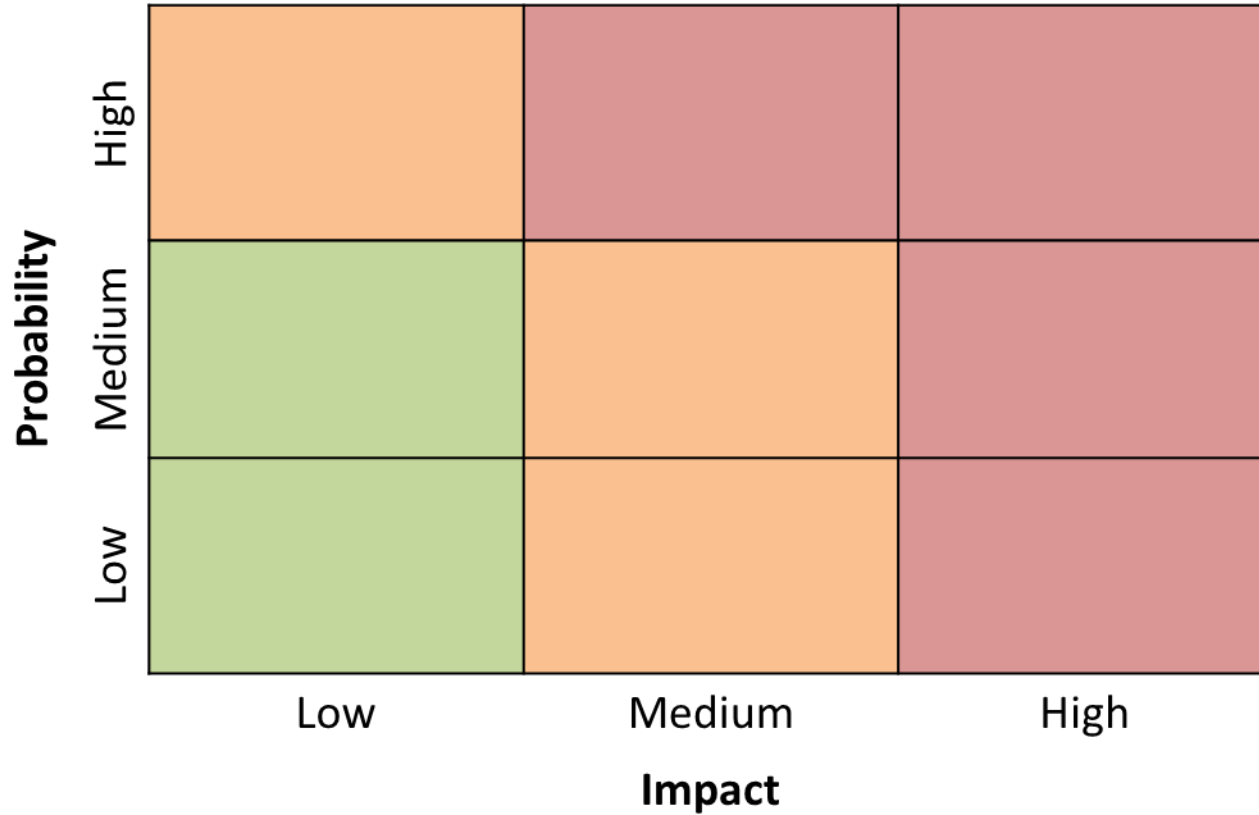
- Identifies link between causes and effect
- Tracks risk back to potential causes
- Highlights triggers
- Breaks down high level factors into detailed contributing features



Risk analysis: tools



Probability-Impact Chart



(Maylor and Turner 2022:250)

Failure Mode Effect Analysis (FMEA)

FMEA is a qualitative and systematic tool, usually created within a spreadsheet, to help anticipate what might go wrong with a project. FMEA also helps find the possible causes of failures and the likelihood of failures being detected before occurrence.

Failure Type	Potential Impact	Severity	Potential Causes	Likelihood	Detection Mode	Hideability/ Detection	RPN
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$$(\text{likelihood}) \times (\text{severity}) \times (\text{hideability}) = \text{RPN}$$

In other words...

$$(\text{probability}) \times (\text{impact}) \times$$

(how easy is it for the team to hide this problem from the client?)



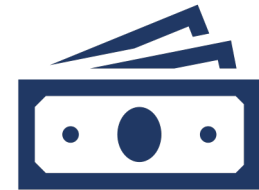
= Risk Priority Number

Expected Value Analysis

expected value =
possible outcome x probability of its occurrence

Example: Expected Monetary Value

Risk	Probability	Impact	EMV = Probability x Impact
1	25%	-\$100.000	-\$25.000
2	15%	-\$200.000	-\$30.000
3	10%	-\$90.000	-\$9.000
4	30%	\$50.000	\$15.000
EMV of The Project			-\$49.000



(Maylor 2010)

Programme Evaluation and Review Technique (PERT)



Example

Optimistic time = o
Most likely time = m
Pessimistic time = p

Activity	o	m	p	Expected Time	Variance
A	3	5	7	5	0.44
B	2	3	10	4	1.78
C	3	4	5	4	0.11
D	4	5	12	6	1.78

$$\text{expected time} = [o + 4m + p]/6$$

$$\text{variance of activity time} = [(p - o)/6]^2$$



Sensitivity Analysis

		Materials & Equipment		
		minus 10%	expected	plus 10%
Labour & Overheads	minus 10%	5	5	5
		-2.07	-2.3	-2.53
		-2.25	-2.25	-2.25
		0.68	0.45	0.22
	expected	5	5	5
		-2.07	-2.3	-2.53
		-2.5	-2.5	-2.5
		0.43	0.2	-0.03
	plus 10%	5	5	5
		-2.07	-2.3	-2.53
		-2.75	-2.75	-2.75
		0.18	-0.05	-0.28

Why analyse risk?

“The objective of the risk analysis is to enable the project manager to include **contingencies**, that is, having identified the most risky elements of the project, to put some **actions** in place to make sure that the **risk is minimised.**”

(Maylor 2010:230)



Planning to manage risks

There are a number of *risk response strategies* available when planning for potential risks.

- The five main strategies for negative and positive risks:

1. Avoid
2. Accept
3. Share
4. Mitigate
5. Transfer

Threats

1. Exploit
2. Enhance
3. Share
4. Accept
5. Reject

Opportunities

Threats Response Strategies

- **AVOID:** Focus on eliminating the cause and thus, eliminating the threat.
- **SHARE:** Allocate ownership of a threat to a third-party.
- **MITIGATE:** There are certain risks that cannot be eliminated. However, their impact can be reduced.
- **TRANSFER:** Transfer the risk to some other party.
E.g. insurance purchases, warranties, guarantees, etc.
- **ACCEPT:** Passive acceptance leaves action to be determined as needed, in case of a risk event. Active acceptance may involve contingency plans to be implemented if risk occurs and allocation of time and cost reserves to the project.

Opportunities Response Strategies

- **EXPLOIT**: Add work or change the project to make sure the opportunity occurs
- **ENHANCE**: Increase the probability and positive impact of risk events
- **SHARE**: Allocate ownership of opportunity to a third-party
- **REJECT**: Do not to take any action on the opportunity
- **ACCEPT**: Passive acceptance leaves action to be determined as needed, in case of a risk event. Active acceptance may involve contingency plans to be implemented if risk occurs and allocation of time and cost reserves to the project.

Monitoring and controlling risks

- Risks must be managed once the project is underway
- Commonly done by use of **risk registers**
- All risks should be transferred to a risk register
- The risk register is a **live document**
- Risks and triggers should be **monitored**
- Each risk will have a risk owner, who will monitor trigger, implement plan (if required) and update team
- **Communication** of risk status is part of risk management

Risk register							
Risk No.	Risk description	Cause of risk	Probability of occurrence	Impact on project	Risk response plan	Risk owner	Date of entry

What do we need to do before the seminar?

Think about and make notes on
the **risks** that can occur
during a **music video production** project
and how to **manage** them.



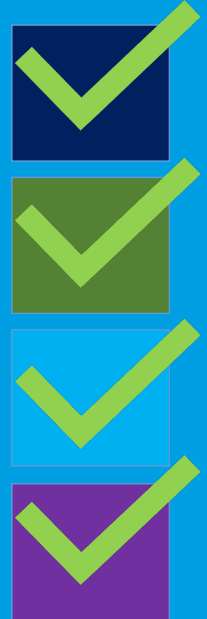
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References and further reading

- Hillson, D. (2002) "Extending the risk process to manage opportunities", *International Journal of Project Management* 20:235-240
- Maylor, H. and Turner, N. (2022) *Project Management (5th Ed.)* Harlow: Pearson
- Maylor, H. (2010) *Project Management (4th Ed.)* Harlow: Pearson
- PMI (2017) *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 6th edition, Project Management Institute, Newtown Square, PA
- Zwikael, O. & M. Ahn (2011) 'The Effectiveness of Risk Management: An Analysis of Project Risk Planning Across Industries and Countries' *Risk Analysis* 31(1):25-37

