

Project Management in Academia

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NARMA

06.12.2023

**Why do need to talk about
project management in
academia?**

ERA Policy Agenda: 20 actions along four priority areas

DEEPENING A TRULY FUNCTIONING INTERNAL MARKET FOR KNOWLEDGE

1. Open sharing of knowledge, incl. EOSC
2. Data legislation fit for research
3. Reform of research assessment
4. Strengthen research careers
5. Gender equality and inclusiveness
6. Protect academic freedom
7. Better knowledge valorisation
8. Research infrastructures
9. International cooperation, reciprocity

TOGETHER FOR TWIN GREEN AND DIGITAL TRANSITION, AND INCREASING SOCIETY'S PARTICIPATION IN THE ERA

10. R&I Missions and Partnerships for ERA
11. Green energy transformation
12. Transition of industrial ecosystems
13. Empower higher education institutions
14. Bring science closer to society

AMPLIFYING ACCESS TO RESEARCH AND INNOVATION EXCELLENCE ACROSS THE UNION

15. Regional and national R&I ecosystems
16. EU-wide access to excellence
17. **Strategic capacity of public RPOs**

ADVANCING CONCERTED R&I INVESTMENTS AND REFORMS

18. Coordination national support for ERA
19. ERA monitoring mechanism
20. Prioritisation and coordination of R&I investments and reforms

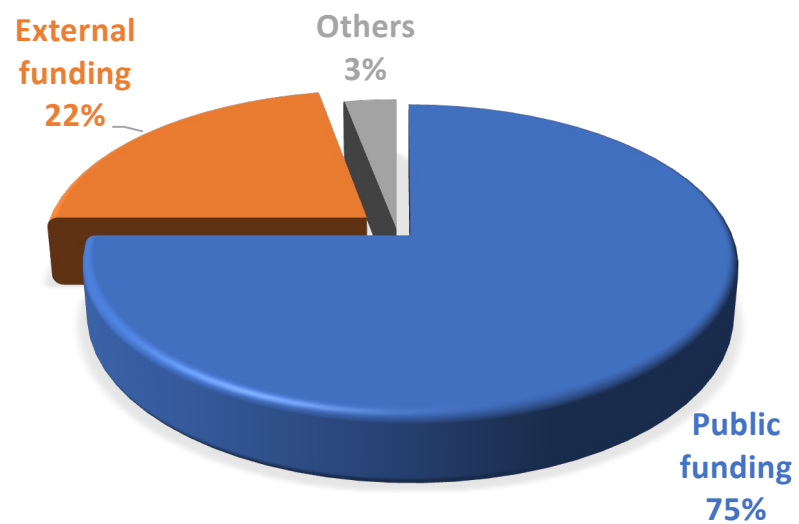


Expected outcomes (Action 3 & 4) → A changing landscape!

- Promote **qualitative judgement** with peer-review, supported by responsible use of quantitative indicators
- Consider the **value and impact of a diversity of research outputs**
- Incentivize **open collaboration** and **early knowledge** and **data sharing**
 - **Transdisciplinary** and **inter-sectoral mobility** across the ERA
 - ...
 - ..

The University of Bergen – Annual budget – 2022

UiO - 32%



UiO - 69%

The shifting landscape of research funding

Despite this massive influx of funding, researchers are still struggling to fund their activities. With public funding declining, the industry is stepping in to fill the gap, making it even more crucial to have deep understanding of project management in all its forms and shapes.

Research project management is a complex

Researchers often are been left alone to take on the responsibility of initiating, organizing, and performing research projects

Project definition

An individual or collaborative enterprise that is carefully planned to achieve a particular aim.

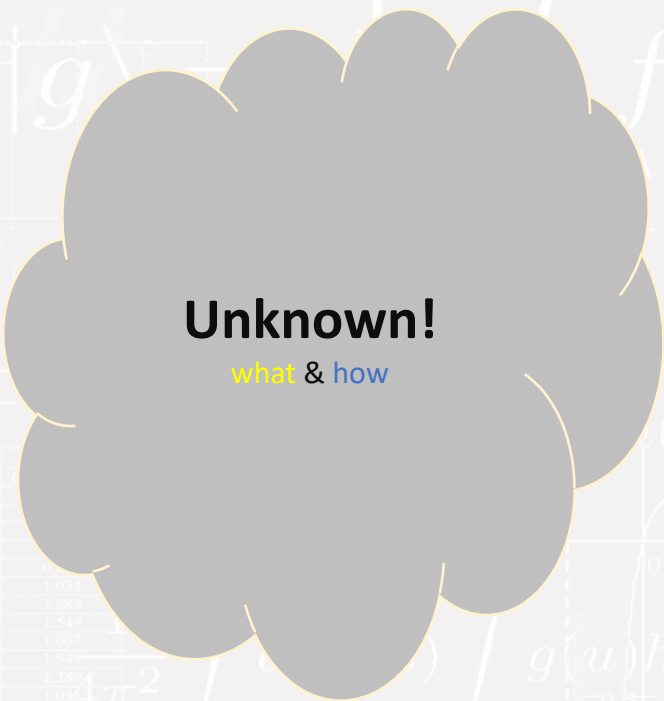




Universitetet i Bergen

Source: www.colourbox.com

The Human Experience

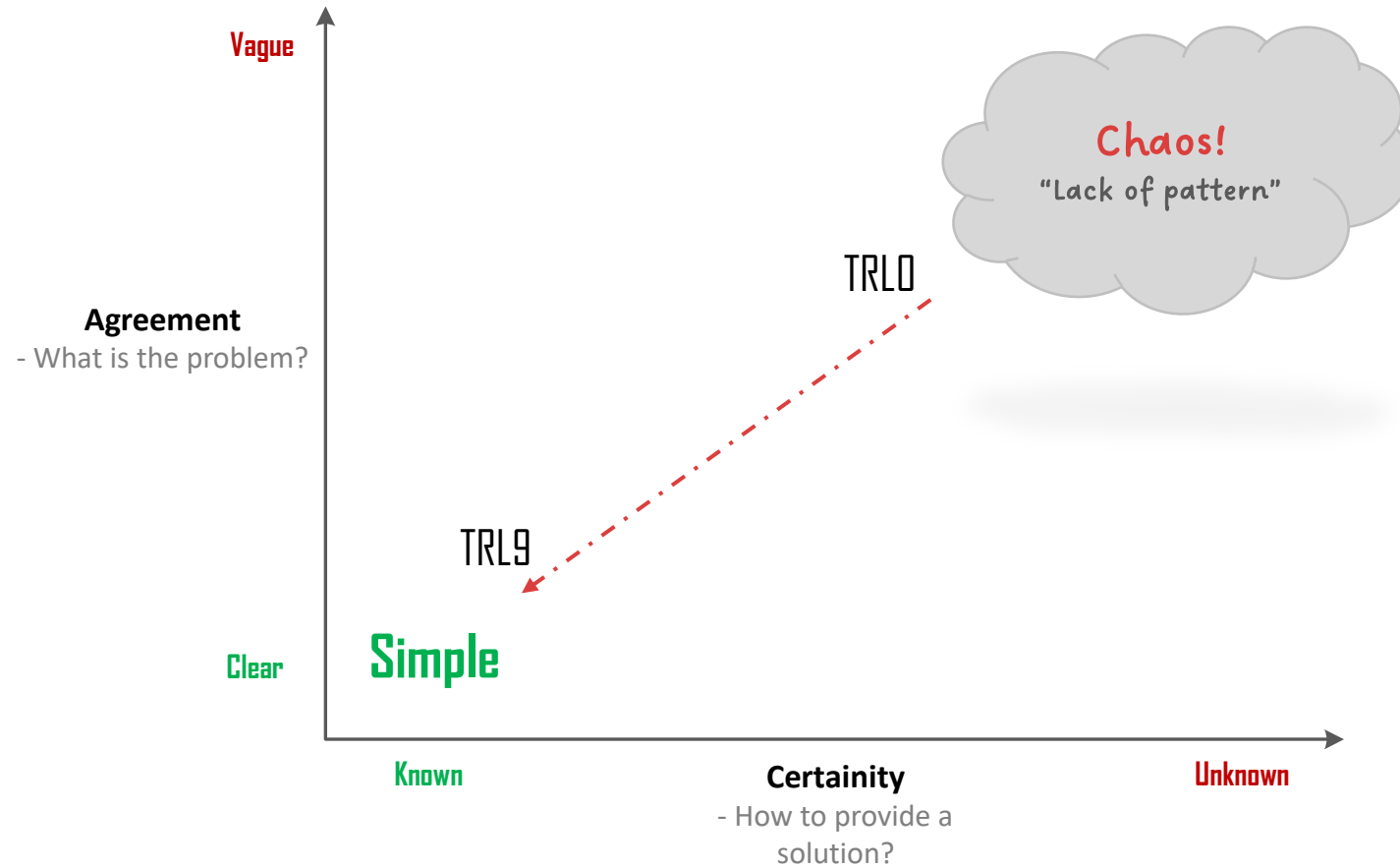


Application

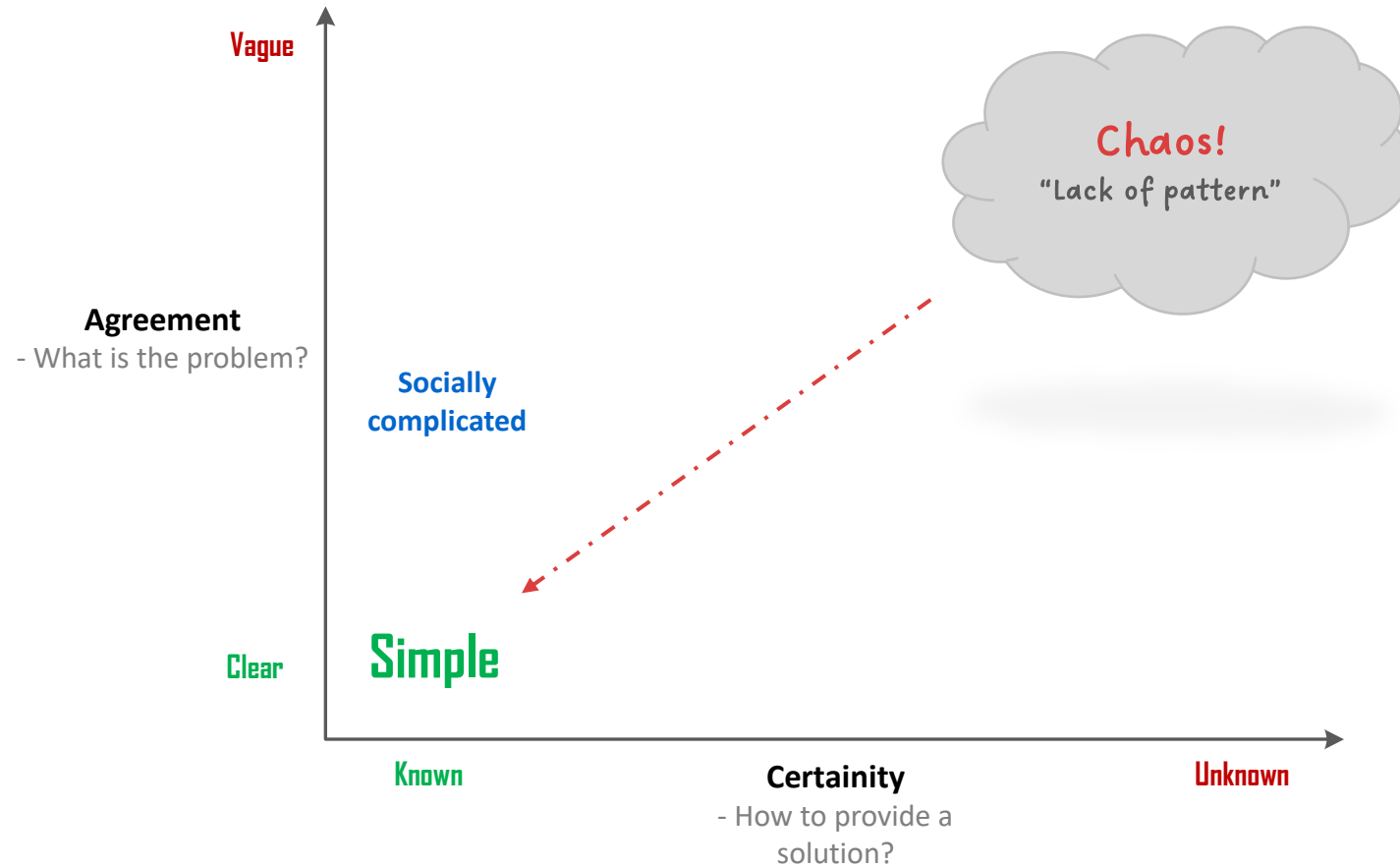
The background of the slide is filled with various mathematical formulas and diagrams, including:

- Trigonometric identities: $\cos^2 x = \frac{1 + \cos 2x}{2}$, $\sin^2 x = \frac{1 - \cos 2x}{2}$, $\cos x \sin x = \frac{\sin 2x}{2}$, $\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$, $\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$.
- Calculus: $\int x^n dx = \frac{x^{n+1}}{n+1} + C$, $\int \frac{1}{x} dx = \ln|x| + C$, $\int \frac{1}{a^2 + x^2} dx = \frac{1}{a} \arctan \frac{x}{a} + C$, $\int \frac{1}{a^2 - x^2} dx = \frac{1}{2a} \ln \left| \frac{a+x}{a-x} \right| + C$, $\int \frac{1}{\sqrt{a^2 - x^2}} dx = \arcsin \frac{x}{a} + C$, $\int \frac{1}{\sqrt{x^2 + a^2}} dx = \ln|x + \sqrt{x^2 + a^2}| + C$.
- Complex analysis: $e^{i\theta} = \cos \theta + i \sin \theta$, $e^{-i\theta} = \cos \theta - i \sin \theta$, $e^{i\theta} + e^{-i\theta} = 2 \cos \theta$, $e^{i\theta} - e^{-i\theta} = 2i \sin \theta$.
- Series: $\sum_{k=-\infty}^{\infty} e^{ikx} = 2\pi \sum_{n=-\infty}^{\infty} \delta(x - 2\pi n)$, $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$, $\sum_{n=0}^{\infty} x^{2n} = \frac{1}{1-x^2}$.
- Geometry: A diagram of a triangle with angles A , B , and C , and sides a , b , and c .
- Algebra: $x^2 - 4x + 4 = (x-2)^2$, $x^2 + 6x + 9 = (x+3)^2$, $x^2 - 9 = (x-3)(x+3)$.

Research Project Management Model

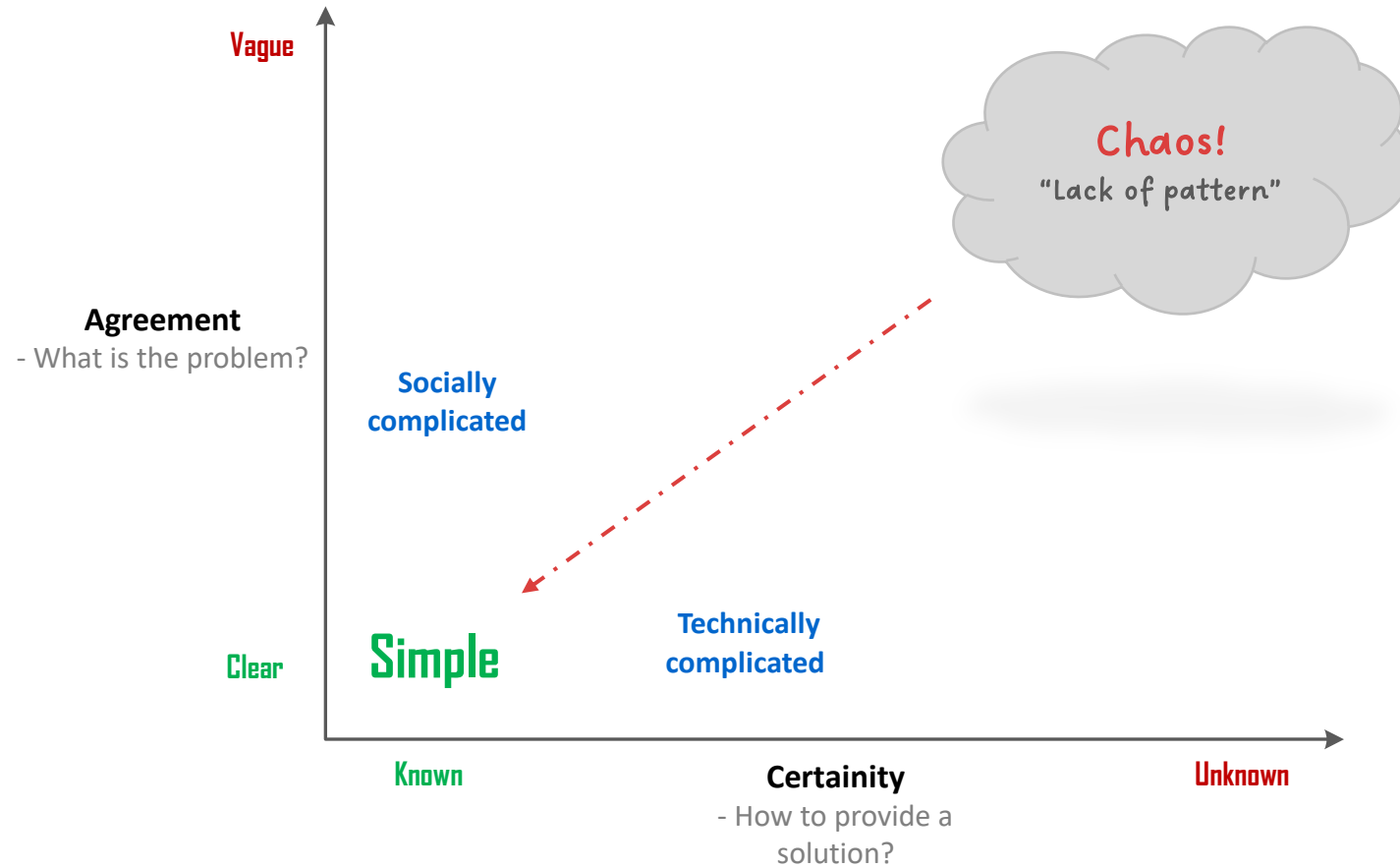


Research Project Management Model



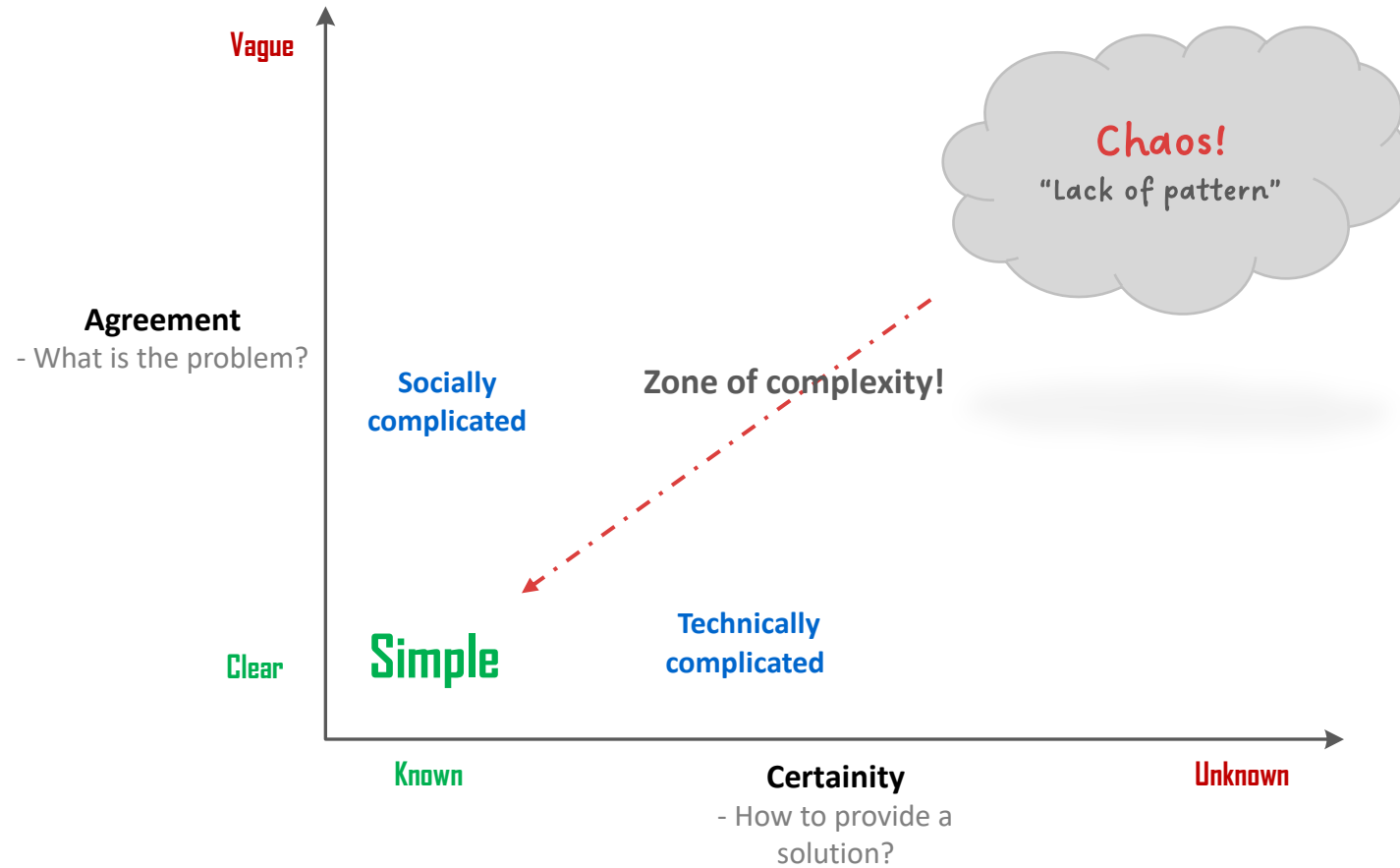
Source: Hiwa Målen, adapted from Ralph Stacey matrix 'Complexity and creativity organizations'

Research Project Management Model



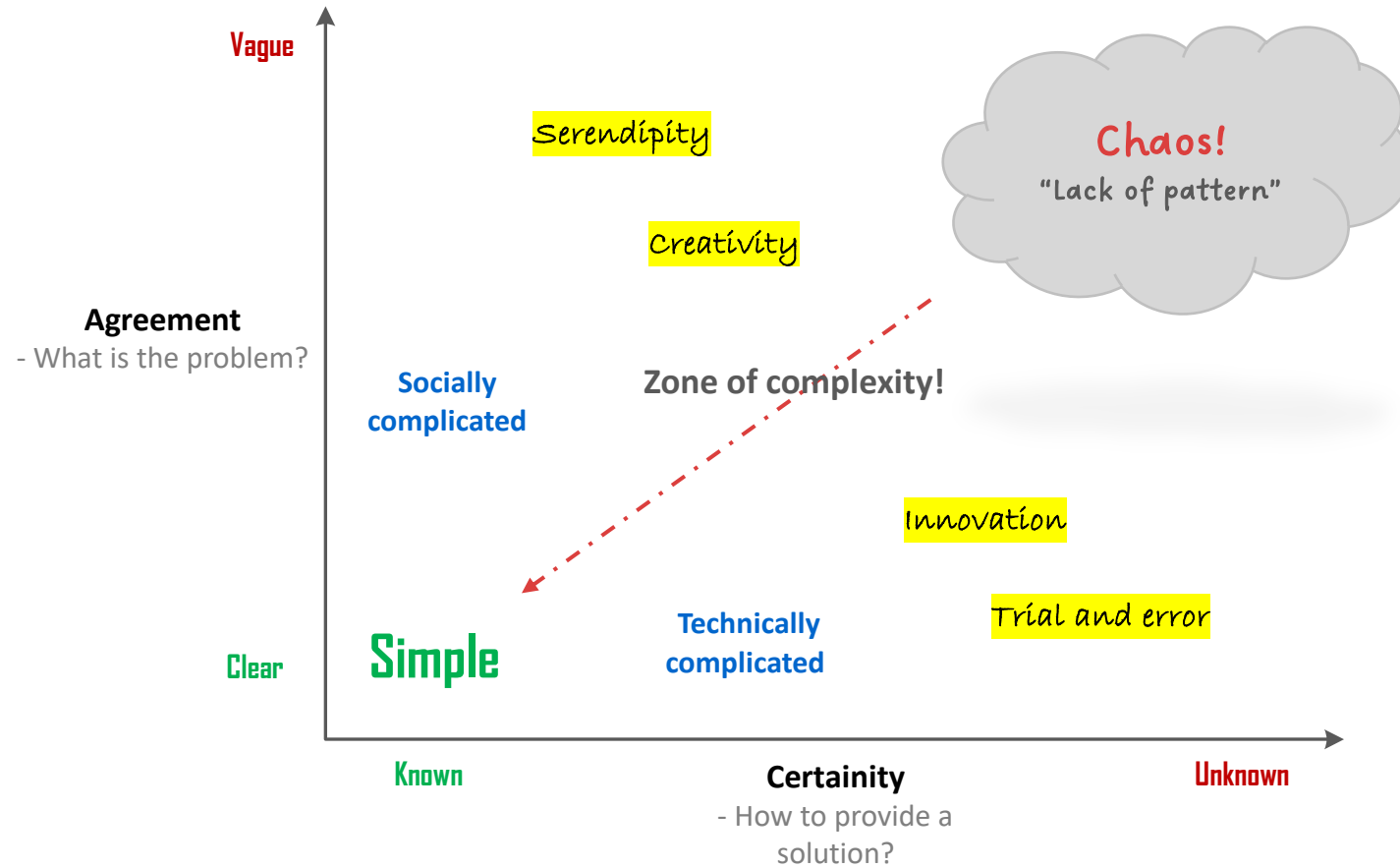
Source: Hiwa Målen, adapted from Ralph Stacey matrix 'Complexity and creativity organizations'

Research Project Management Model

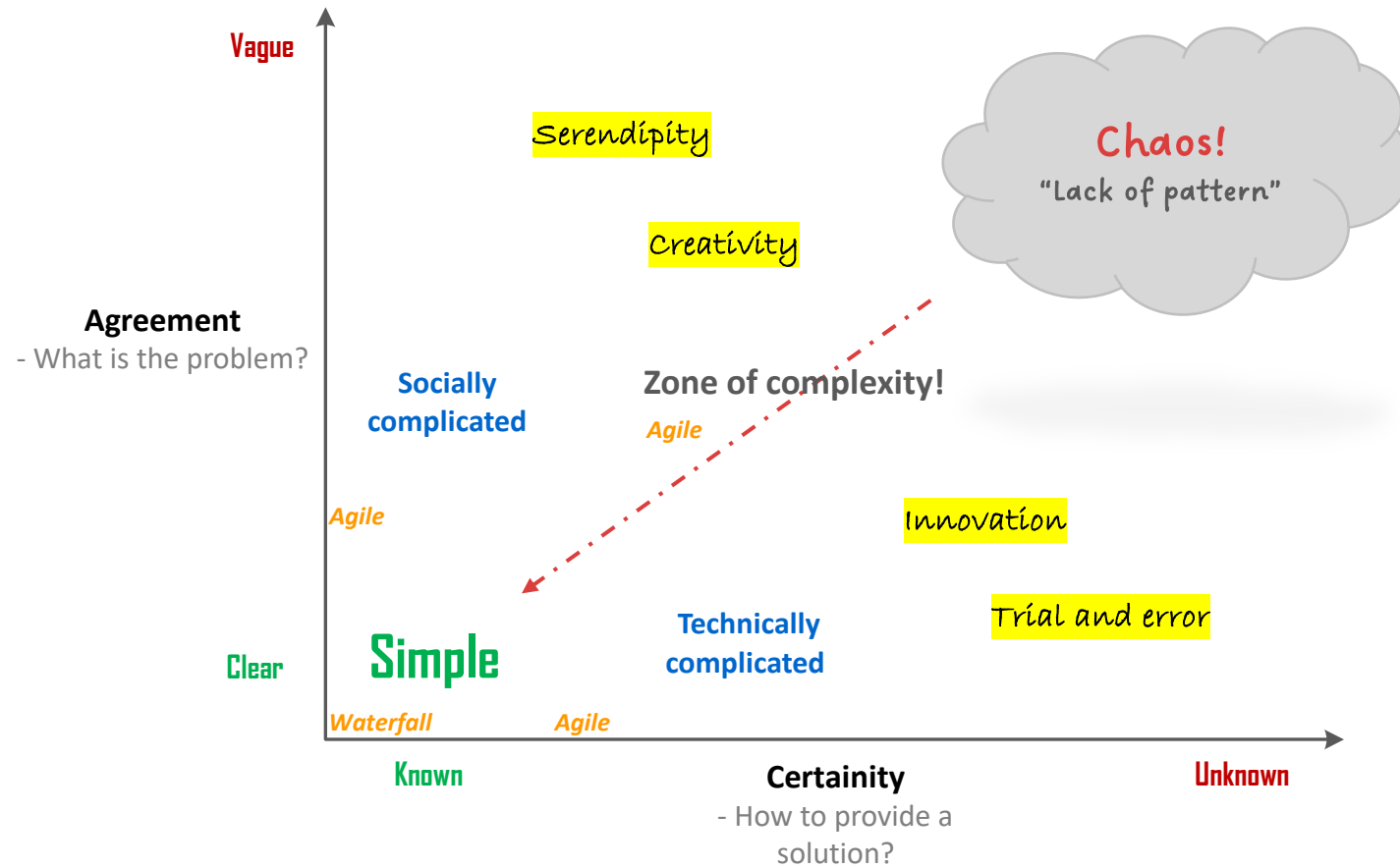


Source: Hiwa Målen, adapted from Ralph Stacey matrix 'Complexity and creativity organizations'

Research Project Management Model



Research Project Management Model



Source: Hiwa Målen, adapted from Ralph Stacey matrix 'Complexity and creativity organizations'

Development of COVID-19 Vaccine: From Chaos to Application

Chaos:

- Global crisis with no vaccine or treatment
- High uncertainty, low agreement on solutions

Pattern:

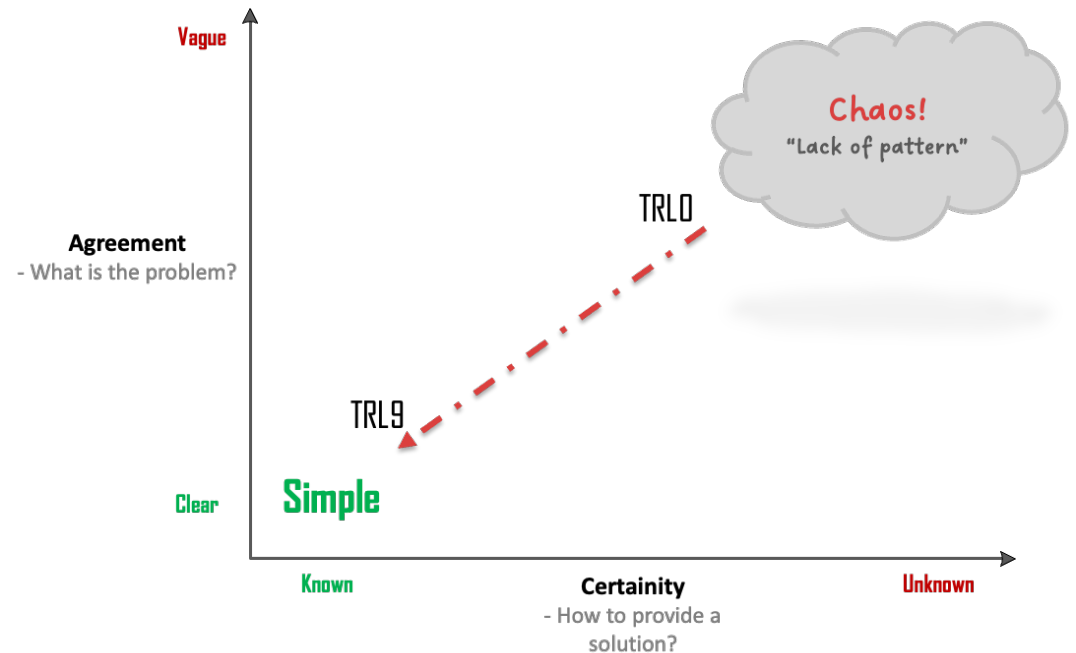
- Global data sharing by researchers
- Identification of virus structure and transmission patterns

Knowledge:

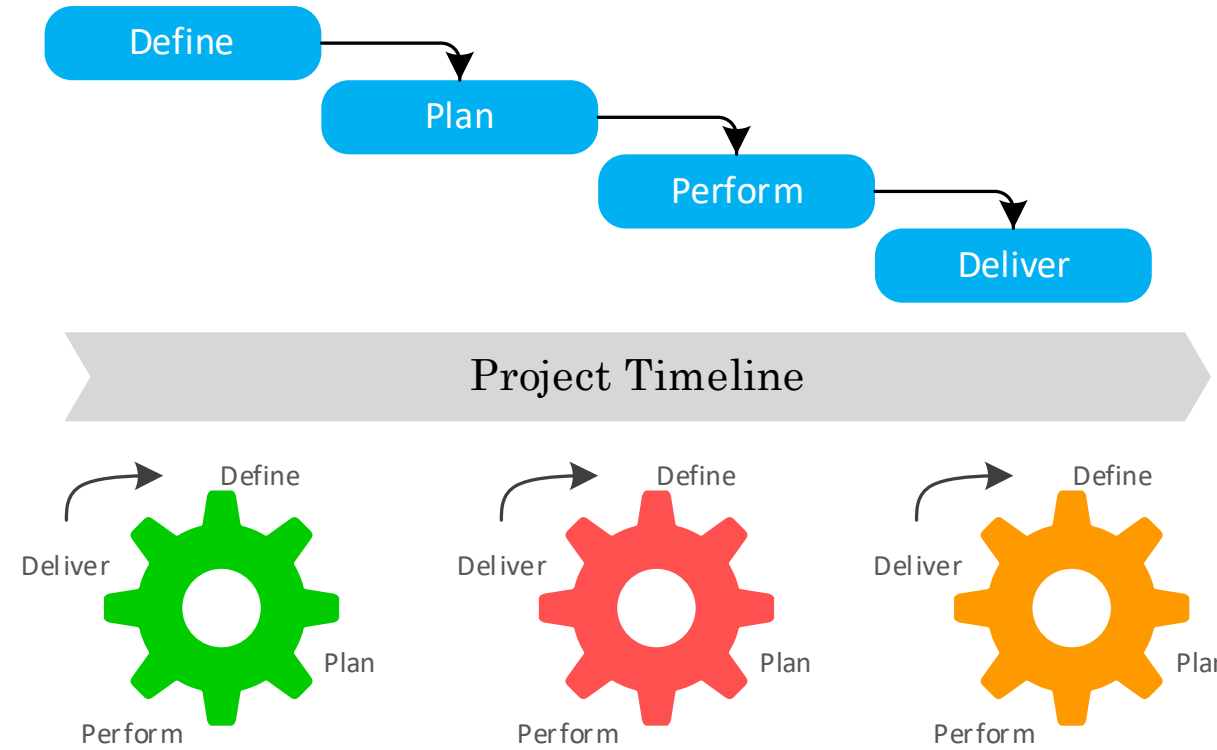
- Collaborative efforts accelerated vaccine target identification
- Multiple vaccine candidates developed

Application:

- Rapid development, testing, approval, and global distribution
- Systematic approach transformed crisis into health solutions



Waterfall project



Agile project

Waterfall project management

Linear, sequential, each phase must be completed before moving onto the next.



Agile project management

Flexible and iterative, emphasizes collaboration, and continuous improvement.



Project Management Theory and the Management of Research Projects - CBS Research Portal. Author: Erik Ernø-Kjølhede. URL: <https://research.cbs.dk/en/publications/project-management-theory-and-the-management-of-research-projects>

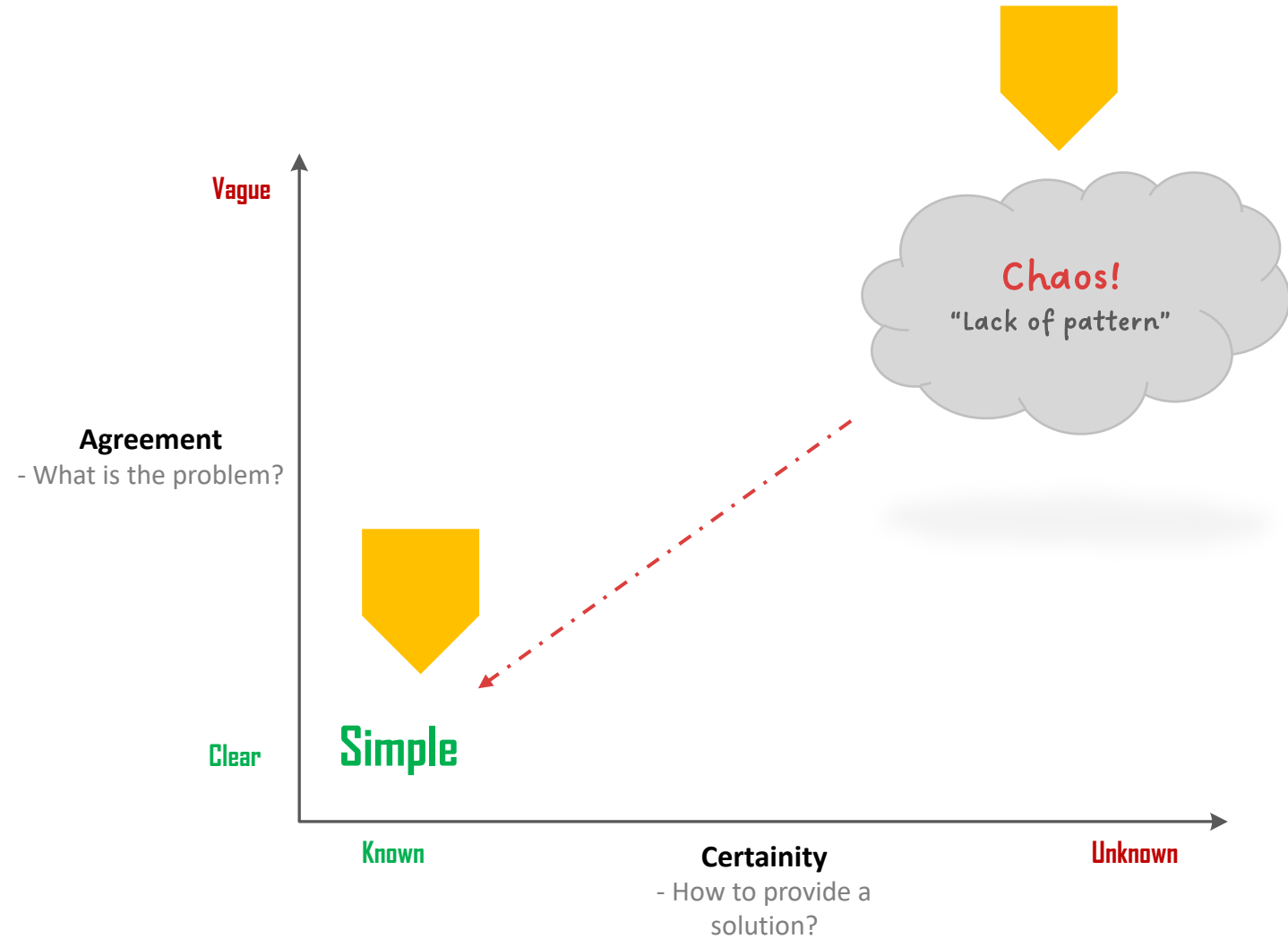
Adapting Scrum to Managing a Research Group. Authors: Michael Hicks and Jeffrey S. Foster. URL: <http://www.cs.umd.edu/~mwh/papers/score.pdf>


Complexity and Creativity in Organizations. Author: Ralph Stacey. URL: <https://www.amazon.com/Complexity-Creativity-Organizations-Ralph-Stacey/dp/1881052893>

The background of the image is a complex, abstract composition of overlapping, swirling lines and shapes. The colors are vibrant and varied, including shades of yellow, orange, red, and blue. The lines are thin and delicate, creating a sense of movement and depth. The overall effect is a rich, textured visual field that changes as the viewer's perspective shifts.

10 min reflection

A comparison between project management in academia and industry.

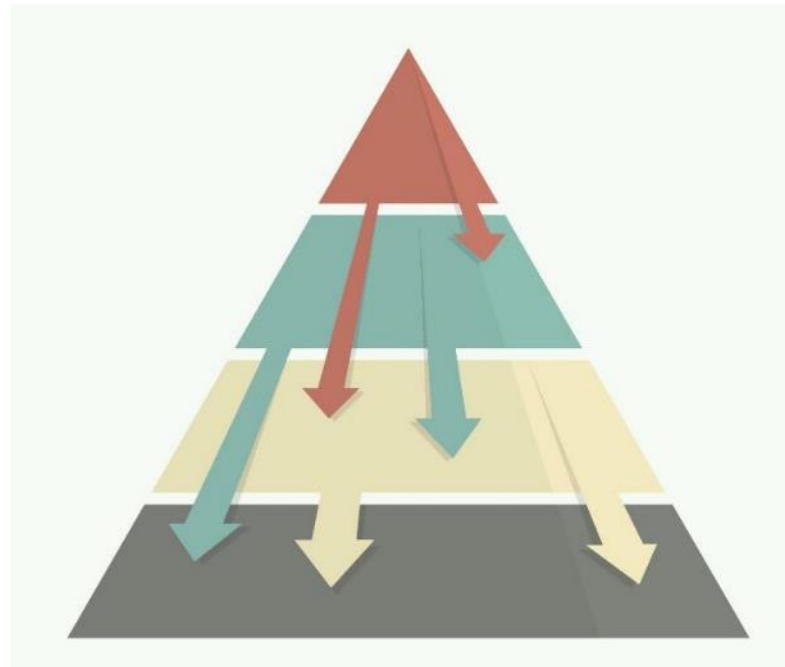




Project Genesis in Industry
Organisational Ecosystem

Top-down, strategic
alignment, problem or
need driven!

Decision Gate
System..



Project genesis in industry

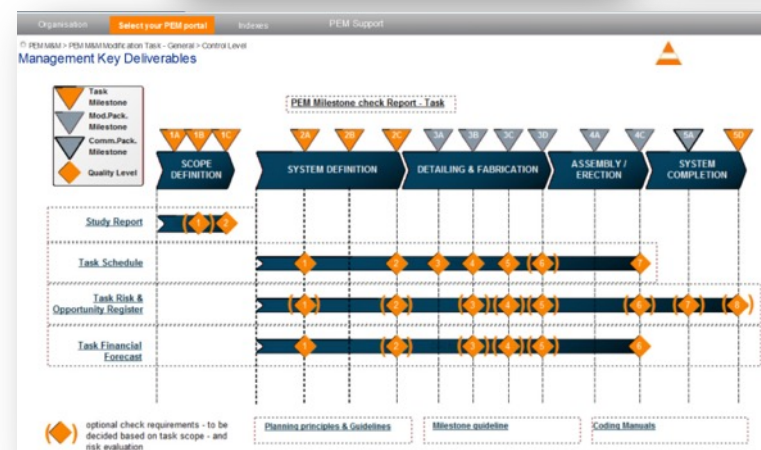
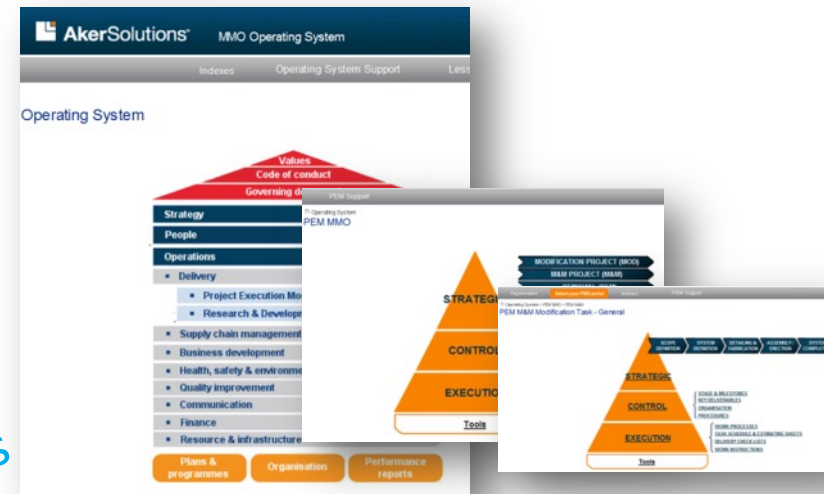
Underlying business **challenge or opportunity** is determined, a **solution** is defined, a project concept is formed, suitable project implementation **method** is chosen, and a project **team** is appointed to deliver the solution to the **customer**.

Toolbox for me and my Team! “Project Excellence Modell”

Ensure streamlining of all project activities across the corporate:

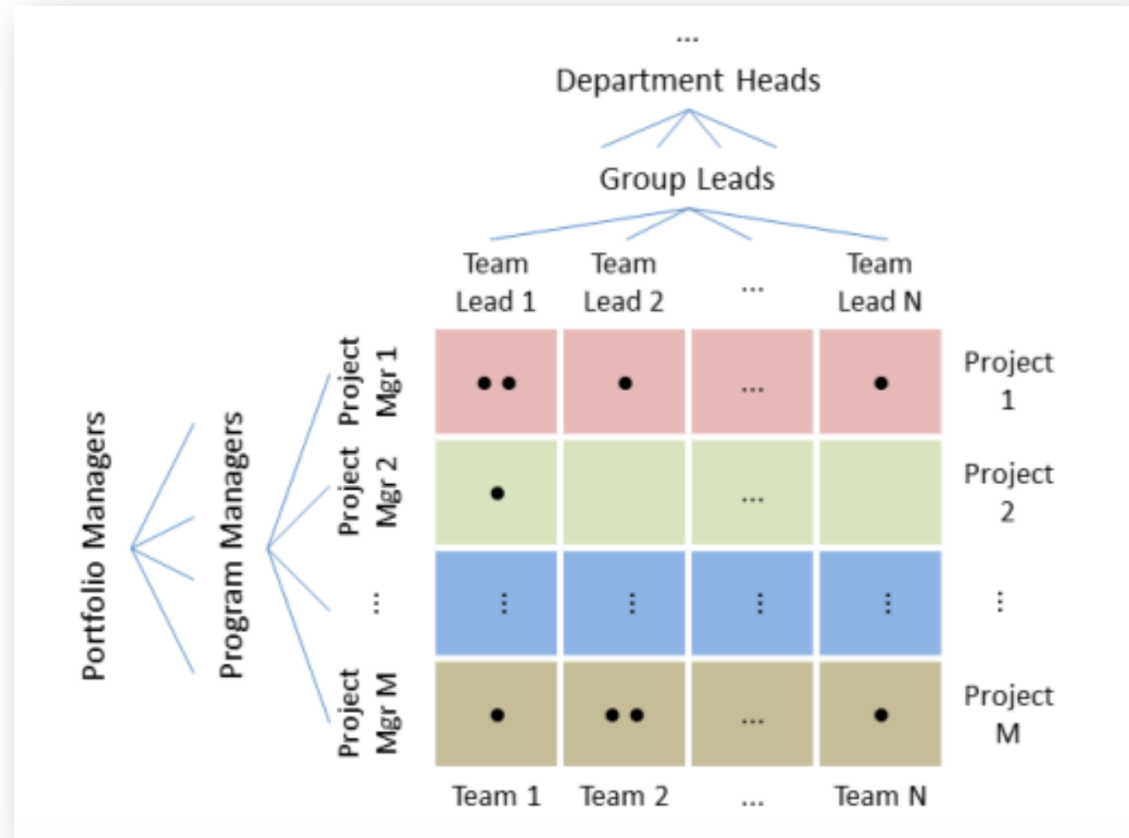
- Reproducibility
- Efficiency
- Improvements
- Reputation
- Knowledge transfer
- ..

Experts



My Project Teams!

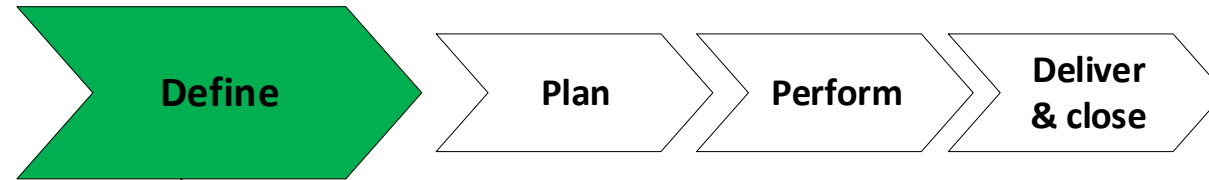
- Multidisciplinary
- Clear roles and responsibilities
- Clear line management
- Clear career path
- Critical personnel → Permanent positions and competitive salaries
- Excellent support from base-organization!!
- **Normally co-localized!**



**Life Cycle of Typical
Projects**
Project Implementation

Phase 1

Research proposal!

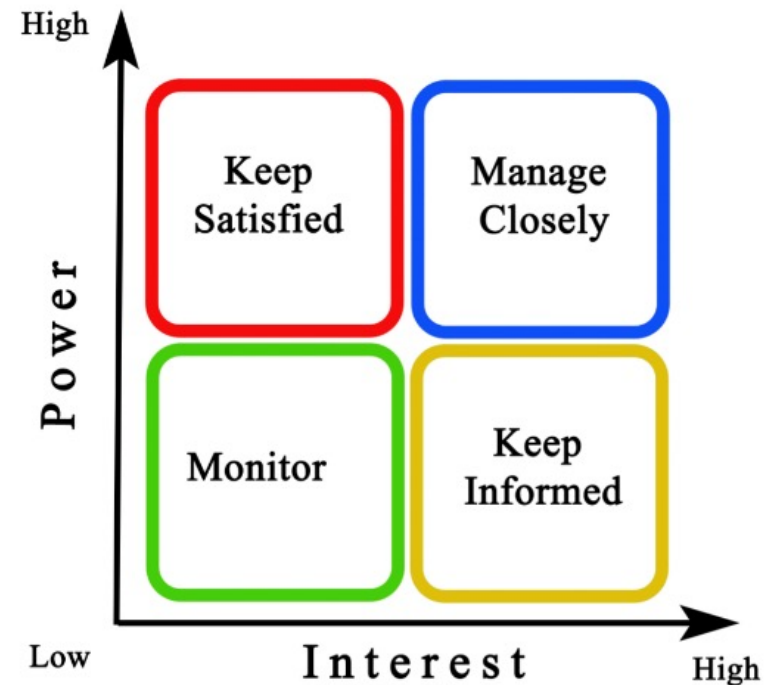


- Need
- Goal
- Requirements

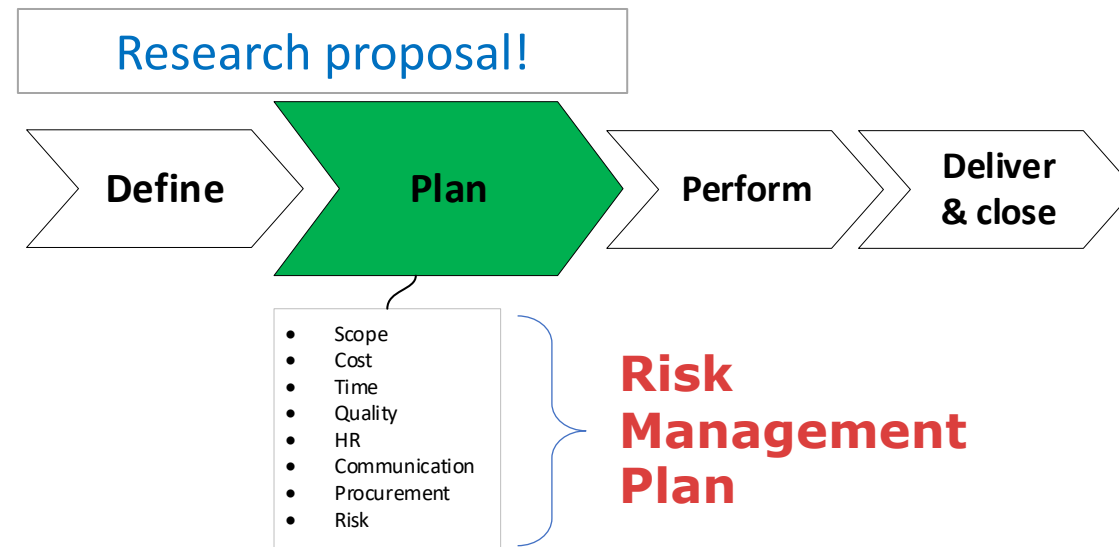
Landscape and the rules of the game!

Stakeholder analysis

Project stakeholders are individuals and organizations that are directly involved in the project, or whose interests may be affected as a result of project execution or project completion.



Phase 2

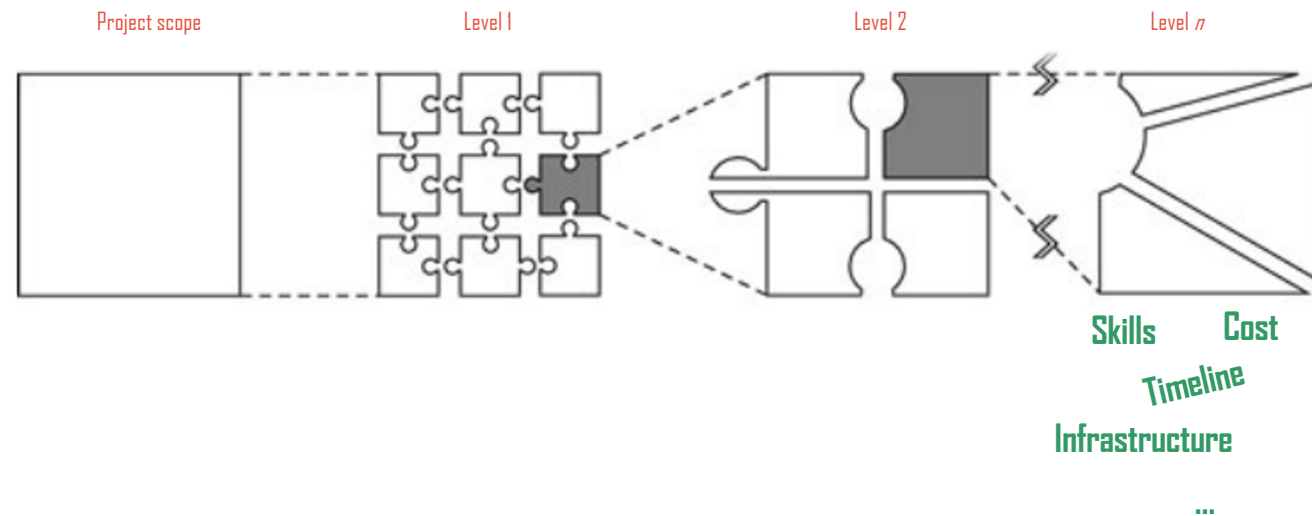


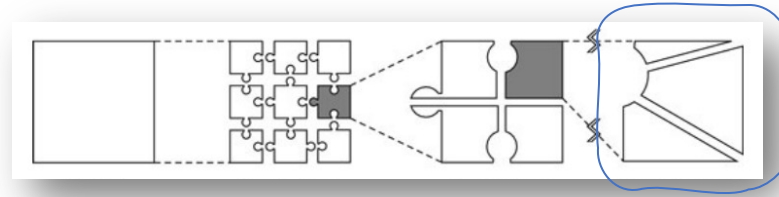
What is your battle plan? What would you do if something goes wrong?

Project scope decomposition to smaller pieces!

A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.

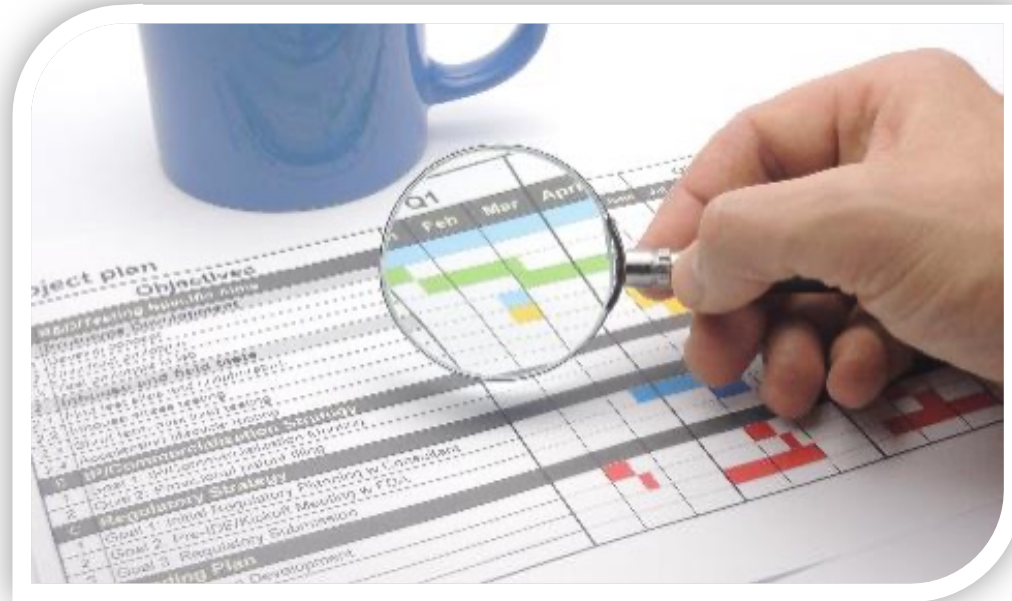
More points to accurately measure progress.



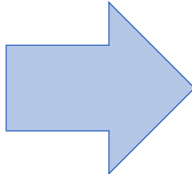
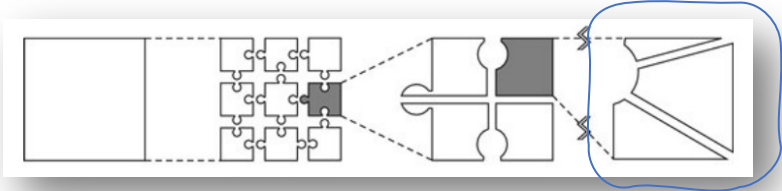


Project duration

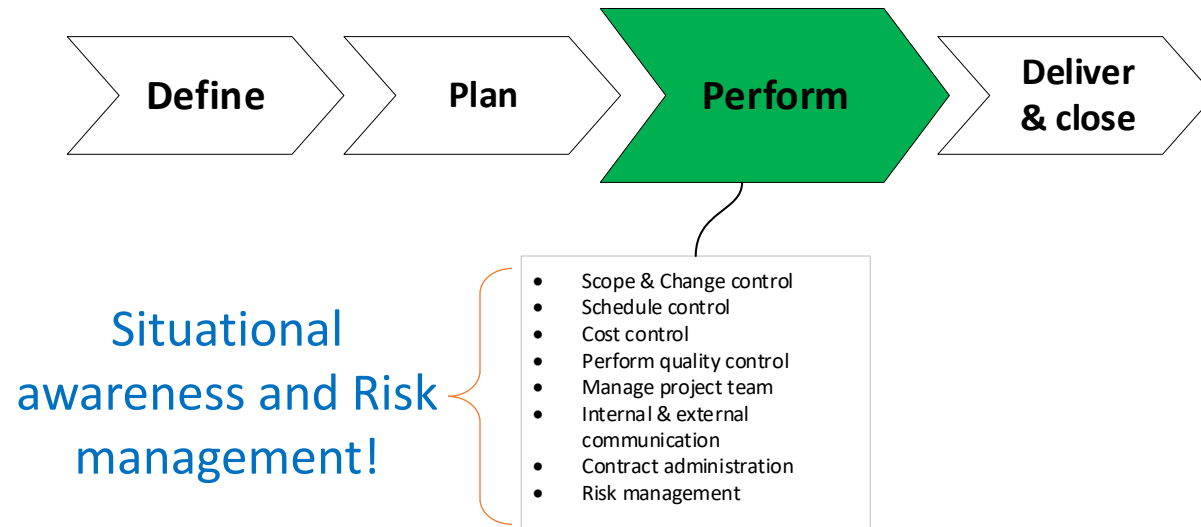
Gantt chart: A visual view of tasks scheduled over time.



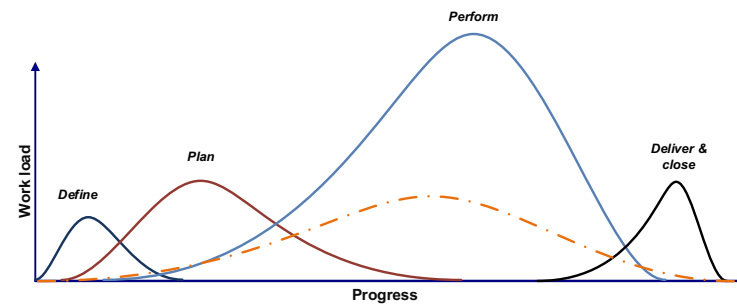
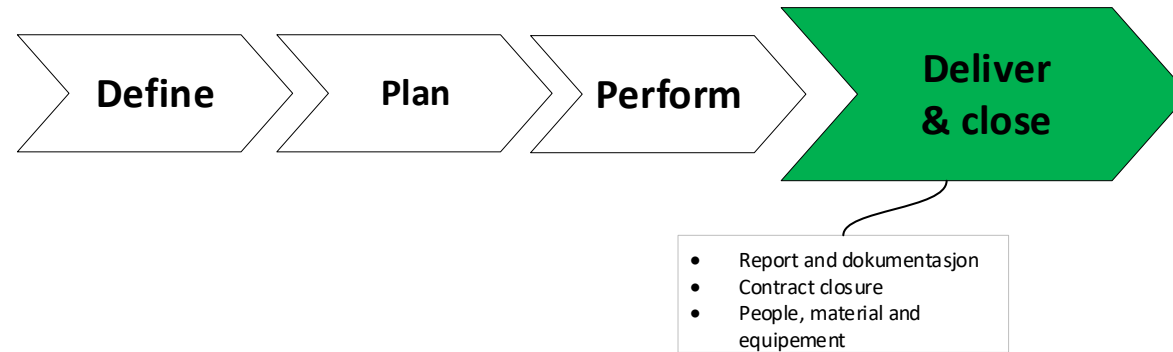
Project Cost Estimation



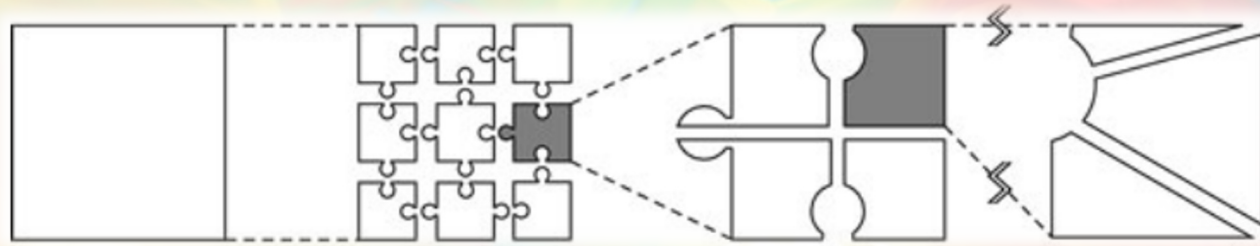
Phase 3



Phase 4



Spend 10 min to discuss WBS of a project your are involved inn



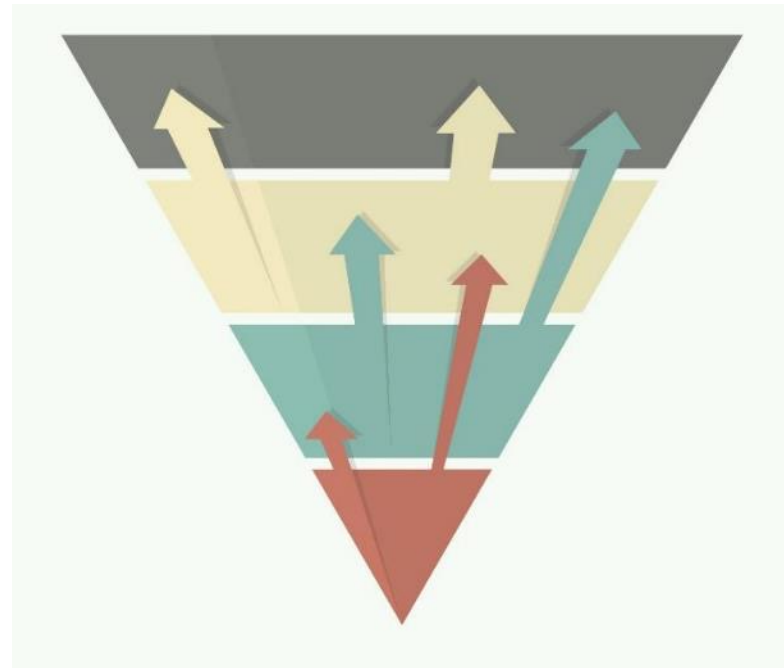


**The Genesis of Research
Projects
Organisational Ecosystem**

Bottom-up, mainly motivated by curiosity!

The PI determines if the project is worth undertaking.

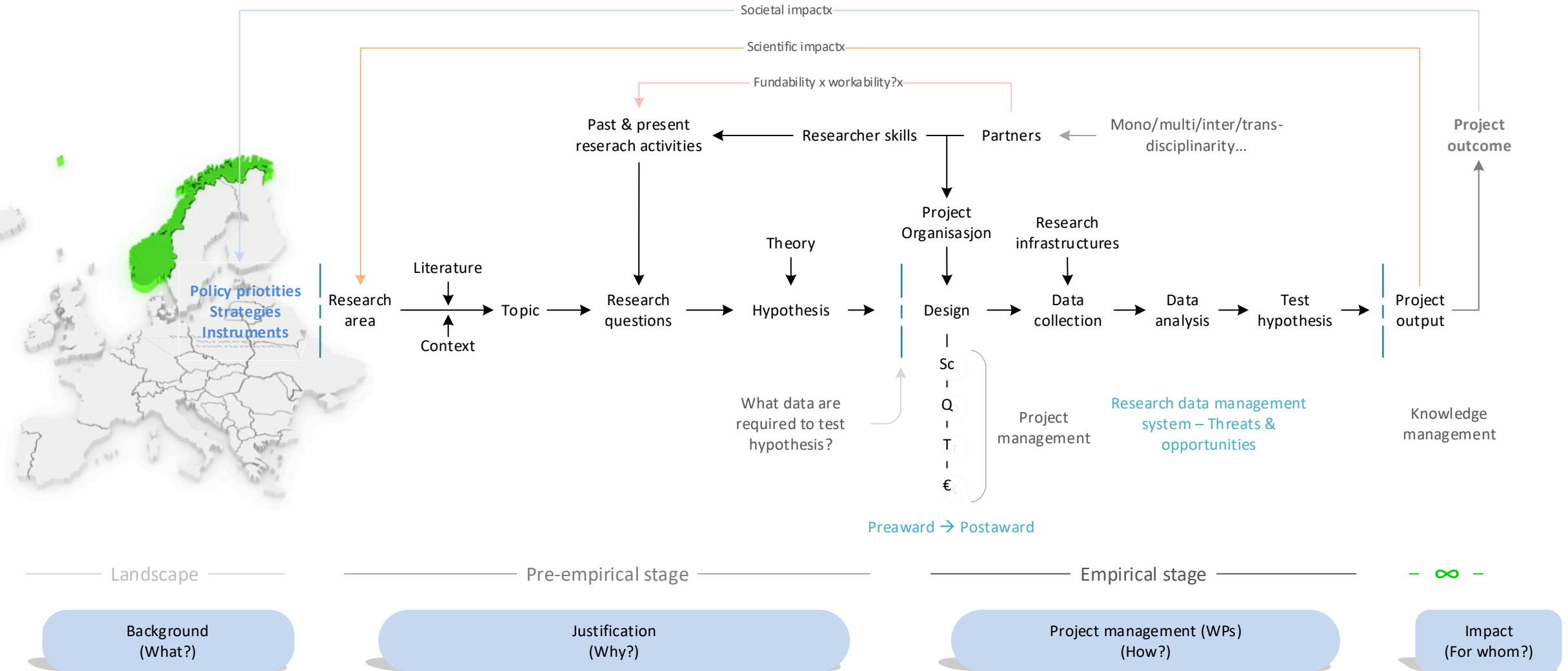
No/limited decision gate system..



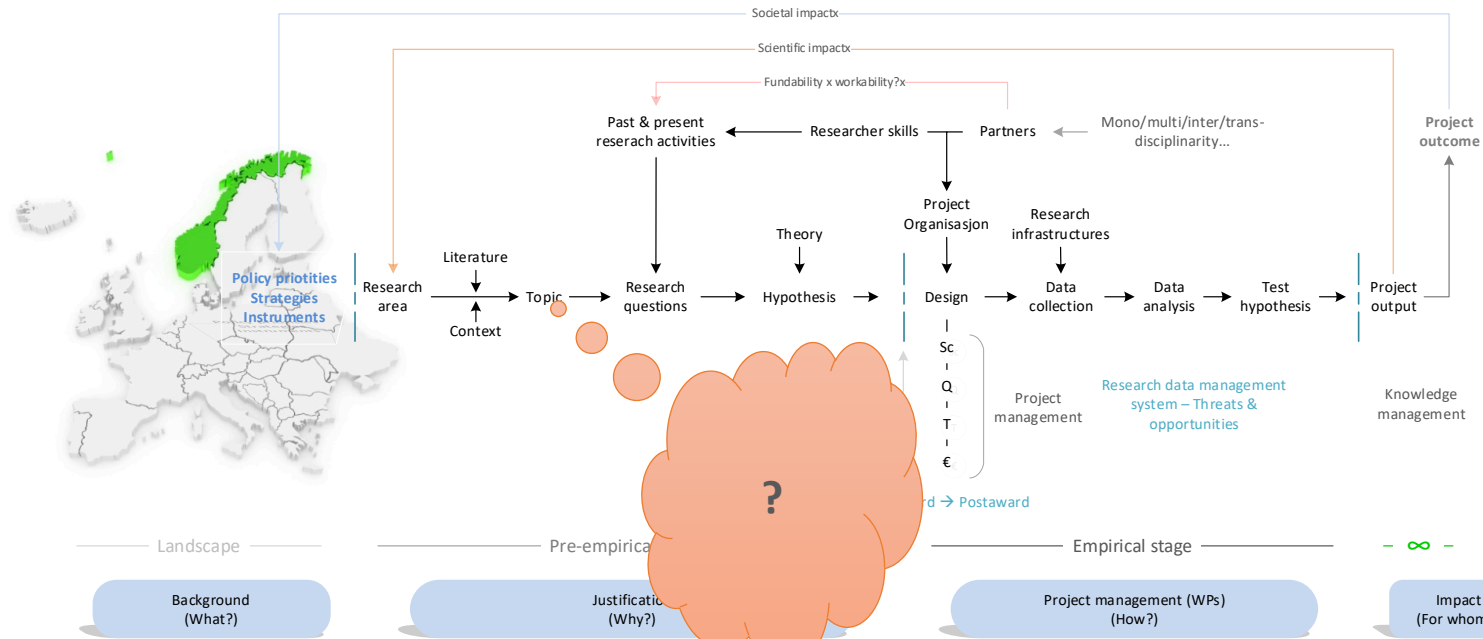
Project genesis in academia

Knowledge gap identified by PI, research question is developed, suitable methods are defined, and a project team is appointed move the existing boundaries of state-of-the-art of the cumulative knowledge of humankind!

Genesis of research projects



Genesis of research projects



Project scope (objectives!)

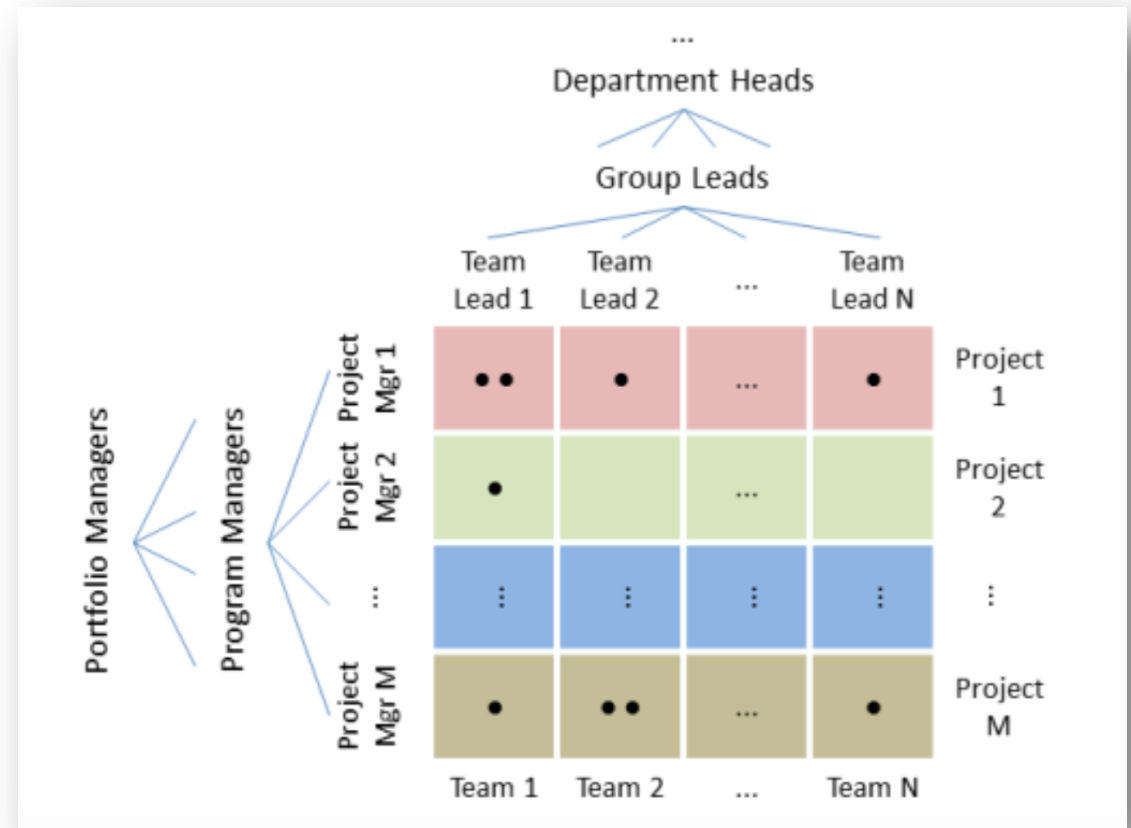
- Limits of our knowledge and key research question
- Project objectives based on State-of-the-Art moving knowledge boundaries
- Rigorous methodology
- End-goal → Short-term <> Long-term Impact

Human Resource Management

- Talent recruitment and retainment.
- Continuous skills development to ensure quality and competitiveness.
- Career plan for critical personnel..
- Institutionalized knowledge transfer mechanisms from project to project..

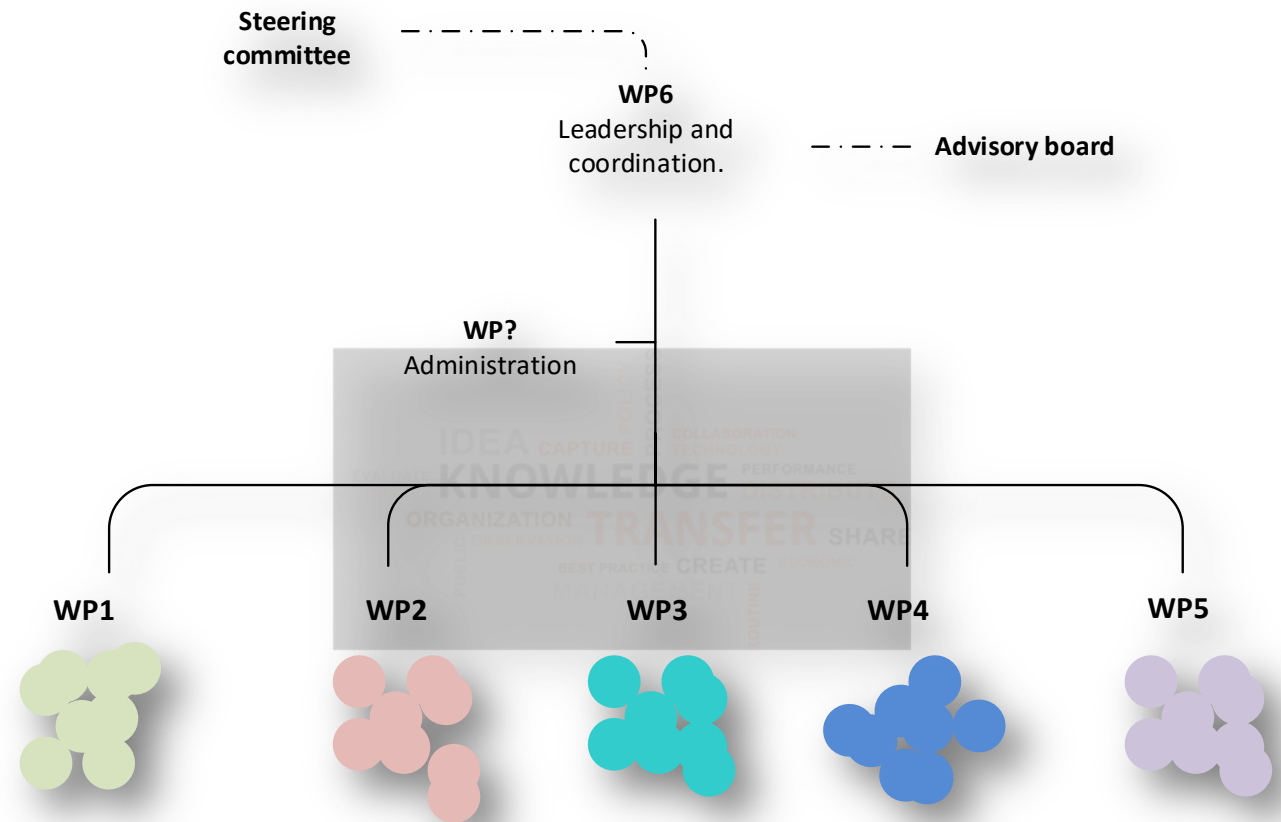
Supervisor → You are committed to research for the rest of eternity

UiB → We are not committed to provide you with a permanent position for the rest of eternity..

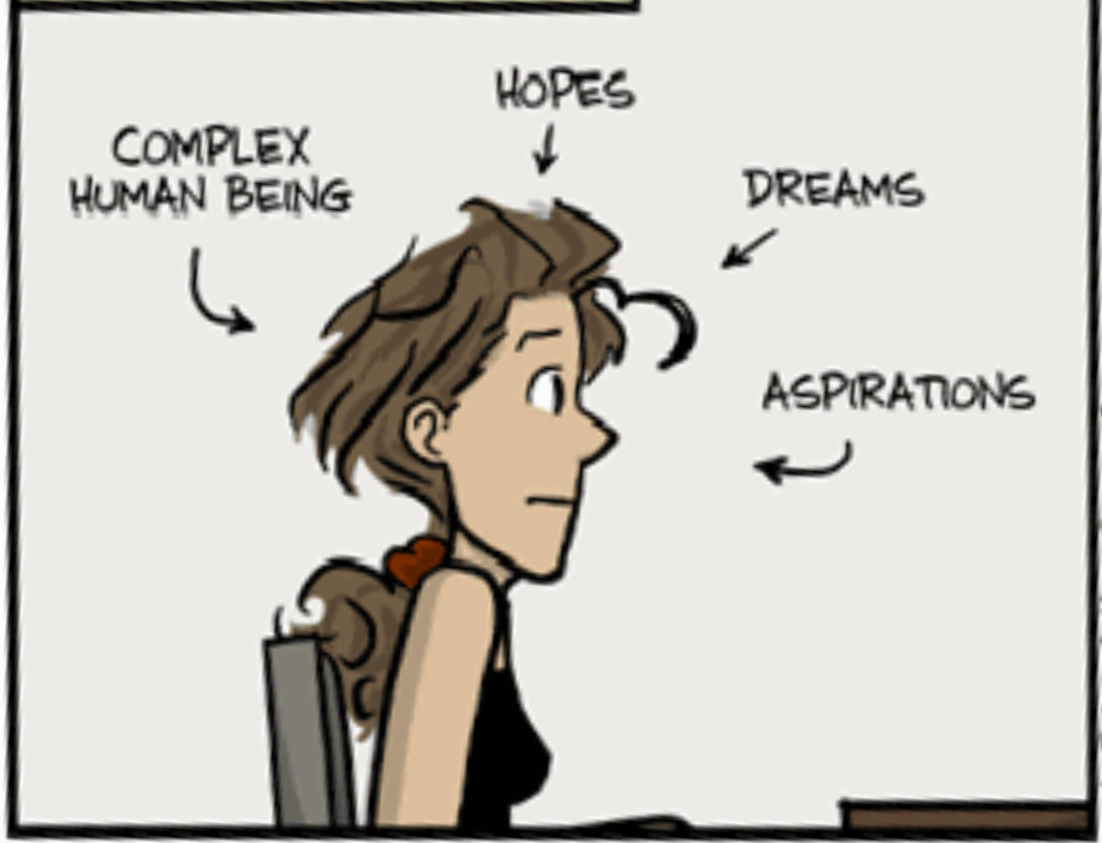


Putting together a collaborative team

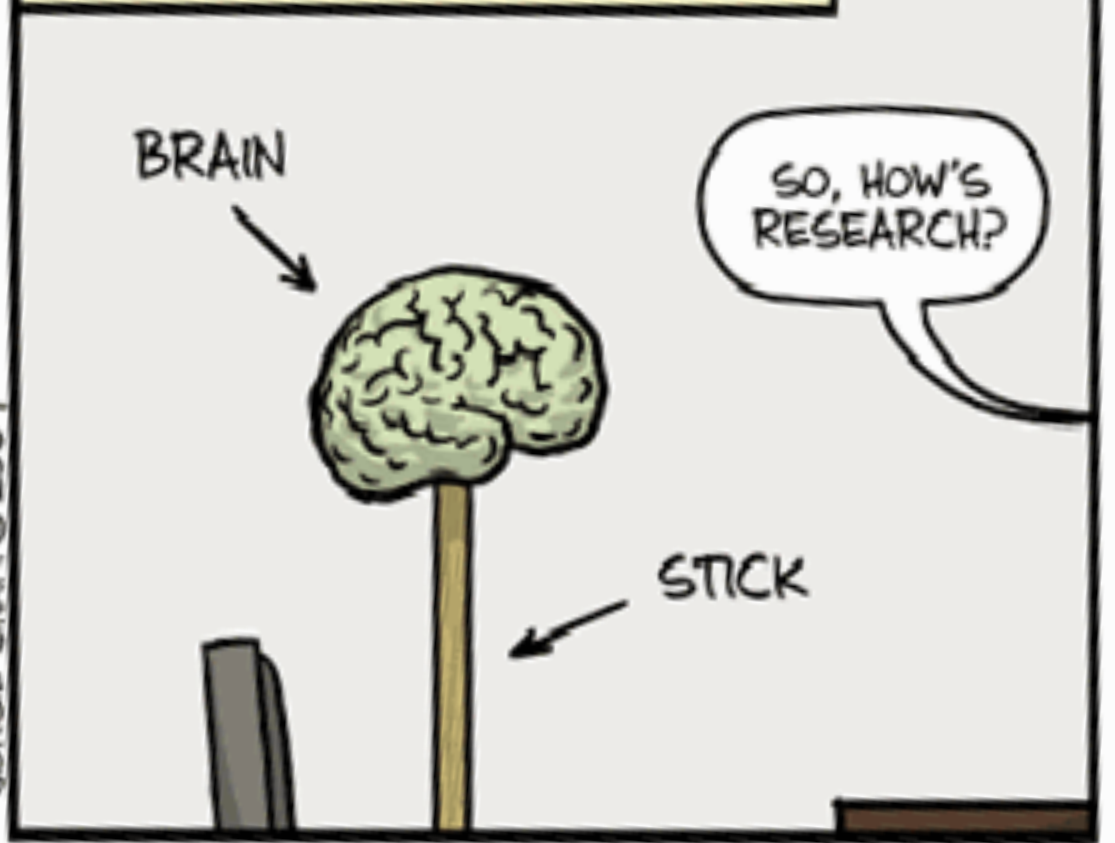
- Excellent academics! Not interested in management.
- Line management, only on paper.
- Formal and informal leadership
- To kind of team members: Permanents and NOT permanents.
- Common goals? Maybe or maybe not..



HOW YOU SEE YOURSELF:

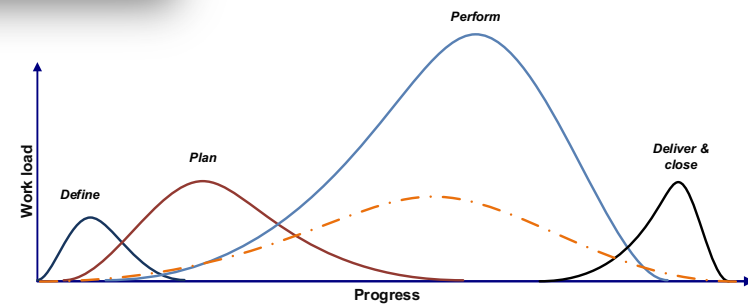
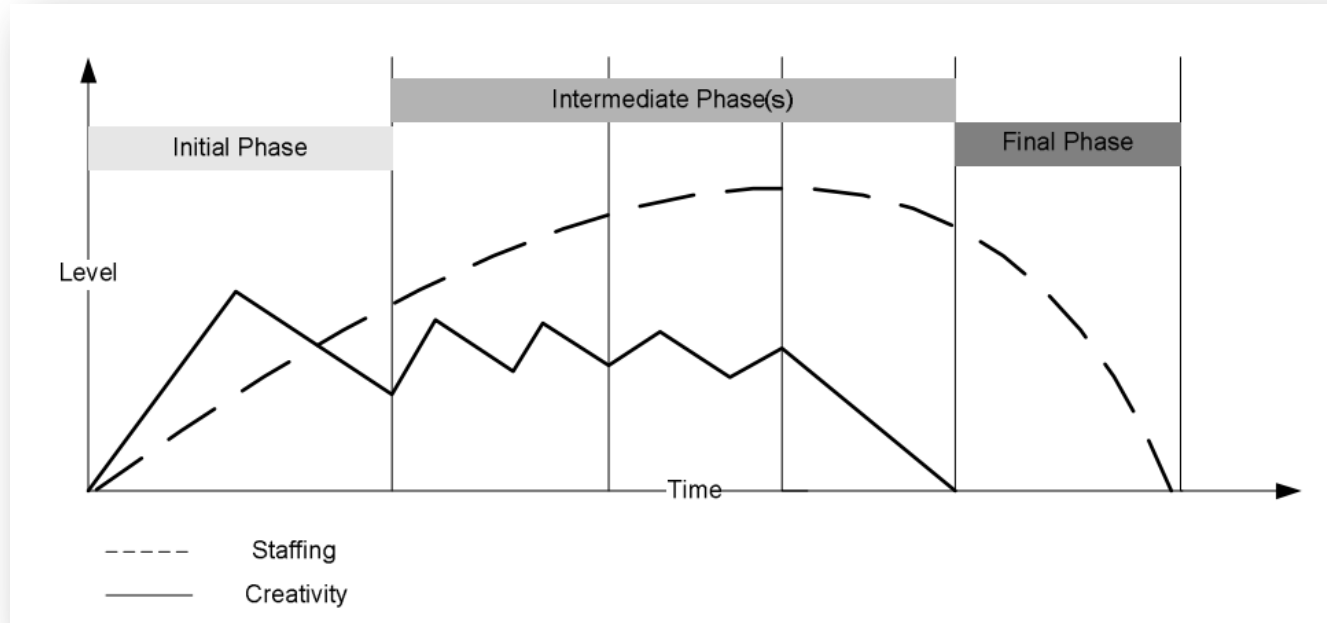


HOW MOST PROFESSORS SEE YOU:



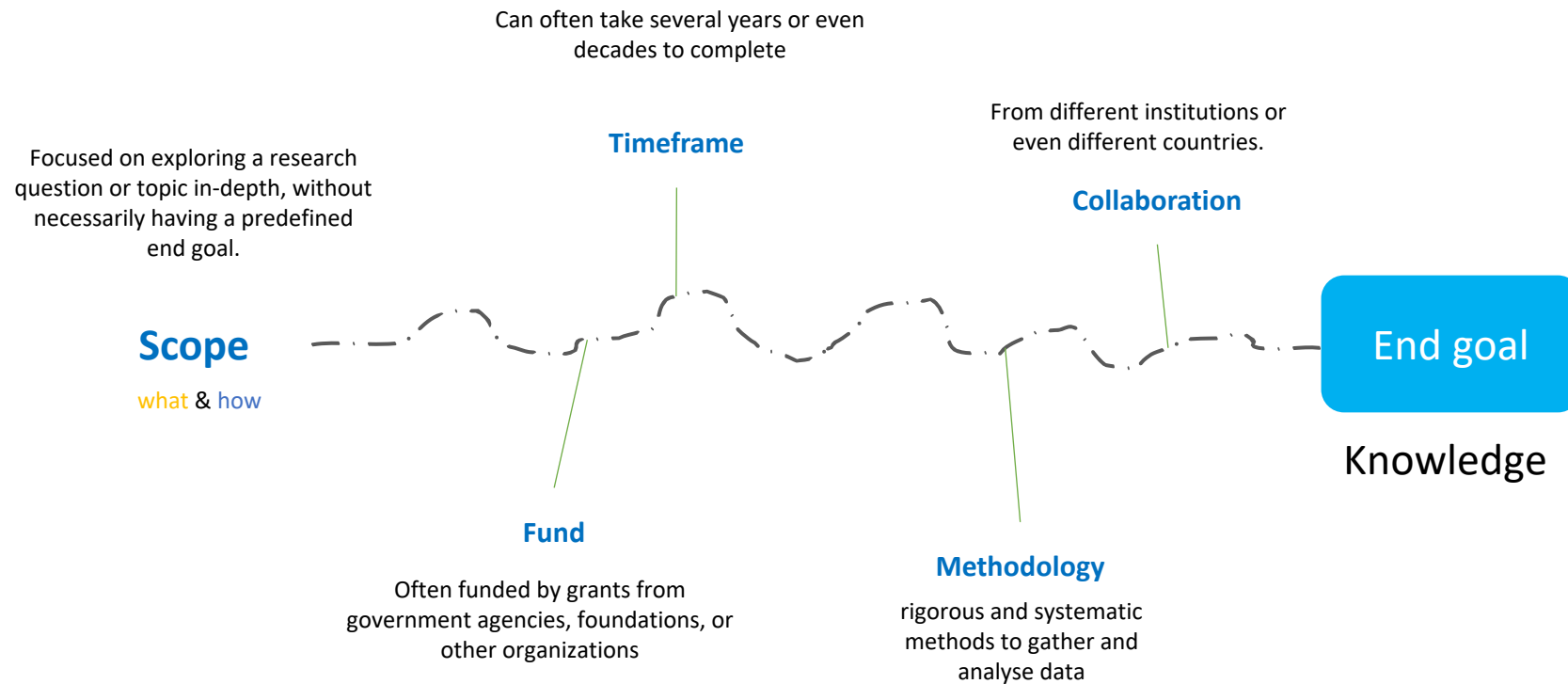
JORGE CHAM © 2009

Creativity in research projects

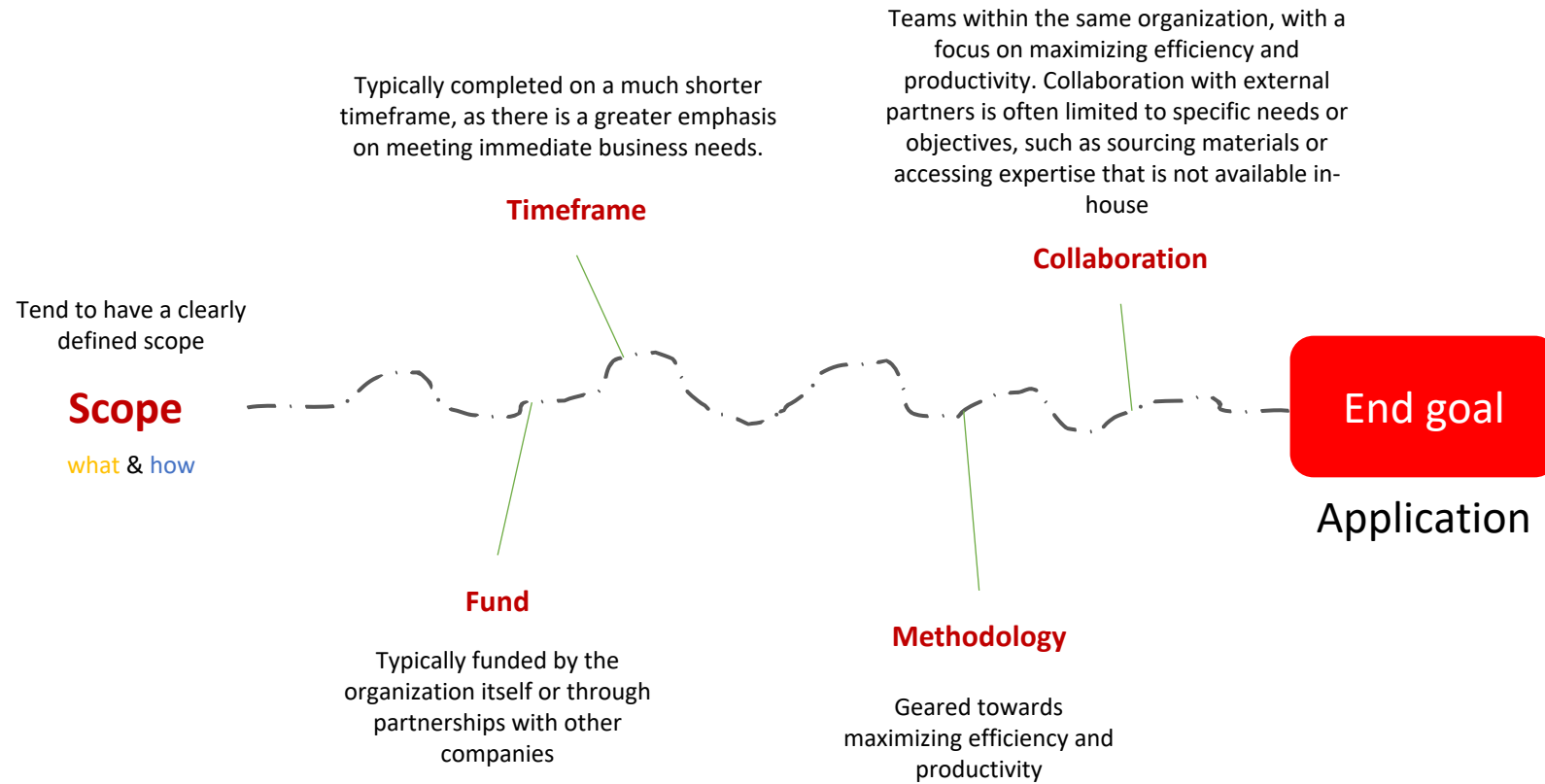


Research projects compared to other
types of projects

Research Projects



Other Projects

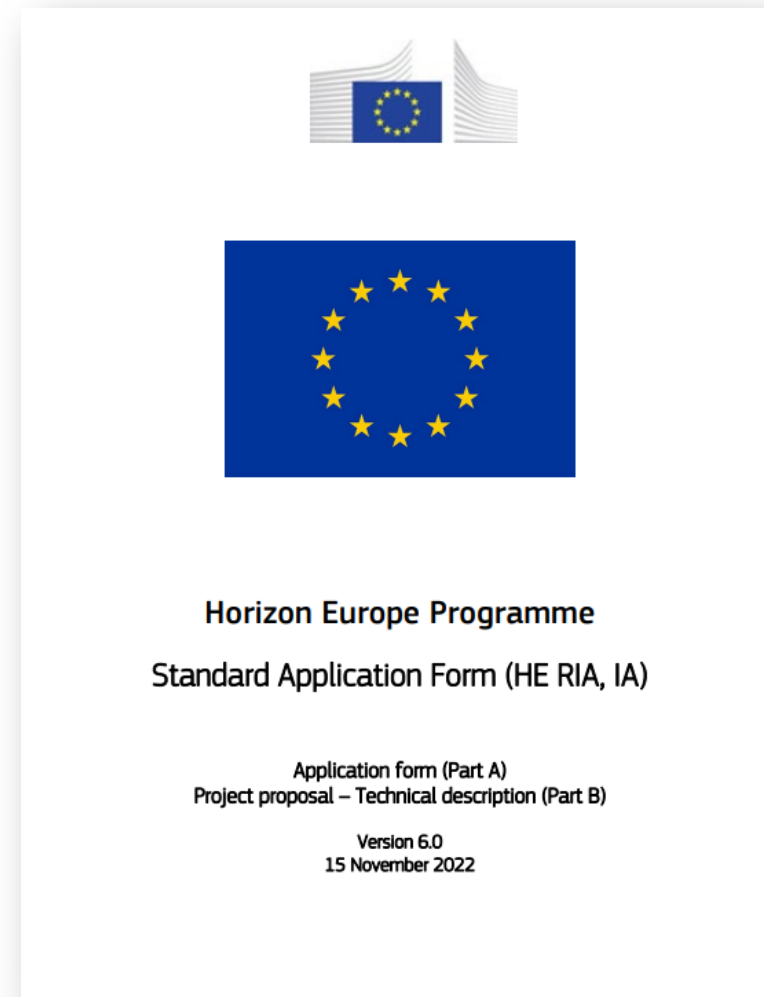




10 min reflection

**A universal key for project
management!**

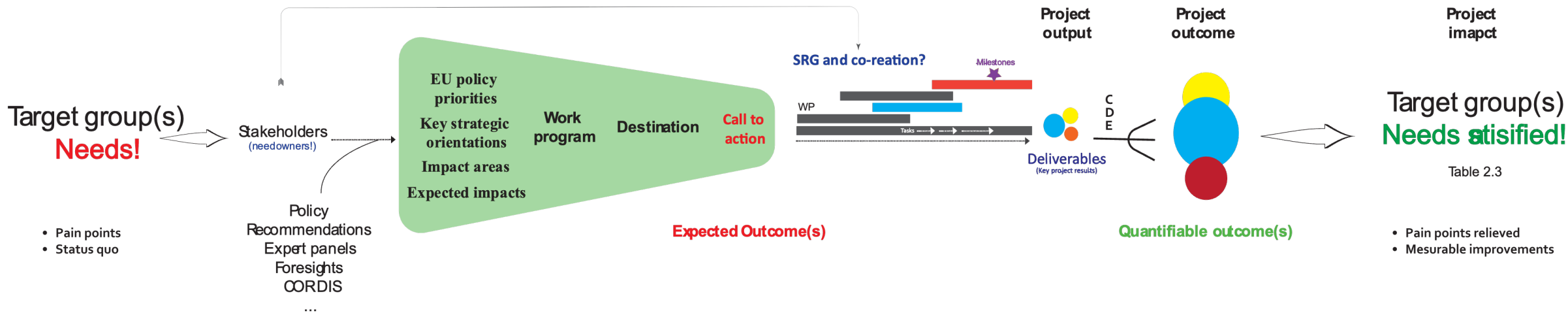
Standard Application Form



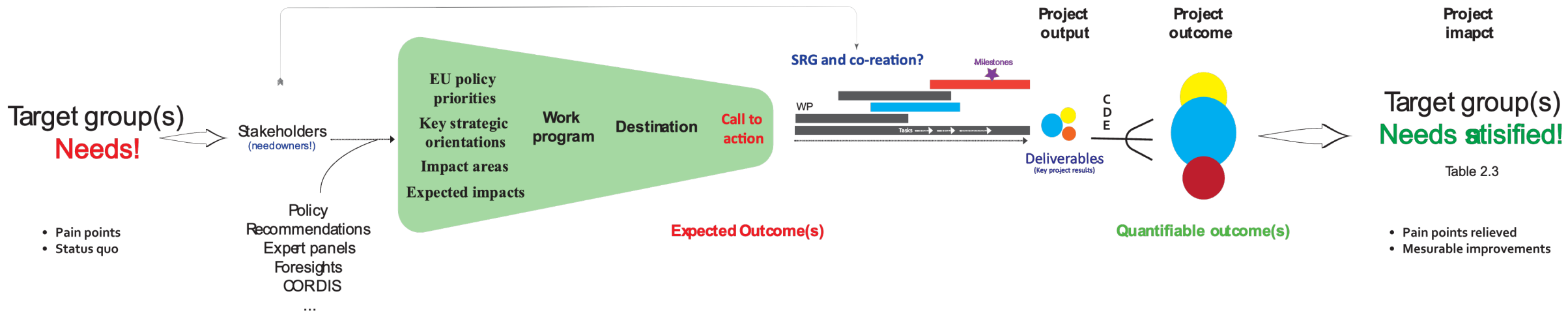
https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/af/af_he-ria-ia_en.pdf



From **Need** to **Impact!**



From **Need** to **Impact!**



Expected outcomes	Target group	Expected Results	WP assignments	Quantified outcomes	Impact
From "Topic description: Expected Outcome"	Stakeholders	Key project results (KER)	Partner expertise		

Example 1

Project results	Expected impacts	Intermediary developments steps / Indicator	Potential users of results
Scientific Impacts			
Individual differences on food preferences and consumption patterns	Personalized nutrition solutions according to individual sweeteners preference.	Match sweeteners preferences with different segments of the population, geographies, etc. Including those subjects that are taste averse.	Consumer
Effect of S&SEs on gut-brain&cephalic response biomarkers, microbiota changes, brain activity, energy compensation, meal eating behavior, expected satiety, reward and food choice.	<p>Generation of new knowledge on the mechanistic neuro-biobehavioural processes and on consumer perspectives after the acute and repeated use of new S&SE</p> <p>Generation of safety data on acute and repeated exposure of S&SE in liquid and solid form</p> <p>Generation of microbiological safety data of solid matrixes for the delivery of S&SE</p>	<p>Clinical trial on acute effects of new S&SE blends delivered via beverages in 162 European adults</p> <p>Clinical trials on acute and repeated effects of new S&SE blends delivered via solids in 240 European adults</p>	<p>Food manufacturers (through WPI health impact database)</p> <p>General public</p> <p>Scientific community</p>
Technological Impacts			
Technological database	Increased presence of sugar-reduced foods on marketplace	Availability of a database that supports the formulation of sugar-reduced foods across different food categories	Ingredient suppliers, BTC industries/ SME, technology centres
Health impact database	Increased presence of sugar-reduced foods on marketplace	Availability of a database that supports the formulation of sugar-reduced foods and predicts health i	Ingredient suppliers, BTC industries/ SME, technology centres, he

Example 1

2.3 SUMMARY OF THE PROJECT IMPACT PATHWAY

SPECIFIC NEEDS

- Drainage and poor ecological condition of wetlands are causing critical erosion of Europe's ecosystems and alarmingly accelerating the rate of biodiversity loss. Thus, there is an urgent need for wetland restoration upscaling.
- Need for more knowledge and data about the status of wetlands, emissions reporting, restoration trade-offs and benefits for climate and biodiversity as well as defined GHG abatement potentials.
- Need of new tools for policy makers and land managers, to support them in defining the best strategies to tackle climate change and biodiversity loss, considering environmental and socio-economic aspects.

EXPECTED RESULTS

- | | |
|---|--|
| R1. Interactive European peatland database | R5. 2 Digital tools: Interactive App, DSS tool |
| R2. Wetland databases for the catchments and a European wetland map (GIS-dataset) | R6. New wetland policy and governance options |
| R3. Updated GHG EF for restored wetlands | R7. Hotspots priority lists for urgent action |
| R4. Improved models on wetland dynamics | R8. Dedicated Media Campaign & Citizen Science about wetland restorations needs to the public's agenda |

D & E & C MEASURES

Communication toward all public. 8 interviews, 6 journalistic articles, 1 video news release, various press releases. >500.000 citizens on various channels (online, print, television). >8.000 web visits/year, >24.000 in total. cross-linking with social media accounts, referencing and Search Engine Optimization

Dissemination

- towards the:
- Scientific community: >1.000 academics, 30 peer-reviewed publications leading to > 120 citations. >40 presentations and >3 conference workshops reaching > 600 experts.
 - EU projects and related research initiatives, research & wetlands associations: >2 joint events leading to >100 new contacts from environmental science, agriculture, and other stakeholders
 - Policymakers, governments, farmers, associations, and other WET HORIZONS stakeholders: 9 multi-actor stakeholder groups, 1 international advisory group. At least 10 Webinars/workshops with stakeholders. WP deliverables reaching >150 policy makers on regional, national and EU level. One final event with more than 80 stakeholders. >1.000 policymakers, governments, farmers, associations, and WET HORIZONS partners.

Exploitation: free and open access to KER. Protection, by copyright of the KER.

Generating new knowledge about wetlands, GHG emissions and restoration strategies:

- Definition of new research collaborative projects 3 projects identified after WET HORIZONS
- Incorporation of project findings in Bachelor and Masters Degree. -> KPI: relevant courses incorporated: 15
- Incorporation of project results in open tools that are already available for key stakeholders:
 - to reach an agreement with the EEA for a long-term future 'home' for spatial data in the form of a portal
 - Use the new geo-spatial dataset generated for peatlands to increase the impact of the Greifswald Mire Centre (and the Global Peatland Database) in Europe
 - Publication of KER in open repositories like Open Research Europe data platform, GitHub and Zenodo

TARGET GROUPS

- Policymakers and governments, land managers, farmers and farming associations, environmental authorities,
- Other researchers and European projects, students
- Relevant wetland associations, NGOs, and interest groups
- Journalists and media companies, other stakeholders interested in the project results,
- Citizens interested in citizen science activities and the general public at a large scale

OUTCOMES

- Agreement with the EEA for a long-term future 'home' for spatial data: 1 Portal
- European peatlands to be registered in a database (1 ha minimum area): 80%
- Improved GHG emission inventory for the implementation of LULUCF Regulation and the assessment of added values of wetland restorations via enhanced datasets on wetlands and GHG EFs.
- Improved knowledge on how climate change scenarios impact wetland restoration approaches via quantitative analyses and comprehensive simulations of climate-extreme-induced effects on wetlands
- Access and use of DSS tool and by policy makers
- Access and consults to App
- New governance models applied in land manager organisations
- Blending public and private finance for peatland restoration in Europe

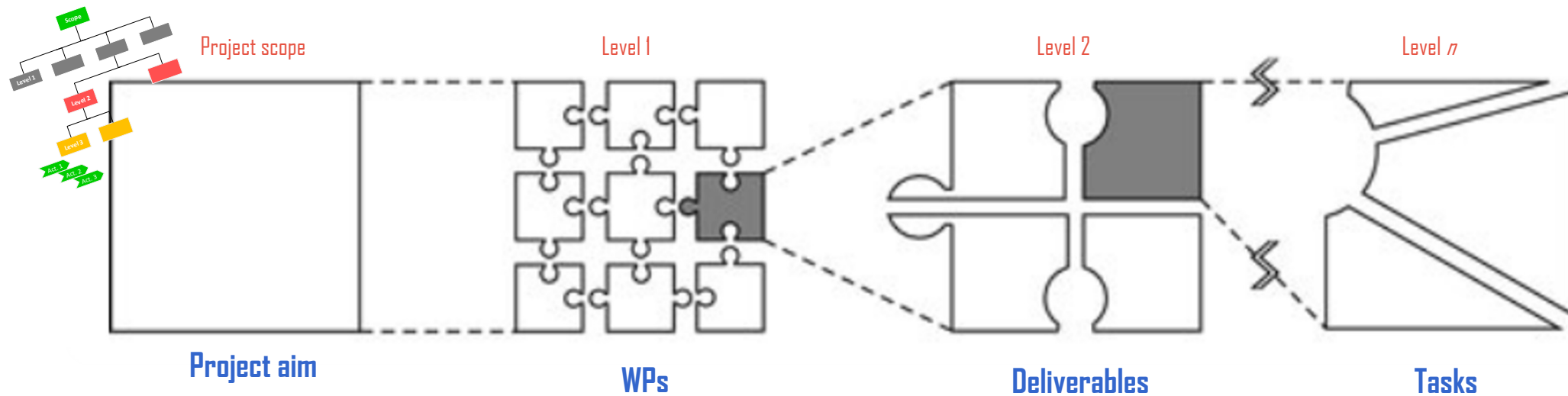
IMPACTS

Scientific: New knowledge in data and map of wetlands, updated GHG EFs and wetland and peatland models
Economic: Novel climate and LULUCF policy and governance approaches that can support wetland restoration

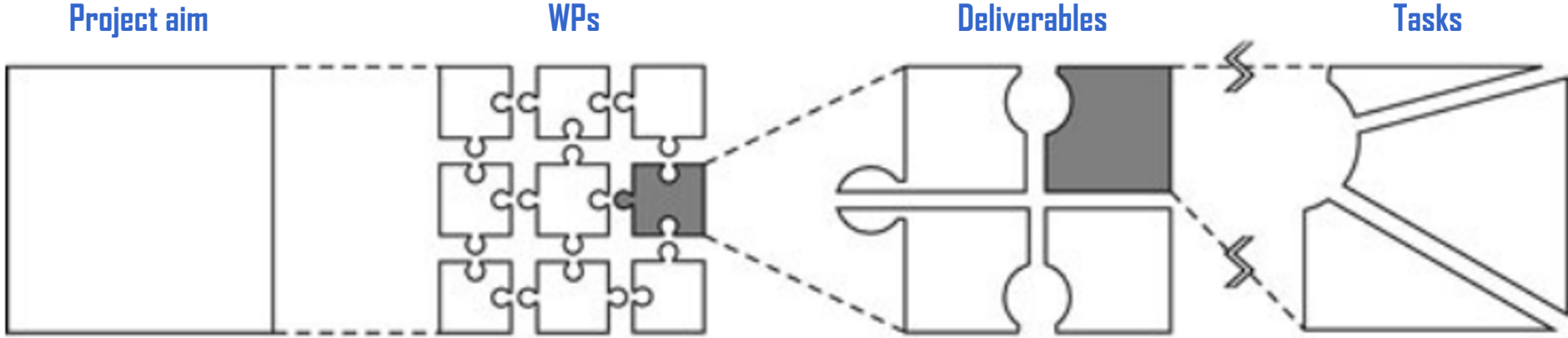
5 key questions!

- i. **What** problem are you trying to solve? And for whom?
- ii. Is it an **European** priority or could it be solved at **National** level?
 - iii. Are you familiar with the **state-of-the-art**?
 - iv. **What** happens if the project is not funded?
- v. **Why You** and do you have the best network to undertake this work?

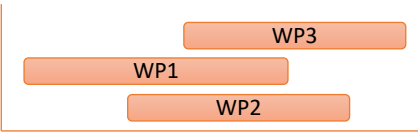
Two-dimensional decomposition



Two-dimensional decomposition



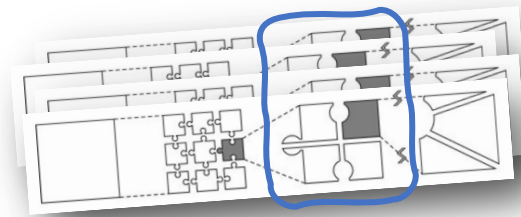
What, why, how, why now & why you?



Task ID	Task Name	Start	End	Duration	Predecessors	Successors
1	Analysis					2, 3
2	Design				1	4, 5, 6, 7, 8
3	Training				1	4, 5, 6, 7, 8
4	Development				2, 3	9
5	Manual Testing				2, 3	9
6	Automated Testing				2, 3	9
7	Documentation				2, 3	9
8	Proc.				2, 3	9
9	Deploy				4, 5, 6, 7, 8	10
10	Deploy				9	

Risk management → What can go wrong?

I. Program Evaluation Review Technique or PERT



An excellent tool for early involvement and expectation management!



- Is the work plan of good quality and effective?
- Does it follow a logic structure (for example regarding the timing of work packages)?
- Are the resources allocated to the work packages in line with their objectives and deliverables?

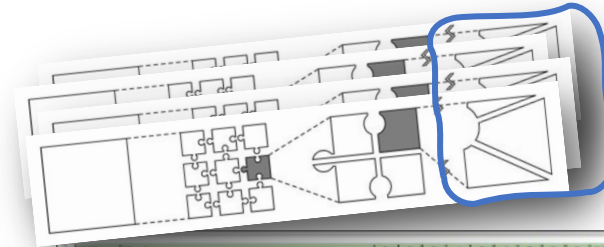
PERT in practice

An example from a non-academic setting.

A complex, multidisciplinary, multi-million projects..



II. Gantt chart - a logical timeframe

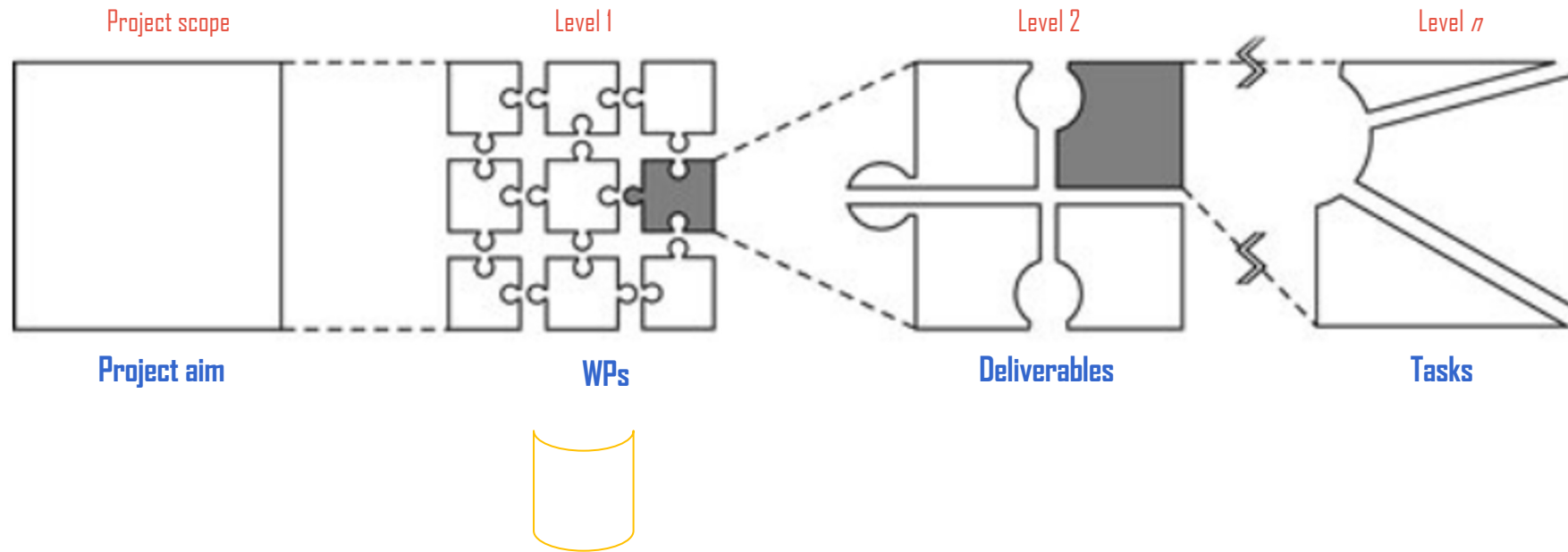


Crucial when creating the project schedule, tracking how work progresses throughout the project lifecycle.

A logical sequence of events! Includes WPs, deliverables, tasks, milestones, interdependencies.

WP	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			
WP1	Coordination and Project Management	WP LEADER APRE																																						
	Task 1.1 Consortium Management	M																																						
	Task 1.2 Technical Management				D																																			
	Task 1.3 Project Administration																																							
WP2	Creation of the framework	WP LEADER WEeR																																						
	Task 2.1 Review on barriers and opportunities for the development of bio-based value chains				D																																			
	Task 2.2 Stakeholders (quadruple helix) interests' and motivations' identification					D																																		
	Task 2.3 Mapping bio-based products (applications) based on stakeholders' interests							D																																
	Task 2.4 Guidelines for the design of the BIOVoices MML approach									D																														
WP3	Bio-based Community building	WP LEADER CE																																						
	Task 3.1 Classification of stakeholders groups				D																																			
	Task 3.2 Creation of the stakeholders' database																																							
	Task 3.3 Focus group with the initial																																							
	Task 3.4 BIOVoices methodological approach for MML to foster bio-based value chains																																							
WP4	Creation of the on line BIOVoices social platform and on line mutual learning activities	WP LEADER FYA																																						
	Task 4.1 Design and implementation of a sustainable BIOVoices multi-stakeholder on line social platform							D																																
	Task 4.2 Population of the BIOVoices multi-stakeholder on line platform with contents																																							
	Task 4.3 Animation of the multi-stakeholders Platform																																							
	Task 4.4 Social Media innovative engagement and animation																																							
WP5	BIOVoices Mobilisation and Mutual Learning Events	WP LEADER PEDAL																																						
	Task 5.1 BIOVoices European MML																																							
	Task 5.2 BIOVoices National MML																																							
	Task 5.3 BIOVoices Local/Regional MML																																							
	Task 5.4 Action Plan to raise citizens' awareness and foster collaboration among stakeholders																																							
WP6	BIOVoices Dissemination, Communication and Exploitation	WP LEADER LOBA																																						
	Task 6.1 Strategy for Impact, Dissemination and Communication																																							
	Task 6.2 Execution of the Dissemination and Communication Plan																																							
	Task 6.3 Exploitation and Sustainability																																							

- Does it include quantified information so that progress can be monitored?

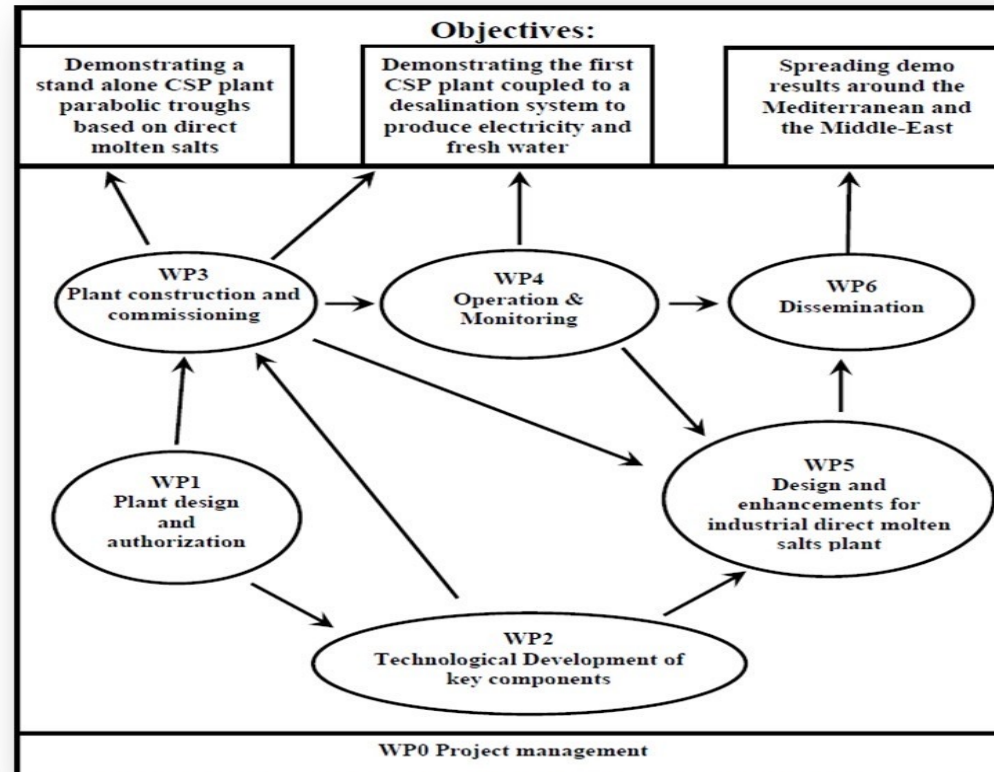


- Should be easily described and understood by project participants.
- A meaningful unit of work where specific responsibility and authority can be assigned to a responsible individual(s).
 - It should be possible to estimate duration and cost to complete.

The number of work packages should be proportionate to the scale and complexity of the project.

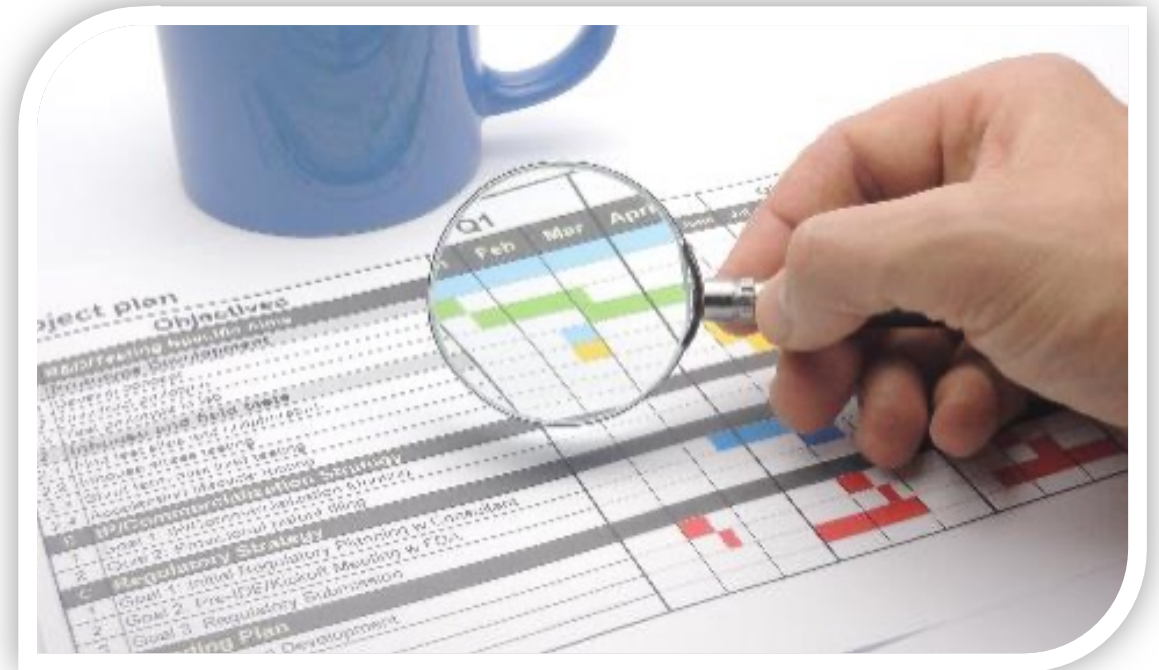
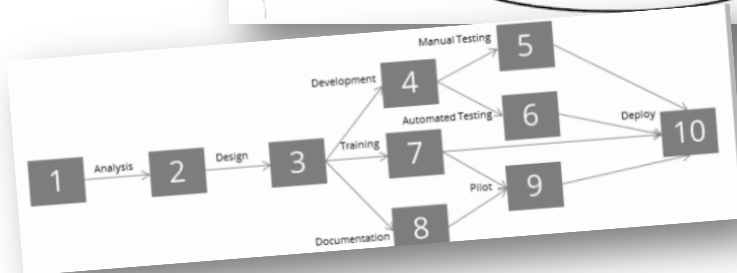
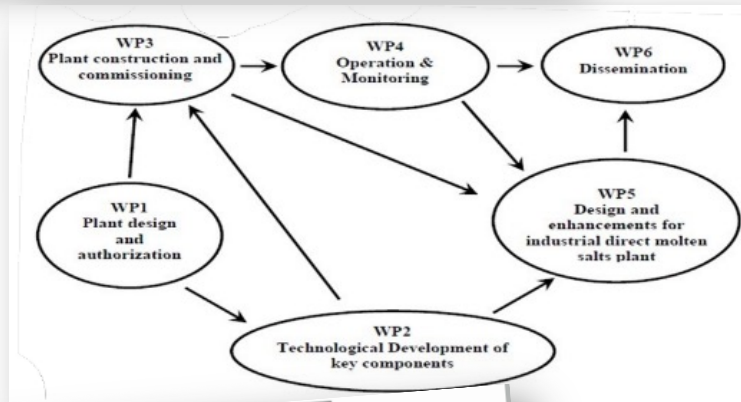
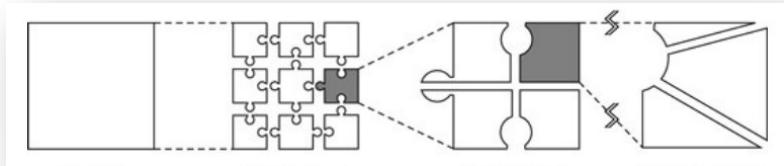
Work package relationships

- Explicitly defines and makes visible dependencies and relationships between the work breakdown structure elements
- Where feedback is needed to/from
- Reduces overlapping of activities and tasks



How to Manage Risk?

Start with a clear and precise definition of what your project plans to deliver.



Bonus 😊

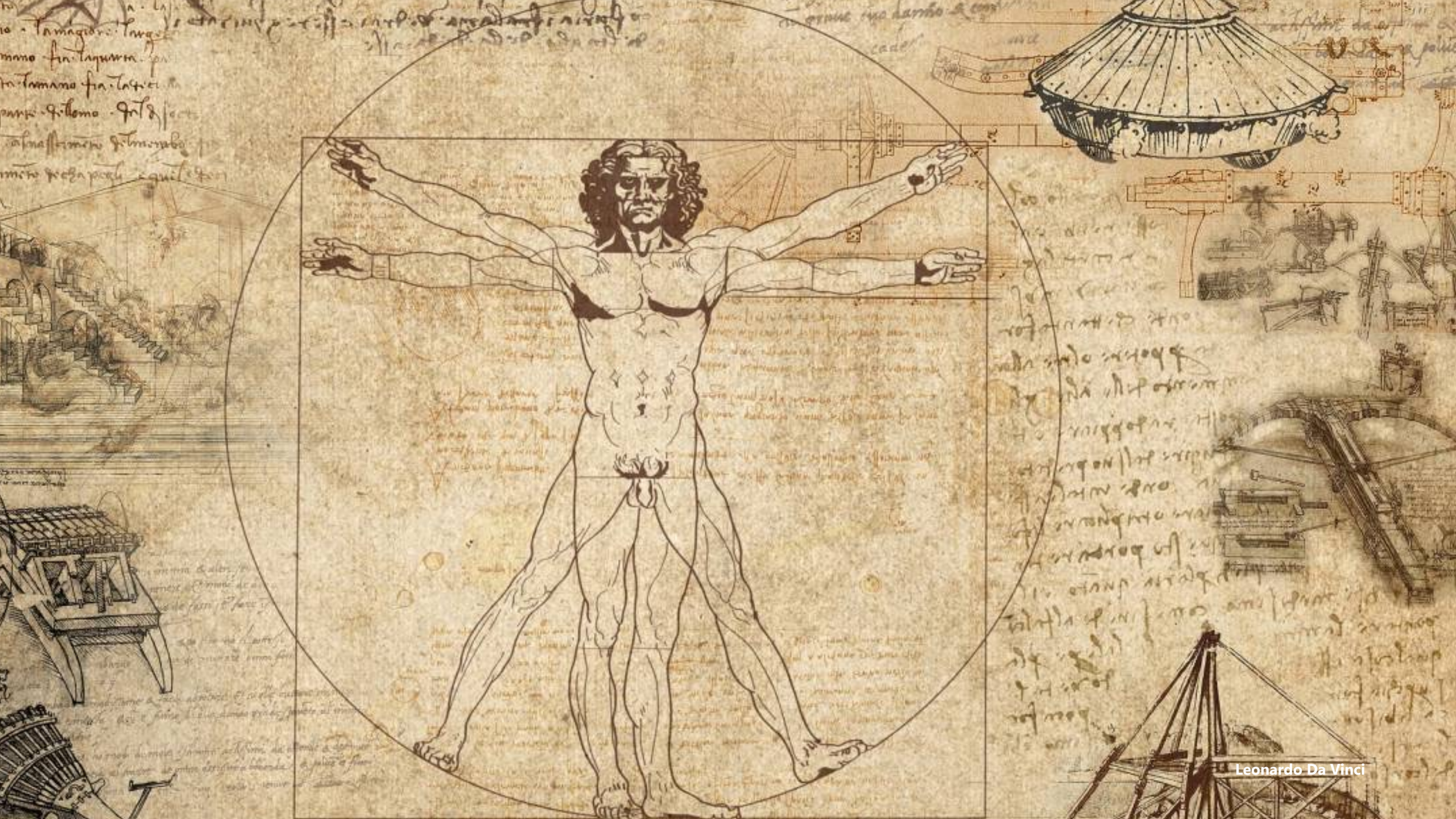


Source: www.d

CORDIS – EU research results

The Community Research and
Development Information Service
(CORDIS)

The screenshot shows the CORDIS search interface. At the top, there is a navigation bar with links for HOME, RESULTS PACKS, RESEARCH/PEU MAGAZINES, PODCASTS & NEWS, PROJECTS & RESULTS, ABOUT US, and a highlighted SEARCH button. A user account link (MY ACCOUNT) is in the top right. Below the navigation bar, there are utility links: Save search, My saved searches, Download search results, RSS feed, and My booklet. A search bar contains the text 'biomaterial' with a clear button (X) and a Help icon. An 'Edit query' link is below the search bar. A 'Filters' section is visible, showing 'Projects' as a selected filter and a 'Clear all filters' button. A grid of filter categories is displayed, including Collection, Domain of Application, Field of Science, Programme, Topic ID, Language, Project acronym, Project ID, Call ID, Funding scheme, Start date, End date, EU contribution, Total cost, Organisation country, Organisation region, SMEs, Organisation name, Contact person, Target audience, Nature, and Source. A checkbox for 'Include archived content' is present. A large blue 'Search' button is centered below the filters. The results section shows '1182 results for 'biomaterial'' with sorting options for 'Last update' and 'Title'. A featured result for 'DEBBIE A database of experimental biomaterials and their biological effect' is shown with the 'HORIZON 2020' logo and ID: 751277.



Leonardo Da Vinci