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SCIENTIFIC RESEARCH METHODOLOGIES AND TECHNIQUES

Unit 14.a: PROJECT PROPOSAL PREPARATION - EXAMPLES
= ICT example =

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Rui Neves-Silva – Short CV

- Engineering degree in Electrical and Computers Engineering (Telecommunications) in 1991 (IST/UTL);
- Master in ECE (Control and Robotics) in 1994 (IST/UTL);
- PhD in ECE in 2000 (IST/UTL) within the research theme of *Predictive Adaptive Control in Power Plants*;
- Advance Program in Management for Executives (PAGE) in 2012 (Católica-Lisbon).
- Certified Personal Coach.
- Founder of **inknow solutions** working in knowledge integration.
- **Researcher at INESC-ID Lisboa (1991 - 97).**
- Associate Professor at DEE–FCT/UNL
  Decision and Control Systems Unit;
- **Senior Researcher at CTS / UNINOVA**
- **Project coordinator of 6 European projects in FP6, FP7 and H2020 in the ICT area.**
- **Evaluator in several Grant Programs.**
- More than 100 communications in conferences and scientific journals related to the area of decision and control.

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Course contents

Unit 1: INTRODUCTION
Objectives for a PhD, base concepts, types of research, relationship with supervisor
Unit 2: SCIENTIFIC METHOD
Overview of research methods, steps of the scientific method, engineering research
Unit 3: LITERATURE REVISION
Information sources, information search, special sources, synthesis and critics
Unit 4: PUBLICATION OF RESULTS
Writing scientific papers, publication channels, evaluation procedures, citations
Unit 5: THESIS ORGANIZATION AND VALIDATION
Structure, research question, thesis contribution, validation of results
Unit 6: RESEARCH IN COLLABORATION
Types of projects and partnerships, requirements, collaboration spirit and constraints
Unit 7: PROJECT PROPOSAL PREPARATION
General structure of a proposal, typical example
Unit 8: RESEARCH PROJECT MANAGEMENT
Management structure, management principles, tools, risks, reporting
Unit 9: ASSESSMENT OF RESEARCH RESULTS
Phases of research and outcomes, research performance indicators
Unit 10: RESEARCH ETHICS
Ethical issues and behavior, responsible conduct, scientific practices and violation
Unit 11: INTELLECTUAL PROPERTY RIGHTS
Concepts, types, protection mechanisms, rights identification, rights transfer
Unit 12: ROADMAPPING AND FUTURE PLANNING (1)
Future planning objectives and approaches, concept of road mapping
Unit 13: ROADMAPPING AND FUTURE PLANNING (2)
Road mapping methodology
Unit 14: PROJECT PROPOSAL PREPARATION - EXAMPLES
Examples in different programs – EC-Horizon Europe-ICT, ESA, NMP
Unit 15: PANEL

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Contents of Unit 14.a

- This Unit presents a project proposal preparation example to a call in the Information and Communication Technologies (ICT) of the current Framework Programme of the European Commission: **Horizon Europe.**
- At the end of this Unit, the audience should be able to identify the key aspects on building a proposal to ICT-HE, including, the steps to follow from the first idea to the proposal submission.

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3 Pillars

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Key Impact Pathways

1. Creating high-quality new knowledge
2. Strengthening human capital in R&I
3. Fostering diffusion of knowledge and Open Science

Scientific Impact

4. Addressing EU policy priorities & global challenges through R&I
5. Delivering benefits & impact via R&I missions
6. Strengthening the uptake of R&I in society

Societal Impact

7. Generating innovation-based growth
8. Creating more and better jobs
9. Leveraging investments in R&I

Economic Impact

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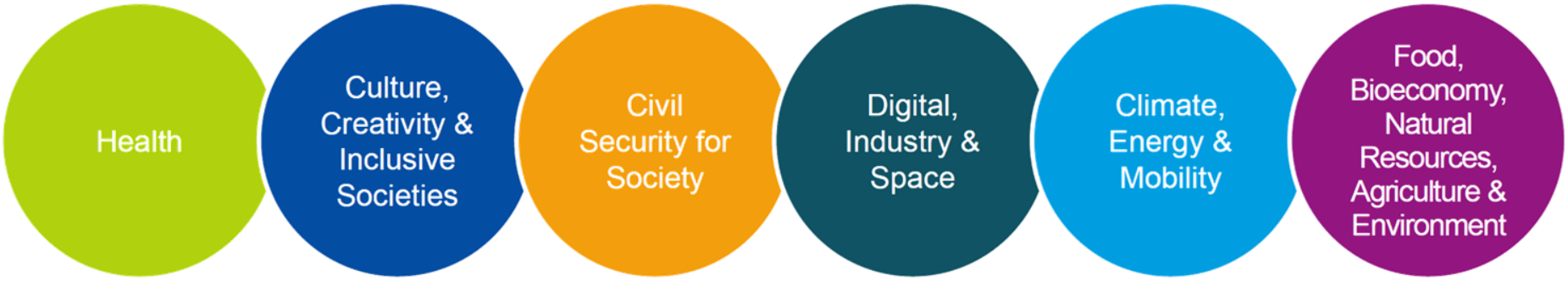
Pillar II - Clusters

Pillar II - Clusters

GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS:

boosting **key technologies** and solutions underpinning **EU policies & Sustainable Development Goals** (6 clusters and JRC – non-nuclear direct actions)



€53.5 billion

~60% of the budget

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Cluster 4: Digital, Industry and Space

Areas of intervention

- manufacturing technologies
- key digital technologies including quantum technologies
- emerging enabling technologies
- advanced materials
- artificial intelligence and robotics
- next generation internet
- advanced computing and Big Data
- circular industries
- low carbon and clean industries
- space including earth observation

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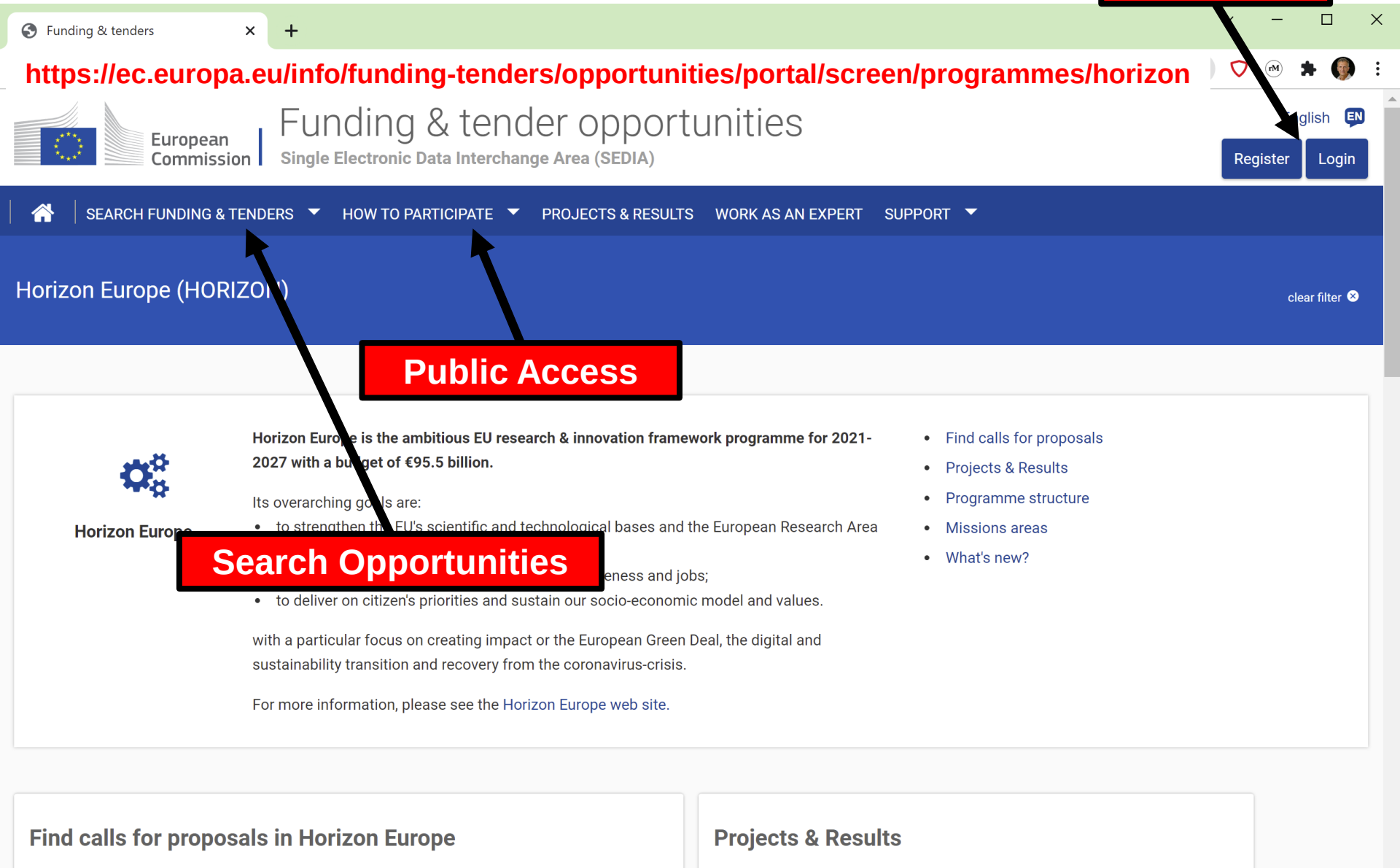
Funding & Tender Portal



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Conditions for participation

- **Minimum conditions**
  - Unless otherwise provided for in the specific call conditions, (...) the consortium includes:
    - at least one independent legal entity form a MS;
    - at least two other independent legal entities from different MS/AC
- **Additional conditions**
  - To be set out in the Work Programme
    (i.e. number of participants, type of participants, etc.)

Types of actions supported by grants

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Research and innovation actions (RIA)

Activities that aim primarily to **establish new knowledge or to explore the feasibility of a new or improved technology, product, process, service or solution**. Includes: basic and applied research, technology development and integration, testing, demonstration and validation of a small-scale prototype in a laboratory or simulated environment.

Innovation actions (IA)

Activities that aim directly to **produce plans and arrangements or designs for new, altered or improved products, processes or services**. These activities may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication

Coordination and support actions (CSA)

Activities that contribute to the objectives of Horizon Europe. This excludes R&I activities, except those carried out under the 'Widening participation and spreading excellence' component of the programme (part of 'Widening participation and strengthening the European Research Area').

...

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Contents of the work programme

- Introduction and general objectives;
- Priorities, features and structure;
- Content of calls
  - For each call (e.g. ***A HUMAN-CENTRED AND ETHICAL DEVELOPMENT OF DIGITAL AND INDUSTRIAL TECHNOLOGIES***):
    - There are a set of Specific Topics, for example: **HORIZON-CL4-2024-HUMAN-01-07: AI for human empowerment**
      - Specific Conditions (e,g, type of action [RIA, IA, CSA,...])
      - Expected Outcome
      - Scope
- Conditions for these calls (what and when!)

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Work programme
Conditions for these calls

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to start at TRL 2-3 and achieve TRL 4-5 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering a broad range of AI research areas, grants will be awarded to applications not only in order of ranking but at least also to the highest ranked proposal addressing focus 1 (mixed human-AI initiatives) and the highest ranked proposal addressing the focus 2 (hybrid decision-support), provided that the applications attain all thresholds.

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Technology Readyness Levels

Example taken from the work programme:

Activities should focus on (...) systems that reached already **TRL 2-3** and bring them to **TRL 4-5**

9	Successful mission operations
8	System complete and qualified
7	Demonstration in operational environment
6	Demonstration in relevant environment
5	Technology validation in relevant environment
4	Technology validation in lab
3	Experimental proof of concept
2	Technology concept formulated
1	Basic principles observed

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Find your Project Officer: DG CONNECT

- The several topics are under the responsability of EC Units.
- The Project Officer or just the PO is your contact point with the European Commission.
- They usually attend the Infodays organised by EC to explain the content of the calls.
- They can give you some additional information about the match between your idea and the scope of the call.
- For ICT search:

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Success Criteria

- Project idea (innovative, excellence of scientific content, etc.)
- Co-ordinator and partners (key players, diversity, coverage, etc.)
- Proposal ("SELLING the PROJECT"):
  - What are you doing?
  - Why are you doing this?
  - Who benefits?
  - Who is doing what?
  - What does it cost?

- Put yourself on the evaluator shoes…

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EC Evaluation criteria

Excellence	Impact	Quality and efficiency of the implementation
• Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious and goes beyond the state of the art. • Soundness of the proposed methodology, including the underlying concepts, models, assumptions, (...)	• Credibility of the pathways to achieve the expected outcomes and impacts specified in the WP, and the likely scale and significance of the contributions from the project. • Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.	• Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall. • Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.

Each criterion will be scored out of 5.
The threshold for individual criteria will be 3.
The overall threshold, applying to the sum of the three individual scores, will be 10.

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Finding a partner

EC Organised Events

- Usually, during the most active period of a work programme there are meeting events (Proposers' Day) where everyone has the opportunity to present their ideas and discuss them with other potential partners and even advisors from the commission.

CORDIS

- CORDIS has a number of services and information sources which may be useful in partner search for participation in ICT projects, as well as a list of organisations which have already expressed an interest in participating in the calls (call for Expression of Interest).

National Contact Points

- There is a network of National Contact Points (NCPs), which can be helpful to organisations from their country both for general advice (particularly on preparing proposals) and for finding partners from other countries. Organisations should contact the NCP of their own country.

Ideal-ist project web-service

- The Ideal-ist project helps potential proposers and newcomers to find the right partners across international boundaries. It comprises a network of 49 national representatives in each Member and Associated State, as well as Western Balkan Countries, New Independent States and Mediterranean Countries

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Experiences – DO NOT (BE)…

…too ambitious and complex to be believable;

…unclear and chaotic;

…irrelevant to the call and Work Programme;

…not going beyond the state of the art;

…miss to explain how to achieve the objectives;

…miss to clarify/quantify the results (=no exploitation);

…present unrealistic cost estimates;

…present an unbalanced project consortium;

…lack to present appropriate management structure and processes.

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Experiences - DO

- **Start** by reading the work programme document and try to understand what, **exactly**, EC is expecting from proposals;
- Cross the objectives of the work programme with your scientific interests and ask yourself *"what do I have to offer fulfilling these objectives/needs?";*
- Prepare a first abstract on your idea and try to discuss it with EC project officers from the unit your project will fit. They won't tell you where to go but they will tell you if you are misdirected.

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macro structure of the proposal

Part A → general information + administrative data

Part B → project description

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macro structure of the proposal

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macro structure of the proposal

Part A – 1.	title & abstract	: attract!
Part B – 1.	excellence	: say what!
Part B – 2.	impact	: say why! : why the project! : why the funding!
Part B – 3.	implementation	: say how! : say when and where!
Part B – 4.	consortium	: say who!
Part B – 5.	ethics & security	: just say no! :-)

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Proposal submission

- Proposals must be submitted electronically, using the Commission's **Participant Portal** https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home
- Proposals arriving at the Commission by any other means are regarded as '**not submitted**', and will not be evaluated.
- Only the **project coordinator** is authorised to submit the proposal.

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Medium-size Projects

- Medium-size projects are quite dynamic projects, not very large, focusing on a single research issue.
- Often mono-disciplinary.
- Common structure:
  - Between 8 and 10 partners from 3-4 countries;
  - Duration between 24 and 36 months.
  - Total budget around € 4M (≠ EC financing!).
- Target audience: Industry (including SMEs) and RTDs (research institutes, universities).

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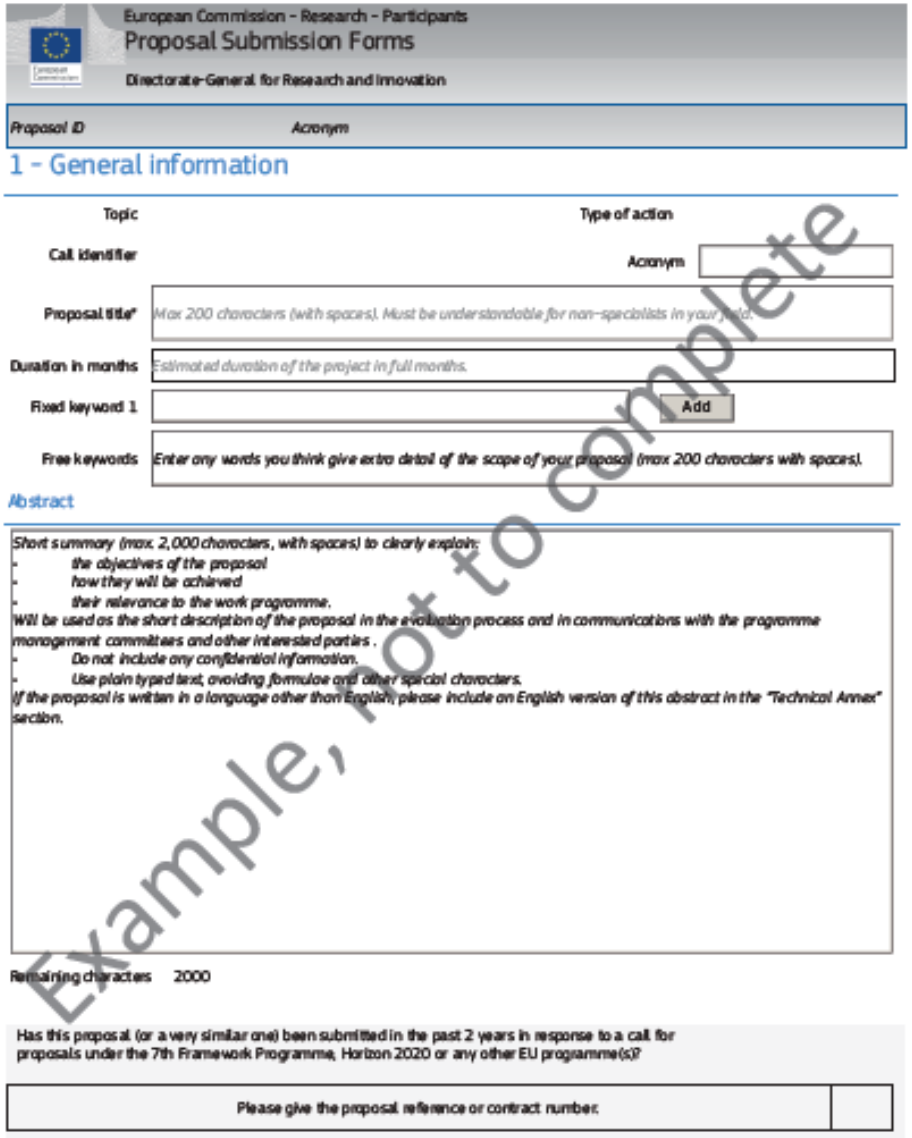
Administrative Forms (I)

- **Form 1: General Information**
  - Topic, type of action, call identifier
  - Proposal acronym
  - Proposal title
  - Duration
  - Keywords and abstract
  - Plus, some questions about previous/current submissions of the same proposal.
  - Declarations


European Commission - Research - Participants
Proposal Submission Forms
Directorate-General for Research and Innovation
Proposal ID Acronym
1 - General information
Topic Type of action
Call identifier Acronym
Proposal title* Max 200 characters (with spaces). Must be understandable for non-specialists in your field.
Duration in months Estimated duration of the project in full months.
Fixed keyword 1 Add
Free keywords Enter any words you think give extra detail of the scope of your proposal (max 200 characters with spaces).
Abstract
Short summary (max. 2,000 characters, with spaces) to clearly explain:
- the objectives of the proposal
- how they will be achieved
- their relevance to the work programme.
Will be used as the short description of the proposal in the evaluation process and in communications with the programme management committees and other interested parties.
- Do not include any confidential information.
- Use plain typed text, avoiding formulae and other special characters.
If the proposal is written in a language other than English, please include an English version of this abstract in the "Technical Annex" section.
Remaining characters 2000
Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under the 7th Framework Programme, Horizon 2020 or any other EU programme(s)?
Please give the proposal reference or contract number.
Example, not to complete

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Administrative Forms (II)

- **Form 2: Administrative data of participating organisations**
  - One form per participant;
  - Organisation legal name and address;
  - Organisation status (profit/non-profit, research/industrial, SME, etc.);
  - Departments carrying out the proposed work.
  - Dependencies with other proposal participants.
  - Person in charge of the proposal.
  - Other contact persons.

Administrative Forms (III)

- **Form 3: Budget for the proposal**

European Commission - Research - Participants

Proposal Submission Forms

Directorate-General for Research and Innovation

Proposal ID *Acronym*

3 - Budget for the proposal

Participant	Country	(A) Direct personnel costs/€	(B) Other direct costs/€	(C) Direct costs of sub-contracting /€	(D) Direct costs of providing financial support to third parties/€	(E) Costs of inkind contributions not used on the beneficiary's premises/€	(F) Indirect Costs/€ (=0.25(A+B-E))	(G) Special unit costs covering direct & indirect costs	(H) Total estimated eligible costs/€ (=A+B+C+D+F+G)	(I) Reimburse-ment rate	(J) Max. grant / € (=H*I)	(K) Requested grant / €
		0	0	0	0	0	0	0	0	100	0	0
Total		0	0	0	0	0	0	0	0		0	0

not to complete

Administrative Forms (IV)

- **Form 4: Ethics issues table**

European Commission – Research – Participants
Proposal Submission Forms
Directorate-General for Research and Innovation

Proposal ID *Acronym*

4 – Ethics issues table

1. HUMAN EMBRYOS/FOETUSES i		Page
Does your research involve Human Embryonic Stem Cells (hESCs)?	○Yes ◉No	
Does your research involve the use of human embryos?	○Yes ◉No	
Does your research involve the use of human foetal tissues / cells?	○Yes ◉No	
2. HUMANS		**Page**
Does your research involve human participants?	○Yes ◉No	
Does your research involve physical interventions on the study participants?	○Yes ◉No	
Does it involve invasive techniques?	○Yes ◉No	
3. HUMAN CELLS / TISSUES		**Page**
Does your research involve human cells or tissues? If your research involves human embryos/foetuses, please also complete the section "Human Embryos/Foetuses" [Box 1].	○Yes ◉No	
4. PROTECTION OF PERSONAL DATA ii		**Page**
Does your research involve personal data collection and/or processing?	○Yes ◉No	
Does your research involve further processing of previously collected personal data (secondary use)?	○Yes ◉No	
5. ANIMALS iii		**Page**
Does your research involve animals?	○Yes ◉No	

European Commission – Research – Participants
Proposal Submission Forms
Directorate-General for Research and Innovation

Proposal ID *Acronym*

6. NON-EU COUNTRIES		Page
Does your research involve non-EU countries?	○Yes ◉No	
Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○Yes ◉No	
Do you plan to import any material – including personal data – from non-EU countries into the EU? If you consider importing data, please also complete the section "Protection of Personal Data" [Box 4]	○Yes ◉No	
Do you plan to export any material – including personal data –from the EU to non-EU countries? If you consider exporting data, please also complete the section "Protection of Personal Data" [Box 4]	○Yes ◉No	
If your research involves low and/or lower middle income countries, are benefits-sharing measures foreseen?	○Yes ◉No	
Could the situation in the country put the individuals taking part in the research at risk?	○Yes ◉No	
7. ENVIRONMENT PROTECTION v Directive 2001/18/EC – vi Directive 2009/41/EC – vii Regulation (EC) No 1946/2003 – ix Directive 2009/28/EC x Council Directive 92/43/EEC xi Council Directive 79/409/EEC – xii Council Regulation (EC) No 338/97		**Page**
Does your research involve the use of elements that may cause harm to the environment, to animals or plants?	○Yes ◉No	
Does your research deal with endangered fauna and/or flora and/or protected areas?	○Yes ◉No	
Does your research involve the use of elements that may cause harm to humans, including research staff?	○Yes ◉No	
8. DUAL USE xiii		**Page**
Does your research have the potential for military applications?	○Yes ◉No	
9. MISUSE		**Page**
Does your research have the potential for malevolent/criminal/terrorist abuse?	○Yes ◉No	
10. OTHER ETHICS ISSUES		**Page**
Are there any other ethics issues that should be taken into consideration? Please specify	○Yes ◉No	

I confirm that I have taken into account all ethics issues described above and if any ethics issues apply, I have attached the required documents. ☐

Legal Info

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Technical Annex (I)

1. Excellence
   - Objectives

     Clear, measurable, realistic and achievable.
   - Relation to the work programme

     How is the specific challenge and scope of the topic addressed.
   - Concept and approach
     - Overall concept – the idea at a glance!
       PICTURE IT! BE CLEAR AND CREATIVE!
     - Positioning – Technology Readiness Levels
     - Linked activities – re-using results
     - Overall approach and methodology – activities, phases
   - Ambition
     - State-of-the-Art – the starting point you dominate
     - Innovation – your expected contribution to improve the SotA

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Technical Annex (II)

2. Impact

- Expected impacts
  - Contribution to expected impacts set out in the work programme, improving innovation capacity and integration of new knowledge, and other environmental and socially important impacts
  - Barriers/obstacles and conditions – regulation, standards
- Measures to maximize impact
  - Dissemination and exploitation of results
    - Plan for dissemination and exploitation of results – how results will be shared and re-used
    - Business plan
    - Management of research data generated
    - Strategy for knowledge management and protection – gold or green open access
  - Communication activities – promote the project

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Technical Annex (III)

3. Implementation

- Work plan – Work packages, deliverables and milestones
  - Overall structure of the work plan
  - Timing of work packages – Gantt chart
  - Detailed work description – each WP, WP list, deliverables list
  - Interdependencies of tasks – Pert diagram

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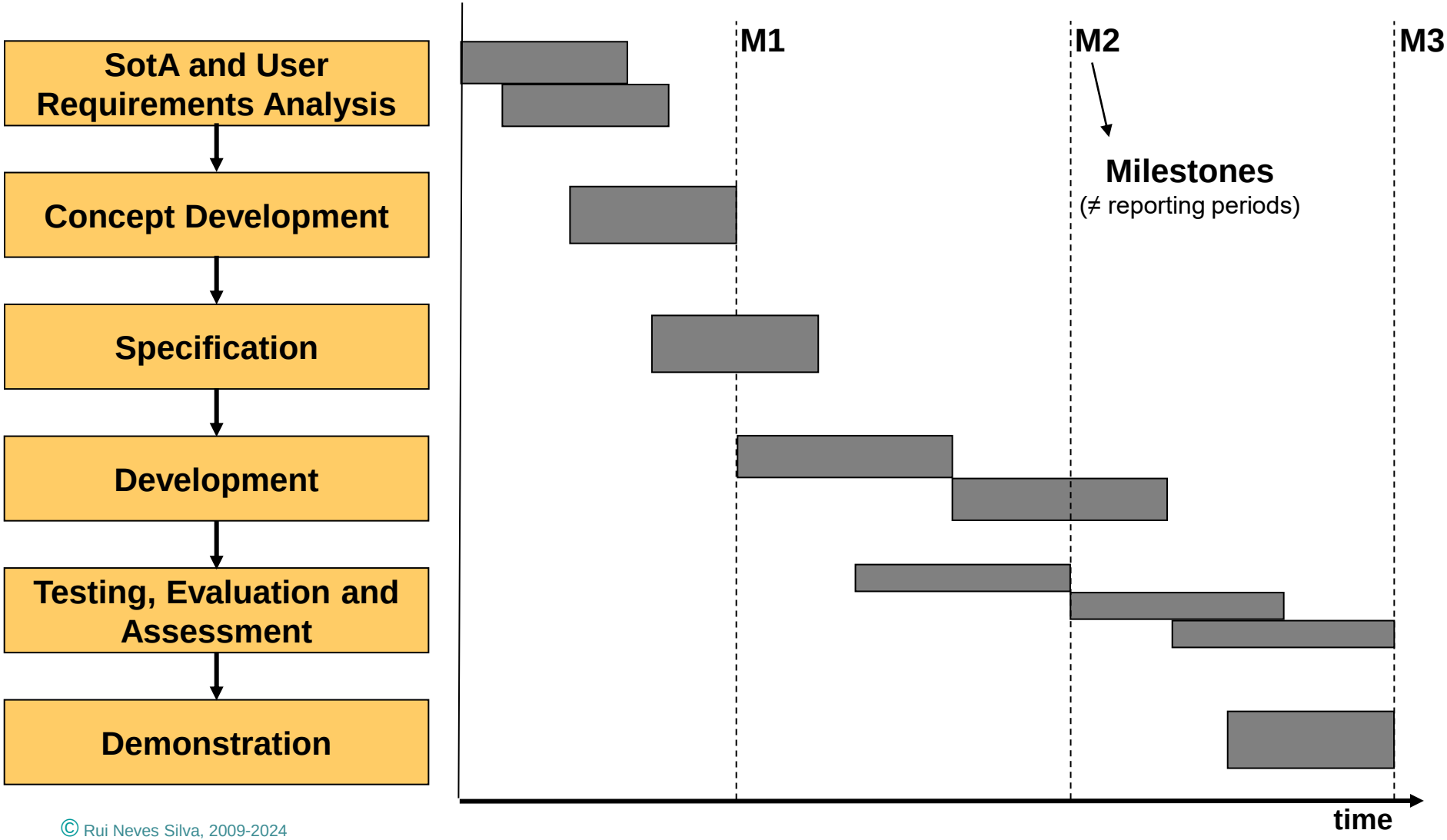
Key aspects: the WP structure

- WPs should structure the workflow. **Example:**



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Key aspects: the evaluation/assessment metrics

- At some point, the scientific and technological objectives must be translated in socio-economical goals.
- Typically, the industrial users within the consortium establish a set of business objectives to be achieved using the project results.
- It's very important to quantify these objectives comparing the current business situation (baseline) with the expected situation.

- The assessment methodology should demonstrate the ability to truly measure these quantities.

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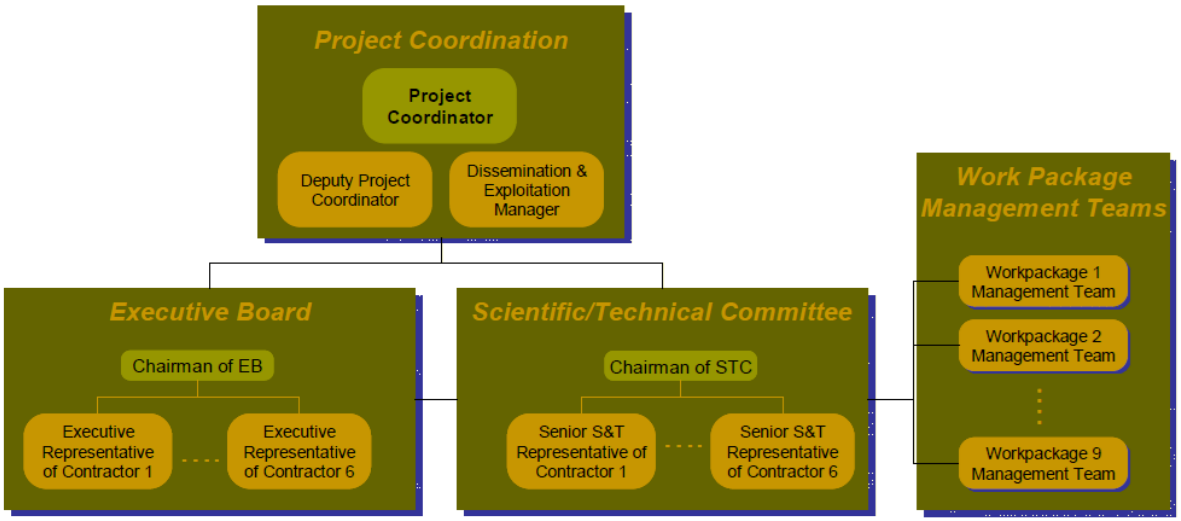
Key aspects: Gantt chart and budget

- Balance the participation of all partners within the consortium accordingly with the project objectives.
- Balance the budget but take into consideration the specific management costs (<7%) to the project coordinator.
- Note that, the coordinator does not own the project.
- If the project is accepted you will have to run it – don't put anything on the proposal that you don't want to do in case of success.
- Smooth the efforts contribution along the project duration as much as you can for all partners.

Technical Annex (III)

3. Implementation

- Management structure and procedures



- Consortium as a whole
- Resources to be committed

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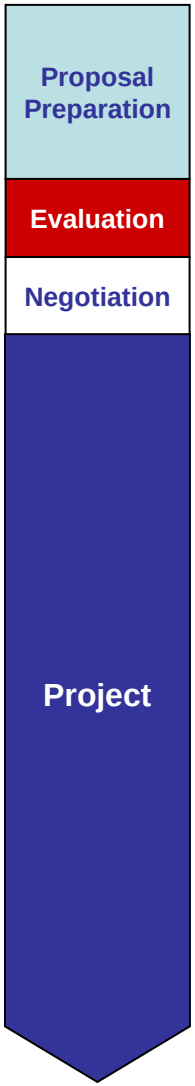
From the proposal to the project
HE Target: 5 months + 3 months



- **Submission**
  - Is made electronically through a set of documents respecting detailed templates & guidelines, and… **in time (strict deadline!)**
- **Evaluation**
  - A fair, transparent and relatively quick process (5 months for informing applicants after deadline) involving independent experts working on the basis of the Call documents and of (public) selection criteria
- **Negotiation**
  - **If the proposal is pre-selected**, the proposers and the EC work together on the possibility to transform the proposal into a project, on the basis of evaluators' remarks and comments
- **Contract**
  - (if the negotiation phase is successful) a contract is signed between the EC and the project coordinator, usually, around **8 months** after the submission deadline
- **Project**
  - The project can then smoothly develop on the basis of a "Description of Work" and of the "Contract and its annexes" (administrative and financial issues)
  - its progress will be reviewed by the EC every 18 months

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Closing remarks

- Read the objectives of the open call;
- Keep your ideas on a restricted group;
- Build a balanced consortium and explain who is doing what;
- Picture your ideas as if you were explaining them in a kinder-gardening;
- Be nice to the evaluator: **clarity! clarity! clarity!**
- Don’t forget to add anything but be concise;
- Give everything you’ve got in preparing the proposal (~1 month!);
- Most important: Don’t give up on rejection, don’t blame the referee - **learn from your mistakes!**

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Homework assignment

- group of 3 persons prepare proposal to any call in the work-programme to any topic on cluster 4.
- Elements to include:
  - Proposal acronym, proposal title, duration, call identifier, keywords and abstract;
  - Consortium: identify the roles needed and give examples of true companies that could take them;
  - Concept and objectives, including business goals;
  - Study logic and structure of work plan (workpackages and tasks); draft Gantt chart;
  - Expected impacts listed in the work programme (Relation to the topics addressed by the Call);

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Let’s get to work!

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