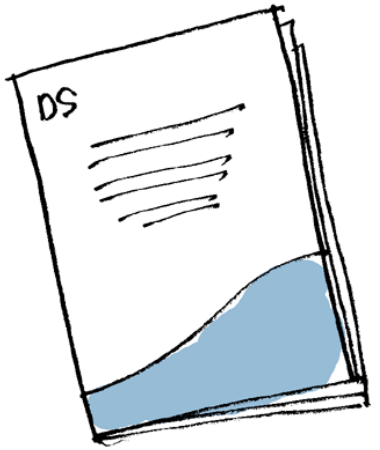
ISO certification in project management



Preparation lecture

Project Management (42429/42430)

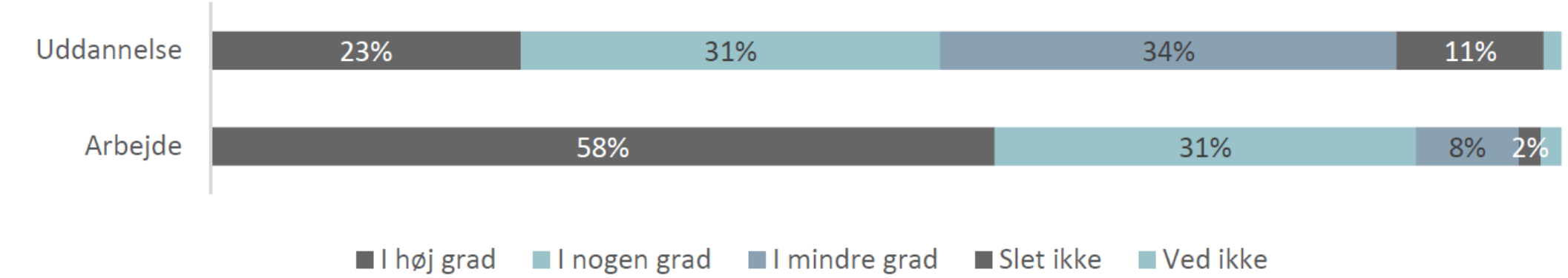
Agenda

- Background for the certification
- The certification process and test
- Presentation of the standard
- Questions

The importance of project management for DTU students

- Former DTU students express a need for more education in project management. (This was also the case in the previous investigation from 2012.)
- 89% mention that project management competences are important, but only 54% mention that they have gained that while they studied at DTU.

Generelle kompetencer, evnen til at arbejde med alle faser i et projekt, herunder eks. udarbejdelse af tids-planer, udformning og dokumentation

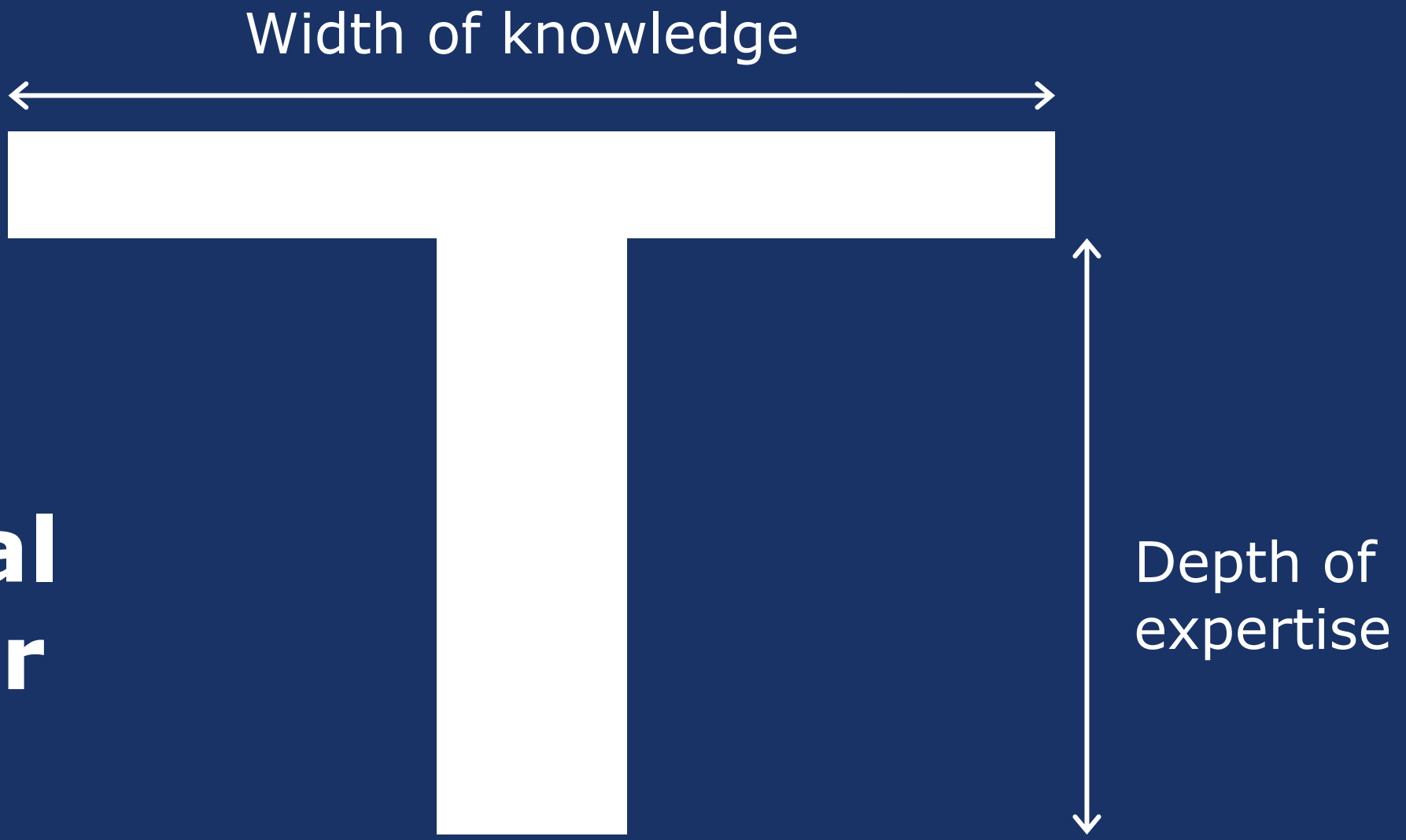


Kilde: DAMVAD Analytics 2015

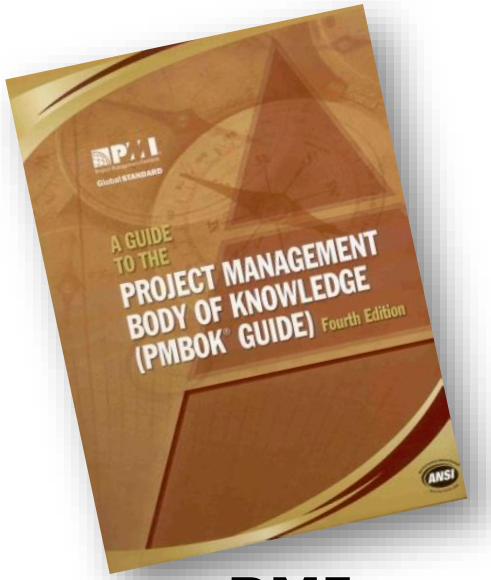
Note: N=1.361. Begrebet "Uddannelse" i venstre kolonne dækker over, om dimittenderne har opnået kompetencen gennem deres uddannelse, mens begrebet "Arbejde" beskriver, om denne specifikke kompetence er relevant på arbejdsmarkedet.

Project management is the second most important competence for engineers

The ideal engineer



Languages of project management



PMI

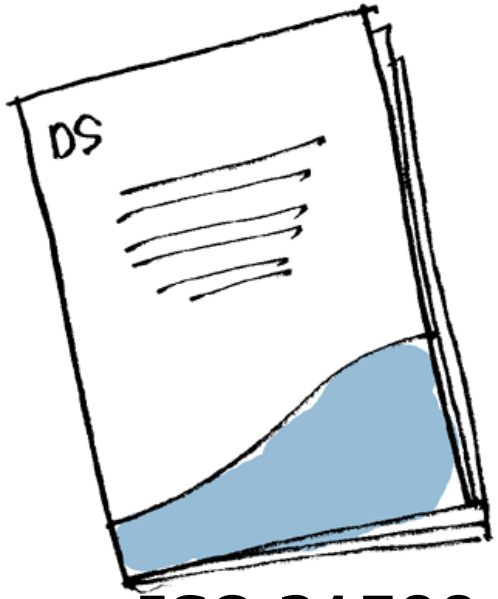
American

IPMA

European

Prince 2

UK



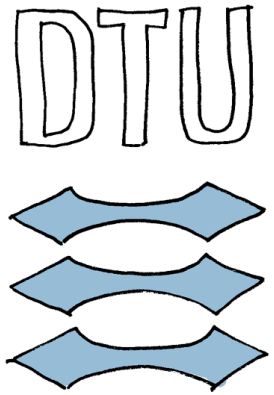
ISO 21500

International

ISO 21500 was chosen as it…

- represents state-of-the-art (was published Dec 2012)
- is developed and maintained by 100 experts from more than 30 countries. Including members of PMI, IPMA and DS.
- represents the basis for the future development of the other standards
- establishes a common "international" language for project management

Collaboration



- To strengthen your CV, we offer you the opportunity to be certified in the new international project management standard (ISO 21500).
- Partnership between DTU Management Engineering and Dansk Standard (initiated in 2013)
- Certified until now: 1186 (April 2021)
- https://www.ds.dk/da/standardisering/uddannelse-og-forskning/studerende/projektledelse

Benchmark

Certification	Requirement for experience	Size / duration		Cost (DKK)	
		Course	Test	Course	Test
IPMA D	12 months	4 days + preparation	Self assessment, application and exam	68.500	6.000
Prince2 (foundation)	None	3 days + preparation	1 hour, 75 questions	13.900	?
PMI (CAPM)	1500 hours	3 days + preparation	3 hours, 150 questions	52.500	2.300
DTU/DS	None	120 hours	Rapport, individual quizzes, 1½ hours test	0 (book)	500 (fee)

Testimonials?

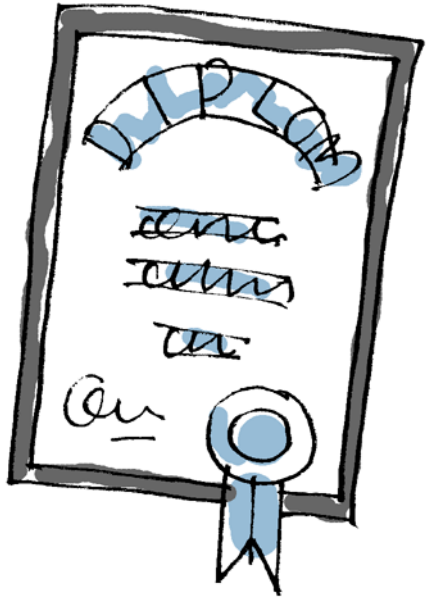
- »Det er et godt tiltag, at DTU inkluderer projektledelse i det tilbud, der ligger til de studerende. De kommer ud til en verden, hvor større og større dele af arbejdet sker under projektformen. De studerende kommer ud til en verden, hvor organisationer og virksomheder bruger forskellige modeller såsom IPMA, PMI, Prince2 og APM, og derfor det er godt, at DTU tilrettelægger deres tilbud efter den *generiske* guideline, der ligger i ISO 21500. Det gør, at de studerende har en høj forståelse af projektledelsesmetodikken, uden at de er låst fast i en eller flere af modellerne.« John Holst Siemens Danmark.

- ”Et godt kort at have på hånden når der skal søges jobs” (studerende)

- ”Rigtig spændende fag, utrolig relevant både nu og i fremtiden (godt at have på CV'et). Meget billigere end, hvis man selv skulle ud og få det efter studiet” (studerende)

- ”Super godt og utrolig relevant tilbud til os, studerende. Jeg er i hvert fald rigtig glad for at have fået muligheden for at kunne tage sådan en certificering.” (studerende)

Value proposition



You get a personal electronic diploma

You are listed in DS database of certified persons

Access to the ISO 21500 standard (digital) by DTUs Library

More info:

DTU:

- http://www.doing-projects.org/resources/certification

Dansk standard:

- https://www.ds.dk/da/standardisering/uddannelse-og-forskning/studerende/projektledelse

The examination process

Where and when?

Saturday 24th of April from 10:00 - 11:30

In certain cases, you may request extra time (e.g. dyslexia). Please send us an e-mail with documentation hereof.

The exam is online via WiseFlow systems

You will receive a login for

1. A demo exam (Demoflow)
2. The ISO 21500 exam

Before the exam

How do I log on and get access to WISEflow?

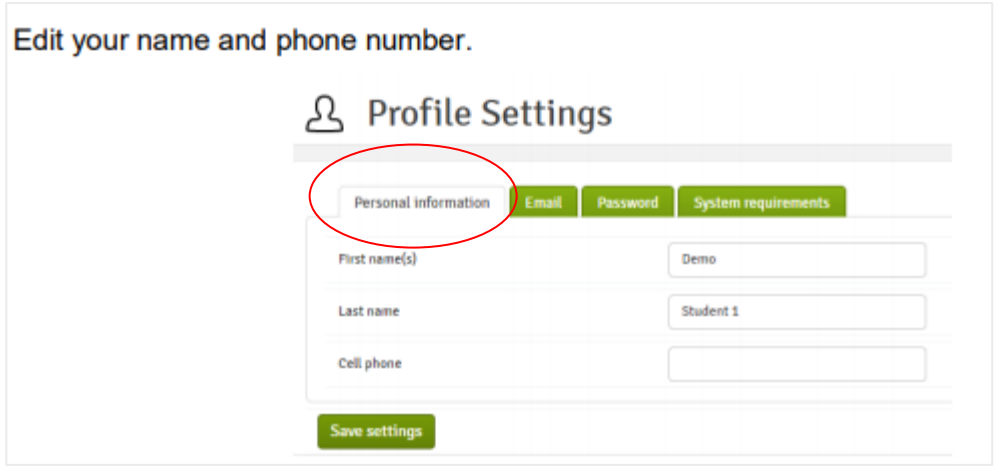
- You will receive an email with a link to the exam.
- The exam will be locked – meaning you will not be able to open any other programs during the exam.

Browser set up

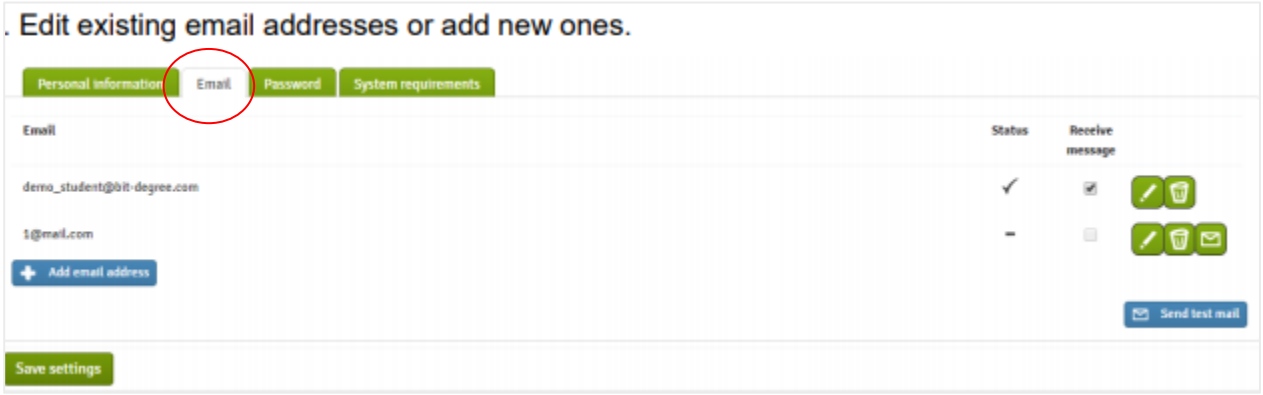
- We recommend that you use Chrome or Firefox for accessing WISEflow. The two latest versions of the browsers are supported by WISEflow.
- It is important that you, prior to your exam, check that your browser is updated. If not, you may not be able to submit your exam in WISEflow.

Setting up your profile

Edit your name and phone number.

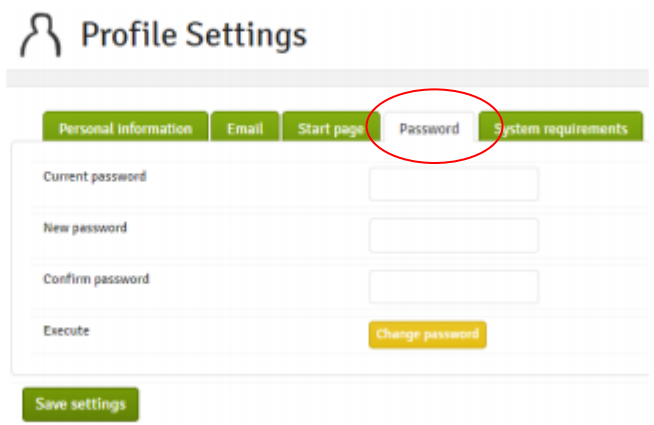


. Edit existing email addresses or add new ones.

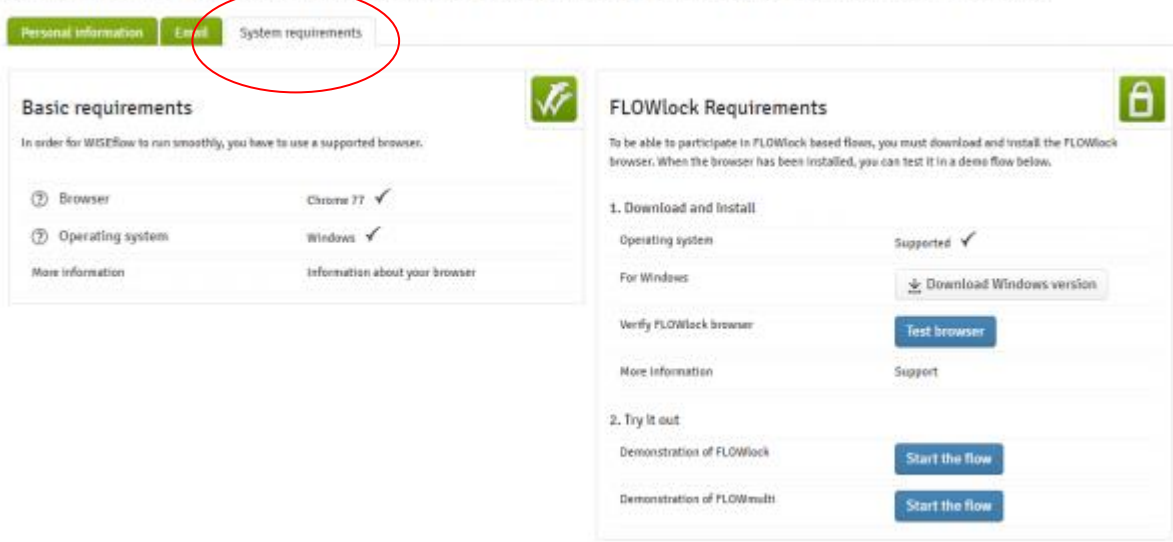


Setting up your profile

Change password (if you are logged in with WF login)

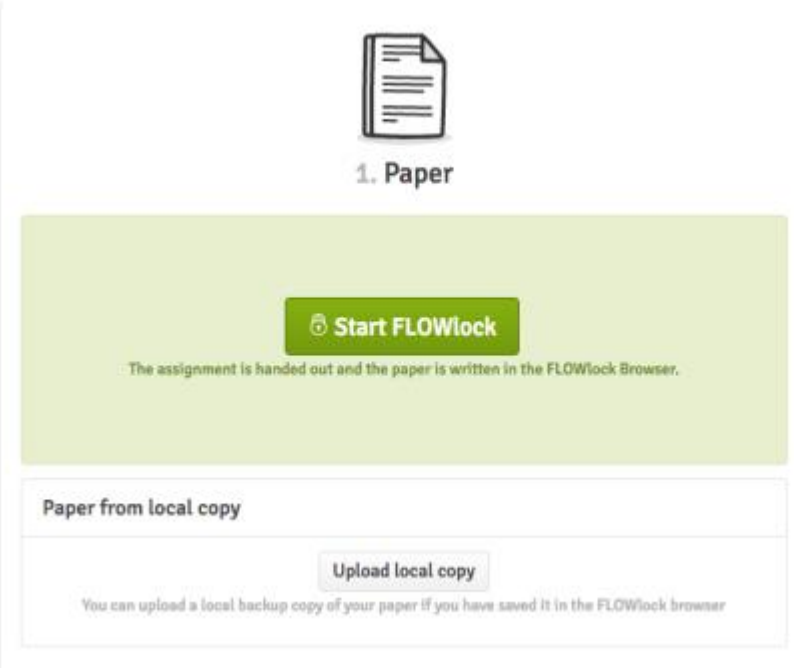


Check whether the system requirements are met and install the required software.



FLOWlock

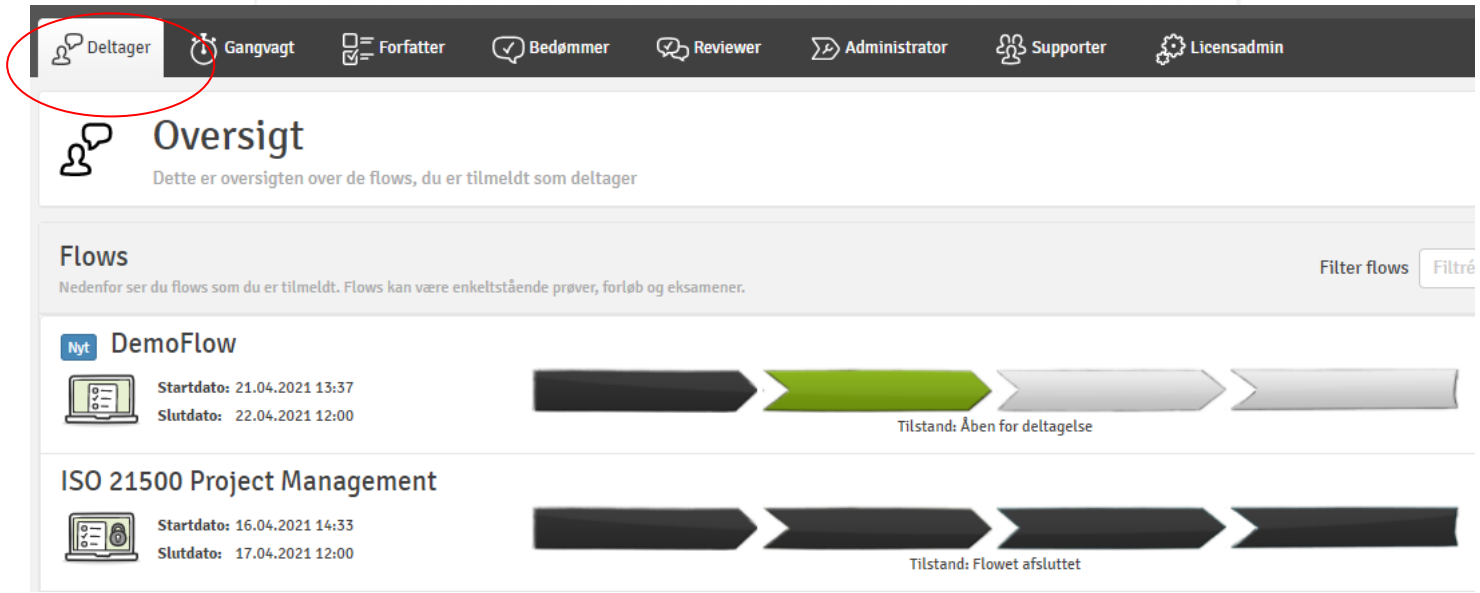
- FLOWlock is a special type of exam in WISEflow which allows submission within a specific time frame. FLOWlock limits your access to all other programmes on your computer while the flow is active.
- To take a FLOWlock exam, you must download, install and test the FLOWlock browser.
  - Click on your name in the top right-hand corner in WISEflow
  - Select "Edit profile".
  - On the "System Requirements" tab you can download and test the browser.
- It is important that you do this well ahead of the date of the examination in order to prevent any problems.



Access to the exam

Flow Overview

When you log in to WISEflow, you are met by the flow overview. This is a list of all the active exam flows where you are added as a participant. This includes the demo flow, which can be used to get a feel for how a typical exam flow is conducted. You can also access the participant archive to see previous exam flows that have become inactive.



If you are late or for some reason are logged of the exam, you need a ”gangvagt / invigilator” code to get access. The acces code is:

1

Checklist

Preparation

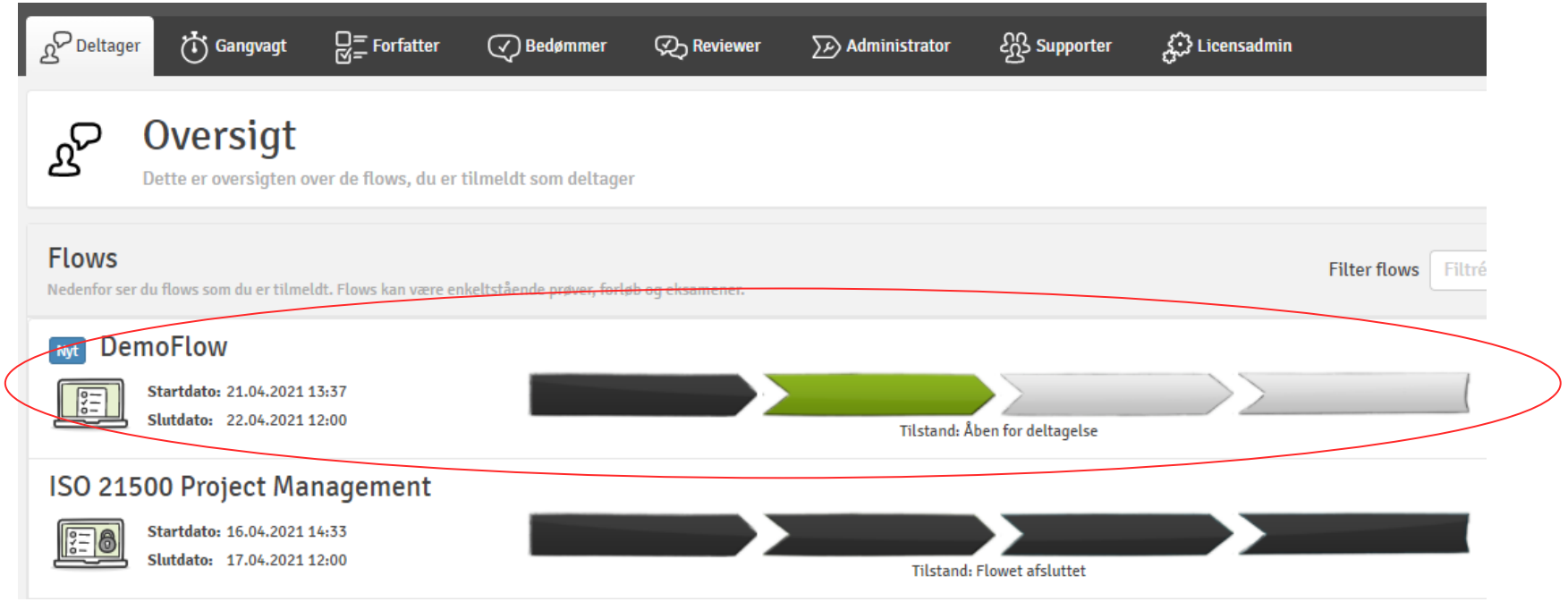
To prepare for the digital WISEflow exam, it is a good idea to go through the following checklist:

- Have you updated the operating system on your computer?
- Have you installed and updated your browser? We recommend that you use Firefox or Chrome.
- Did you try out the demo exam (Demoflow) in WISEflow?
- Do you have access to the exam in WISEflow (approximately 2 days prior the exam)?
- Did you install the latest version of the FLOWlock browser?

Preparing for the exam – demo exam

Demoflows

- As a student, you have access to a so-called demo exam in WISEflow, which give you the opportunity to try to submit an exam in WISEflow.
- In order to run the FLOWlock demoflow, you first have to downloade the browser which is used for FLOWlock exams.



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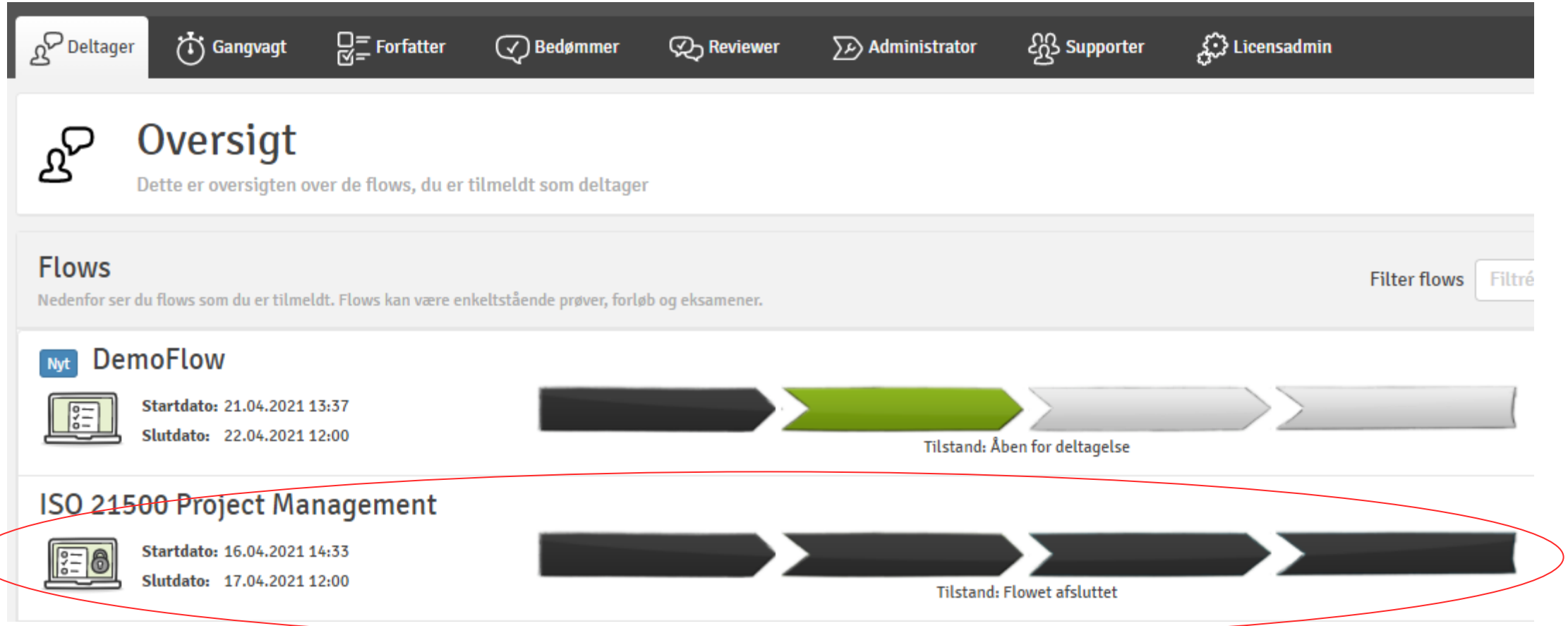
During the exam



The exam

- Multiple choice test with gradient scoring
- Based on the standard
- In English
- Aids are **not** allowed

Types of questions

- **Classical multiple choice:** Definition, input / output
- **Fill in the blanks (drag and match):** What is related…
- **Case (multiple choice):** How would you…

Gradient scoring question

The gradient scoring system works as follows:

- If you select the CORRECT answer, you will be awarded 7 points for the question
- If you select the SECOND BEST answer, you will be awarded 3 points for the question
- If you select the THIRD BEST answer, you will be awarded 1 points for the question
- If you select the DISTRACTER (the incorrect answer), you will receive no marks for the question

Points and grading

- 22 questions from 2-10 points
- 105 points i total
- 65 points for passing

After the test

- Electronic answer by email no later than two weeks after the test.
- Those who pass receive a diploma in English. Those who don’t pass receive and email informing them that they haven’t passed
- NB: There is no option to receive personal feedback on the test.
- Opportunity for reexamination next semester (however a new fee is required)

Technical support during the exam

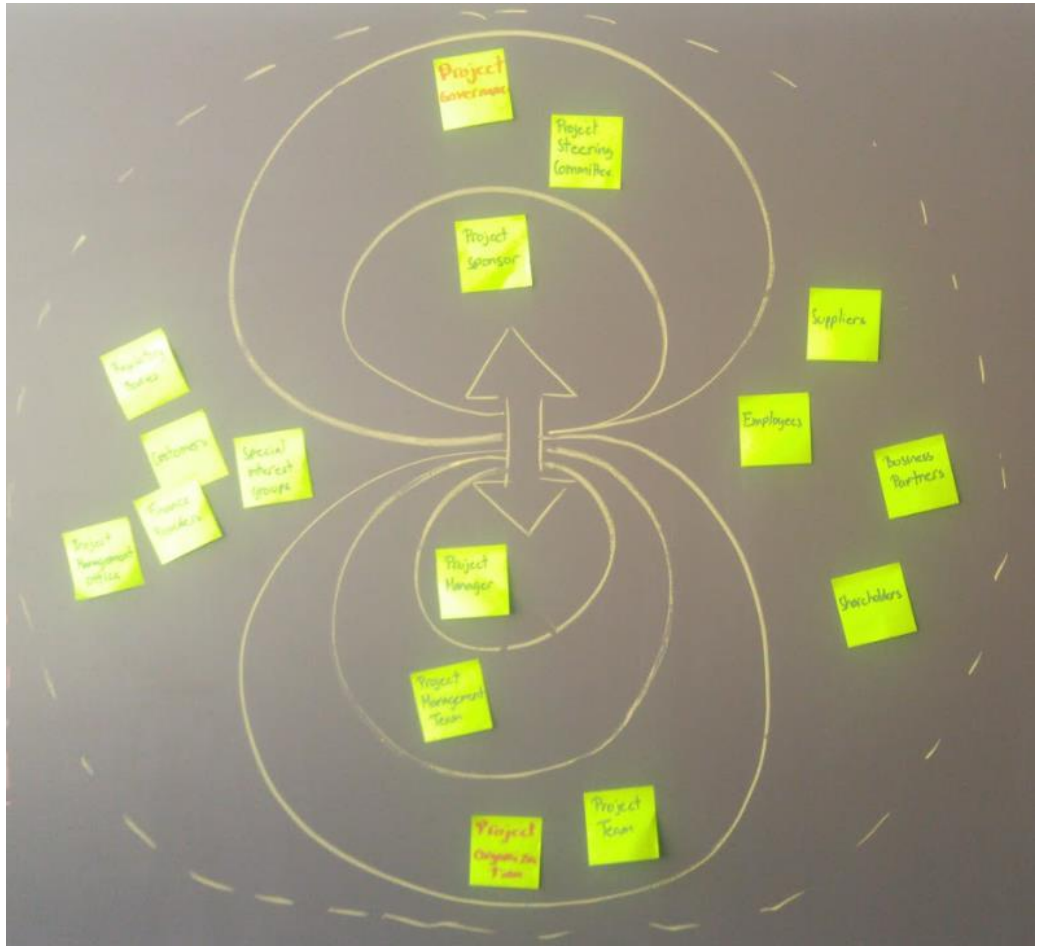
Contact:

- Pernille Bengtsen (29881402) – pab@ds.dk
- Signe Bøgh (41736807) – sab@ds.dk

How to pass?

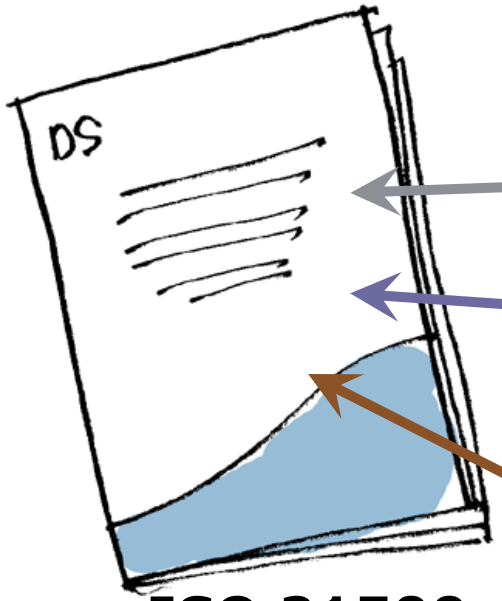
- You must understand the language
- You must understand the relations
- You must be able to navigate in the standard
- You must be able to use the models

A preparation strategy



The ISO standard

Content of the ISO standard



ISO 21500
International

PMI
American

Prince 2
UK

IPMA
European

The ISO standard

- ☐ Introduction and scope
- ☐ Terms and definitions
- ☐ Central concepts
- ☐ Project management processes
- ☐ Appendices

Aim of the standard

…providing guidance on concepts and processes of project management that are important for, and have impact on, the performance of projects.

Source: ISO 21500:2012

Audience

- *senior managers and project sponsors*, in order to provide them with a better understanding of the principles and practice of project management and to help them give appropriate support and guidance to their project managers, project management teams and project teams;
- *project managers*, *project management teams* and *project team members*, so that they have a common basis upon which to compare their project standards and practices with those of others;
- *developers of national or organizational standards*, for use in developing project management standards, which are consistent at a core level with those of others.

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Source: ISO 21500:2012

Scope

- This International Standard provides guidance for project management
- ***Can be used by any type of organization***, including public, private or community organizations, and for any type of project, irrespective of complexity, size or duration.

- This International Standard **provides high-level description of concepts and processes that are considered to form good practice** in project management.
- Projects are placed in the context of programmes and project portfolios, however, this International Standard does not provide detailed guidance on the management of programmes and project portfolios. Topics pertaining to general management are addressed only within the context of project management.

Source: ISO 21500:2012

The ISO standard

- ☑ Introduction and scope
- ☐ Terms and definitions
- ☐ Central concepts
- ☐ Project management processes
- ☐ Appendices

A project is...!

A project is ***a unique set of processes*** consisting of ***coordinated and controlled activities*** with ***start and end dates***, performed to achieve ***project objectives***. Achievement of the project objectives requires the provision of deliverables conforming to specific requirements.

Although many projects may be similar, each project is unique.

Project differences may occur in the following:

- deliverables provided;
- stakeholders influencing;
- resources used;
- constraints;
- the way processes are tailored to provide the deliverables.

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Source: ISO 21500:2012

Project management is ...!

...the application of methods, tools, techniques and competencies to a project. Project management includes the ***integration of the various phases of the project life cycle***.

...performed through processes. The processes selected for performing a project should be aligned in a systemic view. ***Each phase*** of the project life cycle ***should have specific deliverables***. These deliverables should be regularly reviewed during the project to meet the requirements of the sponsor, customers and other stakeholders.

Source: ISO 21500:2012

Terms and definitions (1-4)

Activity (2.1): Identified component of work within a schedule that is required to be undertaken to complete a project

Application area (2.2): Category of projects that generally have a common focus related to a product, customer or sector

Baseline (2.3): Reference basis for comparison against which project performance is monitored and controlled

Change request (2.4): Documentation that defines a proposed alteration to the project

Source: ISO 21500:2012

Terms and definitions (7 & 11)

Corrective action (2.7):
Direction and activity for modifying the performance of work to bring performance in line with the plan

"Intentional activity that realigns the performance of the project work with the project management plan"
(PMBoK 5th edition)

Preventive action (2.11):
Direction and activity for modifying the work, in order to avoid or reduce potential deviations in performance from the plan

"An intentional activity that ensures the future performance of the project work is aligned with the project management plan"
(PMBoK 5th edition)

Source: ISO 21500:2012

Corrective and preventive actions …according to PMBoK (PMI)

Corrective Actions	Preventive Actions	Defect Repair
Intentional activity that realigns the performance of the project work with the project management plan	An intentional activity that ensures the future performance of the project work is aligned with the project management plan	An intentional activity to modify a non-conforming product or product component.
These are the steps taken to remove the causes of existing undesirable situation	These are the steps taken to remove the causes of potential undesirable situations.	These are steps taken to correct existing undesirable situation
Reactive in nature	Proactive in nature	Instant in nature
Should be taken place when a situation has occurred	Should be taken place when a situation has not occurred	Should be taken place as an immediate action when the situation occurs
Don’t let it happen again	Don’t let it happen at all	Don’t let it go
E.g. On hiking, hiking shoes got torn or broken, fixing the broken part and start using the same shoes would be corrective action	E.g. Carrying a pair of extra shoes would be preventive action	E.g. Before starting hiking, inspecting the shoes and stitching and or fixing the areas would be defect repair **Not a part of ISO21500**

Source: https://www.izenbridge.com/blog/pmp-exam-series-change

Terms and definitions (5-6, 8 & 12)

Configuration management (2.5): Application of procedures to control, correlate and maintain documentation, specifications and physical attributes

Control (2.6): Comparison of actual performance with planned performance, analysing variances and taking appropriate corrective and preventive action as needed

Critical path (2.8): Sequence of activities that determine the earliest possible completion date for the project or phase

Project life cycle (2.12): Defined set of phases from the start to the end of the project

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Source: ISO 21500:2012

Terms and definitions (9-10)

Lag (2.9): Attribute applied to a logical relationship to delay the start or end of an activity

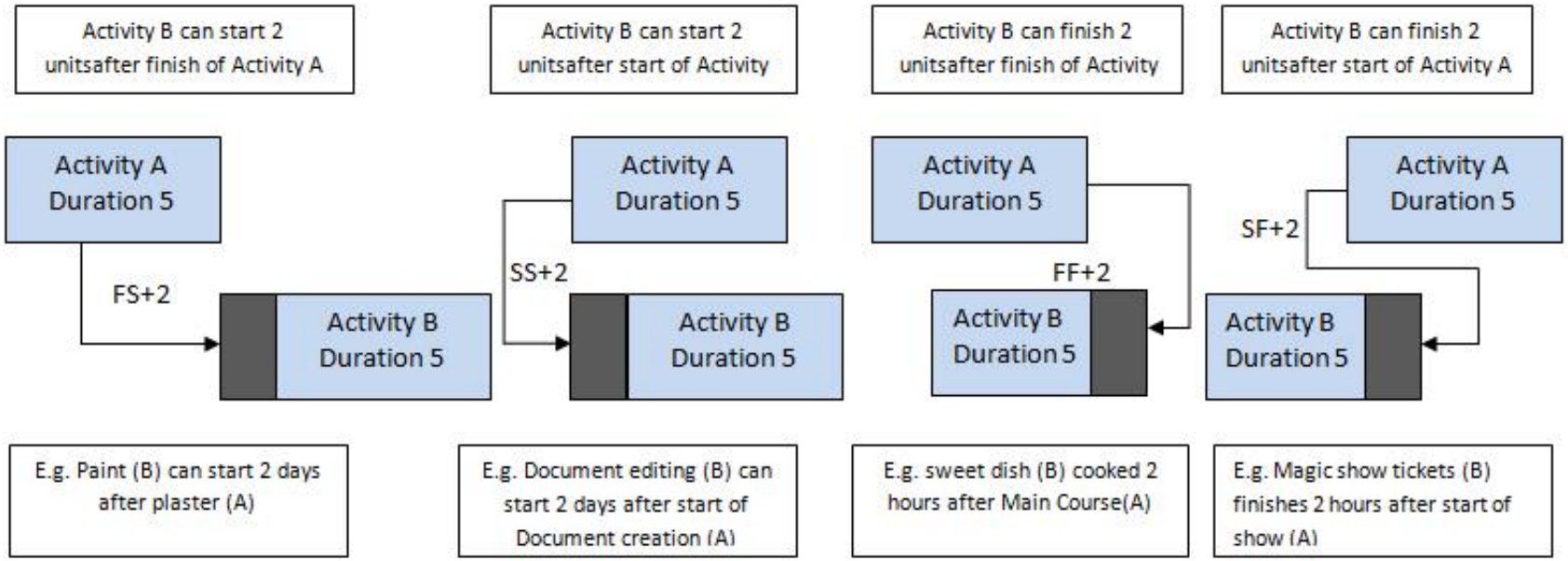
"The amount of time whereby a successor activity is required to be delayed **with respect to** a predecessor activity" (PMBoK 5th edition)

Lead (2.10): Attribute applied to a logical relationship to advance the start or end of an activity

"The amount of time whereby a successor activity can be advanced **with respect to** a predecessor activity" (PMBoK 5th edition)

Source: ISO 21500:2012

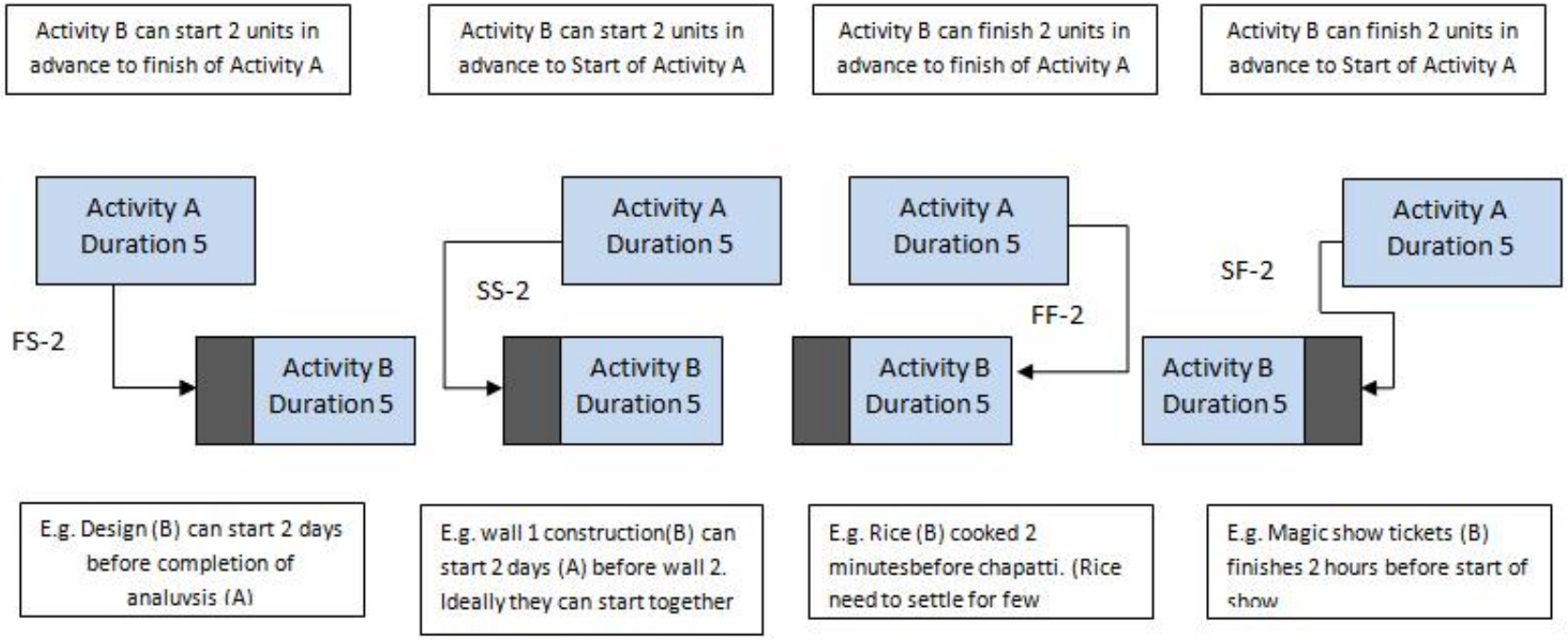
Examples of lag



- Lag always describes **delay**, which means addition of time and **denoted** by "+" sign in the network diagram
- This can be a predefined delay which is required to put in between the activities to fine tune the project and to meet the quality. Classic example of this is we need lag between plaster of wall and paint so that cement can set up first
- Obliviously it's rare that project puts lag without any reason as no one wants to delay the project without proper justification. So Lag is definitely put to accomplish some pre-defined requirement or some strategic goal (specific time to launch the product)

Source: http://www.izenbridge.com/blog/what-is-lead-lag

Examples of lead



- Lead always describes advancement, which means reduction in time taken and denoted by "-" sign in the network diagram
- Lead can be predefined advancement which is required to put in between the activities to fine tune the project and to meet the quality. Classic example of this is starting of document editing immediately once one portion of document is ready. No need to wait till creation of full document as documents having say 5000 pages if we wait for that long and then again take time to edit may lose its purpose
- Lead is also used while using schedule compression technique like fast tracking. Though when put as part of schedule compression, it has risk associated (Rework) with it but we can't avoid project challenges e.g. starting development when one portion of design is ready (earlier planned to start development at the end of full design)

Source: http://www.izenbridge.com/blog/what-is-lead-lag

Terms and definitions (13-16)

Risk register (2.13): Record of identified risks, including results of analysis and planned responses

Stakeholder (2.14): Person, group or organization that has interests in, or can affect, be affected by, or perceive itself to be affected by, any aspect of the project

Tender (2.15): Document in the form of an offer or statement of bid to supply a product, service or result, usually in response to an invitation or request

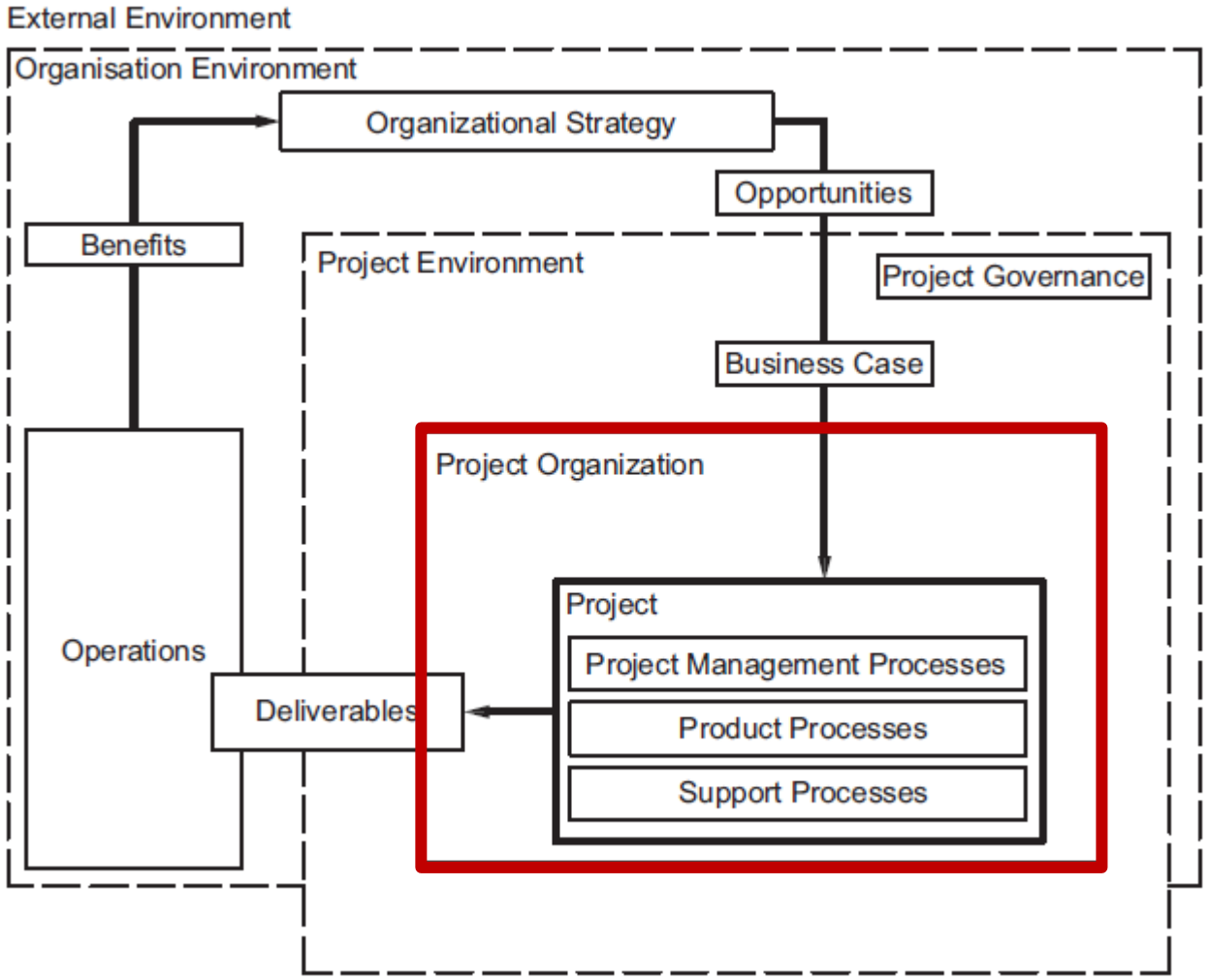
Work breakdown structure dictionary (2.16): Document that describes each component in the work breakdown structure

Source: ISO 21500:2012

The ISO standard

- ☑ Introduction and scope
- ☑ Terms and definitions
- ☐ Central concepts
- ☐ Project management processes
- ☐ Appendices

Project management concepts



KEY:

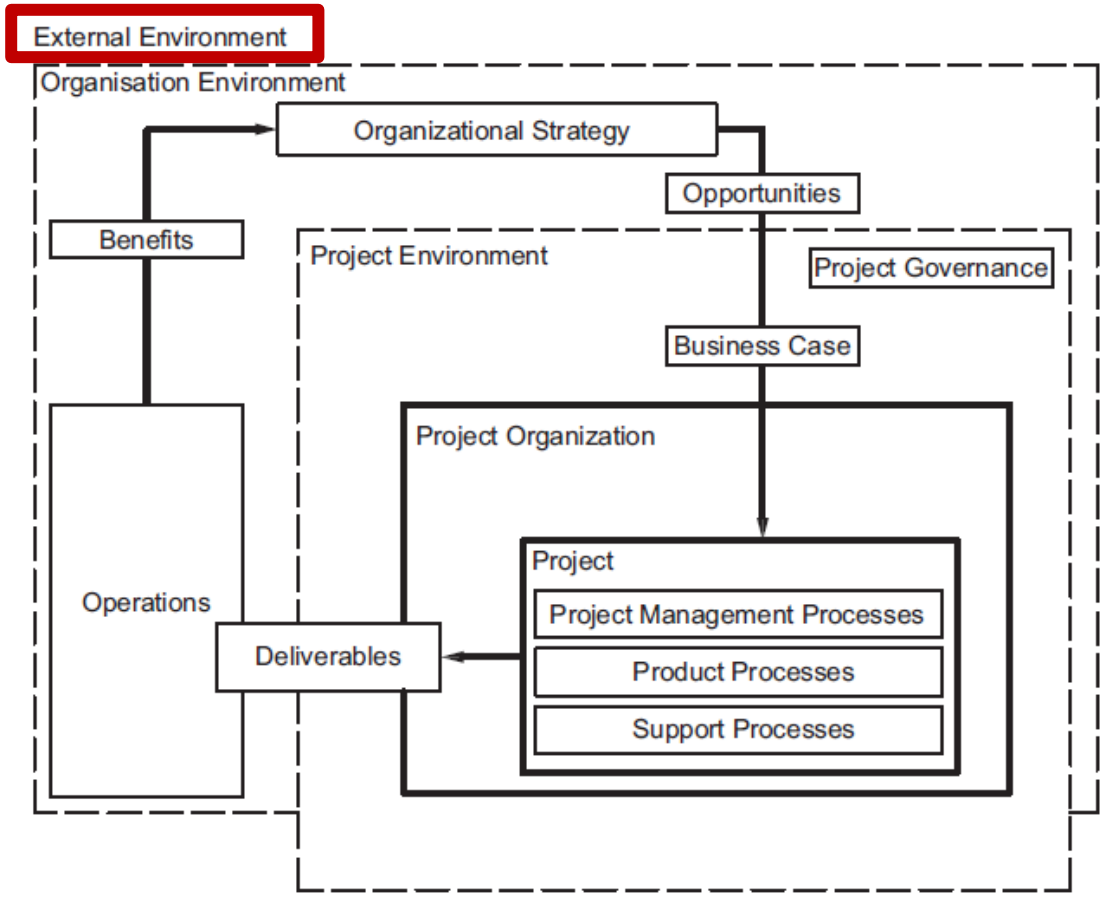
- Boxes represent project management concepts
- Arrows represent a logical flow by which the concepts are connected
- Dotted lines represent organizational boundaries

Source: ISO 21500:2012

External Environment

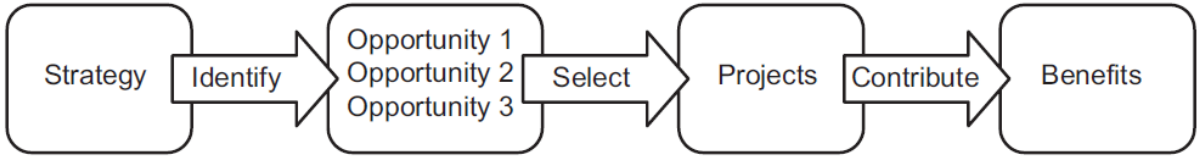
Factors: socio-economic, geographical, political, regulatory, technological and ecological

- … may have an impact on the project by imposing constraints or introducing risks affecting the project.
- … are often beyond the control of the project manager, they should still be considered.

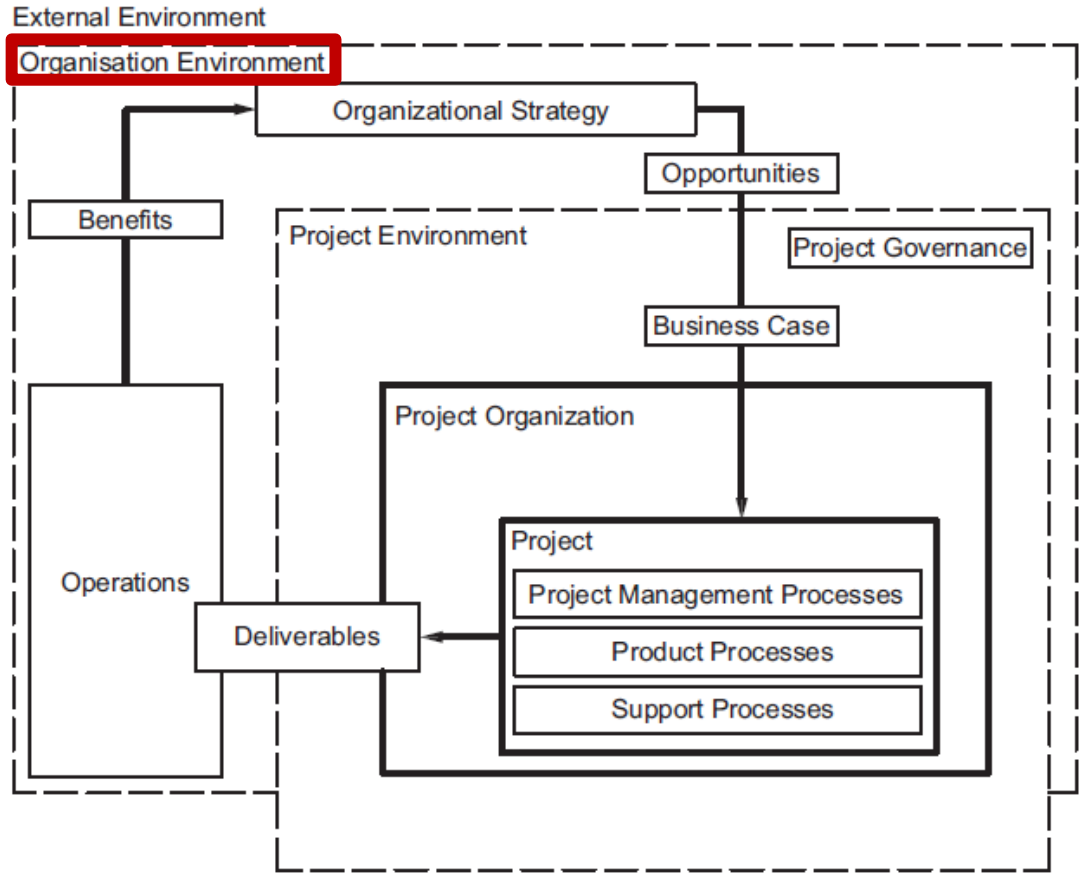


Source: ISO 21500:2012

Organisation Environment



- Organizational strategy (3.4.1)
- Opportunity evaluation and project initiation (3.4.2)
- Benefits realization (3.4.3)



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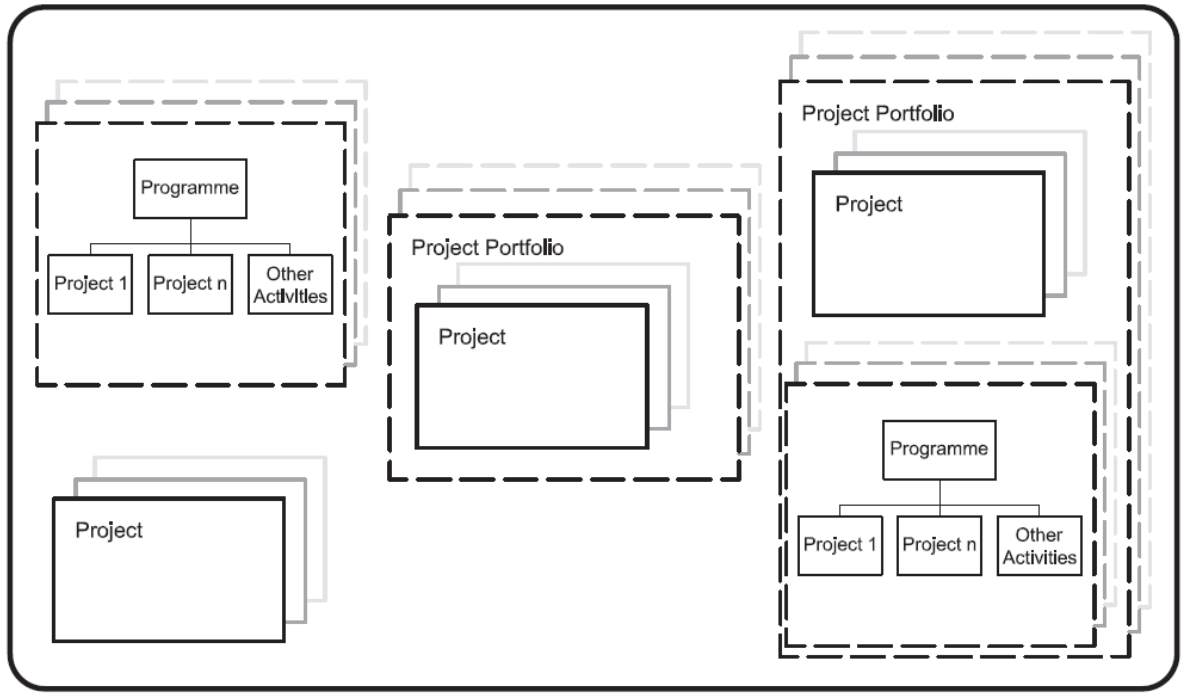
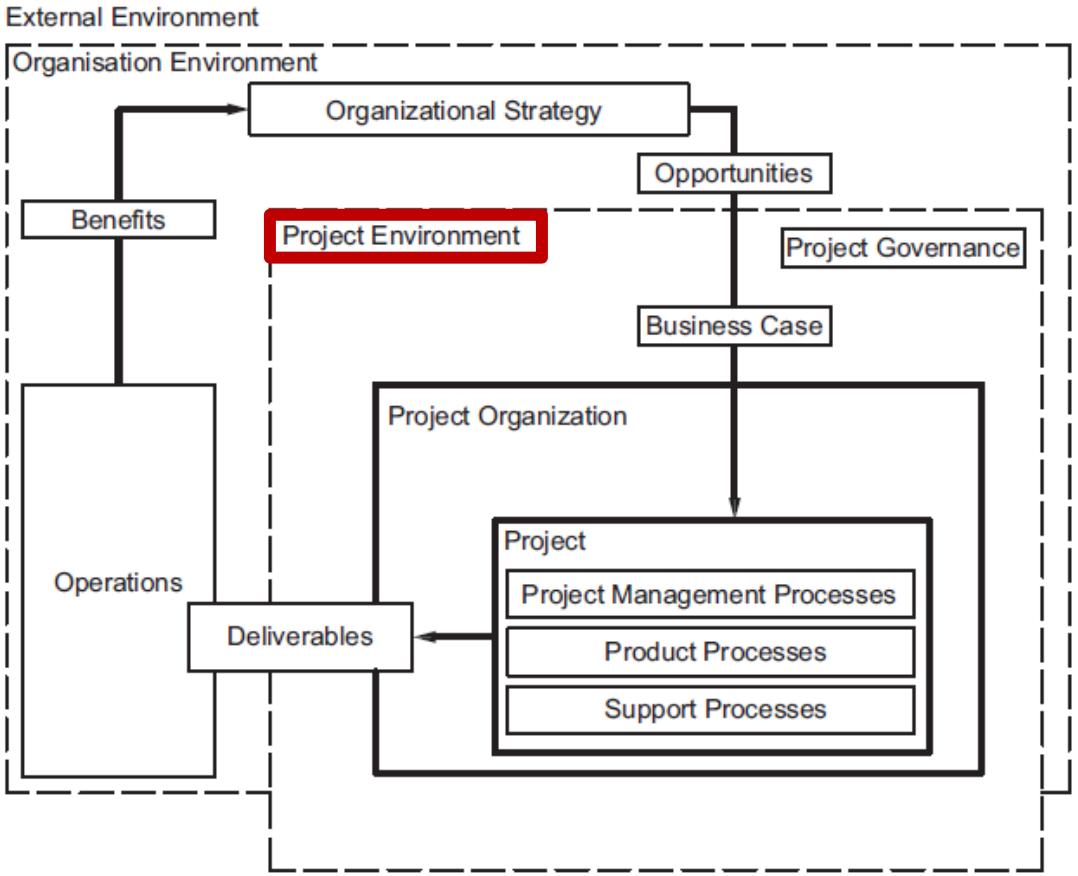
Source: ISO 21500:2012

Project environment 3.5

A project usually exists inside a larger organization encompassing other activities. Projects may be organized within programmes and project portfolios.





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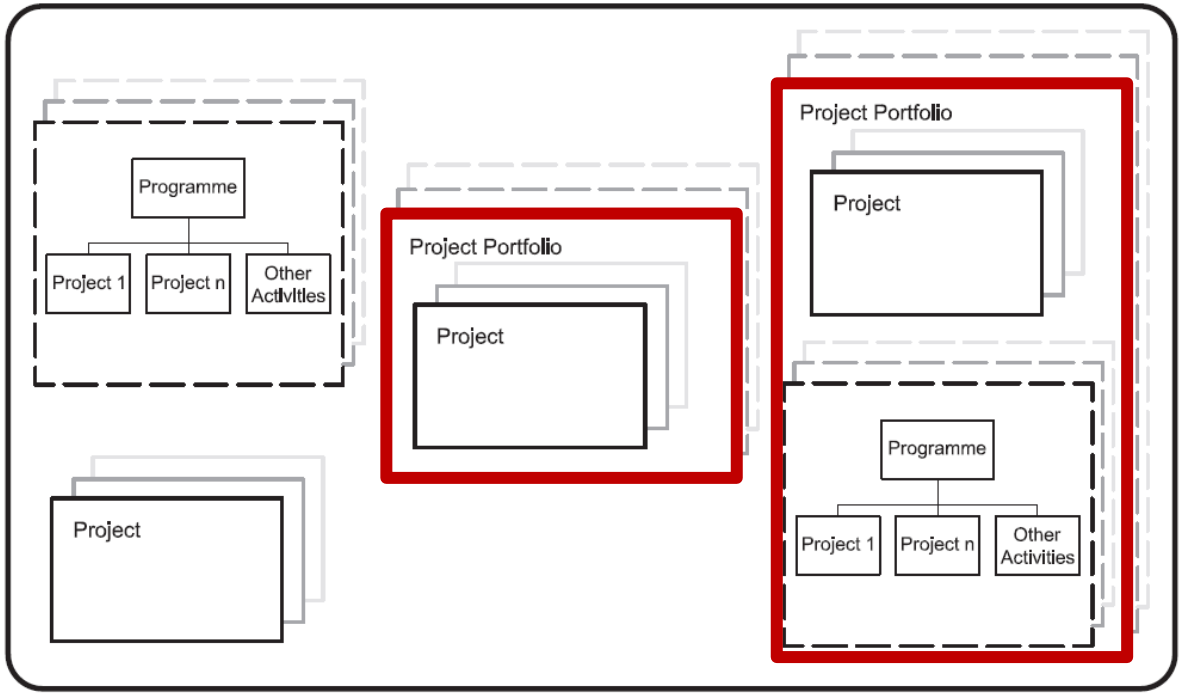
Source: ISO 21500:2012

Portfolio management (3.5.3.2)

- A project portfolio is generally ***a collection of projects and programmes and other work*** that are grouped together to facilitate the effective management of that work to meet strategic goals.

- Project portfolio ***management includes identifying, prioritizing, authorizing, directing and controlling*** projects, programmes and other work to achieve specific strategic goals



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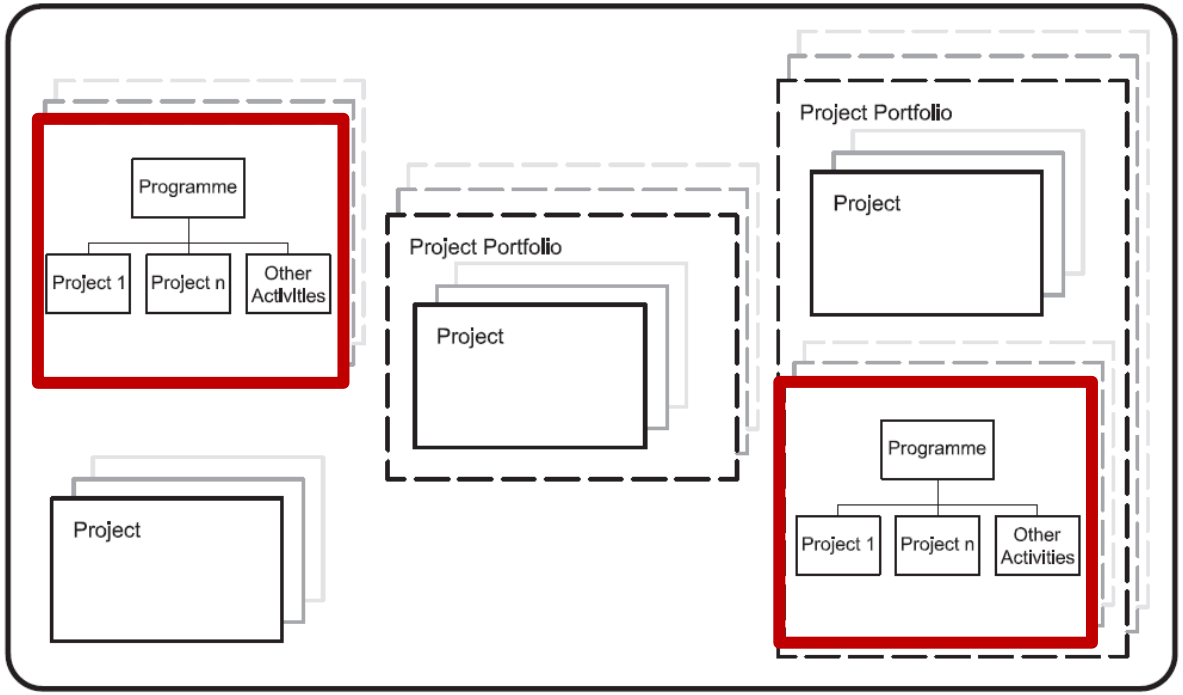
Source: ISO 21500:2012

Programme management (3.5.3.3)

- A programme is generally a ***group of related projects and other activities <u>aligned</u> with strategic goals***.

- Programme management consists of centralized and coordinated activities to achieve the goals.



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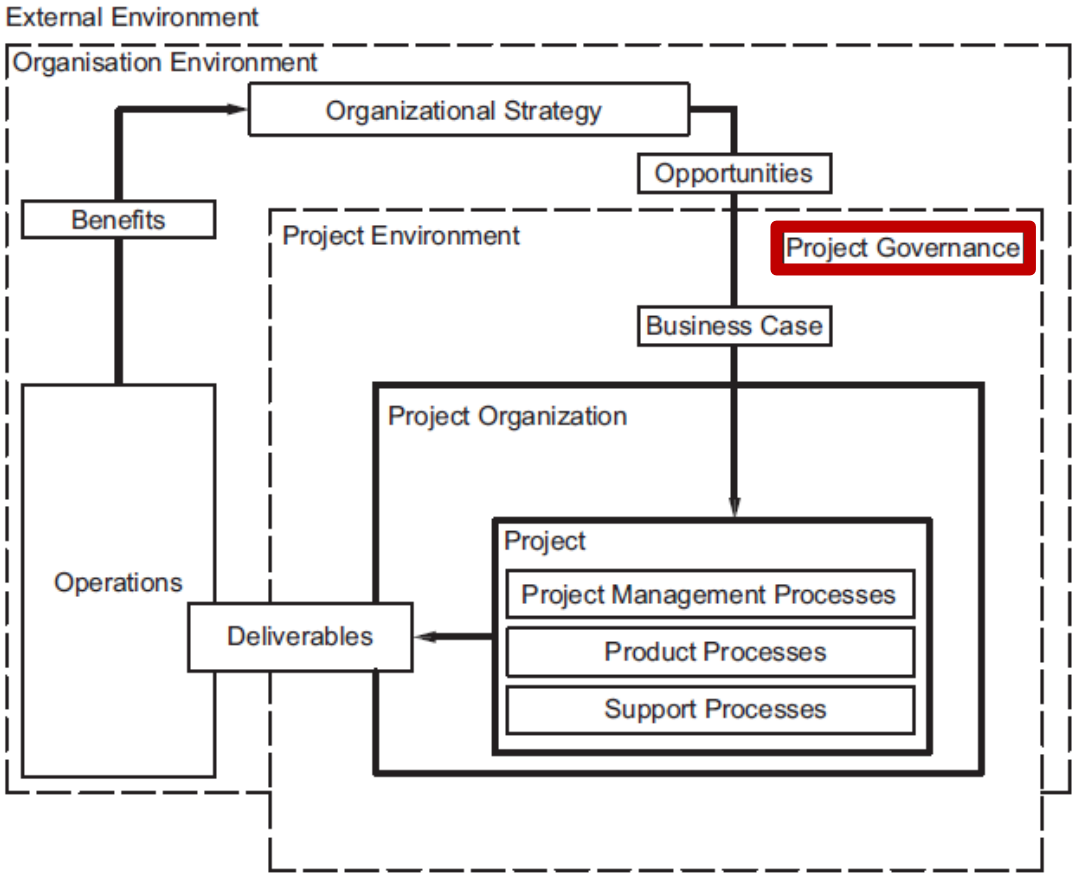
Source: ISO 21500:2012

Project governance (3.6)

- Governance is the framework by which an organization is directed and controlled
- Project governance may include subjects such as the following:
  - defining the management structure;
  - the policies, processes and methodologies to be used;
  - limits of authority for decision-making;
  - stakeholder responsibilities and accountabilities;
  - interactions such as reporting and the escalation of issues or risks.



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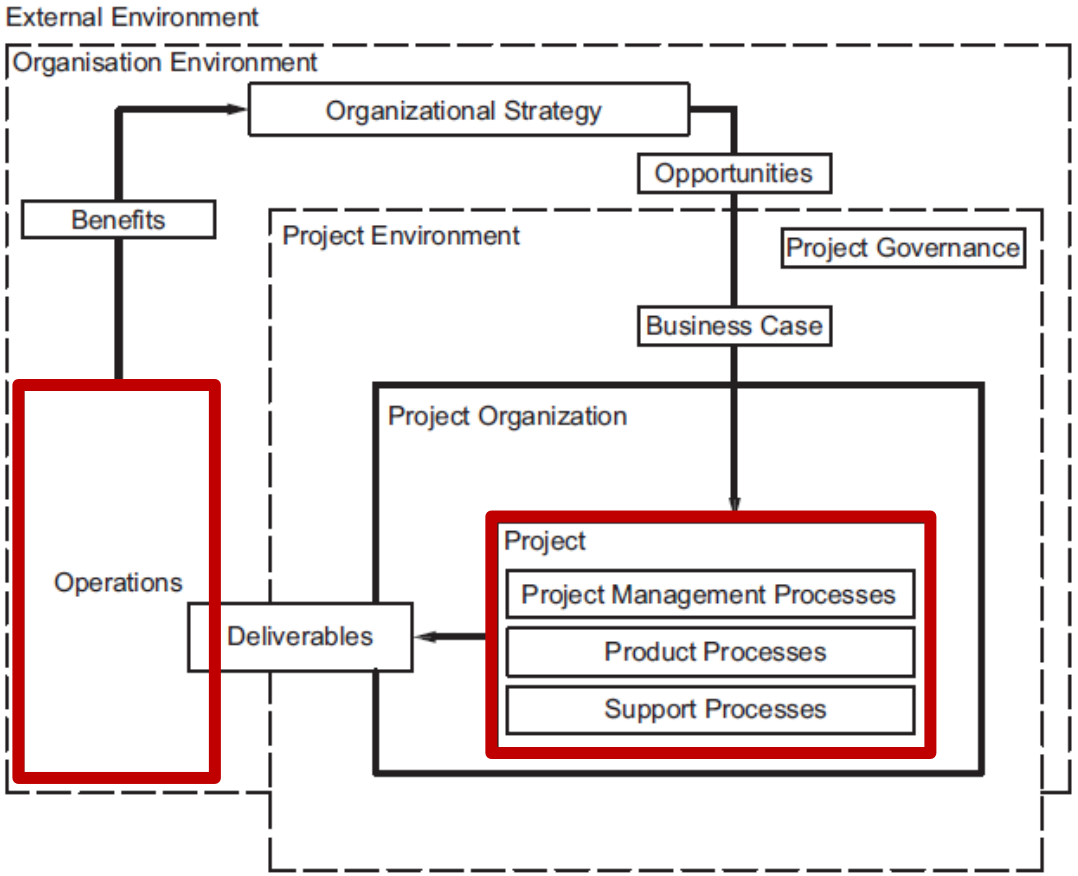
Source: ISO 21500:2012

Projects and operations (3.7)

Operations are performed by relatively *stable teams* through ongoing and *repetitive processes* and are *focused on sustaining the organization*;

Projects are performed by *temporary teams*, are *non-repetitive* and provide *unique deliverables*



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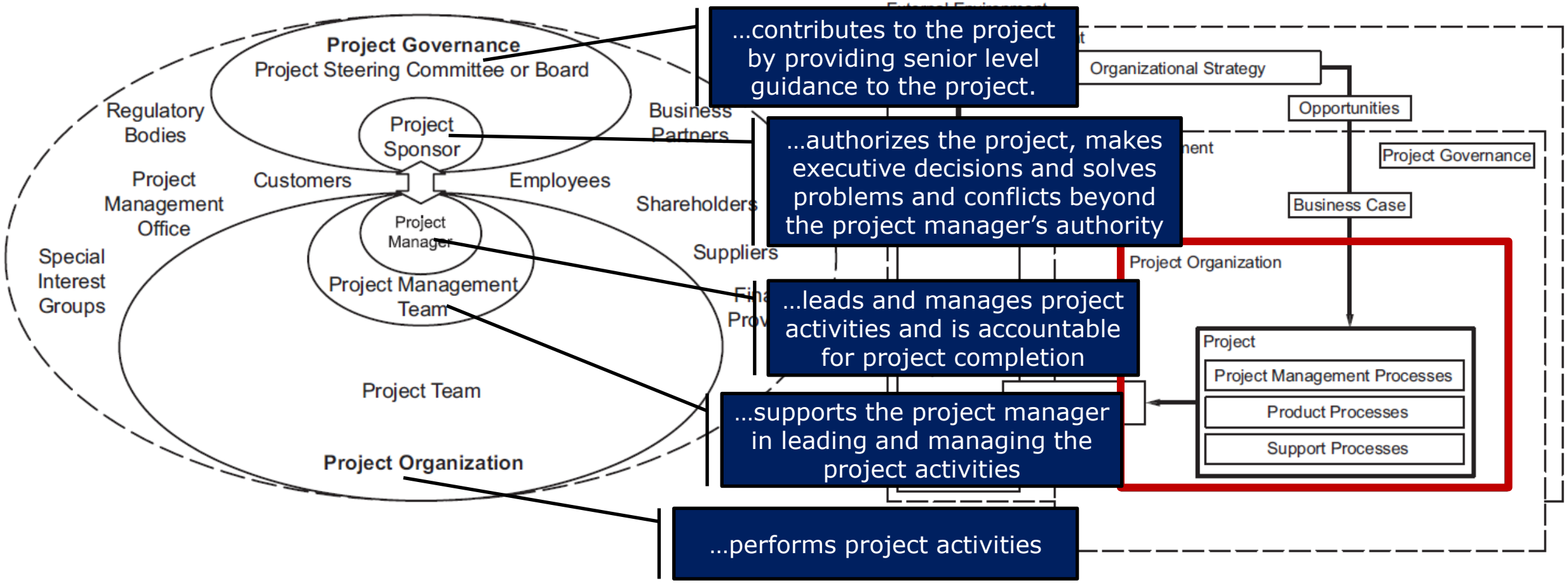
Source: ISO 21500:2012

Stakeholders and project organization (3.8)



Stakeholder (2.14): Person, group or organization that has interests in, or can affect, be affected by, or perceive itself to be affected by, any aspect of the project

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Source: ISO 21500:2012

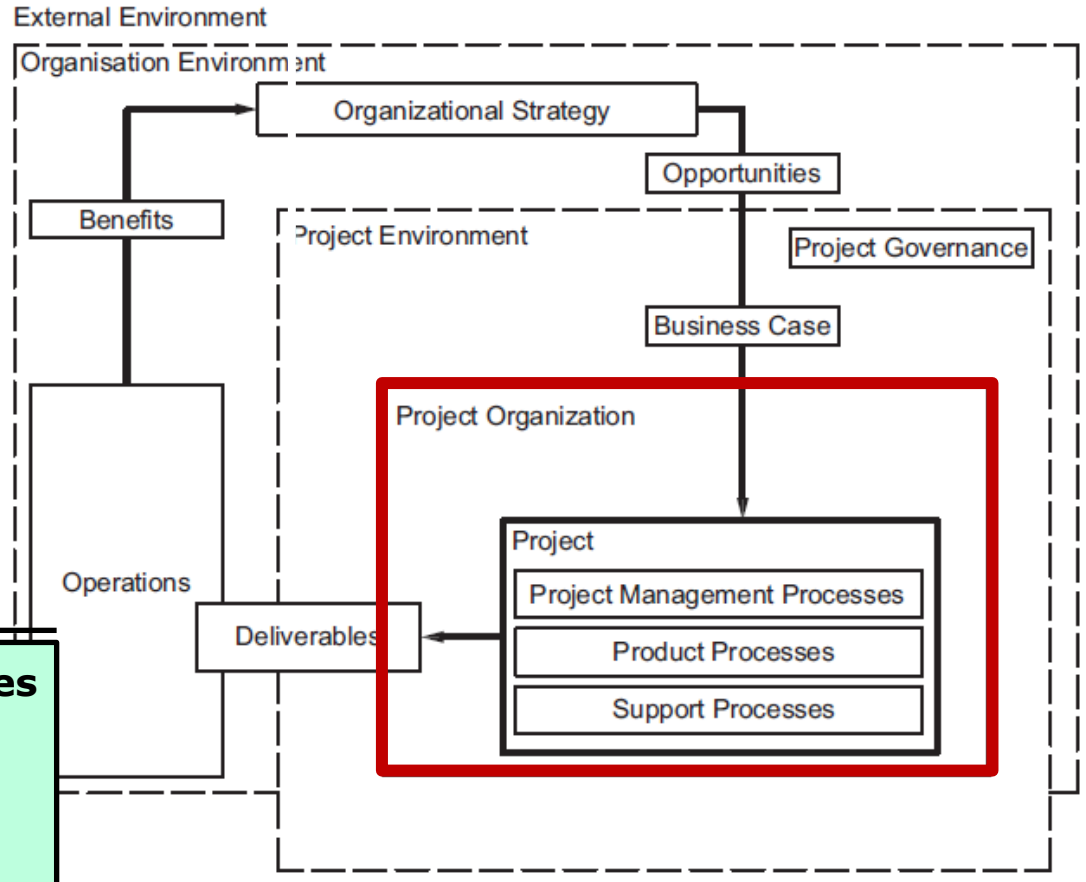
Competencies of project personnel (3.9)

Contextual competencie
related to the managemen
of the project inside the
organizational and externa
environment

Technical competencies, for delivering projects in a structured way, including the project management terminology, concepts and processes defined in this International Standard

3.01 **P** Project orientation									
3.02 **Pg** Programme orientation	3.03 **Pf** Portfolio orientation						2.04 **As** Assertiveness	2.05 **R** Relaxation	2.06 **O** Openness
3.04 **Pp** Project, prog-ram & port-folio implemen.	3.05 **Po** Permanent organization	1.01 **Ps** Project management success	1.02 **Ip** Interested parties	1.03 **Rq** Project re-quirements & objectives	1.04 **Ri** Risk & opportunities	1.05 **Q** Quality	2.07 **Cy** Creativity	2.08 **Ro** Results orientation	2.09 **E** Efficiency
3.06 **Bu** Business	3.07 **Sa** Systems, products & technology	1.06 **Po** Project organization	1.07 **T** Teamwork	1.08 **Pb** Problem resolution	1.09 **Ps** Project structures	1.10 **Sd** Scope & deliverables	2.10 **Co** Consultation	2.11 **Ne** Negotiation	2.12 **Cc** Conflict & crisis
3.08 **Pe** Personnel management	3.09 **Hs** Health, secu-rity, safety, & environment	1.11 **Tp** Time & project phases	1.12 **Re** Resources	1.13 **C** Cost & finance	1.14 **Cn** Procurement & contract				
3.10 **Fi** Finance	3.11 **Le** Legal	1.16 **Cr** Control & reports	1.17 **In** Information & documentation	1.18 **Ca** Communica-tion	1.19 **Su** Project startup				

Behavioral competencies are associated with personal relationships inside the defined boundaries of the project



Each project team requires competent individuals who are capable of applying their knowledge and experience to provide the project deliverables.

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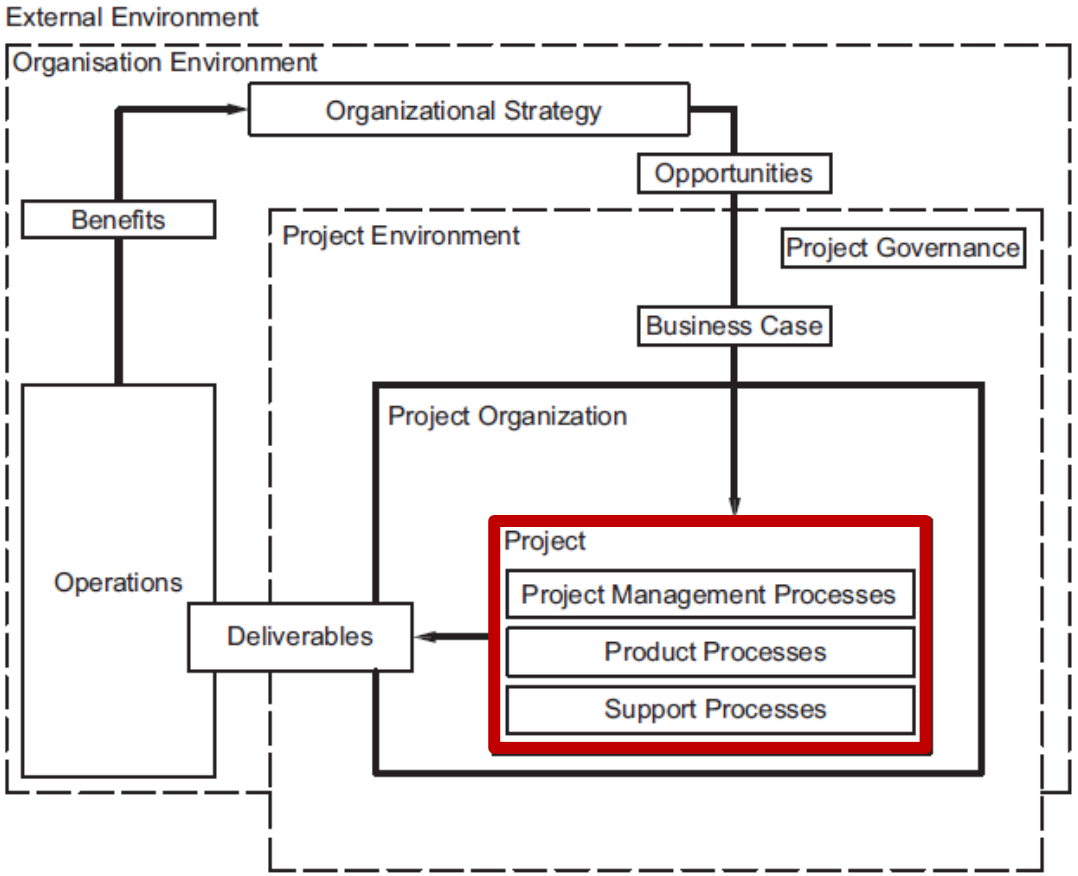
Source: ISO 21500:2012 & IPMA (2013)

Project life cycle (3.10)

- The project life cycle **spans** the period **from the start of the project to its end**.
- The phases are **divided by decision points**, which can vary depending on the organizational environment.
- The decision points **facilitate project governance**.
- By the end of the last phase, the project should have provided all deliverables



Project life cycle (2.14): Defined set of phases from the start to the end of the project

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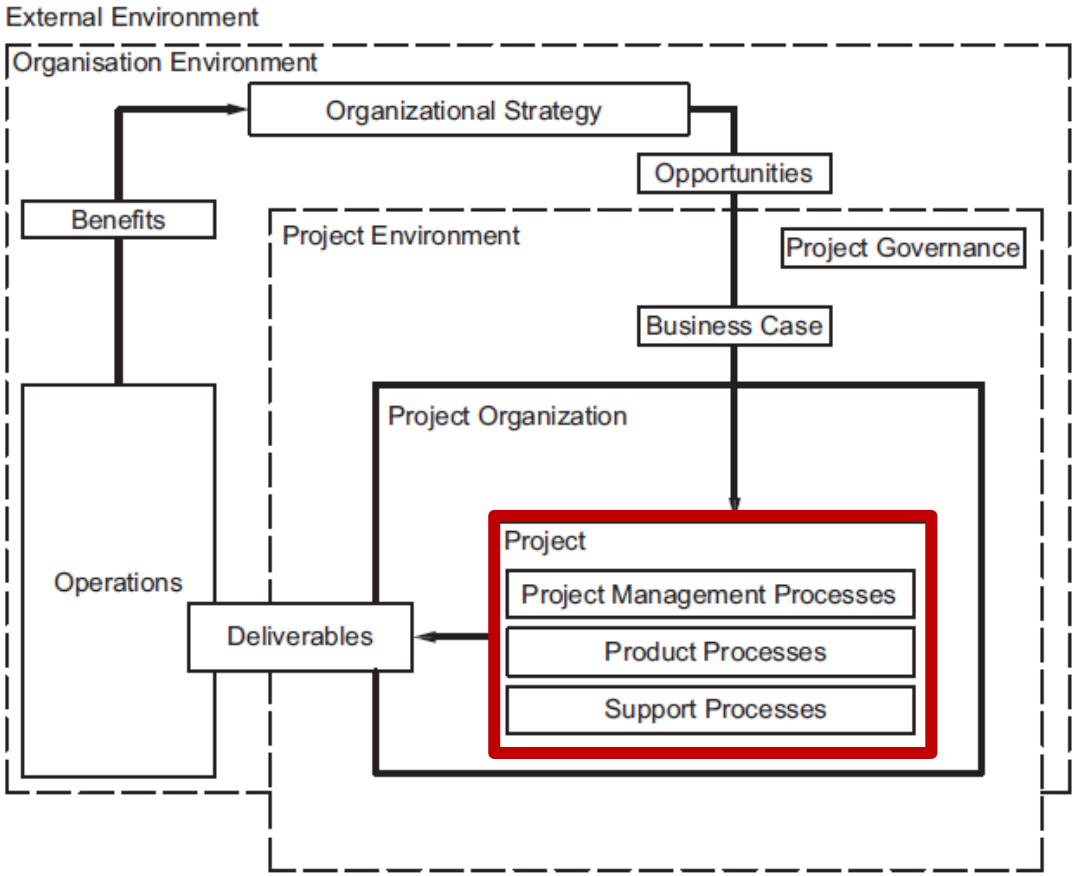
Source: ISO 21500:2012

Project constraints (3.11)

- the duration or target date for the project;
- the availability of the project budget;
- the availability of project resources, such as people, facilities, equipment, materials, infrastructure, tools;
- factors related to health and safety of personnel;
- the level of acceptable risk exposure;
- the potential social or ecological impact of the project;
- laws, rules and other legislative requirements



Achievement of consensus among key project stakeholders on the constraints may form a strong foundation for project success.

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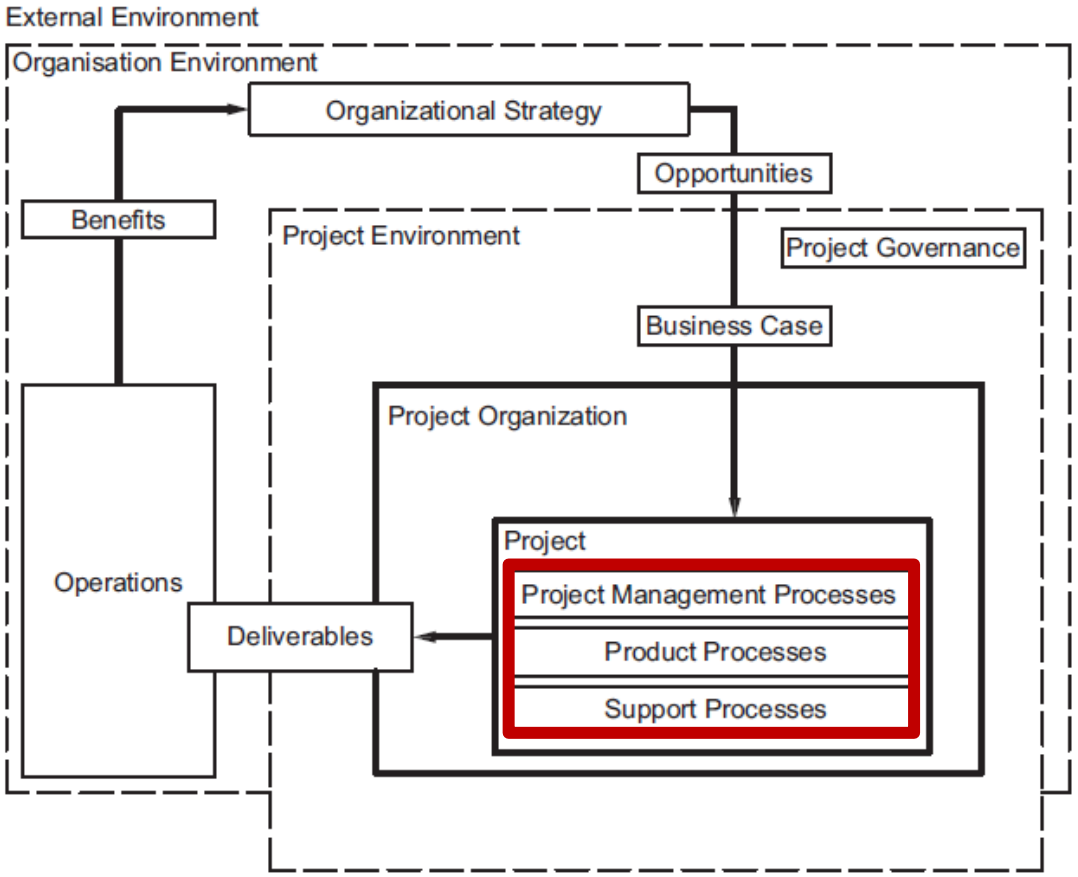
Source: ISO 21500:2012

Relationship between project management concepts and processes (3.12)

Project management is accomplished through processes utilizing the concepts and competencies described. A process is a set of interrelated activities. Processes used in projects are generally categorized into three major types:

- **project management processes**, which are specific to project management and determine how the activities selected for the project are managed;
- **delivery processes**, which are not unique to project management, which result in the specification and provision of a particular product, service or result, and which vary depending on the particular project deliverable;
- **support processes**, which are not unique to project management and which provide relevant and valuable support to product and project management processes in such disciplines as logistics, finance, accounting and safety.



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Source: ISO 21500:2012

The ISO standard

- ☑ Introduction and scope
- ☑ Terms and definitions
- ☑ Central concepts
- ☐ Project management processes
- ☐ Appendices

Making projects successful (4.1)

- select appropriate processes described in 4.3 that are required to meet the project objectives;
- use a defined approach to develop or adapt the product specifications and plans to meet the project objectives and requirements;
- comply with requirements to satisfy the project sponsor, customers and other stakeholders;
- define and manage the project scope within the constraints, while considering the project risks and resource needs to provide the project deliverables;
- obtain proper support from each performing organization, including commitment from the customers and project sponsor.

Source: ISO 21500:2012

Two perspectives on Project Management Processes

- The project management processes may be viewed from two different perspectives:
  - as process groups (see 4.2.2) for the management of the project;
  - as subject groups (see 4.2.3) for collecting the processes by subject

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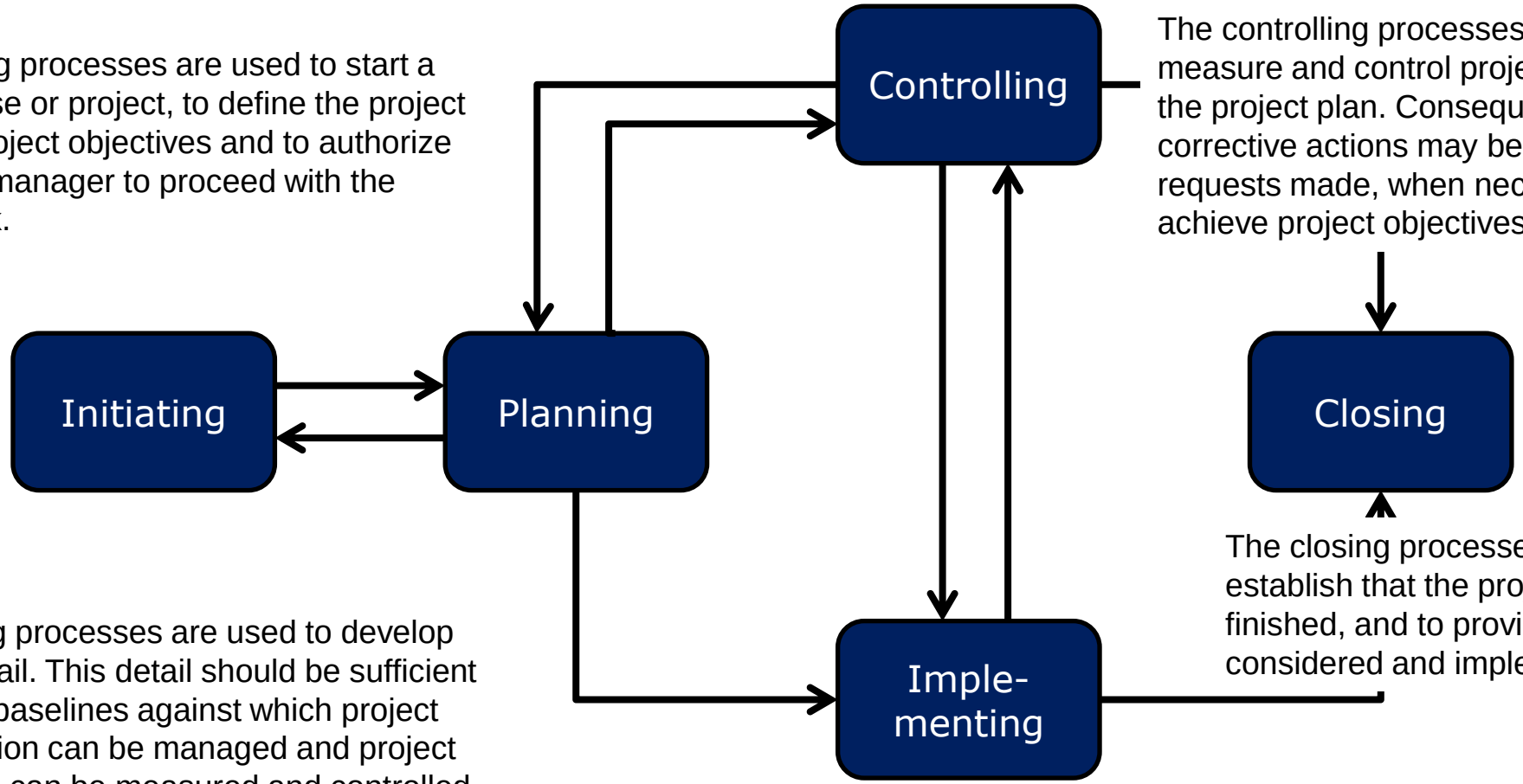
Source: ISO 21500:2012

Project management processes

The initiating processes are used to start a project phase or project, to define the project phase or project objectives and to authorize the project manager to proceed with the project work.



The controlling processes are used to monitor, measure and control project performance against the project plan. Consequently, preventive and corrective actions may be taken and change requests made, when necessary, in order to achieve project objectives.

The closing processes are used to formally establish that the project phase or project is finished, and to provide lessons learned to be considered and implemented as necessary.

The planning processes are used to develop planning detail. This detail should be sufficient to establish baselines against which project implementation can be managed and project performance can be measured and controlled.

The implementing processes are used to perform the project management activities and to support the provision of the project's deliverables in accordance with the project plans.

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Source: ISO 21500:2012

Project management subjects

ISO 21500 Subjects	PMBoK® Guide Knowledge Areas
Integration	Integration
Stakeholder	Stakeholder
Scope	Scope
Resource	Human Resources
Time	Time
Cost	Cost
Risk	Risk
Quality	Quality
Procurement	Procurement
Communication	Communication

Source: ISO 21500:2012 & PMBOK

Subject groups

Integration …includes the processes required to *identify, define, combine, unify, coordinate, control and close the various activities and processes related to the project* (4.2.3.2)

Stakeholder…includes the processes required to *identify and manage the project sponsor, customers and other stakeholders* (4.2.3.3)

Scope... includes the processes required to *identify and define the work and deliverables*, and only the work and deliverables required (4.2.3.4)

Resource… includes the processes required to *identify and acquire adequate project resources* such as people, facilities, equipment, materials, infrastructure and tools (4.2.3.5)

Time …includes the processes required to *schedule the project activities and to monitor progress* to *control the schedule* (4.2.3.6)

Cost …includes the processes required to *develop the budget and to monitor progress to control costs* (4.2.3.7)

Risk… includes the processes required to *identify and manage threats and opportunities* (4.2.3.8)

Quality… includes the processes required *to plan and establish quality assurance and control* (4.2.3.9)

Procurement… includes the processes required to *plan and acquire products, services or results, and to manage supplier relationships* (4.2.3.10)

Communication…includes the processes required to *plan, manage and distribute information relevant to the project* (4.2.3.11)

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Source: ISO 21500:2012

Subject groups	Process groups				
	Initiating	Planning	Implementing	Controlling	Closing
Integration	4.3.2 Develop project charter	4.3.3 Develop project plans	4.3.4 Direct project work	4.3.5 Control project work 4.3.6 Control changes	4.3.7 Close project phase or project 4.3.8 Collect lessons learned
Stakeholder	4.3.9 Identify stakeholders		4.3.10 Manage stakeholders		
Scope		4.3.11 Define scope 4.3.12 Create work breakdown structure 4.3.13 Define activities		4.3.14 Control scope	
Resource	4.3.15 Establish project team	4.3.16 Estimate resources 4.3.17 Define project organization	4.3.18 Develop project team	4.3.19 Control resources 4.3.20 Manage project team	
Time		4.3.21 Sequence activities 4.3.22 Estimate activity durations 4.3.23 Develop schedule		4.3.24 Control schedule	
Cost		4.3.25 Estimate costs 4.3.26 Develop budget		4.3.27 Control costs	
Risk		4.3.28 Identify risks 4.3.29 Assess risks	4.3.30 Treat risks	4.3.31 Control risks	
Quality		4.3.32 Plan quality	4.3.33 Perform quality assurance	4.3.34 Perform quality control	
Procurement		4.3.35 Plan procurements	4.3.36 Select suppliers	4.3.37 Administer procurements	
Communication		4.3.38 Plan communications	4.3.39 Distribute information	4.3.40 Manage communications	

NOTE The purpose of this table is not to specify a chronological order for carrying out the activities. Its purpose is to map subject groups and process groups.

Map of Processes & subjects

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Source: ISO 21500:2012

Create work breakdown structure (4.3.12)

The purpose of **Create work breakdown structure** is to provide a hierarchical decomposition framework for presenting the work that needs to be completed, in order to achieve the project objectives.

The work breakdown structure provides *a framework for dividing and subdividing the project work into smaller, thus more manageable, pieces of work*. The work breakdown structure can be structured, for example, in project phases, major deliverables, discipline and location. Each descending level of the work breakdown structure describes project work in an increasingly detailed level. It is possible to develop other hierarchical breakdown structures for methodically assessing items such as deliverables, organization, risk and cost accounting of the project.

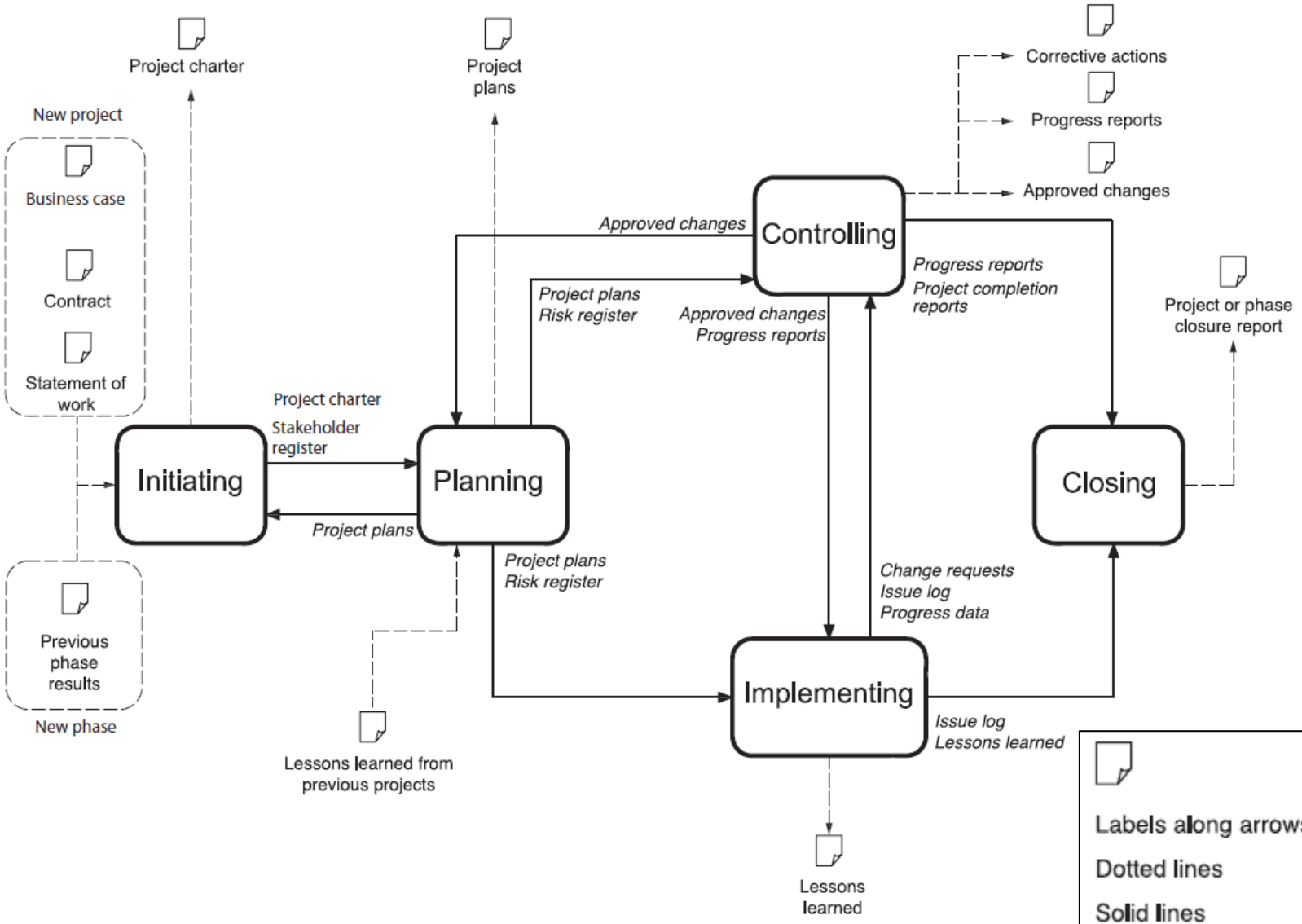
The primary inputs and outputs are listed in Table 12.

Table 12 — Create work breakdown structure: primary inputs and outputs

Primary inputs	Primary outputs
— Project plans	— Work breakdown structure
— Requirements	— Work breakdown structure dictionary
— Approved changes	

Source: ISO 21500:2012

Project documents



	Key project information
Labels along arrows	Information passing between process groups
Dotted lines	Representative inputs and outputs
Solid lines	Interactions between process groups

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Source: ISO 21500:2012

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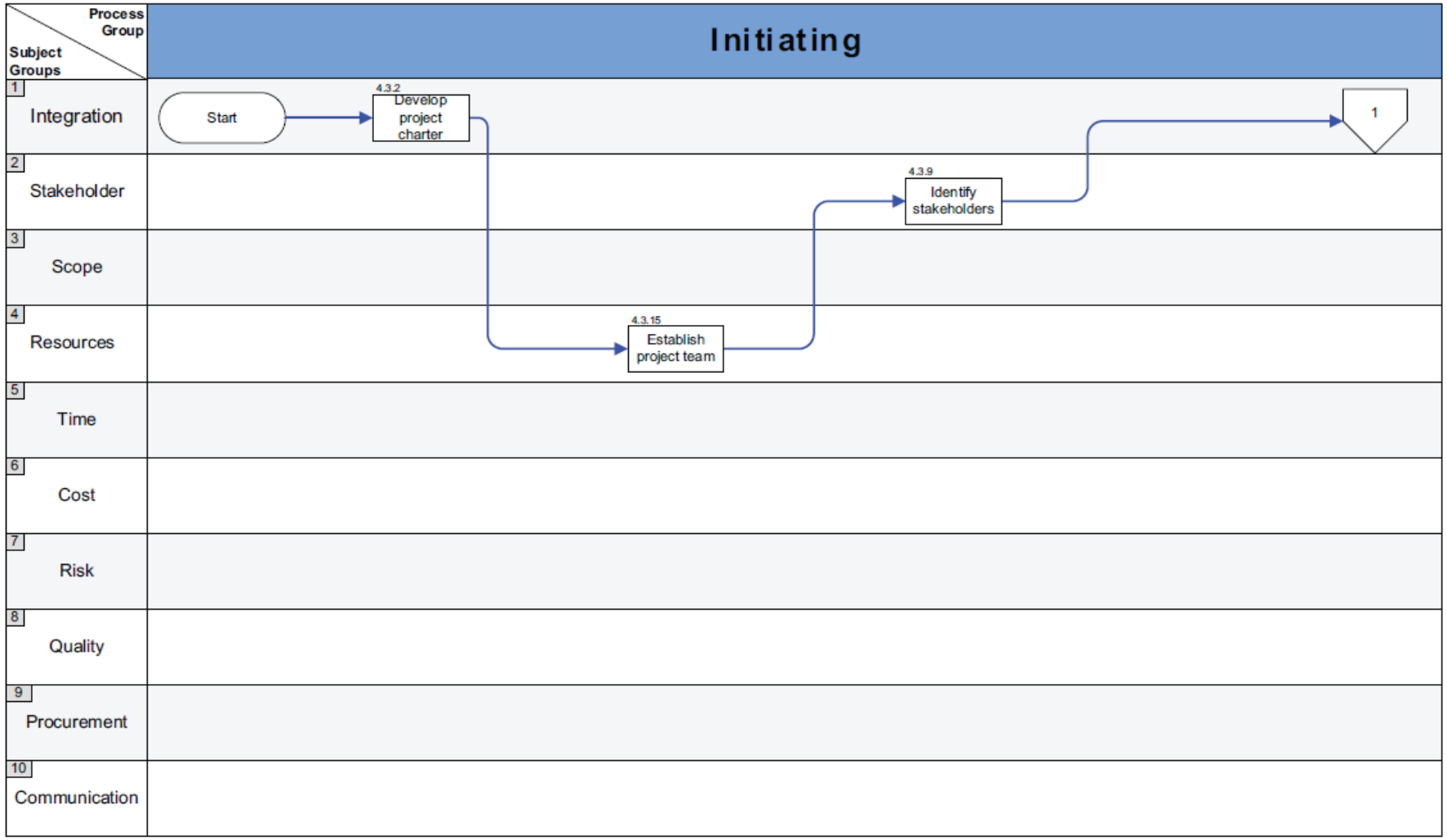
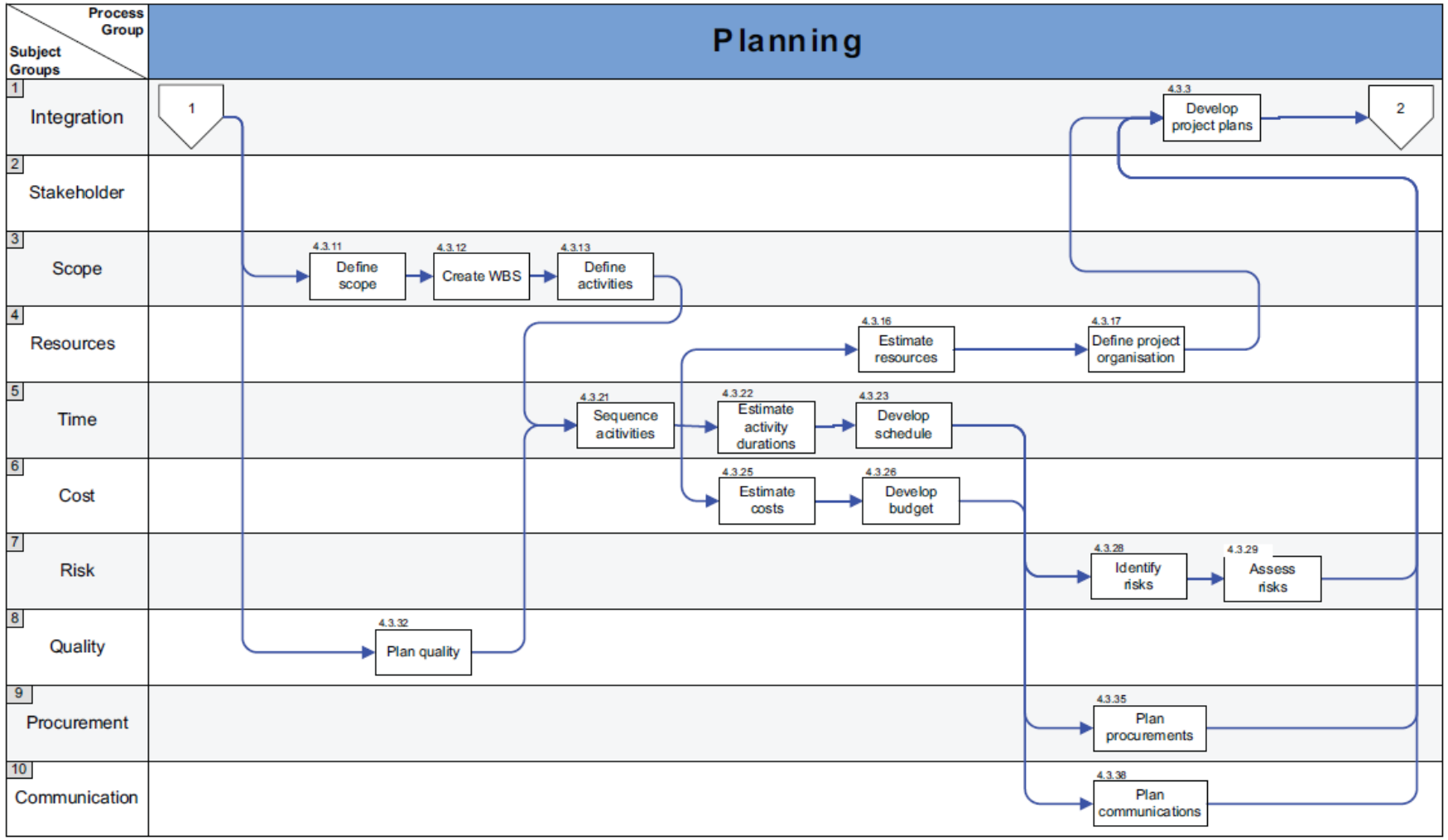
Initiating



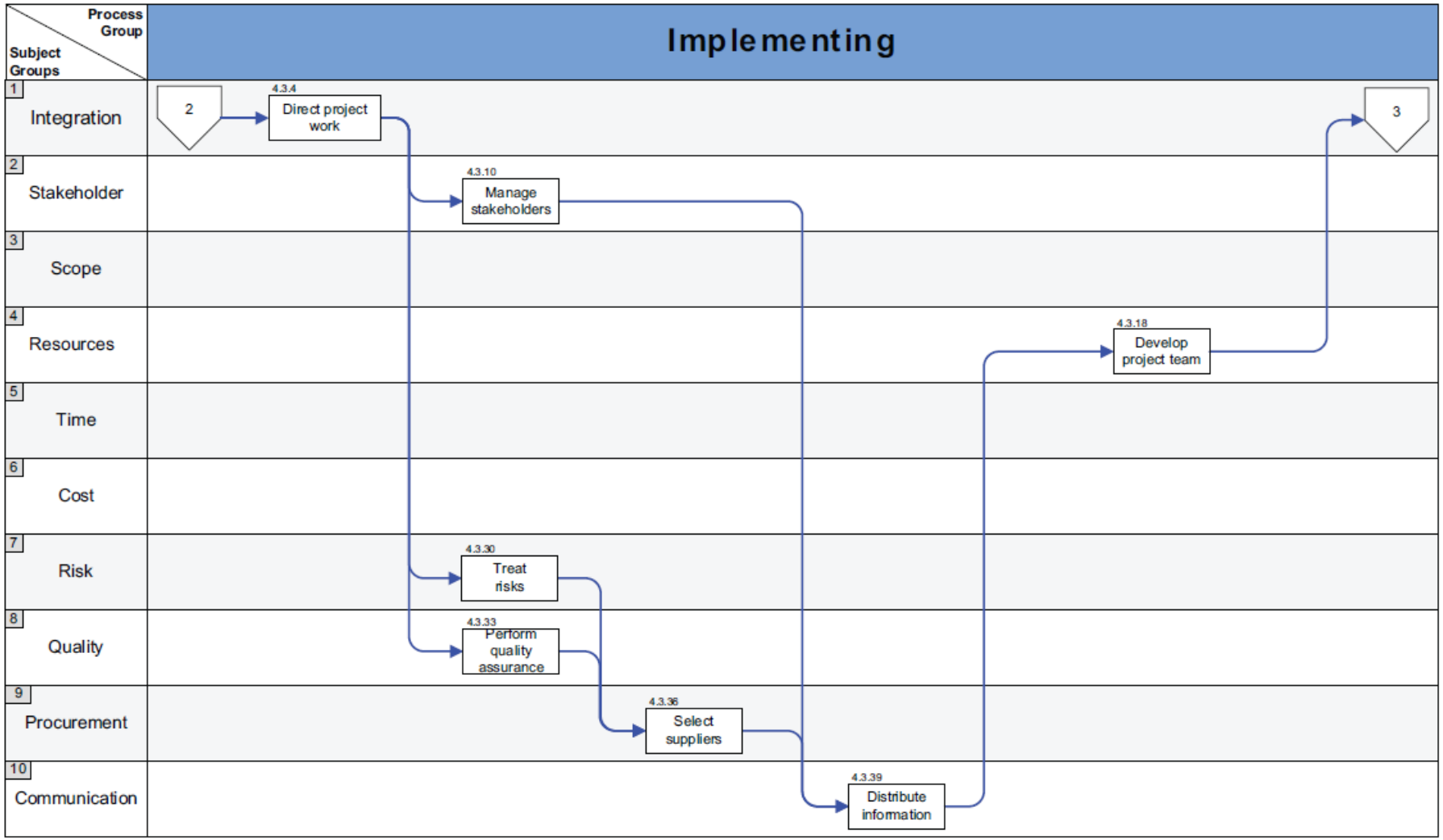
Source: ISO 21500:2012

Planning



Source: ISO 21500:2012

Implementing



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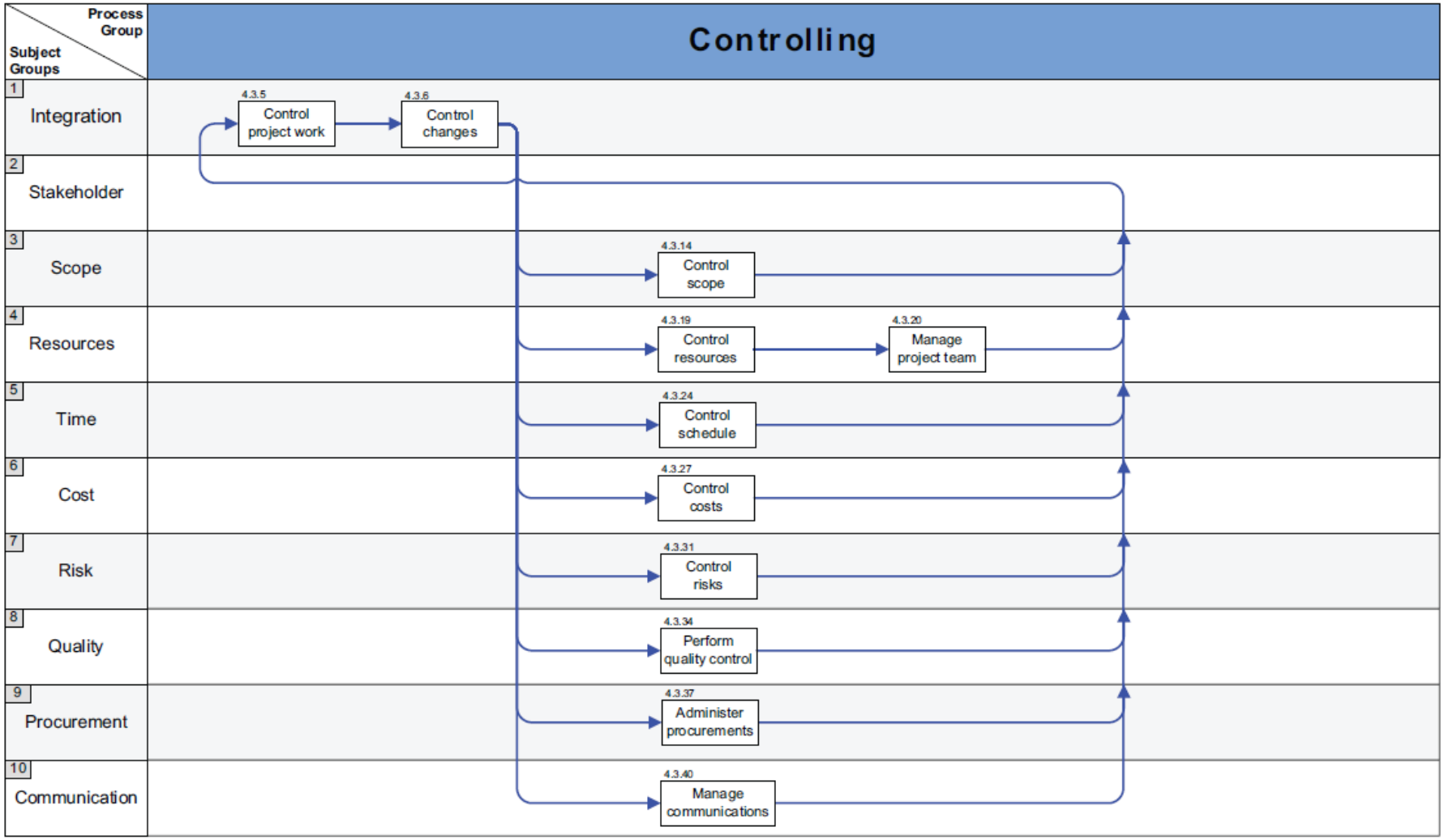
Source: ISO 21500:2012

Controlling



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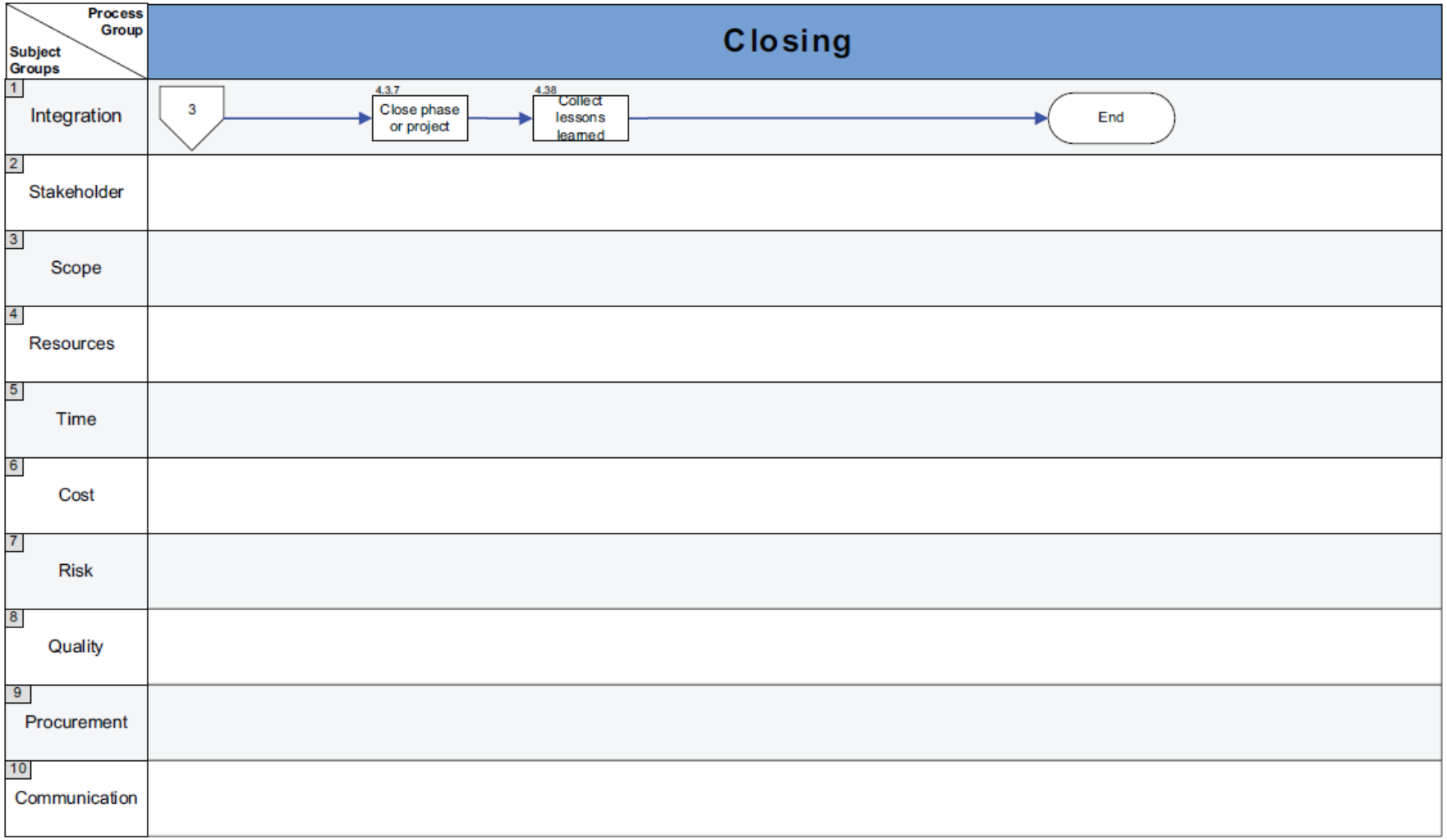
Source: ISO 21500:2012

Closing



Source: ISO 21500:2012

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Questions?