Project risk management and project controlling

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PhD (Utrecht University)
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Agenda

- Monday
  - 09.00h. – 17.00h.
    - Vernissage
    - Risks and uncertainty in projects
    - Project Controlling
- Tuesday
  - 09.00h. – 17.00h.
    - Project Controlling (continued)
    - Project Marketing

Risk and uncertainty

The nature of risk in projects

- *What is a (project) risk?*
- *Give 5 examples of project risks*

The nature of risk in projects

- PRINCE2:
  "An uncertain event or set of events that, should it occur, will have an effect on the achievement of objectives"

- PMBOK Guide:
  "An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives."

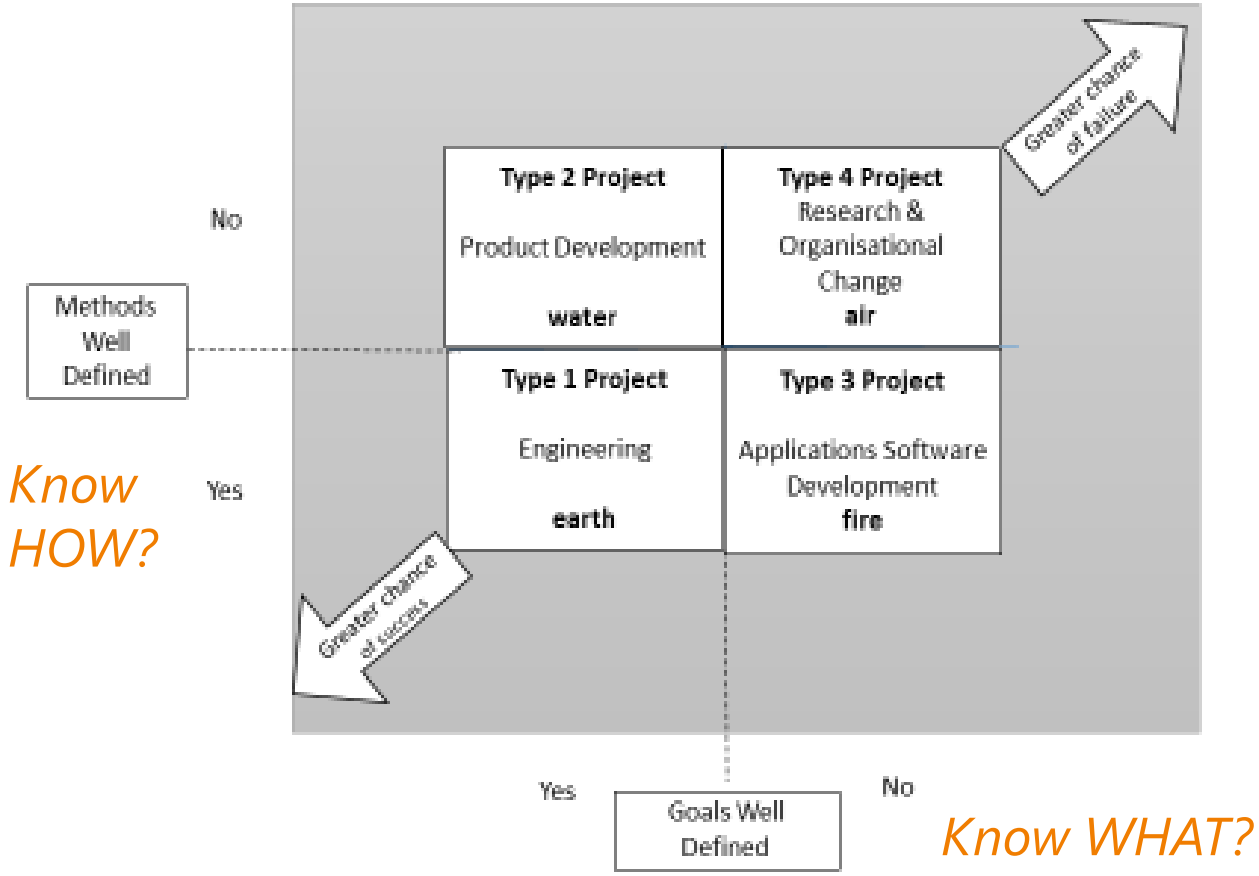
- ISO 31000:
  "Effect of uncertainty on objectives"

The nature of risk in projects
Key concepts

- **Uncertainty**
  - generally resulting from lack of knowledge (Atkinson et al., 2006; Pich et al., 2002)
  - and/or to the inability to measure (Knight, 1921)
  - without additional knowledge, uncertainty is unknown, unpredictable and immeasurable (Bakker, 2011).

- **Effect/Impact**
  - on the project objectives
  - outputs/outcomes?

Uncertainty



Turner, J.R., & Cochrane, R. A. (1993). "Goals-and-methods matrix: Coping with projects with ill defined goals and/or methods of achieving them". *International Journal of Project Management*, 11(2), pp. 93-102.

Risks <> Mistakes

- *Is making mistakes also a risk?*

The nature of risk in projects
Key concepts

- **Uncertainty**
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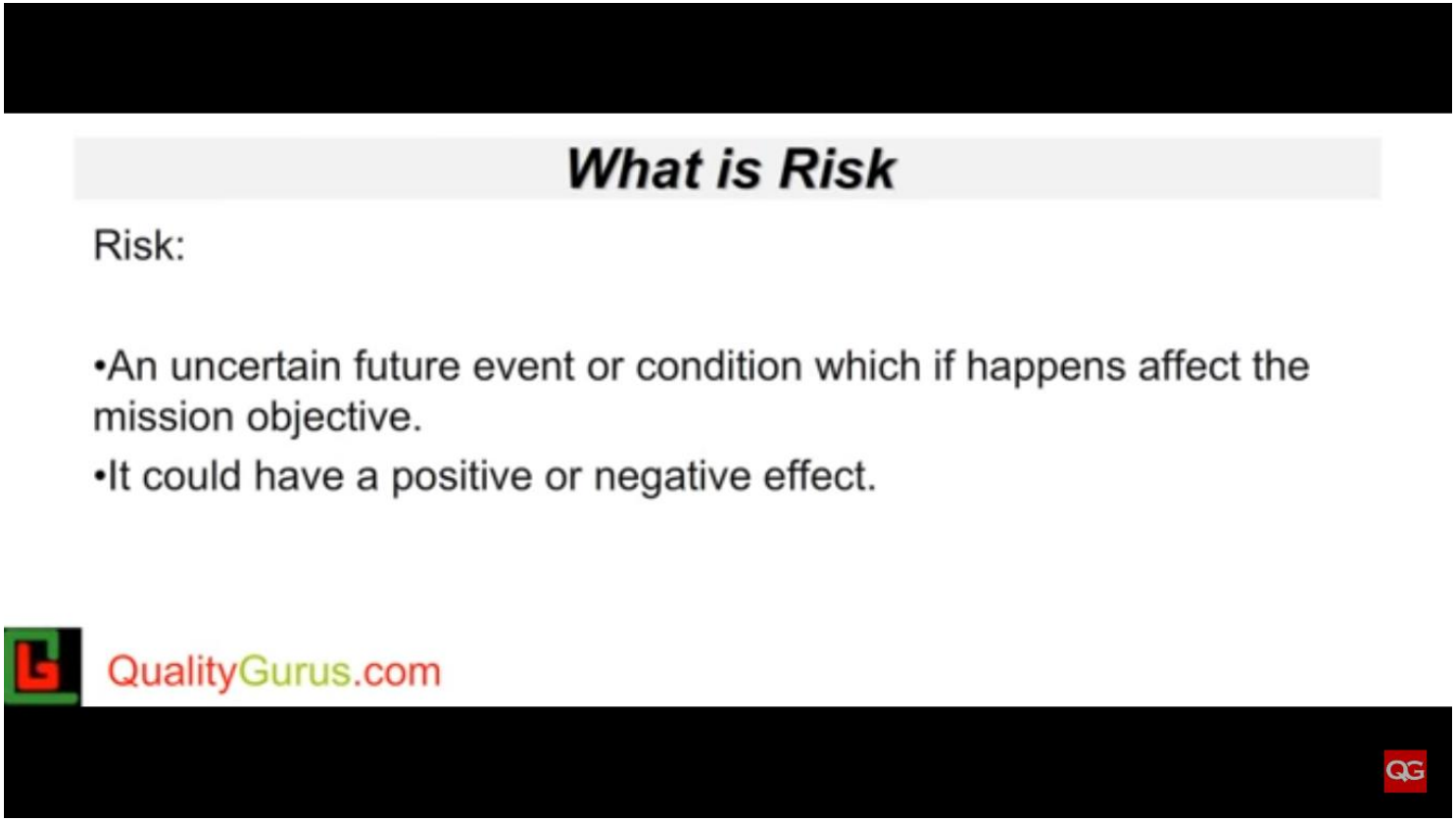
- **Effect/Impact**
  - on the project objectives
  - outputs/outcomes?

Risks <> Issues

- *Is a risk the same as an issue?*
- *If not, what is the difference?*

Now, let's watch…



https://www.youtube.com/watch?v=Cp_XEhexcDw

Project risk management

- Project risk management is about
  - minimizing negative impacts
  - utilizing positive impacts

  by taking actions

- But… Actions cost resources, time and money.

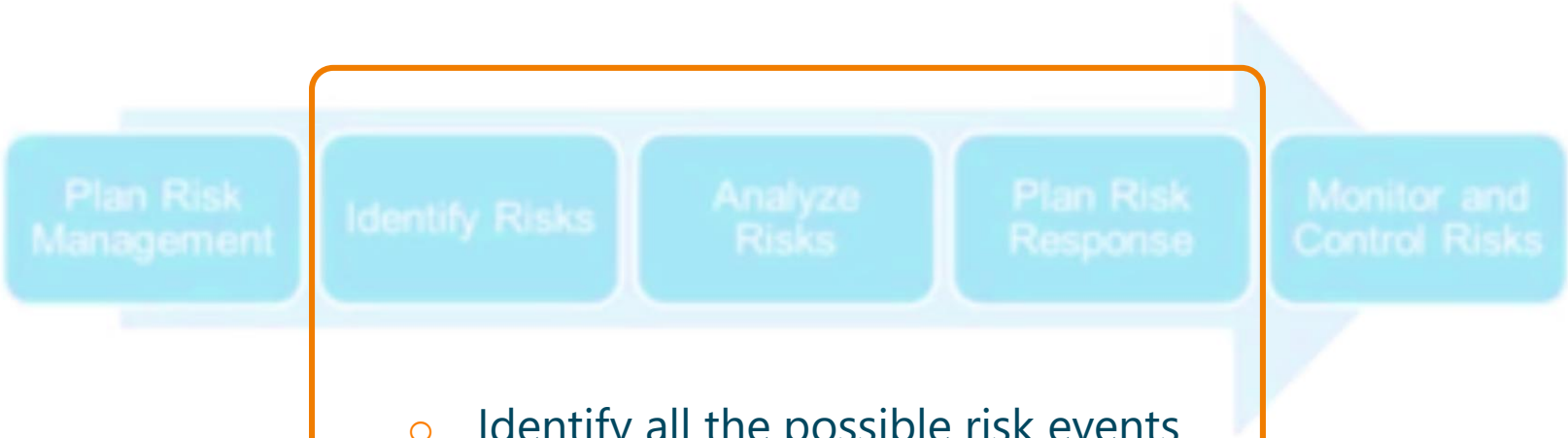
- Therefore project risk management needs to include a cost/benefit analysis for (potential) actions on risks and develop a deliberate risk response strategy

Project risk management process

Project risk management process

ISO 21500	ISO 31000	PMBOK®	ICB 3	M_o_R®
	Establishing the context	Plan risk management		
Identify risks	Risk identification	Identify Risks	Identify and assess risks and opportunities	Identify
Assess risks	Risk analysis Risk evaluation	Perform Qualitative Risk Analysis Perform Quantitative Risk Analysis	Assess the probability of attaining time and cost objectives, and keep doing it during the project	Assess
Treat risks	Risk treatment	Plan risk Responses	Develop a risk and opportunity response plan	Plan
Control risks		Control risks	Continuously identify new risks, reassess risks, plan responses and modify the project plan Control the risk and opportunity response plan.	Implement
			Document lessons learnt and apply to future projects	Communicate Embed and review

Developing a risk management plan



- Identify all the possible risk events that could affect the project
- Analyze and assess each risk in terms of probability, impact severity and controllability
- Develop a strategy and/or contingency for responding to each risk

Identify the project risks

- Generate list of all possible risks by “brainstorming” among team members
- Do not attempt to assess risk probability; that is for a later step
- Focus on risk events, rather than risk consequences
  - For example, “instrument does not return correct data” is a consequence of events like poor circuit design, incorrect or failed components, poor software implementation
- First focus on overall project risks, then identify specific risks
- Use your WBS to help organize your risk identification process
- Seek input from sources from outside your group
- Emphasize critical thinking and remember *Murphy’s Laws*

A framework

External sources of RISKS (for example)

- Political
- Economical
- Social
- Technological
- Environmental
- Legal

Impact /Effect

Internal sources of RISKS (for example)

- Scope
- Planning
- Resources
- Materials
- Suppliers
- Performance
- Accidents
- Price
- Funding
- Management
- …
- …

A framework

External sources of RISKS (for example)

- Political
- Economical
- Social
- Technological
- Environmental
- Legal

Impact /Effect

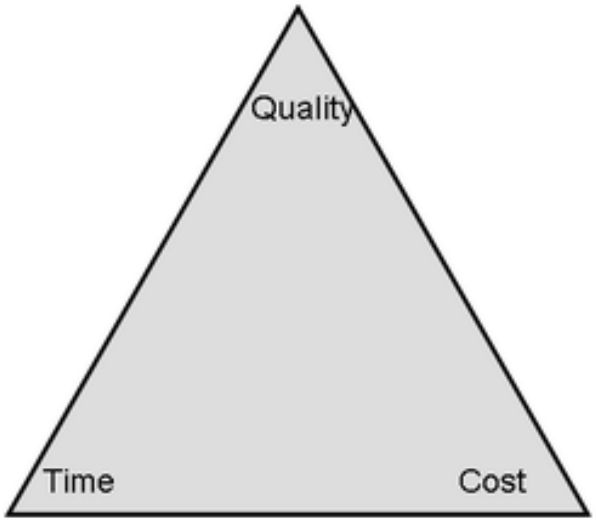
The impact/effect of a risk may be very different on project goals/benefits and on project objectives/deliverables

Internal sources of RISKS (for example)

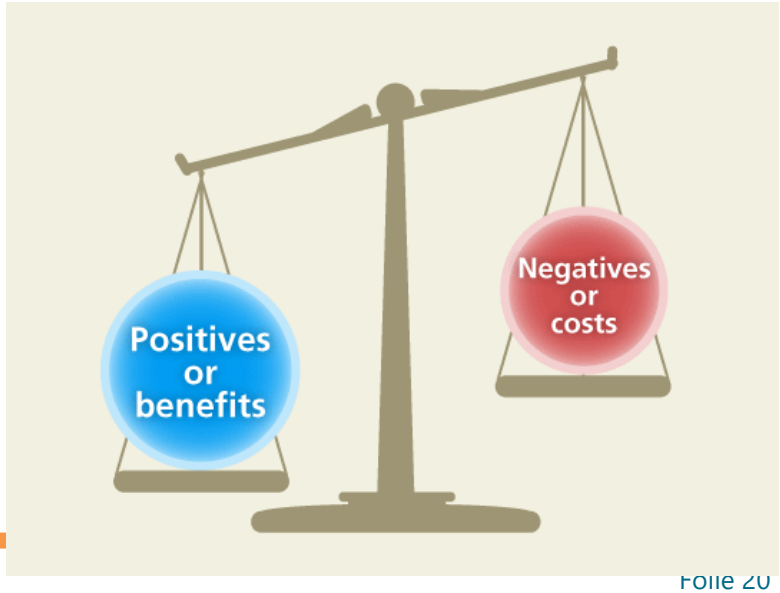
- Scope
- Planning
- Resources
- Materials
- Suppliers
- Performance
- Accidents
- Price
- Funding
- Management
- …
- …

Impact/effect

- On the project's objective / deliverable

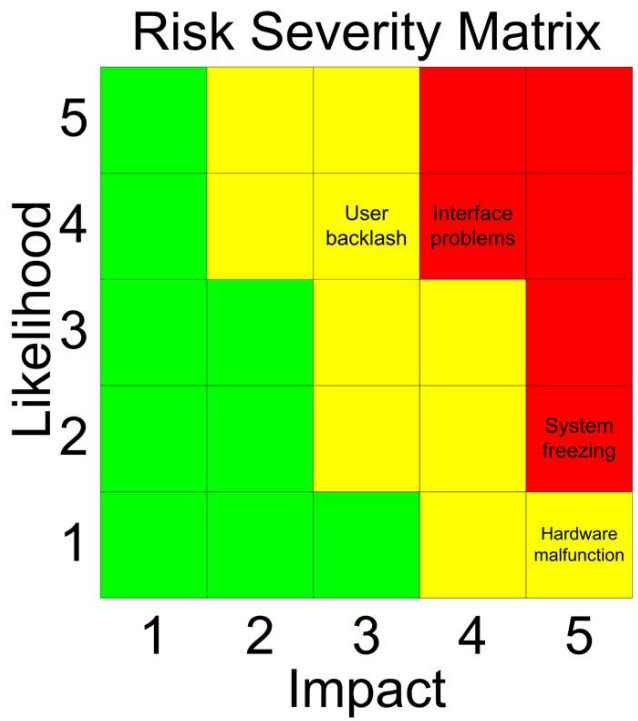


- On the project's goal / benefits



Assessing the risk

- Not all risks need to be subject to monitoring and control
- Assess probability and impact



- Red zone identifies the most important events
- Yellow zone lists risks that are moderately important
- Green zone events probably can be safely ignored

Extended Probability / Impact matrix

Probability	Threats Risk Score = Probability x Impact					Opportunities High (RED) / Med (YEL) / Low (GRN)				
0.90 Very Likely	0.05	0.09	0.18	0.38	0.72	High	High	High	Med	Low
0.70 Likely	0.04	0.07	0.14	0.28	0.56	High	High	Med	Med	Low
0.50 Possible	0.03	0.05	0.10	0.12	0.40	High	High	Med	Low	Low
0.30 Unlikely	0.02	0.03	0.06	0.12	0.24	High	Med	Med	Low	Low
0.10 Very Unlikely	0.01	0.01	0.02	0.04	0.08	Med	Low	Low	Low	Low
	0.05	0.10	0.20	0.40	0.80	Very High	High	Med.	Low	Very Low
	Example Impact Definitions – May Be Tailored to Each Project Objective Impact on an Objective (e.g. Cost, Schedule, Scope, Quality)									

Risk response strategies

- *What are logical risk response strategies?*

Risk response strategies

- Avoid risk
  - The project plan is changed in such a way that the risk is avoided.
- Reduce risk
  - Actions are taken during the project to either A) reduce the likelihood of a risk, or B) reduce the impact of the risk
- Accept risk
  - Usually for events with low probability but high impact when no alternate strategy is feasible
  - Have a contingency plan ready in case event occurs
- Transfer / Share risk
  - Risk is assumed and managed by a unit outside the immediate project
  - Multiple parties associated with the project assume some portion of the risk

Develop a planned response for each risk

- A risk response plan identifies the primary components necessary for managing the risk
  - What response strategy will be used
  - How will the risk event be detected and the response triggered
  - What plan will be put in place in response to the event
  - Who will be responsible for monitoring and controlling the risk

Risk Event	Response	Contingency Plan	Trigger	Who Is Responsible
Interface problems	Reduce	Work around until help comes	Not solved within 24 hours	Nils
System freezing	Reduce	Reinstall OS	Still frozen after 1 hour	Emmylou
User backlash	Reduce	Increase staff support	Call from top management	Eddie
Equipment malfunctions	Transfer	Order different brand	Replacement doesn't work	Jim

Figure from "Project Management" by Gray and Larson

Now...

- *What is the relationship between the project risk management plan and the WBS?*

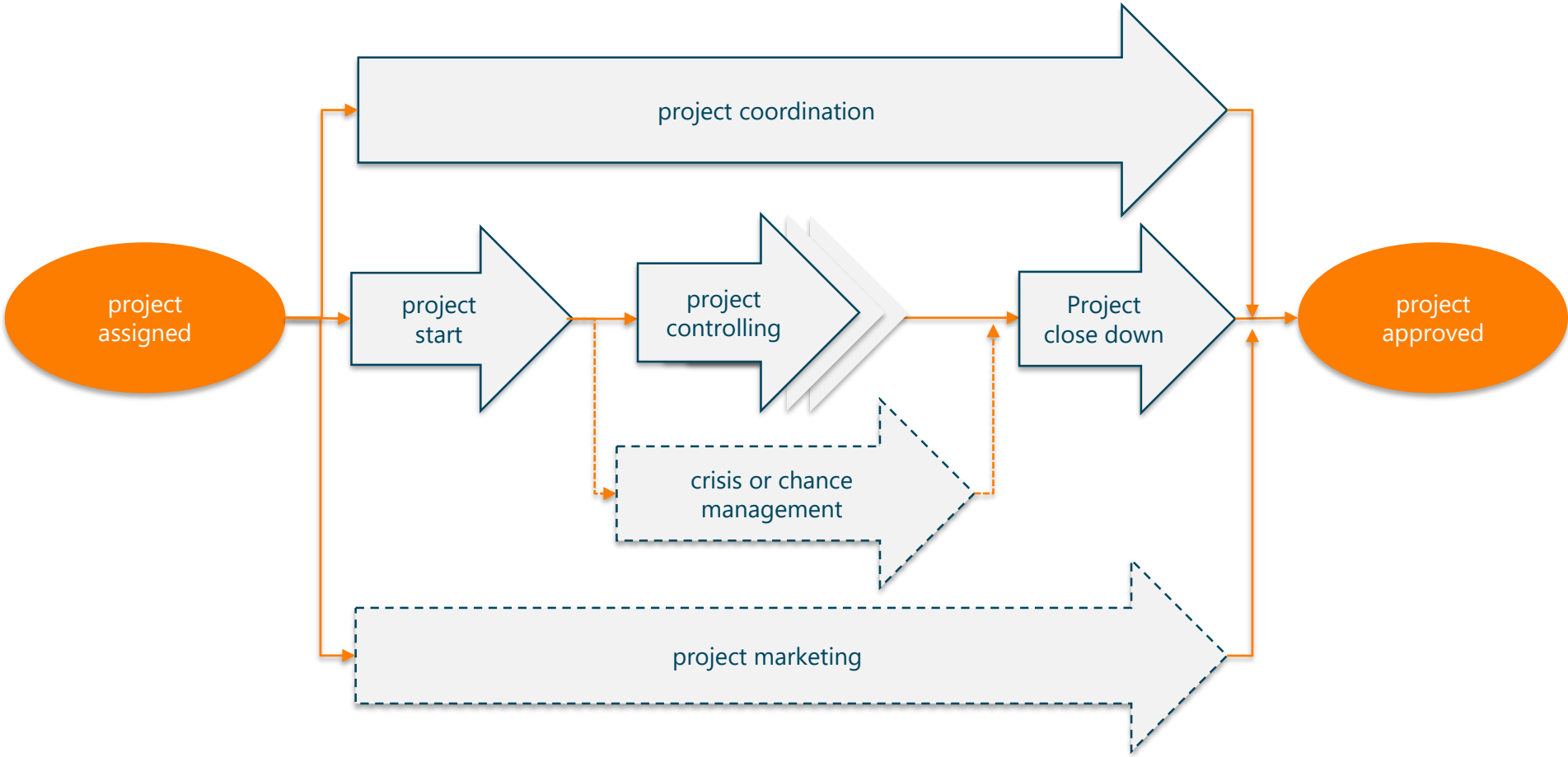
- *Are there also other ways to handle uncertainty in a project?*

Project Controlling

Managing the project

What is it that a project manager actually does, during the execution of the project?

Project Management



(cp. pm baseline, 2009:13)

Distinguish..

- Project Monitoring / Coordinating

  The objectives of project coordination are to ensure the project's progress, continuously ensure the adequate provision of information for project team members, project contributors and representatives of relevant environments, as well as to continuously support the completion of individual work packages.
  Project coordination includes: continuous quality checks of the (interim) results of work packages, ongoing communication between the project manager and project team members and the project owner, continuous forming of relationships to relevant environments and the allocation of project resources.

- Project Controlling

  The objectives of project controlling are to analyse the project status, review the "Big Project Picture", agree on and/or undertake control measures, develop the project organisation and the project culture, create progress reports, redesign the project context relationships, and execute project marketing activities. In certain circumstances, it may be necessary to agree on new project objectives. The project controlling process takes place on specific key dates several times during a project.

(cp. pm baseline, 2009)

Reporting

- *What do you report? To whom? When?*

Reporting

- What do you report? To whom? When?
  - Plan triggered reports
  - Time triggered reports
  - Event triggered reports

Reporting

- Plan triggered reports
  - At completion of a phase
  - To ‘sign-off’ the result
  - And authorize the start of the next phase

Reporting

- Plan triggered reports

- Time triggered reports
  - Periodic Project progress report or Project status report

Reporting

- Plan triggered reports
- Time triggered reports
- Event triggered reports
  - Exception reports / Issue reports

Progress reporting

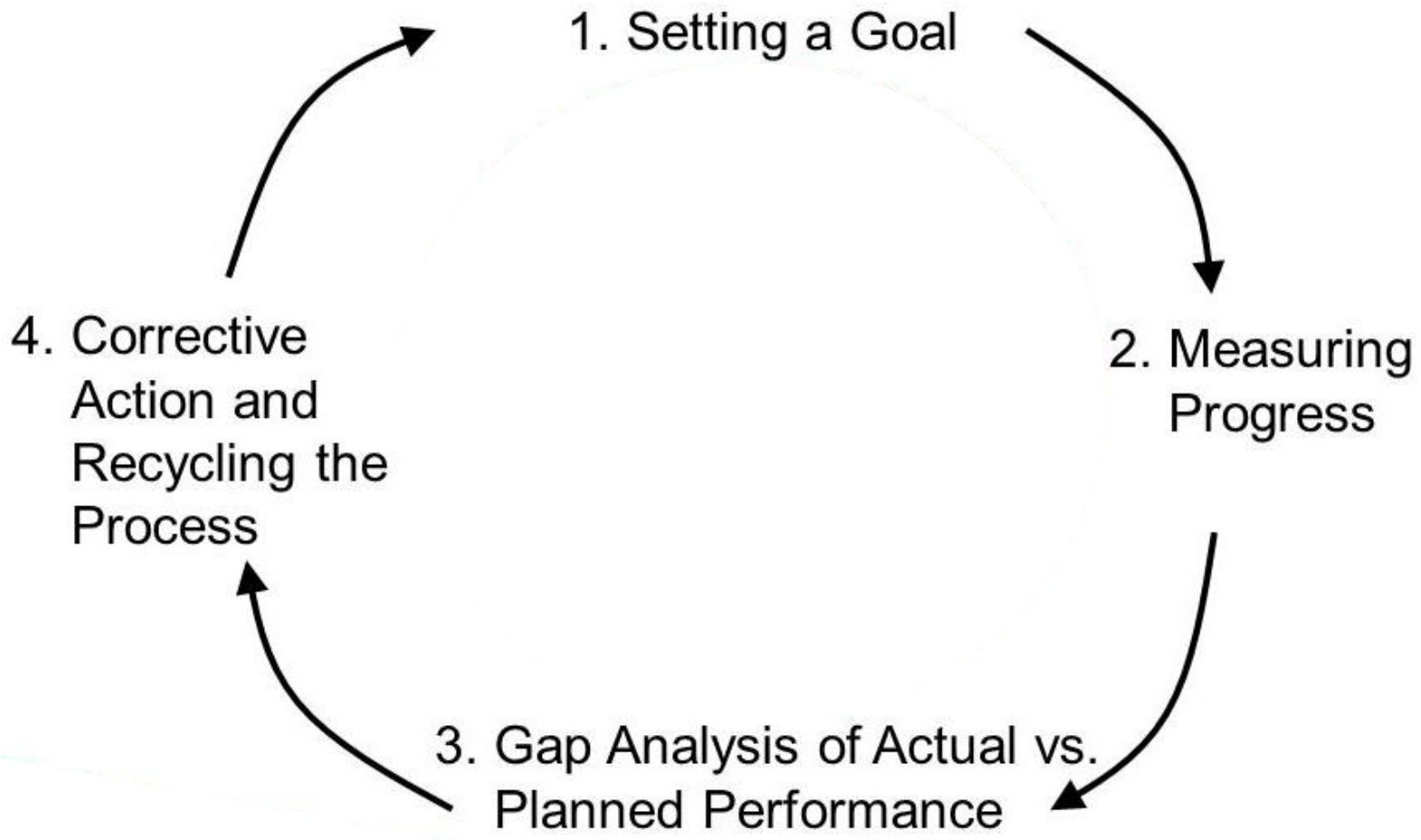
- What data are you reporting?
- What data should you report in the ‘perfect’ progress report?
- What is difficult in reporting progress?

The Triple Constraint

Project controlling / reporting

- What do we want to achieve?

Project controlling



Progress reporting (example)

Highlights	/ lowlights
-	-
-	-
-	-

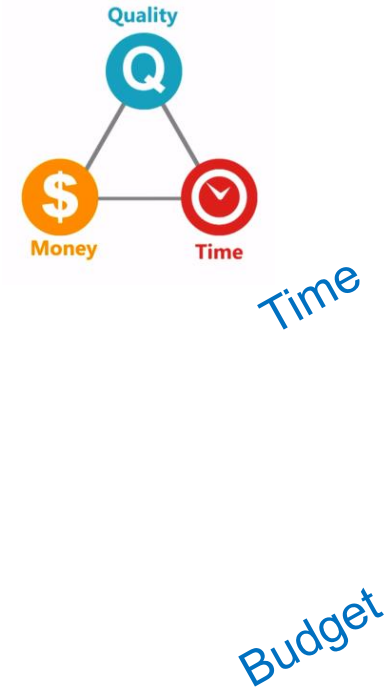
Issues	Actions taken
-	-
-	-
-	-

Changes	Status
-	Proposed / approved
-	Proposed / approved
-	Proposed / approved

Decisions to be taken

Development of risks

Project progress



Expectations next period

Development of team

Reported
Discussed
Approved

Progress reporting

- What data are you reporting?
- What data should you report in the ‘perfect’ progress report?
- What is difficult in reporting progress?

The relationship between result /completion and effort / time

Earned value project management

- It compares the PLANNED amount of work with what has actually been COMPLETED, to determine if *COST, SCHEDULE, and WORK ACCOMPLISHED* are progressing as planned.

- Work is “Earned” or credited as it is completed.

Terminology

- BCWS (Planned Value)
  - Budgeted Cost of Work Scheduled
  - The approved budget for the work scheduled to be completed by a specified date
- BCWP (Earned Value)
  - Budgeted Cost of Work Performed
  - The approved budget for the work actually completed by the specified date
- ACWP (Actual Cost)
  - Actual Cost of Work Performed
  - The costs actually incurred for the work completed by the specified date

https://www.youtube.com/watch?v=skb-m8UOKqg

An example

- Assume a project to develop an App for smartphones. The planning (activities and planned number of man hours per week) is shown in the following table. All man hours cost € 60 per hour.

	Planned hours of work per week												
		Week	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	Total
Activity	1	Document requirements	80	80	80	40								280
	2	Make design		40	40									80
	3	Develop app			40	160	160	160	160					680
	4	Document test scripts				40								40
	5	Test app								80	80	40		200
	6	Fix bugs and issues									80	80		160
	7	Launch app											40	40
	8	Communication campaign					20		20		40	40	40	160
			80	120	160	240	180	160	180	80	200	160	80	1640

An example (2)

- We are now at the end of week 6. The number of hours realized for activity 1 is 287, for activity 2: 73, for activity 3: 473, for activity 4: 40, and for activity 5: 26. All other activities have not started yet.

	Realized hours of work per week													
		Week	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	Total
Activity	1	Document requirements	65	38	77	40	23	44						287
	2	Make design		35	26	12								73
	3	Develop app		12	47	122	154	138						473
	4	Document test scripts				40								40
	5	Test app					12	14						26
	6	Fix bugs and issues												0
	7	Launch app												0
	8	Communication campaign												0
			65	85	150	214	189	196	0	0	0	0	0	899

An example (2)

- We are now at the end of week 6. The number of hours realized for activity 1 is 287, for activity 2: 73, for activity 3: 473, for activity 4: 40, and for activity 5: 26. All other activities have not started yet.

- *What is (at the end of week 6) the Budgeted Cost of Work Scheduled (BCWS) of the project?*

- *And what is the Actual Cost of Work Performed (ACWP), assuming that all hours could be contracted for the planned cost of €60 per hour?*

	Planned hours of work per week												
		Week	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	Total
Activity	1	Document requirements	80	80	80	40								280
	2	Make design		40	40									80
	3	Develop app			40	160	160	160	160					680
	4	Document test scripts				40								40
	5	Test app								80	80	40		200
	6	Fix bugs and issues									80	80		160
	7	Launch app											40	40
	8	Communication campaign					20		20		40	40	40	160
			80	120	160	240	180	160	180	80	200	160	80	1640

	Realized hours of work per week												
		Week	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	Total
Activity	1	Document requirements	65	38	77	40	23	44						287
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	6	Fix bugs and issues												0
	7	Launch app												0
	8	Communication campaign												0
			65	85	150	214	189	196	0	0	0	0	0	899

At the end of week 6, activity 1 is 85% completed. It is estimated that still 30 hours of work need to be done on it. Activity 2 is 100% completed. Activity 3 is 55% completed, with 450 hours still to be done before completion. Activity 4 is 75% completed with an estimated 10 hours still to be done.

All other activities are 0% completed with still to be done 200 hours for activity 5, 160 hours for activity 6, 40 hours for activity 7 and 160 hours for activity 8.

- *What is (at the end of week 6) the Budgeted Cost of Work Performed (BCWP) of the project?*

Schedule Variance (SV)

BUDGET BASED

BCWS Of the work we scheduled to have done, how much did we budget for it to cost?

BCWP Of the work we actually performed, how much did we budget for it to cost?

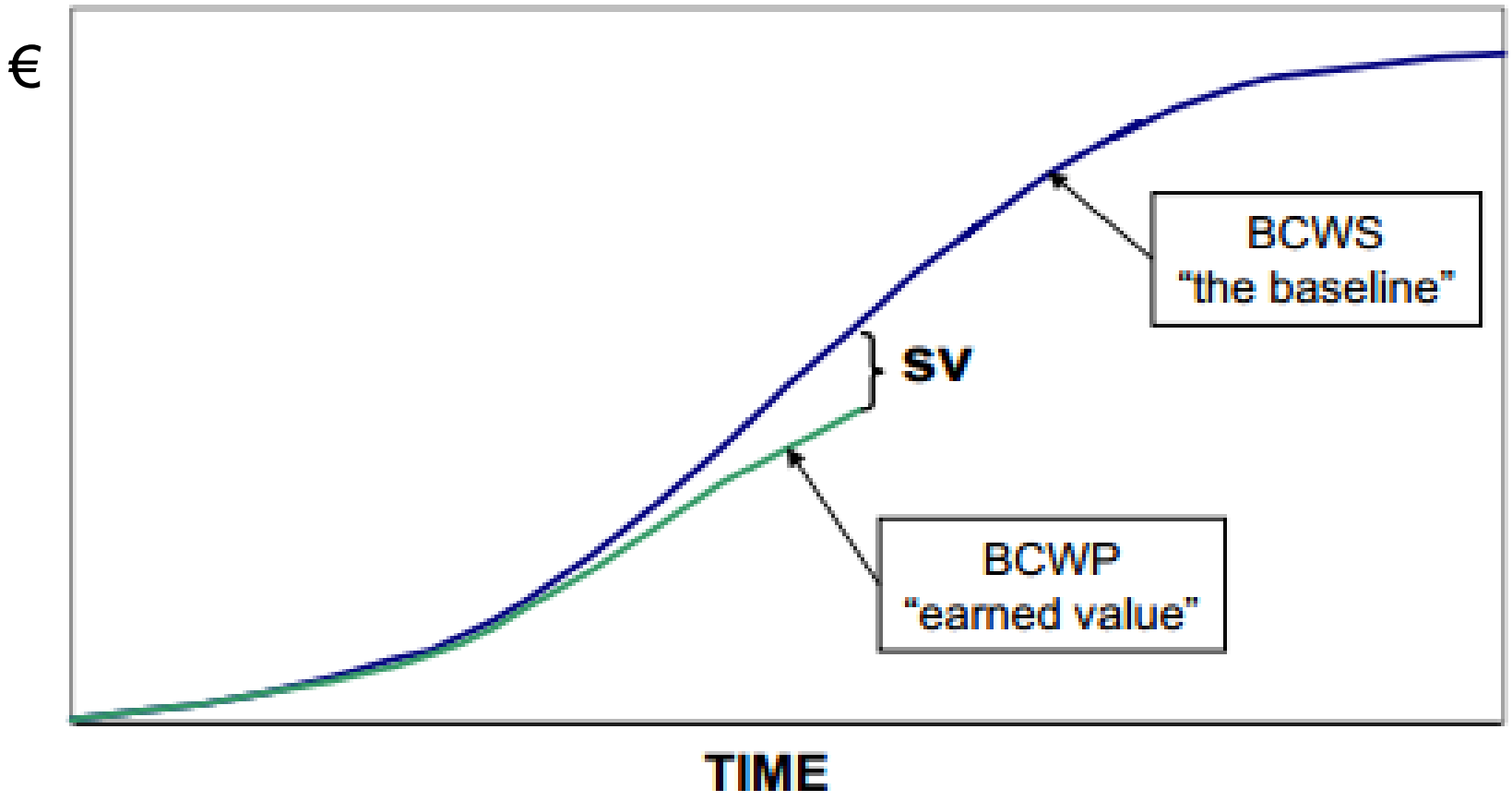
SCHEDULE VARIANCE is the difference between work scheduled and work performed (expressed in terms of budget dollars)

formula: **SV $ = BCWP - BCWS**

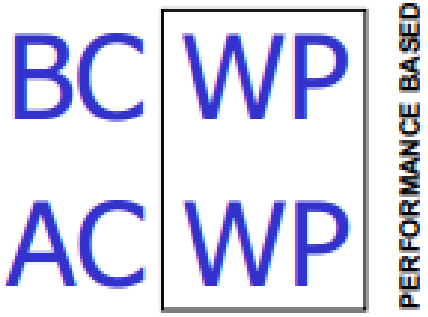
example:

SV = BCWP – BCWS = € 43.320 - € 56.400
SV = - € 13.080 (negative = behind schedule)

Schedule Variance (SV)



Cost Variance (CV)



Of the work we actually performed, how much did we budget for it to cost?

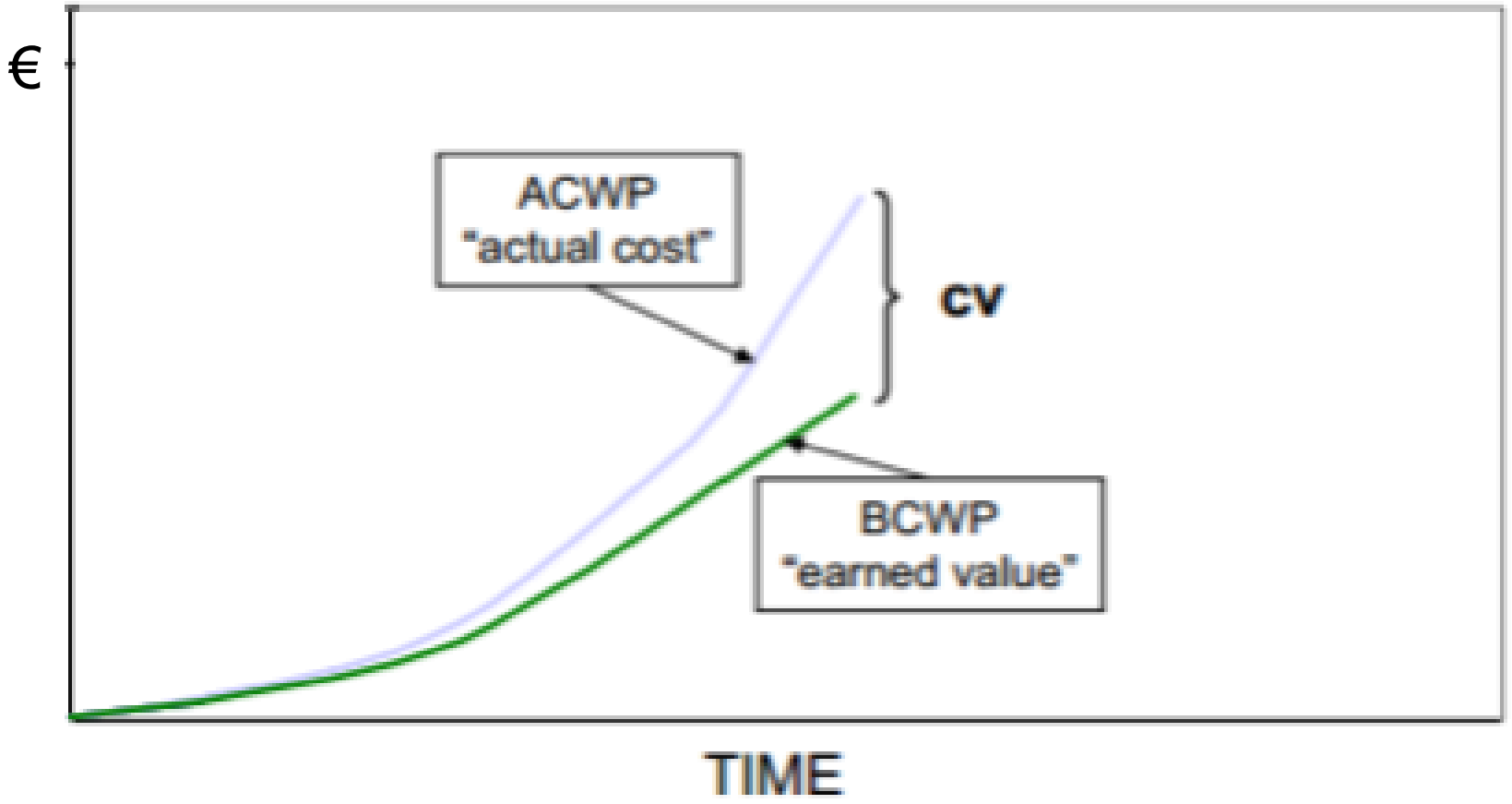
Of the work we actually performed, how much did it actually cost?

COST VARIANCE is the difference between budgeted cost and actual cost

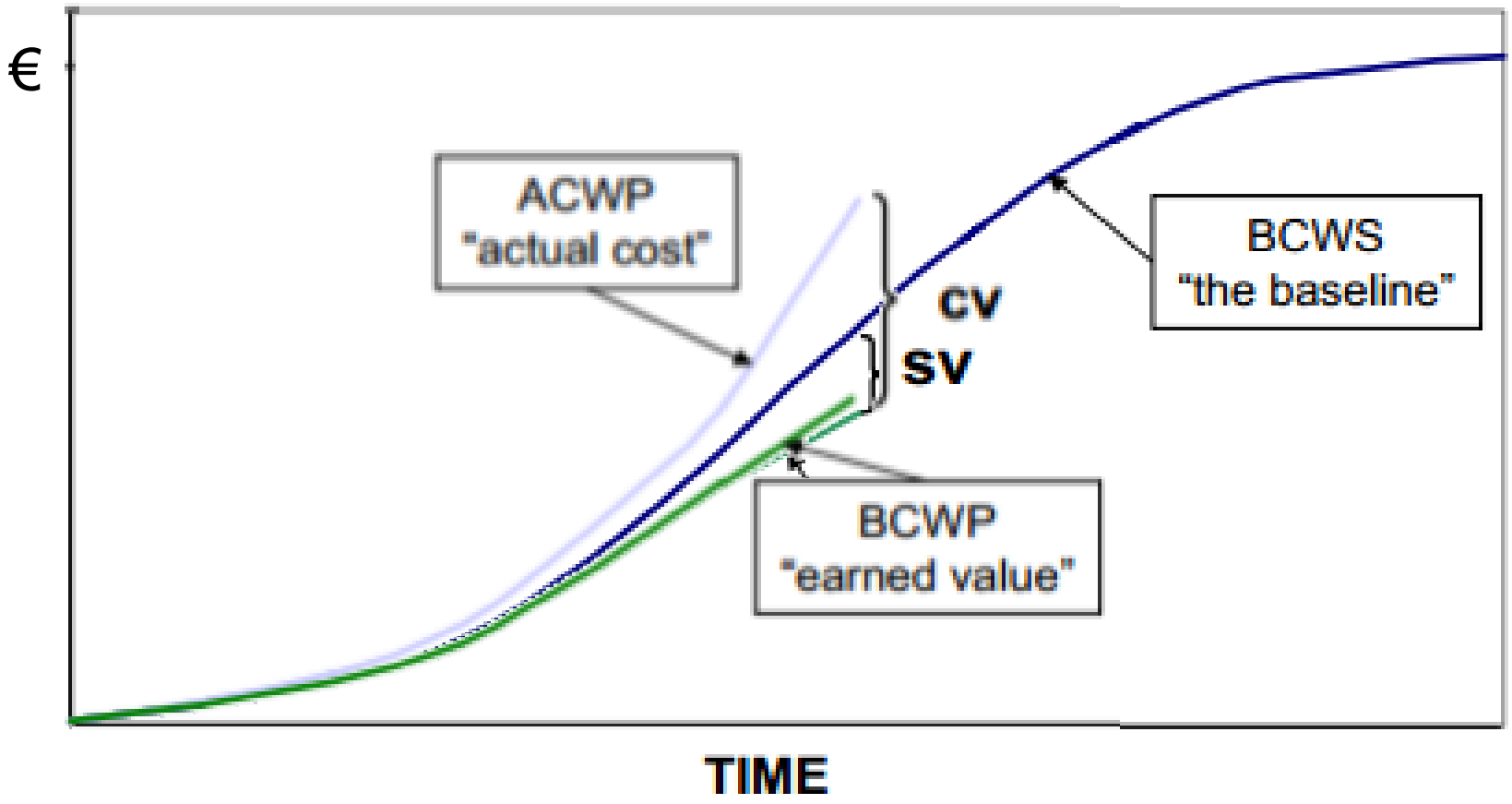
formula: **CV $ = BCWP - ACWP**

example:
CV = BCWP – ACWP = € 43.320 - € 53.940
CV = - € 10.620 (negative = cost overrun)

Cost Variance (CV)



SV and CV


€
ACWP
"actual cost"
BCWS
"the baseline"
CV
SV
BCWP
"earned value"
TIME

At the end of week 6, activity 1 is 85% completed. It is estimated that still 30 hours of work need to be done on it. Activity 2 is 100% completed. Activity 3 is 55% completed, with 450 hours still to be done before completion. Activity 4 is 75% completed with an estimated 10 hours still to be done.

All other activities are 0% completed with still to be done 200 hours for activity 5, 160 hours for activity 6, 40 hours for activity 7 and 160 hours for activity 8.

- *What is the expected budget overrun at completion?*

- *What doubts could the project sponsor reasonably have about this last answer?*

Estimated at Completion (EAC)

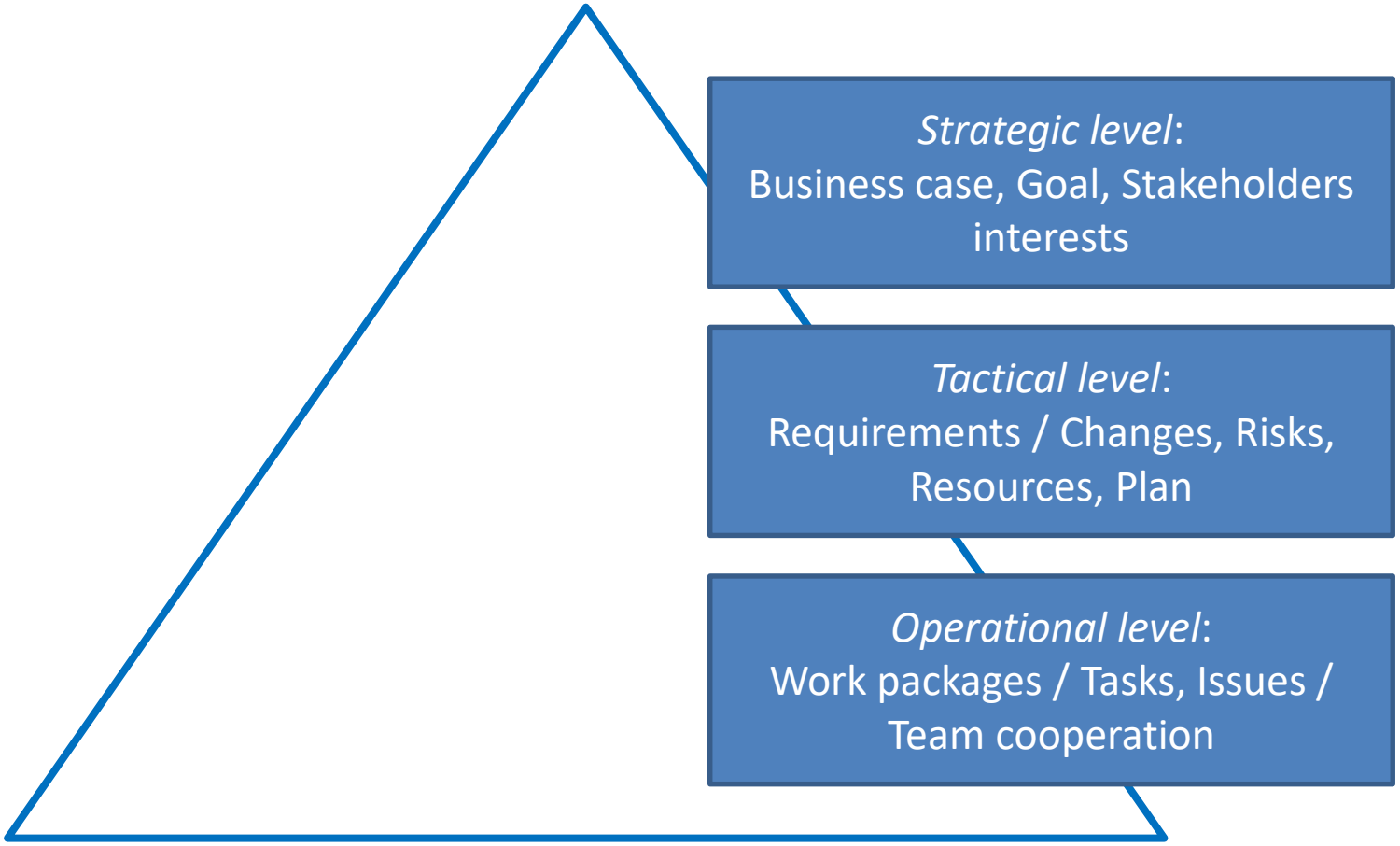
- defined as actual cost to date + estimated cost of work remaining
- usually develop comprehensive EAC at least annually
  - reported by WBS in cost performance report
- should examine on monthly basis
- consider the following in EAC generation:
  - performance to date
  - impact of approved corrective action plans
  - known/anticipated downstream problems
  - best estimate of the cost to complete remaining work
- also called latest revised estimate (LRE), indicated final cost, etc.

ACWP + ETC = EAC

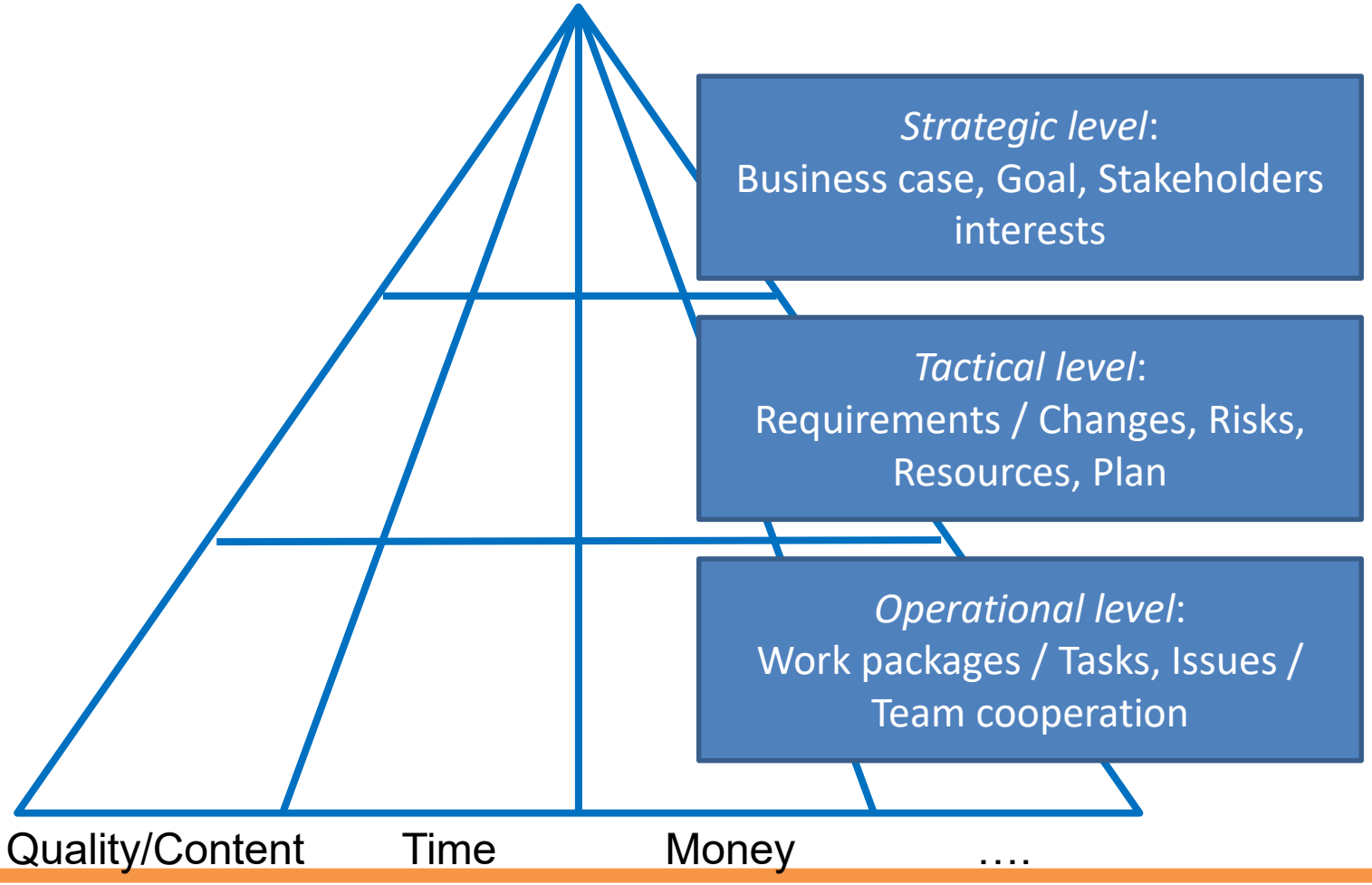
The Triple Constraint

What else?

What to control?



What to control?



Project Marketing

Project Marketing

- *What is it?*
- *Marketing from whom to whom?*

Project Marketing

- *What is it?*

  Marketing 'theory' applied to (the context) of projects

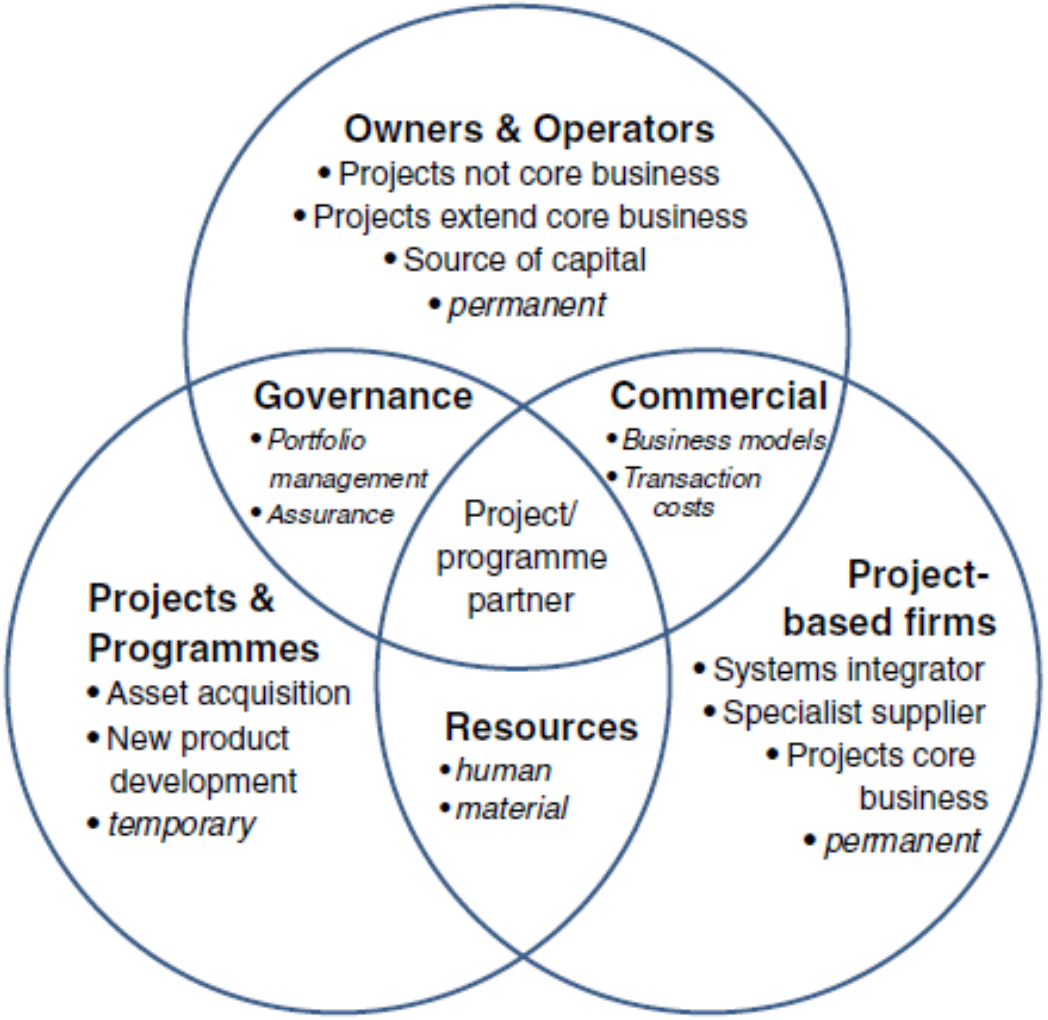
- *"Marketing is the process in society and organisations that facilitates voluntary exchange through collaborative relationships that create reciprocal value through the application of complementary resources"*

  Vargo and R. F. Lusch (eds) (2006), *The Service-dominant Logic of Marketing. Dialog, Debate, and Directions*, Armonk, NY: M.E. Sharpe.

Project Marketing

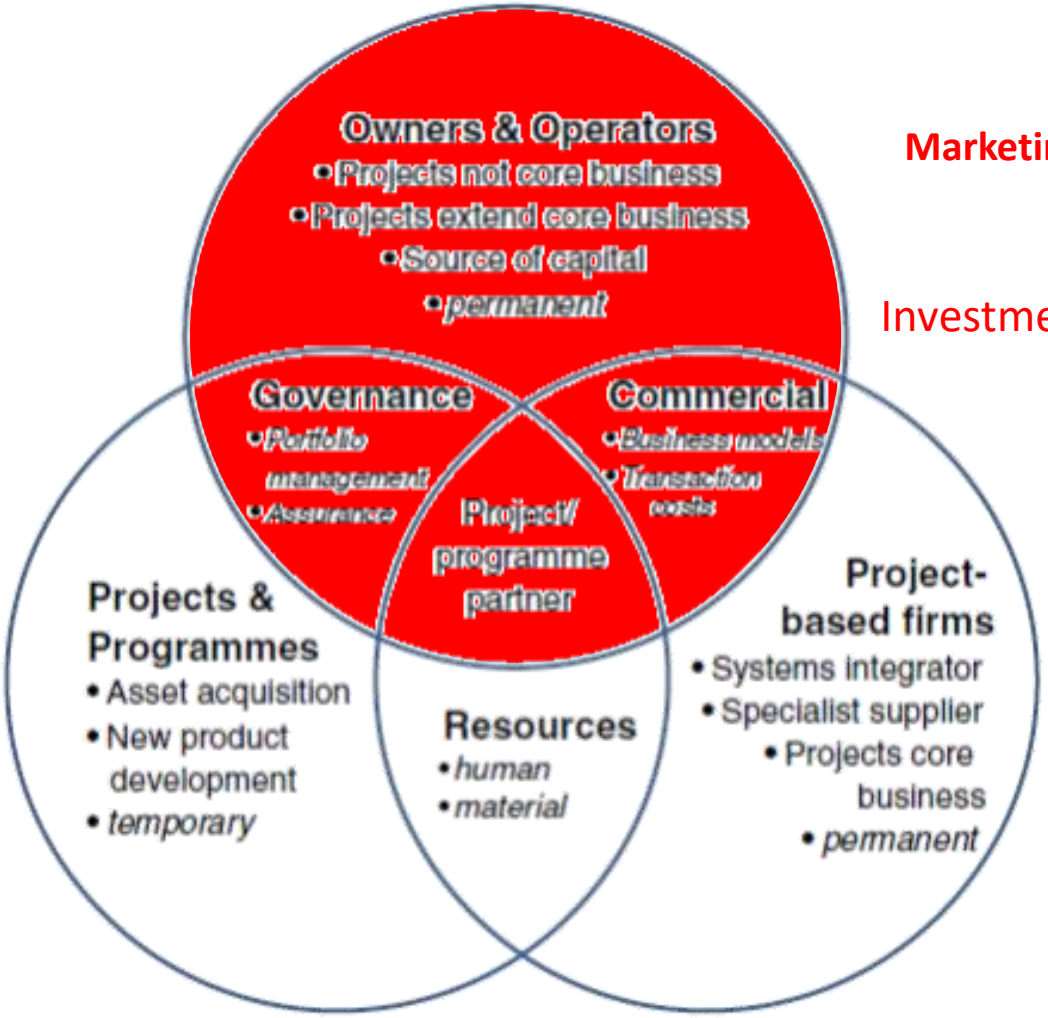
- *What is it?*
- *Marketing from whom to whom?*

Organizations involved in the management of projects



Winch, G. (2013) "Three domains of project organizing", International Journal of Project Management, 32(5): 721-731.

Organizations involved in the management of projects



Marketing *of* the project

Business goal

Business case

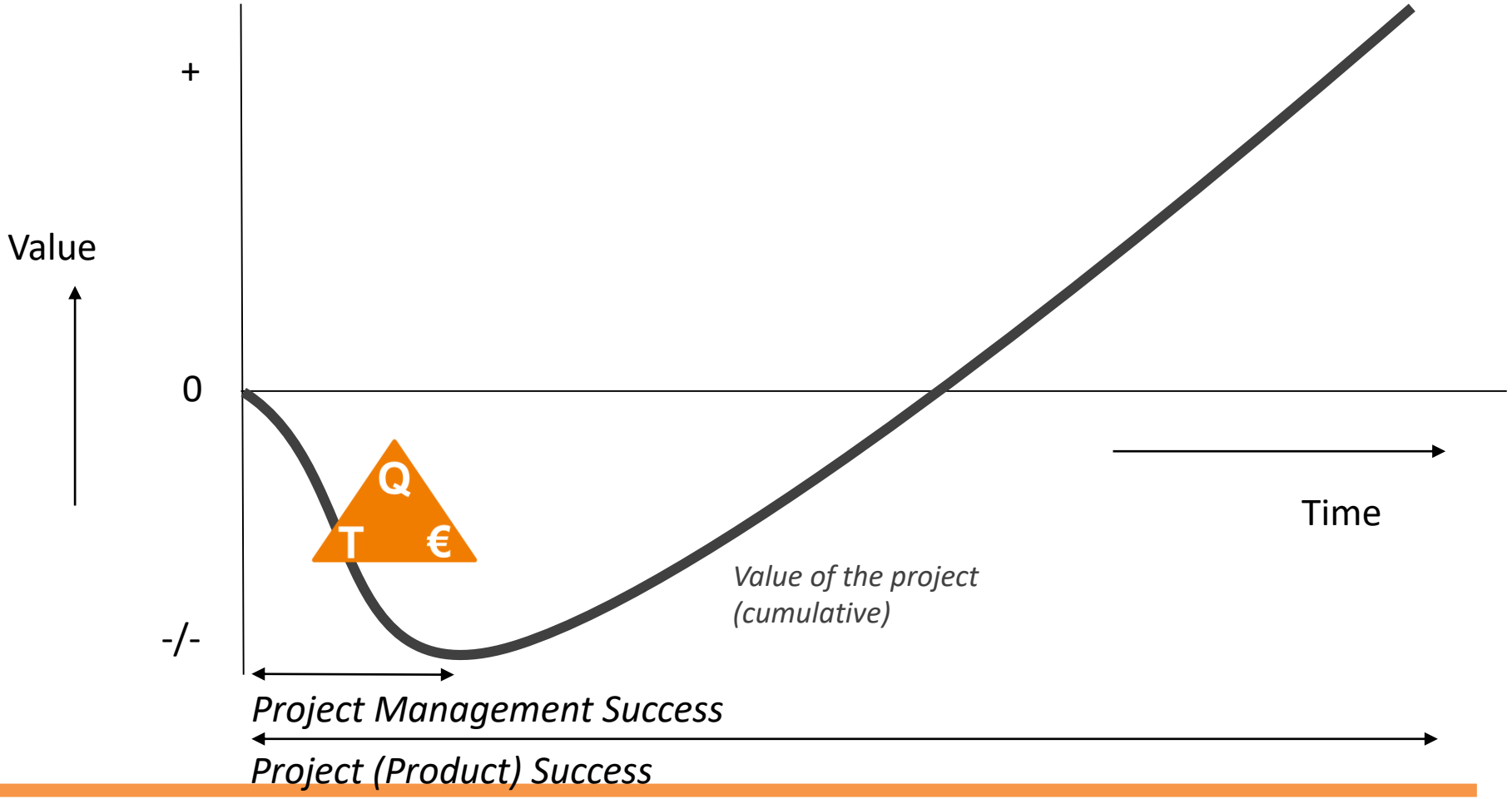
Investment perspective

Winch, G. (2013) "Three domains of project organizing", International Journal of Project Management, 32(5): 721-731.

The business case

- Lies at the heart of every project
- Cost benefit analysis
- The justification of the project

Value creation

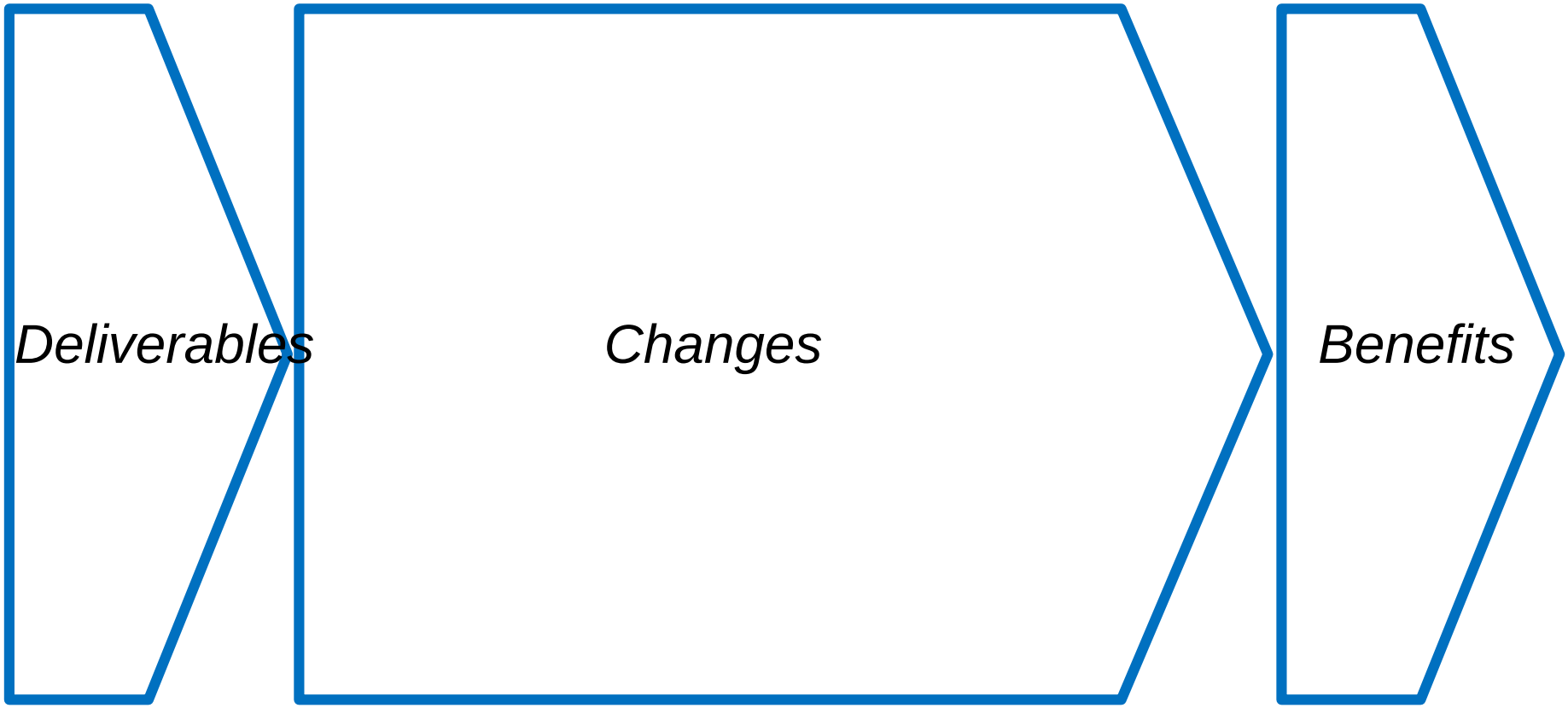


What is a Benefit?

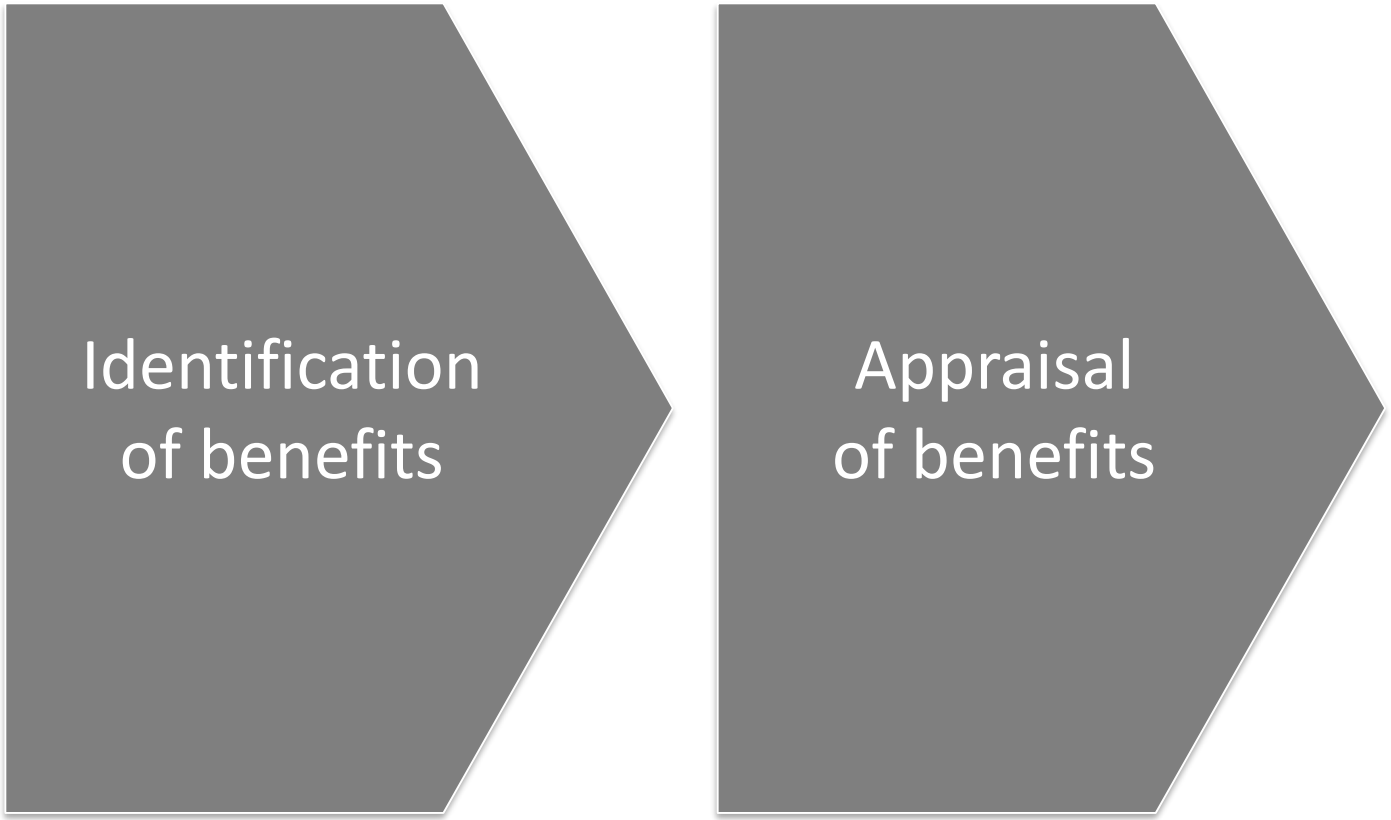
- Definitions vary but in general we can think of a benefit as a *positive outcome* of a *change*
- "*An outcome of actions, behaviors, products, or services that provide utility to the sponsoring organization as well as to the program's beneficiaries.*" (the Standard for Program Management, PMI)
- "*A measurable improvement resulting from an outcome perceived as an advantage by one or more stakeholders*" (MSP, Axelos)
- Of course, there may also be *negative* outcomes: *disbenefits*.

Benefits mapping

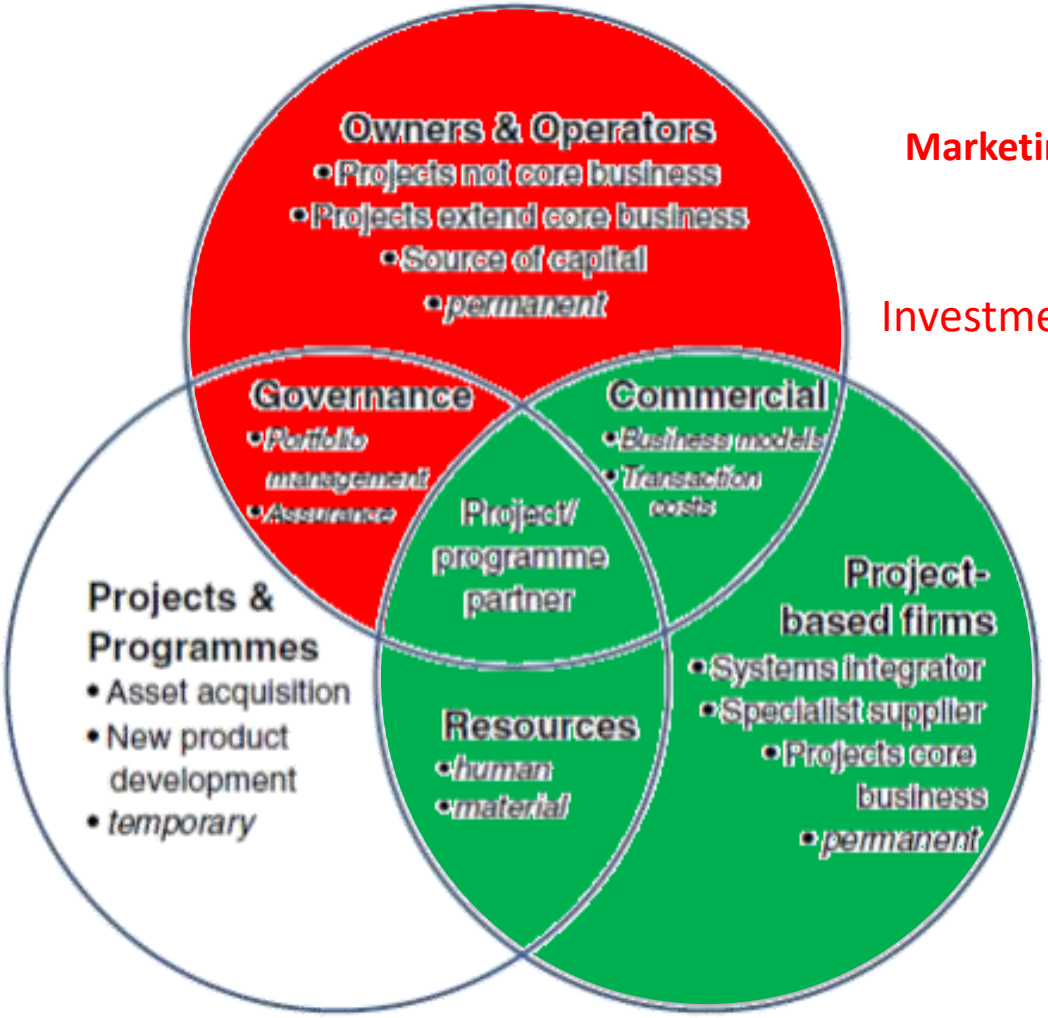
Benefits mapping



The business case
2 stages



Organizations involved in the management of projects

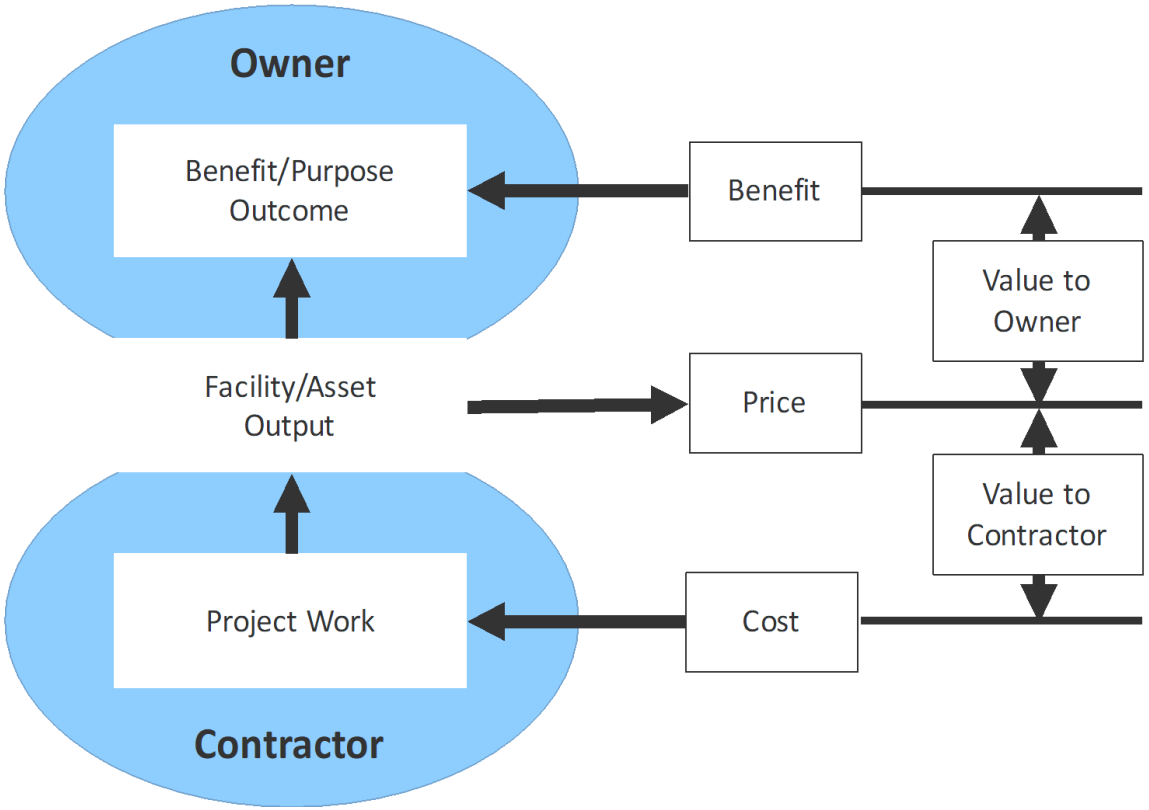


Marketing *of* the project
Business goal
Business case
Investment perspective

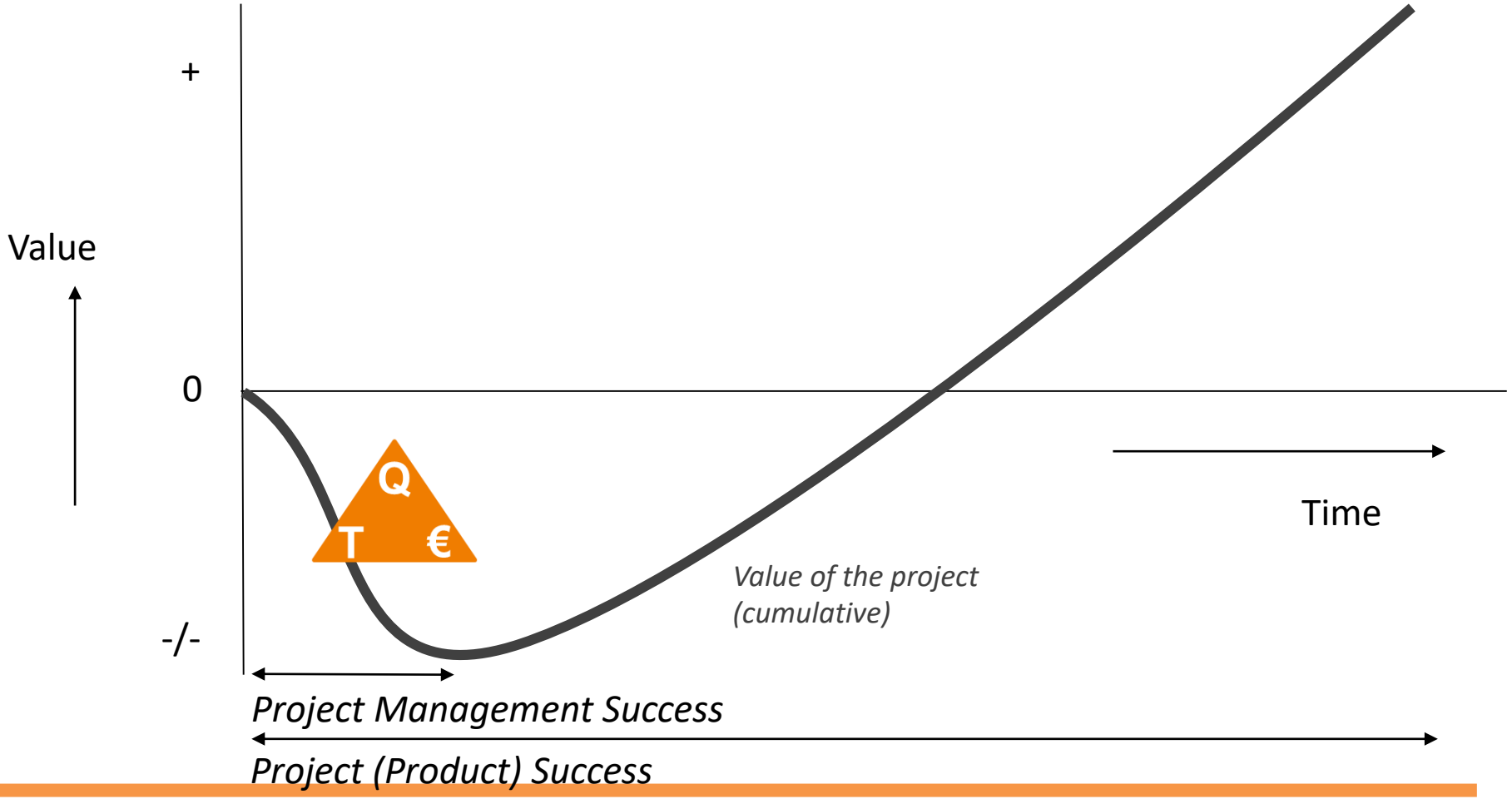
Marketing *for* the project
Bidding

Winch, G. (2013) "Three domains of project organizing", International Journal of Project Management, 32(5): 721-731.

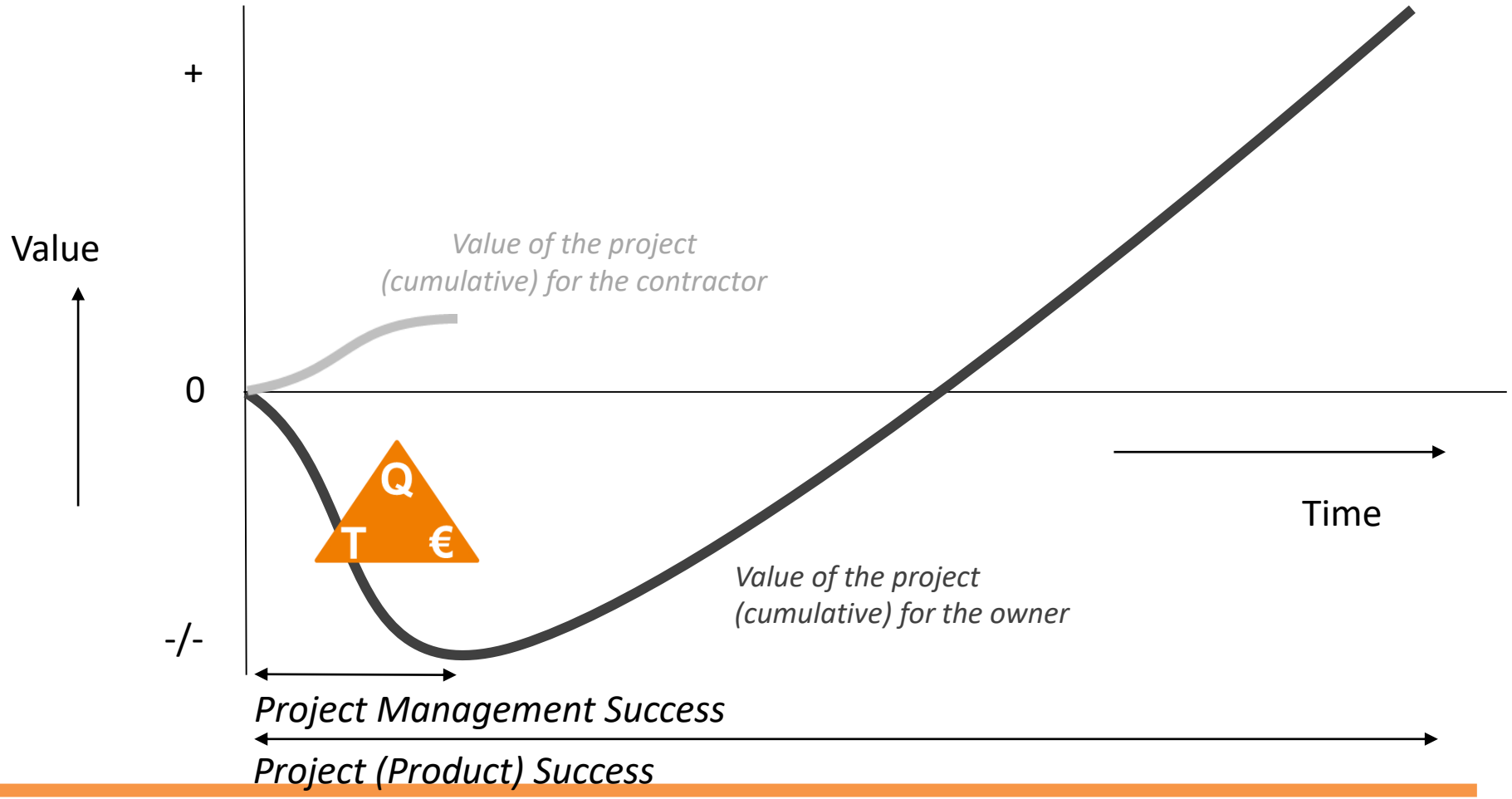
Project


Owner
Benefit/Purpose
Outcome
Benefit
Value to
Owner
Facility/Asset
Output
Price
Value to
Contractor
Project Work
Cost
Contractor

Value creation



Value creation



Organizations involved in the management of projects

Marketing *of* the project
Business goal
Business case
Investment perspective

Marketing *by* the project
Project communication
Stakeholder engagement

Marketing *for* the project
Bidding

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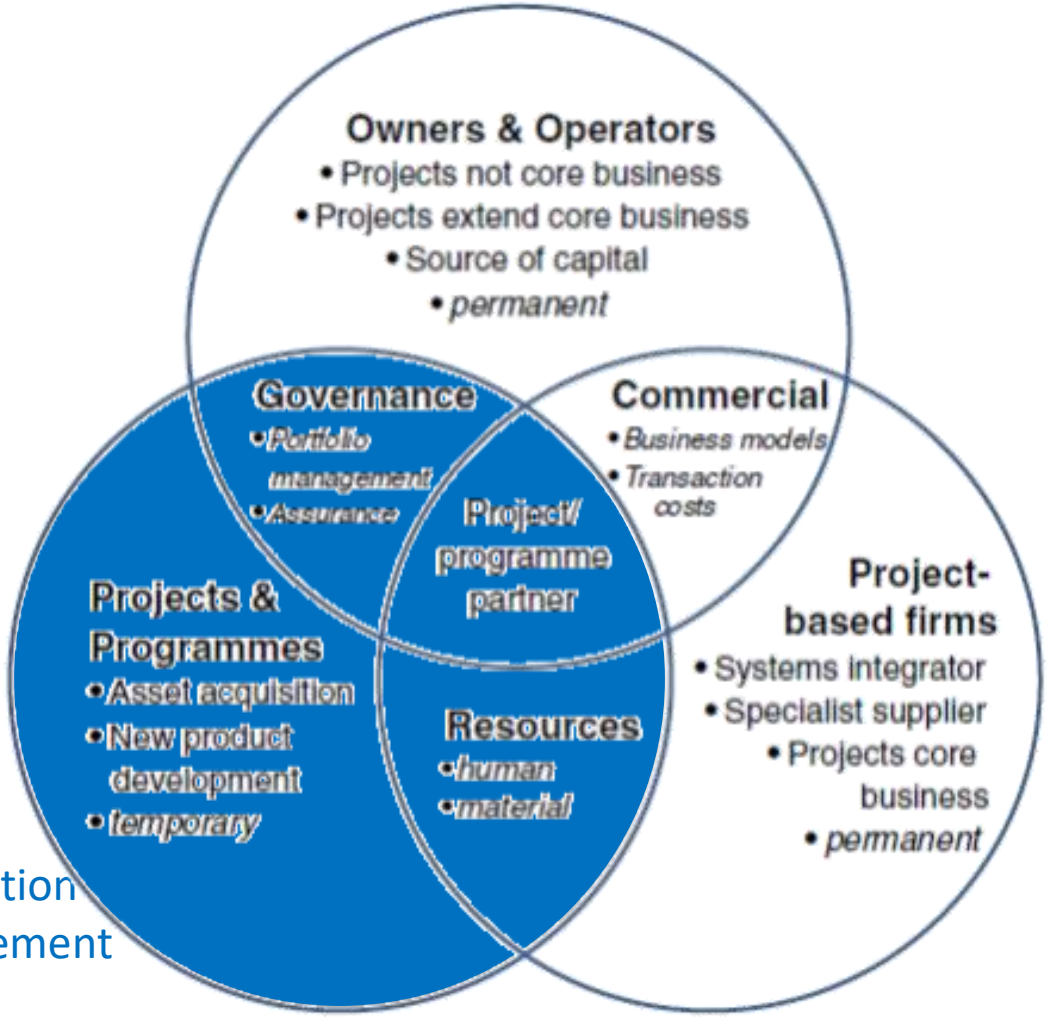
Organizations involved in the management of projects



Marketing *by* the project

Project communication

Stakeholder engagement

Winch, G. (2013) "Three domains of project organizing", International Journal of Project Management, 32(5): 721-731.

Project Marketing

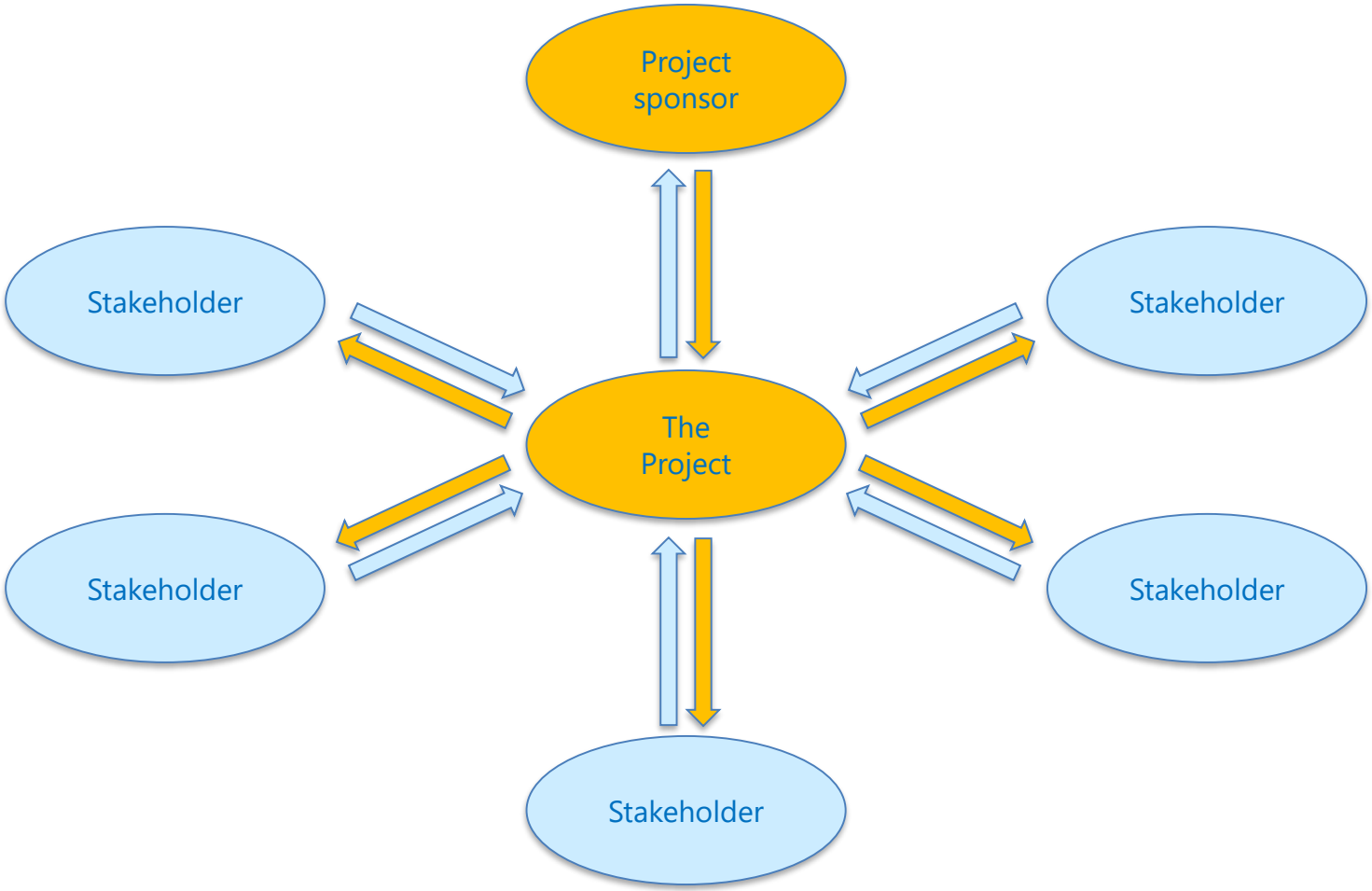
- *What is it?*

  Marketing 'theory' applied to (the context) of projects

- *"Marketing is the process in society and organisations that facilitates voluntary exchange through collaborative relationships that create reciprocal value through the application of complementary resources"*

  Vargo and R. F. Lusch (eds) (2006), *The Service-dominant Logic of Marketing. Dialog, Debate, and Directions*, Armonk, NY: M.E. Sharpe.

Management FOR Stakeholders



Marketing *by* the project (and *to* stakeholders)

Marketing *by* the project (and *to* stakeholders)

What value / benefit does the project provide the stakeholder?

What cost / effort does the stakeholder need to provide?

What channels do we use to engage with the stakeholder?

How can we create awareness for the project? What arguments do we have to convince the stakeholder?

Marketing *by* the project (and *to* stakeholders)

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What value / benefit does the project provide the stakeholder?

What cost / effort does the stakeholder need to provide?

What channels do we use to engage with the stakeholder?

How can we create awareness for the project? What arguments do we have to convince the stakeholder?

Marketing *by* the project (and *to* stakeholders)

Communication / Engagement strategy (per stakeholder)

What channels do we use to engage with the stakeholder?

How can we create awareness for the project? What arguments do we have to convince the stakeholder?

Project Marketing

- *What is it?*
- *Marketing from whom to whom?*
- *How is it different? (different from what?)*

Marketing *by* the project (and *to* stakeholders)

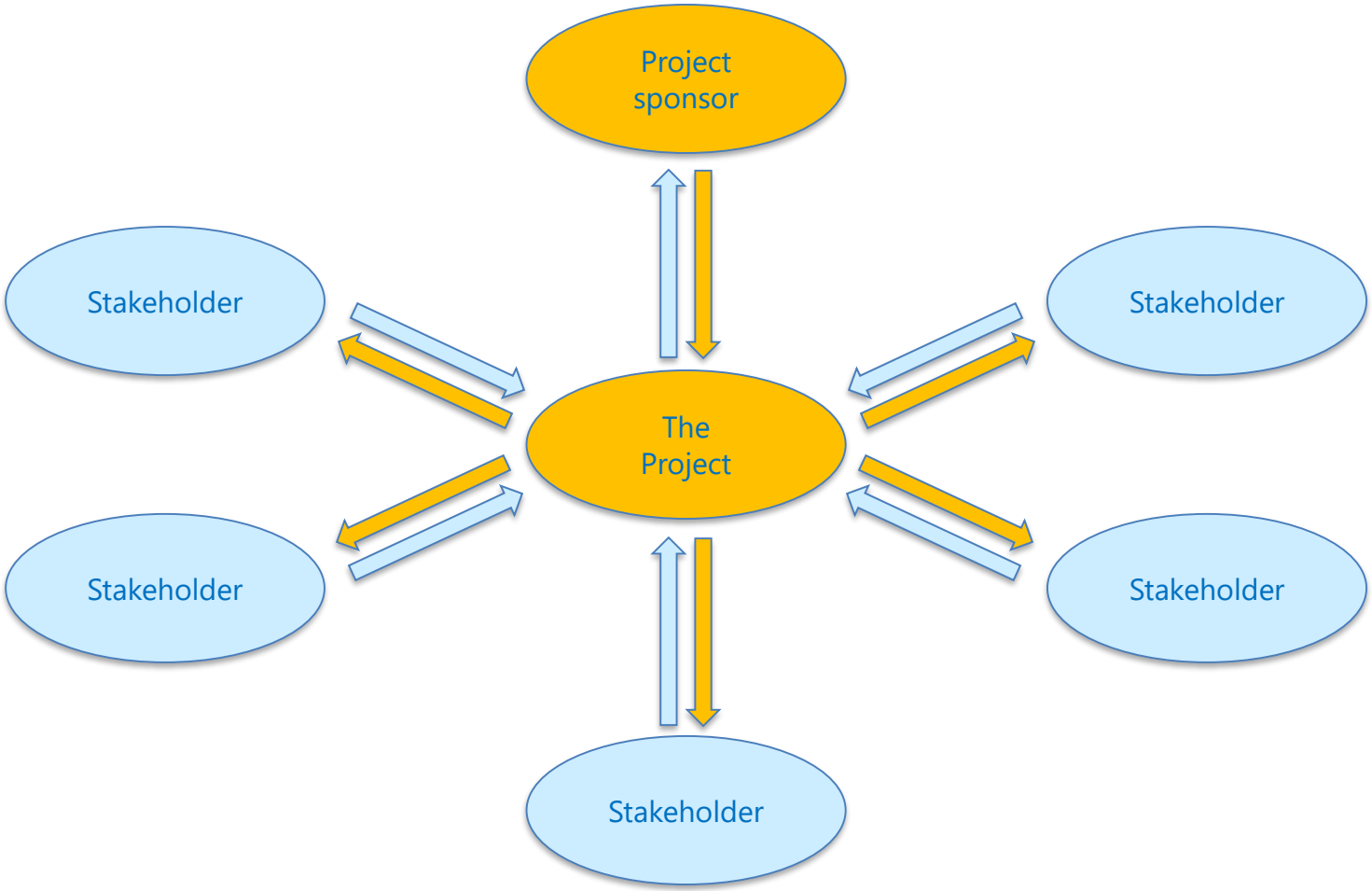
What value / benefit does the project provide the stakeholder?

What cost / effort does the stakeholder need to provide?

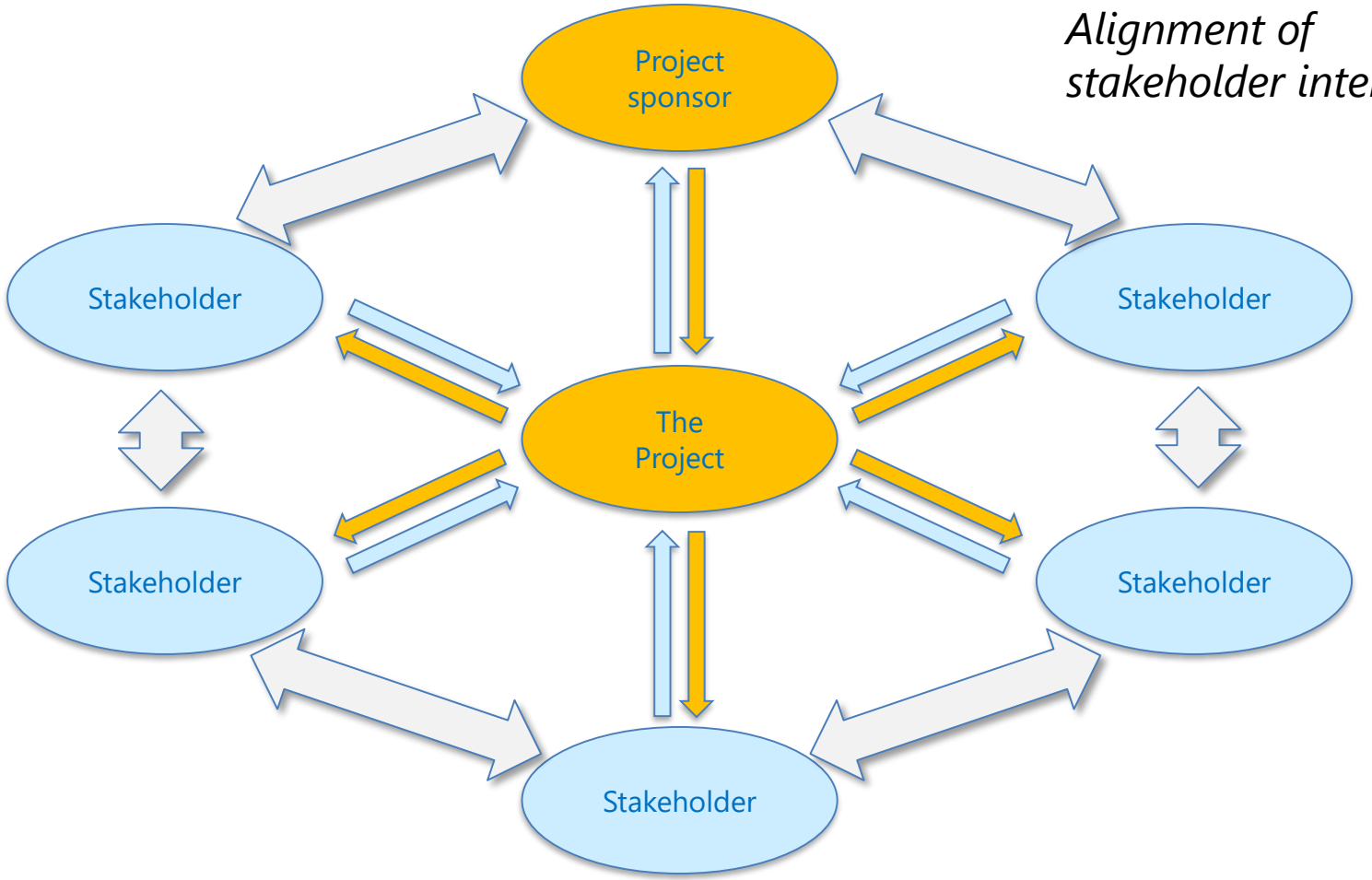
What channels do we use to engage with the stakeholder?

How can we create awareness for the project? What arguments do we have to convince the stakeholder?

Management FOR Stakeholders



Management FOR Stakeholders



Alignment of stakeholder interests

! enable change

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