Programs and Techniques for Management of R&D projects
part 1

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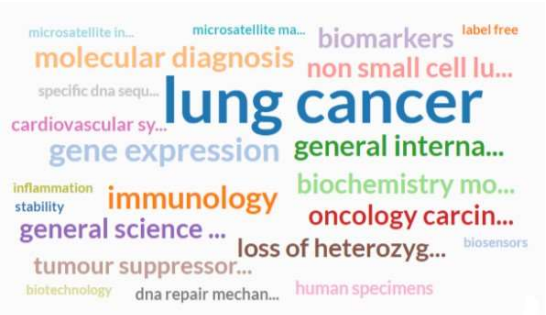
Karolina H. Czarnecka-Chrebelska
BIO

- I am a scientist, researching in the field of molecular biology, human genetics, oncology and epigenetics (thyroid and lung carcinogenesis, COPD and autoimmune diseases).
- I have focused on identifying epigenetic or molecular genetic markers, particularly gene methylation, non-coding RNA and cfDNA markers, in tissue and circulating blood.
- I am experienced in developing new grant proposals, joint grants with companies and creating new cooperation platforms with businesses.



I have over ten years of experience as an external advisor, evaluating grant and scholarship applications for major Polish national funding agencies and UE projects (mainly for EIT Health). I am helping start-ups shape their message to the investors and specify their market purpose.

Karolina H. Czarnecka-Chrebelska
BIO

Short introduction

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- What motivates You to work in Academia?
- How do You feel about project management?
- Do You have experience in collaborational projects with SMEs?

Programs and Techniques for Management of B+R projects

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The Objectives of the seminar:

Developing the following skills:

- team-work, organizing and evaluating own and team work
- the use of modern information and communication technology
- solving problems related to team management
- Communication & group collaboration

Development of research project management competences

Research project management competences

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1st day

- **Knowledge of creating a scientific project plan, defining project stages, task organization, and project management techniques.**
- **Ability to co-create project on-site and on-line using group collaboration techniques: brainstorms, Storytelling, mind maps (Miro)**
- **Ability to define project stages and charterize task, task organization drill down technique, mind maps (Miro), Work Breakdown Structure (wrike)**

2nd day

- **Ability to control the course of the project f.ex. using web tools and applications (Kanban framework, Critical Pathway Method, PERT).**
- **Ability to select information necessary to operate programs for project development and management.**

Research project management competences

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- Ability to perform risk assessment in B+R projects.

AND

- Ability to perform a SWOT analysis of the project outcome or future implementation. ***
- OR
- Ability to create surveys useful in scientific work via online platforms.***

3rd day

During the coffee break today, let's talk about Your expectations regarding the 3rd days of the workshop.

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Project management – some definitions

How would You define the following?

- What is the project?
- How do we define a team?
- How do we break down the project into parts – tasks?

Project?

- **A project is "a temporary endeavor undertaken to create a unique product, service, or result."***
- Operations is work done to sustain the business. *
- A project ends when its objectives have been reached, or the project has been terminated.
- There is no limit to the duration of the project.

*PMI, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (2004), p. 5.

Project definition from the grant perspecive:

- **A project is xxxxxxxxxxxx.**
- Operations is work done to sustain xxxxxx.
- A project starts when xxxxxxx.
- A project ends when xxxxxxx.
- Limit to the duration of the project?
- Accessible resources xxxxxxxxxxx

Project management

It is the process and activity of planning, organizing, motivating and controlling sources, procedures, protocols in order to achieve planned goals or solve everyday problems.

- Before managing we have to plan and schedule the projects ->
- Parts of the projects – **TASKS**
- characterize the length of each task, then the total length of the project
- **analyse /plan the work commitment of the project team**
- Plan the money and materials needed to complete the tasks (reagents, software, no of patients, visits).

What define a **team**?

- A team is defined as a group **who interact to achieve a common goal**.

???Question – do the group know the commomn goal???

- The goal has to be defined (it can be defined further by the group).
- Participants in an effective team care about the group's well-being.

Project creation stages :

Project plan preparation: creating / inventing / ideation → synopsis

writing a project → writing out individual elements of the project, schedule, contractors, milestones, boundary conditions, cost estimate

checking the project (before submitting to the financing institution) → complete document, the basis for further activities

Project plan preparation

Before starting:

- Do we have any other project to copy the action scheme? Or do we have to develop new approach?
- Does our project is a part of a longer project?
- Are the planned actions dependent on the results of the previous project? Can we define the outcome of the previous project?
- Do we have the resources limitiation? i.e. max $ for projects, time horizon, no of people to be involved?

Project plan preparation

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If our project is a part of a longer project?
Or the planned actions dependent on the results of the previous project?

We need to plan our project in collaboration of the people responsible of the previous project.

It is very important to know to what extent the previous project is completed.

Storytelling using Dixit cards.

Dixit is a game with amazingly illustrated cards. All people can associate something with a picture - a single word or a whole storyline. Because of this fact, it is easy to use during a coaching session.

https://www.linkedin.com/pulse/dixit-tool-coaching-session-carol-rapp/

Let's discuss our experiences with a highly effective card-based group work method.

How with the picture You would describe:
1. What is your most recent experience collaborating on a grant proposal?
2. What was your experience with your first grant submission and the initial feedback from colleagues or grant evaluators on your project?

What is your most recent experience collaborating on a grant proposal?

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Raising funds for implementation research can be problematic if…

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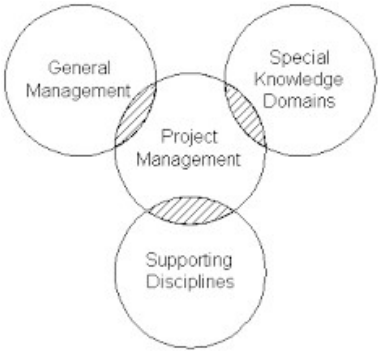
- Applying for grants **in the same calls as SMEs or Start-ups**.
- Main issue goal definition and data required by the financing institution are based on the assessment of the output indicator (product indicator)
- …managing scientific projects in a biotech company and a university can have several key differences.



Funding:

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University / Academia :

- Universities typically secure funding through grants from government agencies, foundations, and philanthropic organizations.
- However, the funding available to universities is often more limited, leading to a greater need for securing grants and competing for resources.

Biotech Company / SMEs :

- Scientific projects in biotech companies usually require funding from various sources, such as private investments, venture capital, partnerships, and potential revenue streams.
- Companies typically have greater financial resources than universities (grant, loans,) which allows for increased investment in research and development.

University / Academia

Biotech Company / SMEs

What are the differences in the project Purpose/aim; Team Composition and IP management?

Purpose and Focus:

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University / Academia:

- Universities emphasize academic research, knowledge generation, and education.
- Scientific projects in universities are often driven by the pursuit of advancing scientific understanding, contributing to the academic community, and training future scientists.

Biotech Company / SMEs:

- The primary focus of a biotech company is to develop and commercialize products or technologies for the market.
- Scientific projects in biotech companies are often driven by the goal of achieving specific business objectives, such as developing a new drug, diagnostic tool, or biotechnological process.

Team Composition and Expertise:

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University / Academia :

- The scientific projects are often conducted within academic departments or research groups.
- The team composition tends to be more academically focused, consisting primarily of faculty members, postdoctoral researchers, graduate students, and occasionally undergraduate students.

Stable employment

Biotech Company / SMEs :

- Scientific projects in biotech companies often involve multidisciplinary teams consisting of scientists, researchers, engineers, business professionals, and project managers.
- These teams may have diverse expertise and skill sets required to address scientific, technical, regulatory, and commercialization aspects.

Dynamic changes of the team

Managing IP:

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University / Academia :

- Universities also prioritize protecting intellectual property resulting from scientific projects.
- However, the approach may differ, as universities often focus on publishing research findings and disseminating knowledge.
- They may pursue patent protection for potential commercialization, but openness and academic freedom are also highly valued.

Biotech Company / SMEs :

- Intellectual property (IP) rights are crucial in the biotech industry.
- Companies invest significant resources in protecting their discoveries, inventions, and proprietary technologies through patents, copyrights, and trade secrets.
- Managing IP, licensing agreements, and potential commercialization are essential considerations.

Timeframe and Pressure:

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University / Academia :

- Scientific University projects may have more flexible timelines, allowing researchers to explore complex questions and focus on long-term goals.
- While project milestones and deadlines may be associated with grant funding, the emphasis is often on scientific rigor and the quality of research outcomes.

Biotech Company / SMEs :

- Scientific projects in biotech companies are typically subject to more stringent timelines and commercial pressures.
- There is often a need to deliver results within specified timeframes to meet business objectives, secure investments, and gain a competitive advantage in the market.

Methods supporting project planning…

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What methods and apps we can use?

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Project planning:

- Brainstorming
- Project Definition, Scope and structure (MindMap, Drill Down)
- The expected time for implementation/realization
- The resource planning/organizing

Mechanics of putting together a plan - Scheduling

- Tools: Work Breakdown Structure (WBS), GANTT charts, PERT, teamgantt

Tracking plan progress - Controlling

- Communicate and follow-up (ASANA, SLACK)
- Checking the goals achieved (GANTT charts, PERT, teamgantt)
- Analyzing the primary constraints [scope, time left, resources used, budget]

Lineal project planning

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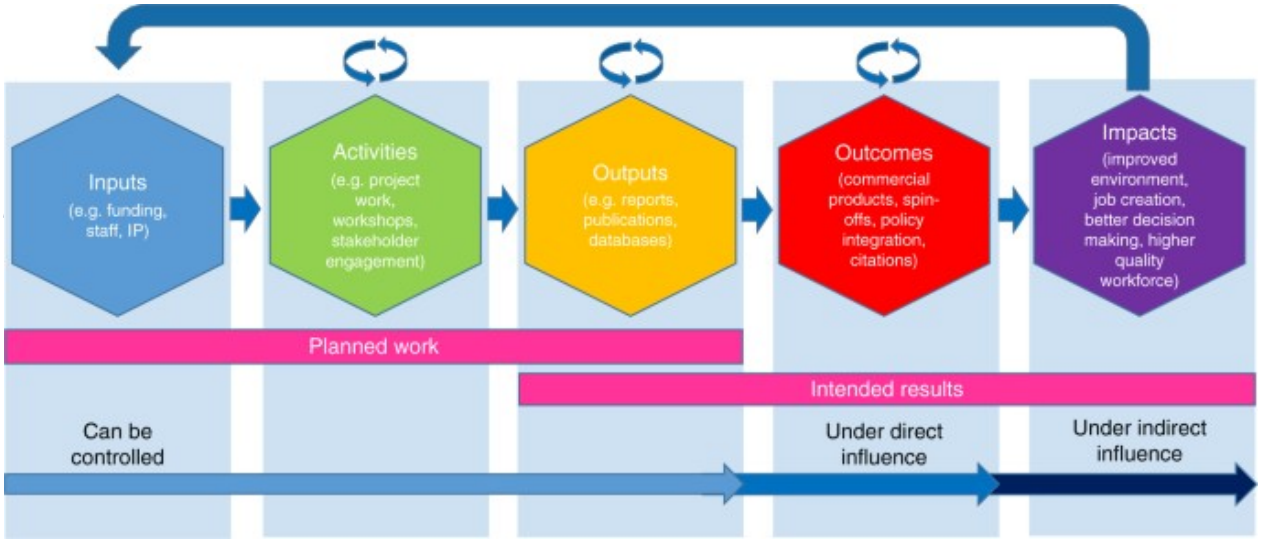

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Circular project management

used more in regular R&D , than in scientific projects

https://www.projectcubicle.com/project-scheduling-steps/

Defining the SCOPE / AIM of the project

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The limits of your investigations?
Vs. completeness of the project?

- What will limit the project?
- Resources
- People
- Time
- Grant availability
- Access to supervisor / project commitee
- 'Publishable quality'

How will you know when the project is complete ?

- What are Your experiences?
- Is it possible to exactly forsee the time to complete the project?

Defining the Beneficiaries

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- In most of the EU Horizon projects, EIT calls, grants financed by PARP, NCBiR, ABM, we have to present who will be the user, stakeholder, or how our project will influence the local community, environment, etc.

Discussion

- **Who will benefit from your work ?**
- **Who do you want to influence ?**
- **What impact do you want your work to have ?**

Defining the Beneficiaries

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- Think ahead to the impact you want your research to have on your career - who needs to know **you** and what you are doing ?
- Who will be the Stakeholders / end-users?
- How do You define Stakeholders / how the project Evaluators will defined them?
- If this is the project that has to target environment (ecology, clean environment, forestry, farming, farm animals) – how do You plan to reach the stakeholders and policymakers?

Defining the End-users analysis of the market segments

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In order to understand the end-user (client) you have to put yourself in the role of a client

Simple tools –
1. Non-tergeter online surveys,
2. Interviews with target groups,
3. Brainstorm with potential users

Digging more on the project SCOPE

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Project scope

encompasses **all the work needed to deliver a results: product, procedure or service**. In short, the project scope describes how the mission will be accomplished.

Defining the project scope may be problematic in the case of collaboration with SMEs

Product scope

identifies the characteristics and functions of a product or service.

These characteristics include physical features such as size and materials, as well as functional specifications.

The project scope

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It includes **identifying and documenting** the project's goals, deliverables, tasks, project members, deadlines, and milestones.

Workgroups will often be assigned listing the internal or external personnel who will be involved with the project.

Documentation consists of the scope statement, statement of work, and a **breakdown of the work structure**.

It can incorporate information about the: project's budget or available resources,

- the project schedule,
- the assignment of tasks

The product scope

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It identifies the **characteristics and functions** of a product or service.

Strong Focus on the **Stakeholders / end-users** important starting from the planning phase

Functional considerations regarding the product design, purpose, or end use.

Product scope

- focuses on the final product or service;
- refer to a service or other item for customer use;
- considers how to evaluate whether the object is on track for completion and whether it meets the expected outcome;
- How we will test the product properties?
- How we will encourage end-users to test it?

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When collaborating in **international/intercultural teams**…
defining the project scope and purpose of the research, the description of the impact on the environment or society can be distorted by incorrect translation.

And then, individual teams develop the project 'with different objectives.

How to prevent it?

With simple collaboration technique that can be used during real-time meetings :

-> Did I understand correctly that (…)

What is **back translation** and how does the process work?

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Back translation is a method that aims to check the quality of the translation and its conformity with the original text.

The process consists of three stages:

1. translating the text 'backwards' - from the foreign language into the original language.
2. comparing the new translation with the original text.
3. Identifying significant differences between the translations and selecting the correct option.

(...) back translation, also called reverse translation, is **the process of re-translating a translation back to its original language**. This type of translation involves a 360-degree comparison of the original text with its back translation, which is then used to evaluate the accuracy of the initial content.

https://www.transifex.com/blog/2023/what-is-back-translation/

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- Once we will have the SCOPE defined and general list of actions needed we should start to organize the **structure of project – schedule and relations between tasks**.
- Many different types of project management methodologies and techniques exist, including traditional, waterfall, agile, and lean.
- For starting new scientific project the most suitable seem the traditional and waterfall.

Types of Project Management

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- A sequential design process for project management
  1. Traditional project management
  2. Waterfall Project Management
- An non sequential design process -> phases of the project are completed in parallel to each other by various team members in an organization.
  3. Agile Project Management

https://www.usemotion.com/blog/waterfall-vs-agile -> comparison of waterfall and agile project management

https://www.investopedia.com/terms/p/project-management.asp

Types of Project Management

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Traditional project management

- **one big sequential project.** Timeframes can stretch into months or even years
- a process with clearly defined requirements upfront.
- The deliverable of the process (product, research item) should well-defined.

Often, the size of the team working on the project will increase as smaller tasks are completed and more extensive tasks begin.

https://www.investopedia.com/terms/p/project-management.asp

Waterfall Project Management

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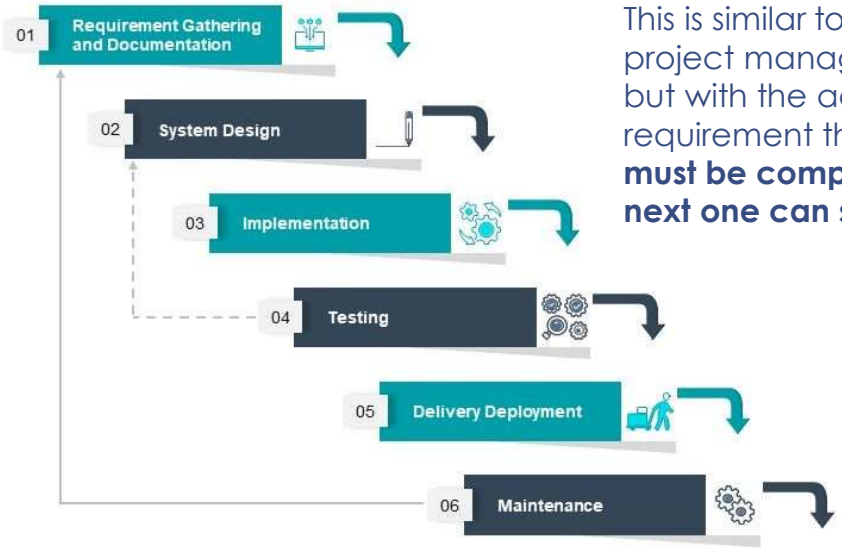

This is similar to traditional project management, but with the added requirement that **each task must be completed before the next one can start.**

Using Waterfall Project management scheme in scientific project

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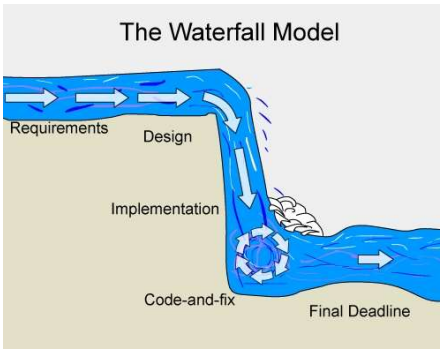


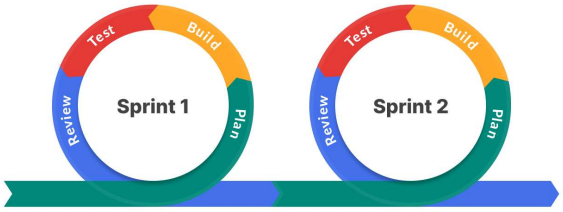
ADVANTAGES

- The model is simple and easy to use. **Linear model.**
- **The phases do not overlap.** They are processed and completed one at a time -> easy to be described in grant applications
- Good for small projects that contain clear requirements.
- It is easy to understand the timeline of the projects. -> easy be adjusted to rigid funding framework

DISADVANTAGES ???

https://blog.ganttpro.com/en/waterfall-project-management-methodology-pros-and-cons/#

Agile methodology



- Is flexible, highly collaborative, and best for those who want continuous improvements.
- Best for a small project (or many of them).
- the best to involve customers/end-users.

Agile project management is a method that involves continuously monitoring and improving deliverables through an iterative process.

- Agile project management does not follow a sequential stage-by-stage approach.
- Instead, **phases of the project are completed in parallel to each other by various team members in an organization.**
- This approach can find and rectify errors without restarting the entire procedure.

https://www.investopedia.com/terms/p/project-management.asp

Using Agile management scheme in scientific project

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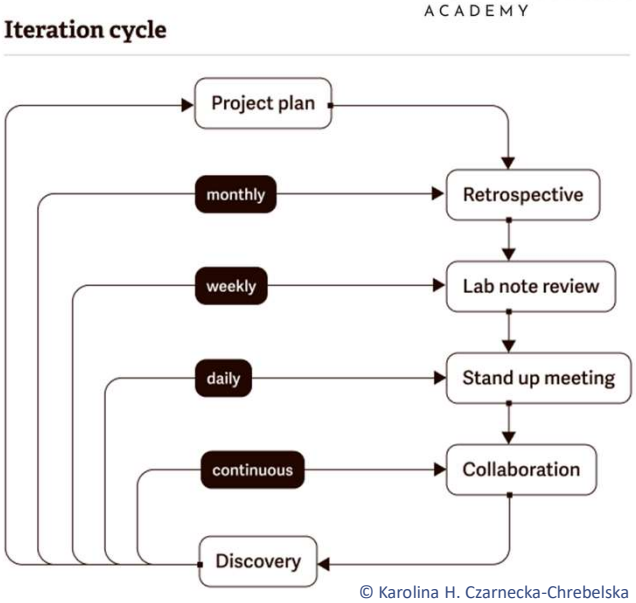
ADVANTAGES

- For a small project (or many of them).
- **Enables constant changes and adjustments**
- highly collaborative, enabling people to work on different tasks simultaneously.
- In case of observed failure no need to restart the project

DISADVANTAGES ???

challenging to describe in grant applications…



https://blog.ganttpro.com/en/waterfall-project-management-methodol

TASKS

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- parts of the projects

- **Once we have the main actions planned -> we need to break down the actions in smaller parts - the tasks.**
- **Tasks finally in the project will be broken into a number of discrete elements** associated with the different phases of the work, with time relations dictated by appropriate priorities.

What methods and apps we can use?

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Examples of methods to facilitate team cooperation and project management.

Early project planning -> Brainstorming, Storytelling, mind maps

Project Definition, Scope, and structure -> MindMap, Drill Down, Work Breakdown Structure

The expected time for implementation /realization -> Gantt charts, Critical Pathway Method, PERT

The resource planning/organizing -> MindMap, Drill Down, Ghantt charts

The management of the ongoing project -> Kanban framework, Critical Pathway Method, PERT, MindMap,

Brainstorming – general rules

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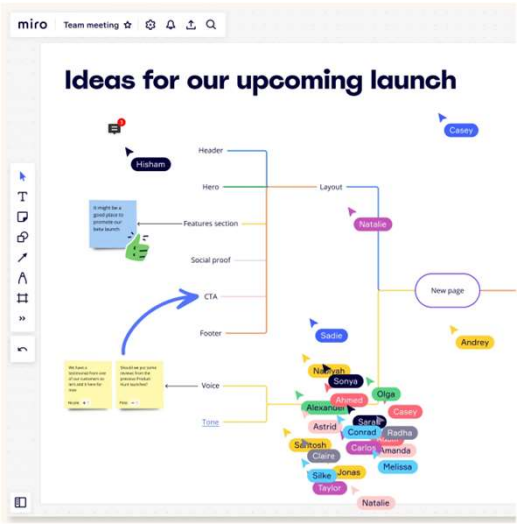
1. Postpone the judgment of ideas for later
2. Base on ideas of others
3. Encourage bold ideas
4. Share your ideas
5. Concentrate on the topic, not the solution
6. Focus on one conversation at a time
7. Visualize
8. Multiply your ideas



Postpone the judgment of ideas for later

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- **Don't judge ideas as they appear.**
- When any idea is criticized, it will inhibit the creativity of not only its author but also of everyone else.
- Remember that many people may feel intellectually paralyzed by the fear of being negative.
- Later in the meeting, it is worth choosing a few leading ideas and focusing on each of them, but without disavowing rejected solutions.

Base on ideas of others

- **Listen** to what others have to say. Don't just focus on your own creativity.
- Try to gather as much useful information as possible from other people's solutions.
- Don't be afraid to develop your own ideas in your own way. Let yourself be inspired

Encourage bold ideas

- **Give up the routine**, go beyond the routines and… have fun!
- At the stage of brainstorming, you can afford crazy solutions.
- Also, encourage other participants of the meeting to do so.

Share your ideas

- If you can draw on others' ideas, let others build on your ideas as well.
- Transform and build upon the ideas that you first came up with.

Visualize

- Enrich your ideas with illustrations (preferably on a board visible to everyone), and when you talk about your vision of a given solution, talk vividly.
- Try to explain your concept with an example that will be easy for all participants to understand and imagine.

Concentrate on the topic, not the solution

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- Face your idea, let it wander off and come back, expect the unexpected.
- Don't hang on tightly to one solution - if it's really the best, i t'll definitely come back later in the meeting.

Focus on one conversation at a time

- If You are working on solving one problem, your focus will be on that only.
- Work on one specific topic during one brainstorming session.

The traditional brainstorming

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- On-line whiteboard
- With post-its
- Without previous preparation
- In real-time on a real meeting

Let's brainstorm about creating new projects

How do we encourage early-stage researchers to create bold ideas?

How to encourage teams from different institutions to collaborate?

Can we perform the brainstorming on line?

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- On-line whiteboard
- Miro
- Mind maps
- https://miro.com/welcomeonboard/ampGTlMyUUk5bGQ5cThPVmNuZjdxVEY5ekV1bnhOQzMyQXdQOFlkOXhlbWdqY3dqUFRUNzcwZ2QxZFpWR0Y4NXwzMDc0NDU3MzYwMjAxMTkxMTM0fDI=?share_link_id=855808250395

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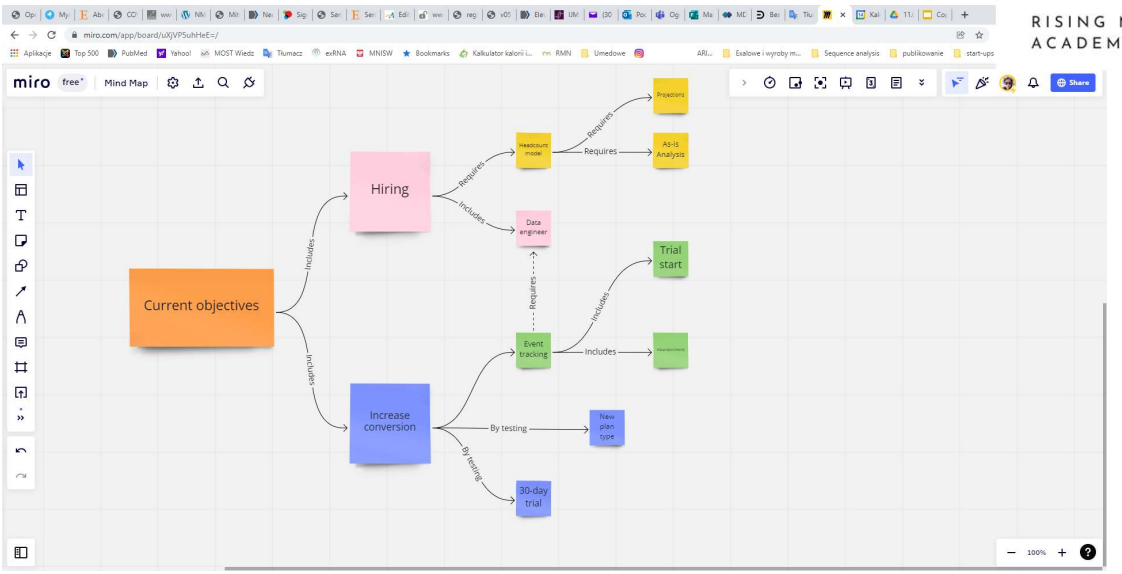

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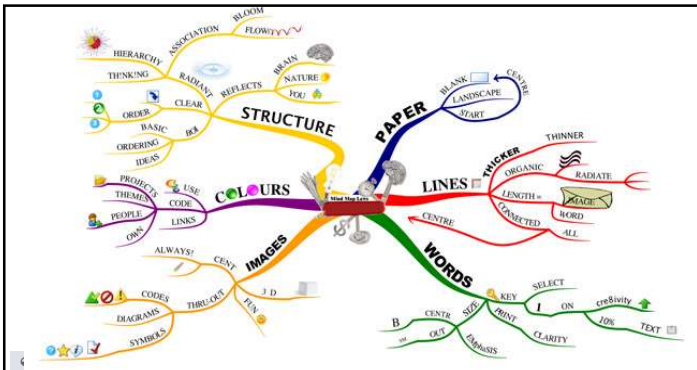
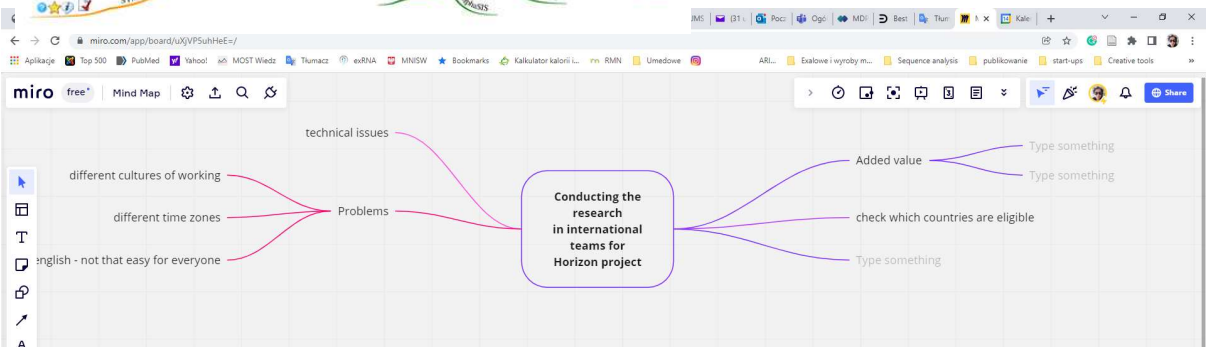
MIND MAPS





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MIND MAPS