Course Objective

- In the new world of Industry 4.0, digitized connectivity may be considered the main driver of change industries have to deal with. This change increases the opportunities to create new business models, exploring network of systems that will allow to increase the cooperation between and across companies and industries. It is expected an increase in customized services that ultimately can become a service for each customer. In this case, we will be dealing with a project service for each customer each time. These projects will be developed by interdisciplinary distributed teams using digital platforms.

- This course aims to prepare graduates to perform in and manage projects and teams in the new highly agile digitized challenging smart industries.

Universidade do Minho

Learning Outcomes

- The students on the completion of this course should be able to
- CLO1 - Discuss Project Management relevance in the context of IND4.0 (Apply)
- CLO2 - Evaluate the needs of an organization regarding IND 4.0, taking into account maturity / readiness models (Evaluate)
- CLO3 - Plan, develop and manage projects in the context of IND 4.0, using frameworks of project management, such as PMI, IPMA and Agile/Lean (Create)
- CLO4 - Support team decision making processes in accordance with the contingencies and uncertain environments of IND 4.0. (Evaluate)
- CLO5 - Perform as a member of an extraordinary team, either distributed or co-located, using different tools and techniques, considering the team development phases (Create).
- CLO6 – Develop a project within a real context, in interaction with an industry organization.

Module 1: Management of Industry 4.0 Projects

- Introduction to Project Management in a new era of digitalization

- Industry 4.0 maturity models (Acatech and PWC models)

- Project Management Processes of initiating and planning a project for evaluating I4.0 maturity levels

- Agile project management for fast adaptation in the era of the fourth industrial revolution

- Project Management execution - time management and project indicators for assessing projects related to I4.0 maturity levels

Module 2: Project Team Management for Industry 4.0

- Project communication management in a new era of digitalization

- Project Management monitoring and control – time compression and team project indicators

- Project team management in a new era of digitalization. Team formation and development of distributed and multicultural teams in Industry 4.0 environments

- Software tools for project management in a new era of digitalization

- Decisions under high uncertainty in the context of fast changing environments of the of the fourth industrial revolution

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- Team formation and team dynamics

- Project selection – development of instruments for assessing the Industry 4.0 maturity level

- Exploring the dimensions of the Industry 4.0 maturity model

- Visual planning of the project for I4.0 maturity model self-diagnosis

- Developing the methodology for maturity level self-diagnosis

- Creating and validating the I4.0 maturity self-diagnosis model

- Applying the I4.0 maturity self-diagnosis model

- Creating and validating the I4.0 maturity self-diagnosis model

- Project Plan + Execution and Monitoring
- Select/Define a project to be executed
- Create project plan
- Develop monitoring process
- Present in poster form in 10 minutes and defend
- Individual project or in groups of 2 to 4 elements

http://pmcanvas.com.br/download/

Assessment
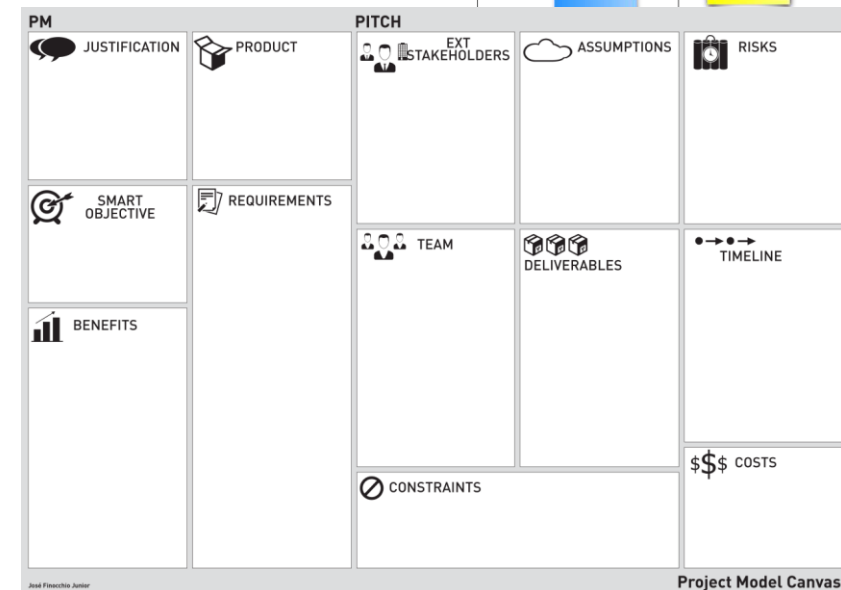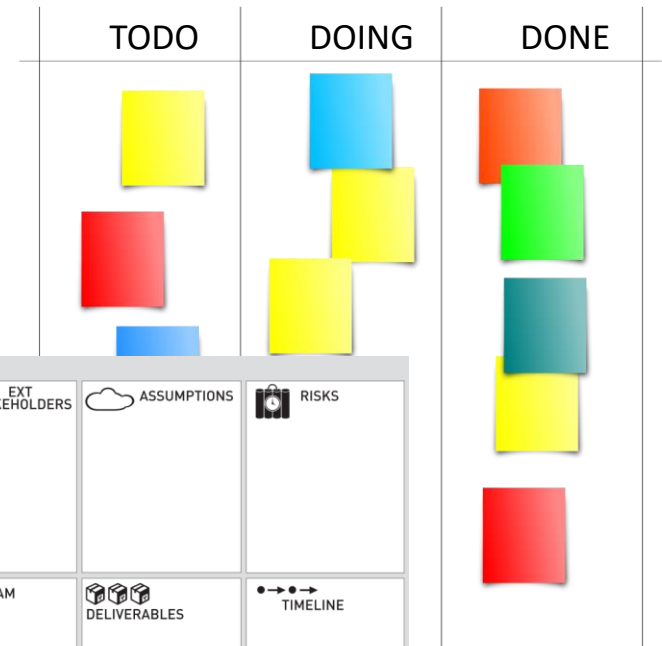
- **Evaluation Scheme:** The final grade will be computed according to the following weight distribution: Individual weekly portfolio entries (10%); overall global portfolio (40%); project presentation and discussion (50%). These will be divided in Oral communication (40%); Written communication (20%); Presentation (10%); Peer Assessment (10%) and Personal Development (20%).

- An "A" would be awarded if a student can demonstrate clearly effective project management competences for industry 4.0.

- A "B" would be awarded if a student can show good progress on project management competences for industry 4.0.

- A "C" would be given if a student can show reasonable progress on project management competences for industry 4.0.

- A "D" would be given if a student shows a lack of improvement in project management competences for industry 4.0.

Reference books

- Schuh, G., Anderl, R., Gausemeier, J., Hompel, M. t. and Wahlster, W. (2017) *Industrie 4.0 Maturity Index – Managing the Digital Transformation of Companies*: Acatech. Available at: https://en.acatech.de/wp-content/uploads/sites/6/2018/03/acatech_STUDIE_Maturity_Index_eng_WEB.pdf.

- Oehmen, J. (Ed.). (2012). *The Guide to Lean Enablers for Managing Engineering Programs, Version 1.0*. Cambridge, MA: Joint MIT PMI INCOSE Community of Practice on Lean in Program Management.
  - http://dspace.mit.edu/bitstream/handle/1721.1/70495/Oehmen%20et%20al%202012%20%20The%20Guide%20to%20Lean%20Enablers%20for%20Managing%20Engineering%20Programs.pdf

- Jeff Sutherland (2014) *SCRUM The Art Of Doing Twice The Work In Half The Time* . Leya

- Harold Kerzner (2009) Project Management: A Systems Approach to Planning, Scheduling, and Controlling; John Wiley & Sons; ISBN: 0470278706.

- PMI-PMBOK (2013) "A Guide to the Project Management Body of Knowledge (PMBOK Guide 5th ed.)". *Pennsylvania, USA: Project Management Institute (PMI)*.

- Finocchio Junior, José (2013) Project Model Canvas – Project Management Without Bureaucracy. Elsevier – Campus. ISBN: 978-85-352-7456-1
  - http://www.livrariasaraiva.com.br/produto/4967937/pro................urocracia/

List of journals of interest

- International Journal of Project Management, Elsevier Ltd.

- Project Management Journal, Wiley-Blackwell

- International Journal of Project Organisation and Management, Inderscience Publishers

- International Journal of Information Systems and Project Management, Scika

- Journal of Modern Project Management, Mundo Press

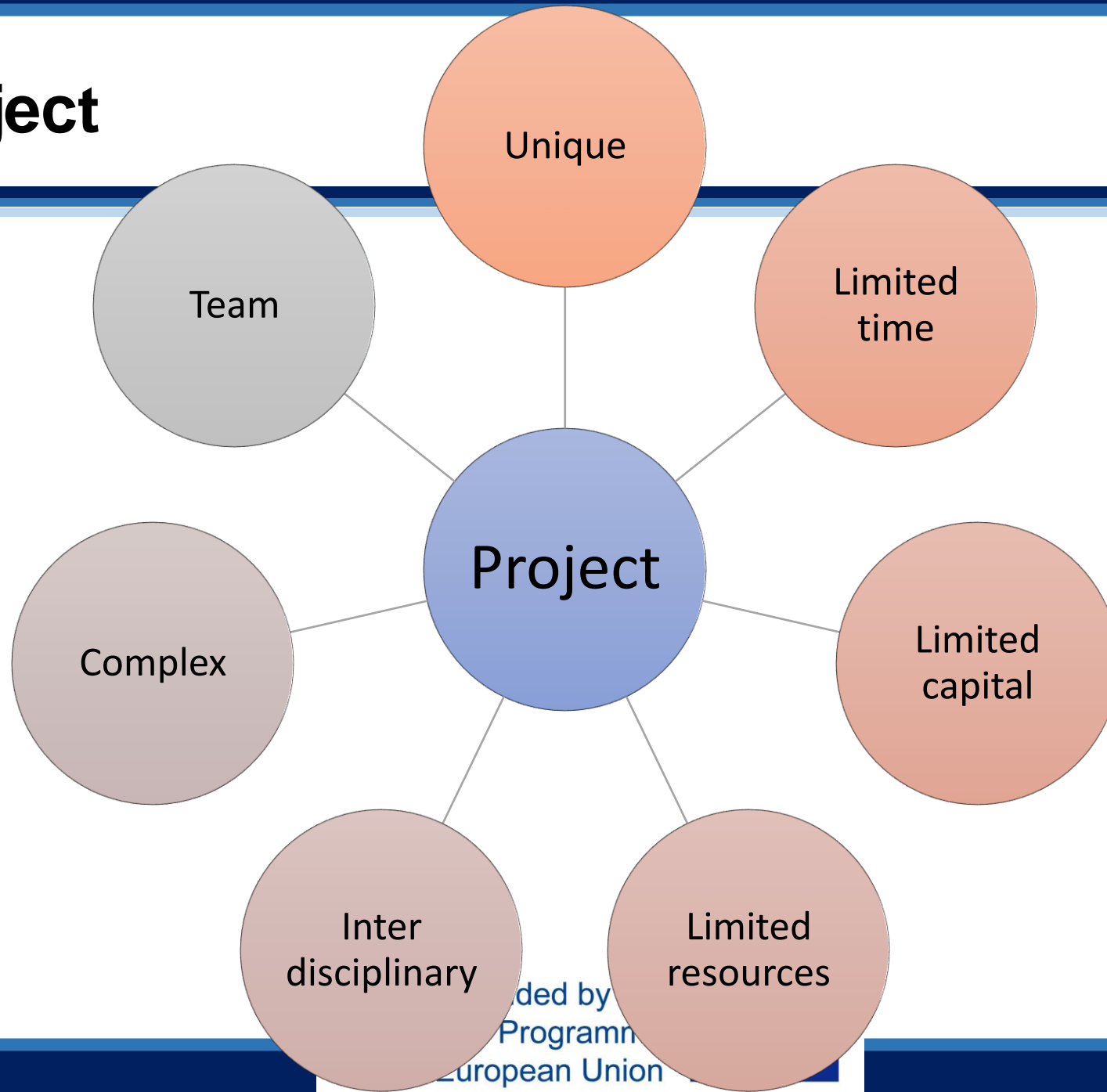Activity - Identifier

- Name
- Formation
- Profession
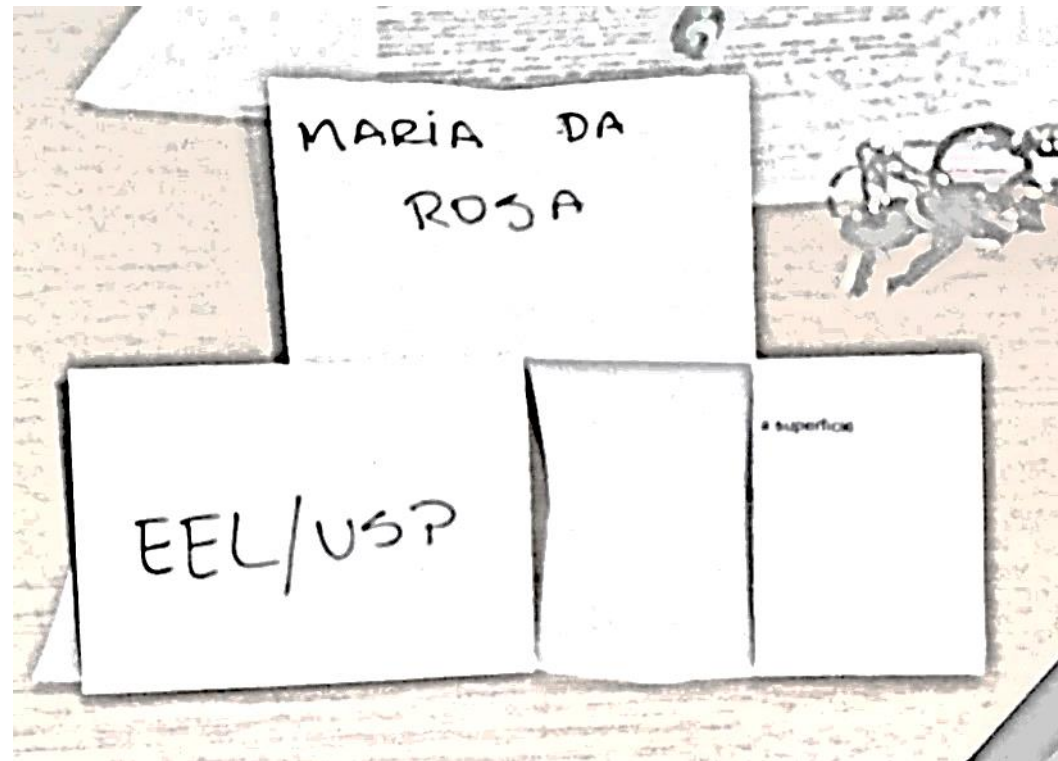
Presentation

Project management - concepts

Design and Dynamics team

Discussion

Closure

Project

Project and Project Management

- Project
  - "A project is a temporary effort made to create a unique product or service." [PMBoK, 2013]
  - "It is non-repetitive work, planned and carried out according to specific technical specifications and predefined cost, investment and deadline". [Brown Boveri]

  - Defined start and end
- It has a specific and unique result, which will be an exclusive product or service

- Management projects
  - " Application of knowledge, skills, tools and techniques to project management activities on order to satisfy their requirements ."

- Production Systems by project

- Operations management *vs.* Project management

- Examples?

    - Conception and design of a new vehicle.
    - Making changes to the structure of an organization.
    - Factory layout design.
    - Structuring a political campaign.
    - Software development.
    - Construction of a building.

Project Management Associations

- IPMA – *International Project Management Association*
    - Focused on project management skills
    - ICB 4.0 : IPMA Individual Competence Baseline
    - Promotes publications, research
    - Organizes seminars and congresses
    - Certifies professionals, ...
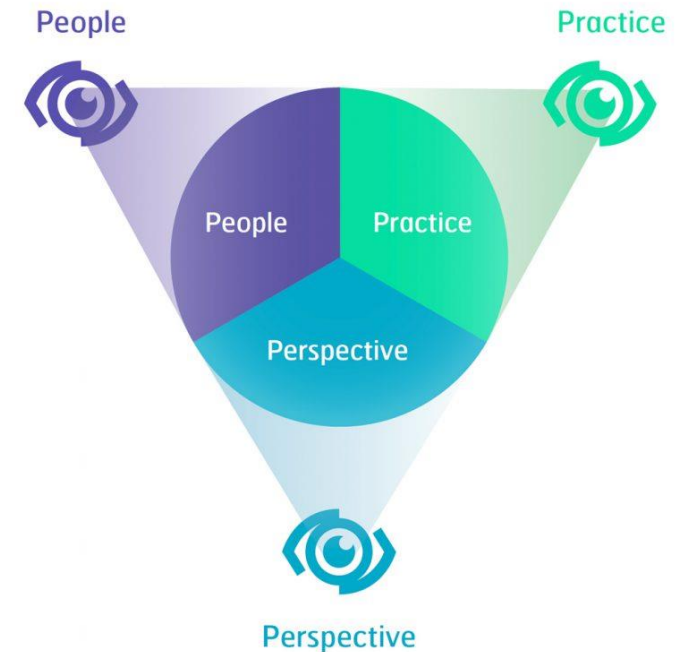
https://www.ipma.world/assets/IPMA_Individual_Standard_ICB4_assesment_areas-768x768.jpg

ICB 4.0 - IPMA

- In the fourth version of the ICB, it was decided to describe the project management skills in different groups :
  - People competences: these consist of the personal and interpersonal competences required to successfully participate in or lead a project, programme or portfolio;
  - Practice competences: these are the specific methods, tools and techniques used in projects, programmes or portfolios to realise their success;
  - Perspective competences: under this heading come the methods, tools and techniques through which individuals interact with the environment, as well as the rationale that leads people, organisations and societies to start and support projects, programmes and portfolios.

ICB 4.0 - IPMA

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ICB 4.0 - IPMA

PRACTICE Competences	PEOPLE Competences	PERSPECTIVE Competences
Project design	Self-reflection and self-management	Strategy
Requirements and objectives	Personal integrity and reliability	Governance, structures and processes
Scope	Personal communication	Compliance, standards and regulation
Time	Relationships and engagement	Power and interest
Organisation and information	Leadership	Culture and values
Quality	Teamwork	
Finance	Conflict and crisis	
Resources	Resourcefulness	
Procurement	Negotiation	
Plan and control	Results orientation	
Risk and opportunity		
Stakeholders		
Change and transformation		

Project Management Institute
PMI

- PMI – *Project Management Institute*
  - Sets standards - process-centered
  - Guide PMBoK; …
  - Promotes publications, research; congresse
  - Certifies professionals, ...

- Project Management Processes (Knowledge areas PMI)

Human Resources

Costs

Scope

Subcontracting

INTEGRATION

Risks

Time

Quality

Communications

STAKEHOLDERS

Phases — Depend on the project!
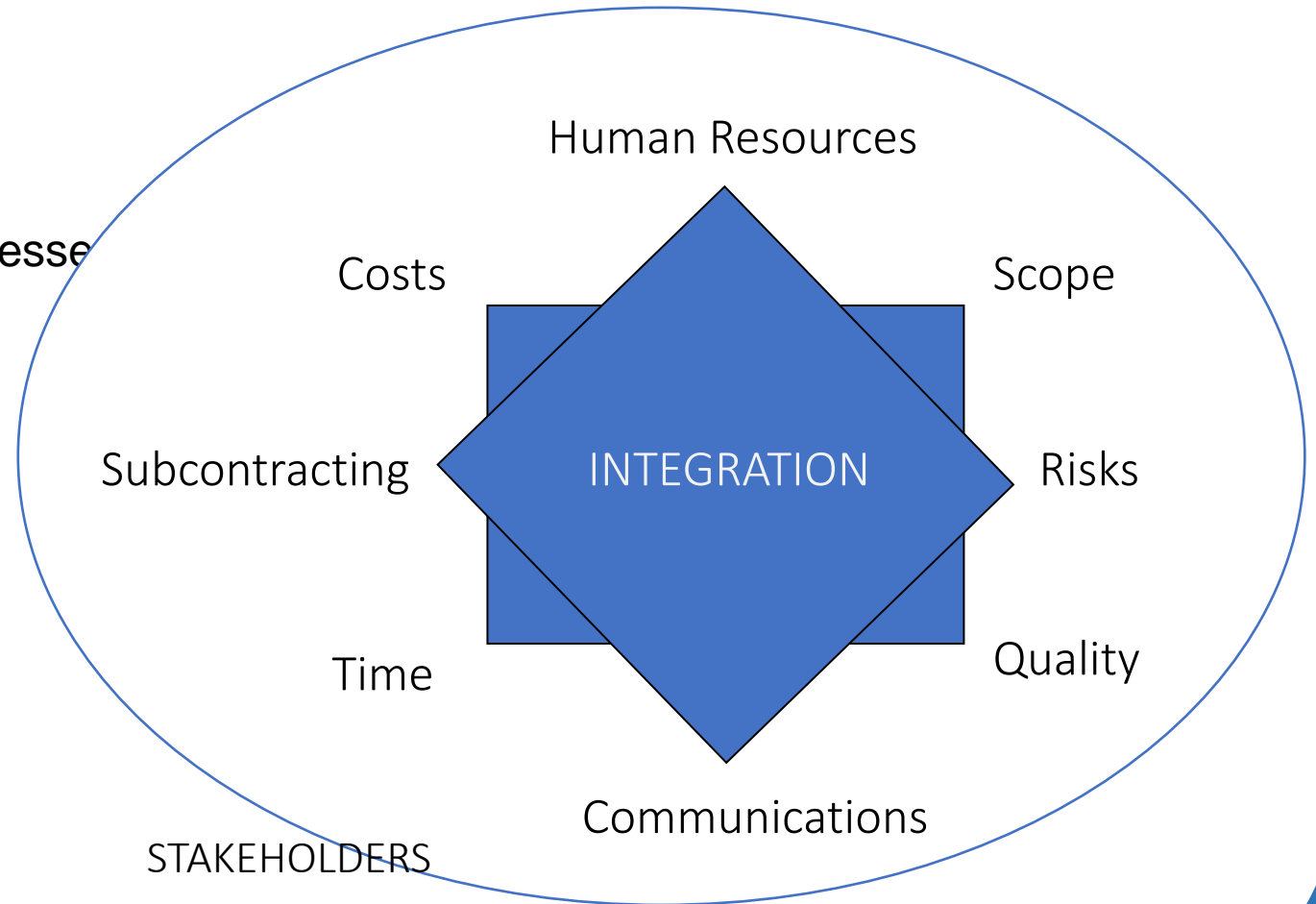
Process groups — Start
Plan
Run
Monitor and Control
Close
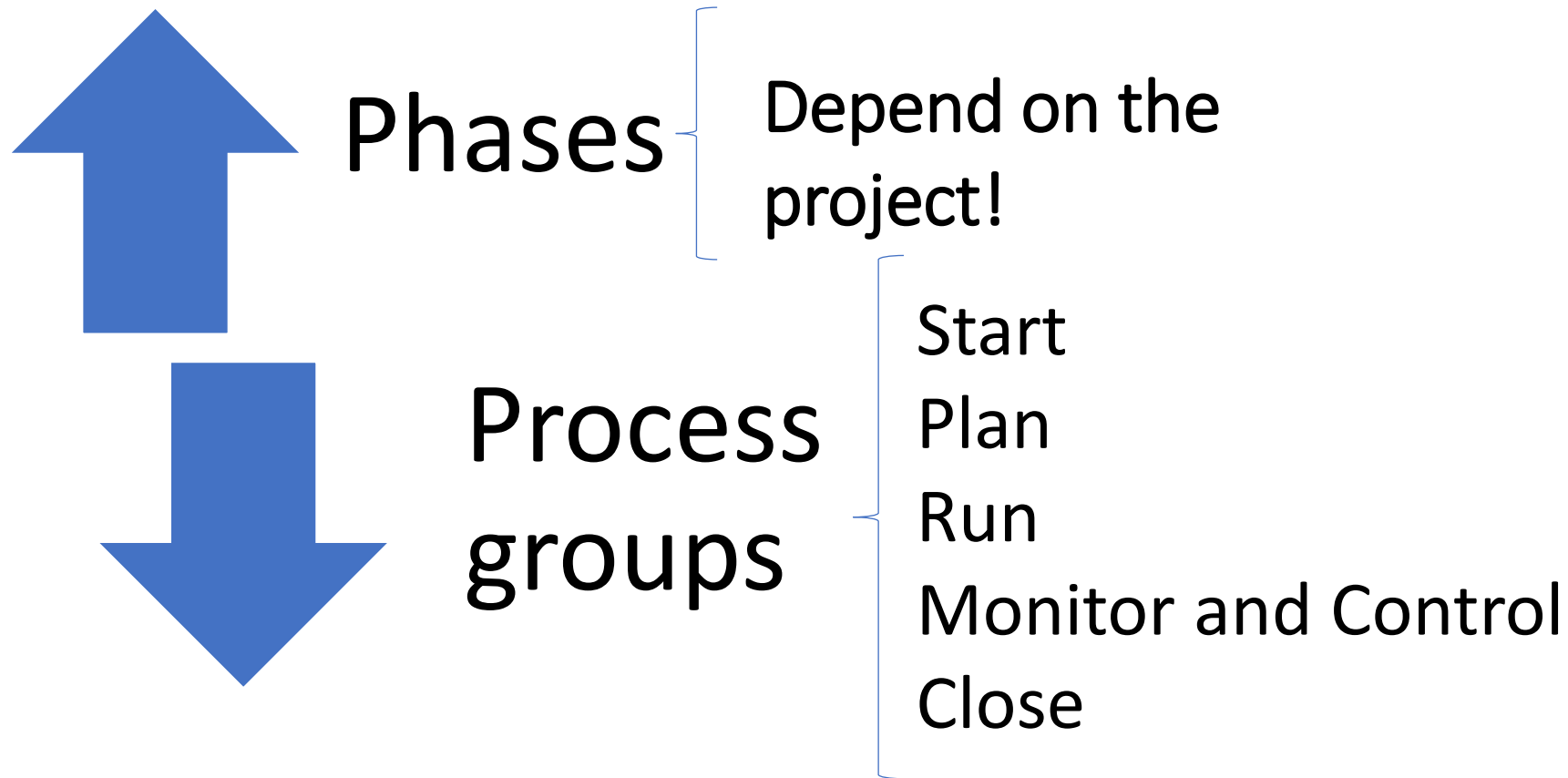
PMBOK 6: The 10 Knowledge Areas & 49 Processes

	Project Management Process Groups				
Knowledge Area Processes	Initiating	Planning	Execution	Monitoring and Controling	Closing
Project Integration Management	Project Charter	Develop project management plan.	Direct and Manage Project Work; Manage Project Knowledge.	Monitor and control project work; Perform Integrated Change Control.	Close Project or Phase.
Project Scope Management		Plan Scope Management; Collect Requirements; Define Scope; Create Work Breakdown Structure.		Validate Scope; Control Scope.	
Project Time Management		Plan Schedule Management; Define Activities; Sequence Activities; Estimate Activity Resources; Estimate Activity Durations; Develop Schedule.		Control Schedule.	
Project Cost Management		Plan Cost Management; Estimate Costs; Determine Budgets.		Control Costs.	
Project Quality Management		Plan Quality Management.	Manage Quality	Control Quality.	
Project Resource Management		Plan Human Resource Management; Estimate Activity Resources.	Acquire Resources; Develop Team; Manage Team.	Control Resources	
Project Communications Management		Plan Communications Management.	Manage Communications.	Monitor Communications.	
Project Risk Management		Plan Risk Management; Identify Risks; Perform Qualitative Risk Analysis; Plan Risks Responses.	Implement Risk Responses	Monitor Risks.	
Project Procurement Management		Plan Procurement Management.	Conduct Procurements.	Control Procurements.	Close Procurements.
Project Stakeholder Management	Identify Stakeholders	Plan Stakeholder Engagement.	Manage Stakeholder Engagement.	Monitor Stakeholder Engagement.	

- Integration Management
  - "Includes the processes and activities necessary to identify, define, combine, unify and coordinate the various project management processes and activities in the Process Groups."

Scope Management
  - "It covers the processes necessary to ensure that the project includes all the necessary activities, and only the necessary activities, to be successfully completed."

Time management
  - "... encompasses the processes necessary to ensure the project is completed on time."

Human resource Management
  - "... encompasses the processes necessary to employ the personnel involved in the project more effectively."

Communication Management
  - ".. encompasses the processes necessary to ensure the generation, collection, dissemination, storage and final and appropriate and timely disposal of project information."

Project Human Resource Management (Team management)

"Includes processes aimed at organizing, managing and leading a project team."

- **HR Management Planning;**

- **Get the project team;**

- **Develop the project team;**

- **Manage the project team.**

Photo by Perry Grone on Unsplash

Project communication management

"It includes the processes that are necessary to ensure timely and adequate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring and final destination of the project information".

- **Communication Management Planning**

- **Manage communication**

- **Communication control**

Photo by Volodymyr Hryshchenko on Unsplash

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References / Acknowledgements

- This PowerPoint uses images and clipart from the public domain provided by Openclipart and Unsplash services.

- Finocchio Junior, José (2013) Project Model Canvas – Project Management Without Bureaucracy. Elsevier – Campus. ISBN: 978-85-352-7456-1
  - http://www.livrariasaraiva.com.br/produto/4967937/project-model-canvas-gerenciamento-de-projetos-sem-burocracia/

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