



Deliverable Number 6.1

Call 2020 Topic Selection

Workpackage	6		
Subtask	6.1		
Date of delivery	Contractual	2020-02-29	
	Actual	2020-05-11	
Code name	D.6.1	Version Number	Draft ☐ Final ☒
Type of deliverable	Report		
Dissemination level	Public		
Author(s)	Watse Castelein (AEI)		
Contact person	Watse Castelein	era-ict@aei.gob.es	
WP/Task leader	Watse Castelein	era-ict@aei.gob.es	
EC project officer	Julian Ellis		
Publishable abstract	The report describes the procedure for the selection of the topics for the CHIST-ERA Call 2020. The CHIST-ERA consortium and the Scientific Advisory Board proposed 13 topics. Those topics have been scored, discussed and ranked in a joint workshop. On basis of the scores and a workshop discussion the CHIST-ERA steering committee has selected the following two topics: • Advanced Brain-Computer Interfaces for Novel Interactions • Towards Sustainable ICT		
Keywords	Call scientific scope – Call topics – Selection procedure		

Executive Summary

CHIST-ERA consortium members and Scientific Advisory Board (SAB) members were given the opportunity to propose candidate topics using the CHIST-ERA Call 2020 Topic suggestion form. This resulted in a list of 13 topic proposals, containing for each topic a short description clearly identifying it as well as a set of application sectors and meaningful keywords and a rationale based on a criteria grid evaluating the scientific interest and innovation potential and the suitability of the topic for a CHIST-ERA call.

After that CHIST-ERA consortium members and SAB members were asked to score the 13 topics on basis of the 8 criteria used in the topic suggestion form. On basis of the votes an average was computed and ranking established. The ranking list served as basis for discussion in a joint workshop of the SAB and CHIST-ERA Steering Committee (SC). On basis of a profound analysis of the highest ranked topics and the workshop discussion two topics were selected for the CHIST-ERA call 2020: Advanced Brain-Computer Interfaces for Novel Interactions and Towards Sustainable ICT.

The outcome of this process will serve as an input for the preparation of a strategic workshop, where the scientific text for the joint call was further developed.

Table of Contents

Introduction	5
Topic selection procedure	6
Topics identification.....	8
Topic Voting	13
Analysis and Discussion.....	16
Conclusion.....	17
Annexes	18
A. SAB (Scientific Advisory Board).....	18
B. Topic selection timeline for Call 2019	19
C. Template for topic suggestion	20

Introduction

The CHIST-ERA topic selection process for the Call 2020 is based on the procedure and topic selection form developed in previous CHIST-ERA calls. To identify potential topics a preliminary list, containing for each topic the title, a short description clearly identifying it, and a set of application sectors and keywords, is compiled by collecting inputs from CHIST-ERA consortium members and from the Scientific Advisory Board (SAB) members. Based on a criteria grid, including criteria enabling to evaluate the scientific interest, innovation potential and the alignment of candidate topics with other programs (FET, national programs), CHIST-ERA consortium members and SAB members are asked to evaluate (score) each proposed topic on each criterion. The results of these evaluations and a deeper analysis of the candidate topics are discussed in a joint workshop of the CHIST-ERA consortium members and SAB members. On basis of scores and discussion outcomes, the CHIST-ERA SC takes the final decision on the topic selection.

In this deliverable, the topic selection procedure and the criteria used to discuss and select the topics for the CHIST-ERA Call 2020 are described; the results of the voting process and workshop outcomes are discussed; and the two topics selected are presented. The outcome of this process serves as an input for the preparation of a strategic workshop, where the scientific text for the joint call will be further developed.

Topic selection procedure

The scientific scope of CHIST-ERA is wide, but the intention is to select focused, emergent themes of common interest, with the potential to lead to significant breakthroughs on the basis of the following criteria:

View	Criteria	Description
Scientific interest and innovation potential	Novelty & ambition	State-of-the-art, missing science, and expected outcomes (the topic should be far from existing knowledge and technology), and analyse potential S&T issues (the topic should be plausible)
	Multidisciplinary and/or transformative	Knowledge and communities from different disciplines can be brought together to investigate unknown fields at the frontier of science and/or how the topic can be a game changer with a high scientific and technological impact
	Clarity and measurability	How well defined is the topic and how scientific and technological performance can be objectively measured in the area (measurement methods, metrics, tools, infrastructures, ...)
	Timeliness	Which opportunities might be lost if the topic is not funded
	Potential impact	The potential impact on future EU economy, environment and/or society, and analyse risks (social acceptance, legal issues, ...)
Suitability for a CHIST-ERA call	Need for transnational cooperation	How transnational cooperation in the framework of a joint call can bring added value (complementary national scientific strengths, need for critical mass, need for joint infrastructures, ...)
	Complementarity with existing calls	Closest calls (FET, H2020, ERA-NETs, ...) and how the topic complements and/or leverages them (the topic should not be redundant with other calls)
	Suitability of topic size	How a significant contribution in the area can be obtained with a call of a few M€, possibly giving indications about the size of the main events, initiatives or structures in the area (conferences, programmes, teams, centres, professional associations, ...).

The topic selection is composed of the following three main phases.

- Topic identification
- Topic pre-selection
- Scientific scope definition

In the first phase (**topic identification**), a preliminary topic list, containing the topic title, and for each topic a short description clearly identifying the topic as well as a set of application sectors and meaningful keywords, is compiled by collecting inputs from CHIST-ERA

Research Funding Organisations (RFOs) and from the CHIST-ERA SAB (Scientific Advisory Board). This information is completed with a rationale based on the CHIST-ERA criteria grid and further information about the addressed research community *list of topic proposals* is compiled and distributed. Proposers of similar topics discuss to merge or adapt these topics. A final list of topic proposals is compiled.

The second phase (**topic pre-selection**) takes previous list as an input and defines the topics to be funded in the call. After common understanding of the full description of each topic, the RFOs are asked to score, from 1 (minimum) to 5 (maximum), the topic according to each criterion.

In addition, the RFO should specify with a yes/no flag for each topic whether they are likely to fund it if selected. This additional information allows RFOs to express their scientific interest independently of their foreseen available budget. It is also used to compute an average mark on the countries intending to participate in a given topic.

On the basis of the votes, a ranking is compiled, and a short list is defined containing those topics with the highest ranks and that would receive funding by a sufficient number of RFOs. On basis of the ranking established and more profound analysis of the highest ranked topics in workshop discussions involving the SAB and CHIST-ERA consortium members the CHIST-ERA SC selects the topics for call 2020.

During the third phase (**call scope definition**), these topics will be further developed and deepened within a strategic workshop.

Topics identification

Based on the suggestion of CHIST-ERA RFOs and the SAB a list of 13 topic proposals was established. The table below gives the title, description and proposers of the topics.

Topic	Description	Proposed by
Frugal ICT	The energy and resource footprint of ICT is rapidly increasing and is becoming a significant contributor to climate change and various kinds of pollution. At the same time, ICT is an ideal area where the entire technology involved may be rethought systemically. Frugal ICT ideally concerns all aspects, from computing hardware, over middleware and software, to networking and mobile computing, in an integrated manner. A central question is how to design and build systems, software, protocols that minimise resource and energy usage over their entire life cycle and favour reusability, reparability, recycling. Human factors should also be studied, in order to jointly rethink technology and its usage in daily and professional life as well to minimise rebound effects, a traditional annihilator of many efficiency gains.	ANR
Intuitive and effective human-robot physical interaction	The fields of application of robots are quickly expanding. As robots become present in many environments (e.g. industry, home, healthcare facilities), they must interact with humans in the performance of tasks. In many cases, a direct physical interaction is the best approach to fully exploit the capabilities of robots and humans and to make this interaction intuitive and effective. However, today's robots are not designed for such interactions. Although so-called 'collaborative robots' are available, the physical interactions that they provide are primitive and must greatly be improved in order to yield intuitiveness and effectiveness.	FRQNT
Resilient Systems	Our information systems are very efficient nowadays, but at the same time very fragile. An accidental failure or an attack of one of their components can lead, in cascade, to a more global service failure. All components relying of course on electricity, it is thus even necessary to consider that the power grid itself may be faulty. It is urgent to make systems resilient to such failures, by completely revisiting our design methods to include fault tolerance and security as a major concern from the early stage of the conception of our systems.	ANR

Next Generation Intelligent Wearable Devices and Analytics	Smart wearables are interconnecting users with the Internet of Things (IoT) usually combining sensing, analytics and portable or cloud applications. The wearable market for lifestyle and health (e.g. biometrics and activity tracking) has grown exponentially, but demand is yet to follow, as their potential to transform daily life remains untapped.	GRST
Remote Teleoperation of Robots in an mixed environment of people (with disabilities) and robots	In a mixed environment of people and robots, when the robots help on the daily needs and sometime even in emergency situation there is a need to control the activities and behave of the robots. The aim is to develop a learning system that will take care of such activities and situations by learning from remote operators and machine learning activities.	ISRED
Deep Learning for Healthy Eating	Nowadays people care about the dietary intake since unhealthy diet leads to numerous diseases (obesity, diabetes, etc.). Food is also related to culture, traditions and business. Automatic analysis of food images and extracting meaningful information (nutritional, cultural, esthetic) can have huge value for the society and the industry. However, extracting information from food images is a challenge. Deep learning allows to develop novel computational frameworks to address this challenge. Multi-task and cross-modal learning as well as domain adaptation allow to define novel approaches to combine multi-modal data, transfer knowledge among different domains and solve efficiently tasks related to food computing.	AEI
Advanced human machine interaction based on brain-computer interfaces	Recently we have seen an explosion of neuroscience research, aiming to develop flexible brain-based neurotechnologies that capitalize on human capabilities to improve human-system interactions. Forerunners of this conception are brain-computer interfaces (BCIs), which have been largely focused on improving the quality of life for particular clinical populations such as paralyzed or “locked-in” patients. Near-term applications are primarily task-oriented and are targeted to overcome development obstacles. However, in the longer-term, a holistic approach to BCIs shall enable a range of task-oriented and opportunistic applications by leveraging pervasive technologies and advanced analytical approaches to sense and merge critical brain, behavioral, task, and environmental information.	Ioannis Kompatsiaris (SAB)

Multimodal data integration for precision health	Precision health aims at improvement diseases diagnosis and treatment by collecting maximum information from people's genes, environments and lifestyles. Recent biological disciplines handle different levels of data sets related to the genetic information (proteomic, genomic, epigenomic, transcriptomic, etc.), as well as the clinical data, image data and at the level of response to pharmacological treatments. The aim of this topic is to develop techniques, procedures and technologies to integrate so many different types of data to aid the determination of the specific type of disease a patient is suffering.	Luis Castedo (SAB)
Collective Memories (CM)	The 1950/1960s have seen a vast proliferation and democratization of analog photography. Likewise, the 1970s have seen a similar development with analog home video. In the last years, several attempts to digitize and thus to preserve this content have been undertaken. However, detailed meta information on the content of the media objects and in particular on the context of this content is needed. Otherwise, the further use of digitized objects would be significantly limited. Today, substantial time is spent to index content, so that it becomes accessible in repositories. Without further activity, much of the cultural heritage of the people, events, places and traditions shown in these images and videos would be irrevocably gone, together with the generation having the knowledge on all these details. Therefore, the knowledge of contemporary witnesses is essential for the index work. The preservation of the cultural heritage contained in such multimedia collections necessitates approaches from machine learning for detecting objects in single images, image clusters, and videos together with their spatial relationships, but also advanced (location- and profile-aware) crowdsourcing mechanisms and appropriate user interfaces for the collection of further meta information at large scale. Since existing knowledge bases on places, people, events, or traditions already exist, approaches to entity recognition and linking and the integration of such data sources and knowledge bases using semantic technologies and interoperability are highly important as well for this topic.	Heiko Schuldt (SAB)

Interaction in Virtual Spaces (IVS)	Recent advanced in human-computer interaction have brought forward very powerful tools and systems for creating virtual spaces, allowing for novel and innovative user experiences. However, most existing Virtual Reality (VR) tools and systems mostly focus on the sole presence of individuals in virtual spaces. Moreover, the interaction with physical objects in virtual spaces is rather limited. The objective of this topic is to extend current approaches to VR by i.) focusing on the co-presence of and interaction between individuals in the same virtual space (independently whether they are located in the same or in different physical spaces), ii.) supporting the interaction with physical objects in virtual spaces, and/or iii.) the provision of novel haptic interfaces and their integration into VR.	Heiko Schuldt (SAB)
Cybersecurity and safety co-design	An increasing number of critical systems are controlled through electronic means and rely both on computing and networking capabilities for command and control. At the same time, these systems must demonstrate that they meet strong safety requirements and be certified. Application domains include cyber-physical systems (transportation, energy, smart city, industry 4.0, healthcare) as well as essential services (finance, e-government). This topic aims at proposing methods and tools for specifying, assessing and proving jointly security and safety properties, to ensure that a system is both secure and safe at the same time.	ANR
Resource constrained security in the post-quantum era	Recent news report on the extraordinary advancements in quantum computation. While such advancements will allow humanity to solve valuable problems, they will also have a catastrophic impact on cybersecurity since it will be possible to break current encryption systems. Post-quantum cryptography seeks for solutions robust to quantum attacks while implementable on conventional hardware. In spite of the recent advances, the scientific community is still far from reaching conclusive security solutions against quantum attacks. Solutions are even more difficult to find for devices severely constrained in terms of storage, computational power, memory, and energy consumption. This topic aims at financing research to address security against quantum attacks considering the hardware constraints of many deployed devices.	Luis Castedo (SAB)

Physical Unclonable Functions based Hardware-Intrinsic Security	A Physical Unclonable Function (PUF) is a function performed by a physical device that, relying on an inherent variability in the manufacturing process, is unique to the device and cannot be duplicated when producing another one. It thus offers a lightweight alternative to classical cryptographic protocols, which is particularly important for trustworthy, energy-efficient, small connected objects, and therefore for a sustainable Internet of Things. However, further research is needed to convert this idea into widely accepted protocols.	ANR
---	---	-----

Topic voting

The RFOs and SAB were asked to score the 13 topics on basis of the 8 criteria used in the topic suggestion form. In addition, the RFO were asked to specify with a yes/no flag for each topic whether they were likely to fund it if selected. This additional information allowed RFOs to express their scientific interest independently of their foreseen available budget.

The voting of 13 RFOs has resulted in an average score of each topic on basis of which a ranking was compiled. Also, on basis of the voting of 9 SAB members an average score was calculated and ranking compiled. The ranking lists of RFOs and SAB have been combined by calculating the average of each topic and on basis of that a combined ranking of RFOs and Scientific Advisory Board was compiled.

Average score and ranking RFOs votes

Rank	Topic Title	Global Score	STDEV
1	Advanced human machine interaction based on brain-computer interfaces	4,19	1,12
2	Intuitive and effective human-robot physical interaction	4,15	0,65
3	Multimodal data integration for precision health	3,97	0,90
4	Resource constrained security in the post-quantum era	3,92	0,99
5	Interaction in Virtual Spaces (IVS)	3,90	0,86
6	Remote Teleoperation of Robots in a mixed environment of people (with disabilities) and robots	3,80	0,67
7	Cybersecurity and safety co-design	3,78	0,52
8	Collective Memories (CM)	3,77	0,82
9	Next Generation Intelligent Wearable Devices and Analytics	3,67	0,84
10	Frugal ICT	3,65	0,78
11	Deep Learning for Healthy Eating	3,62	0,98
12	Physical Unclonable Functions based Hardware-Intrinsic Security	3,60	0,98
13	Resilient Systems	3,44	0,79

Average score and ranking of Scientific Advisory Board

Rank	Topic Title	Global Score	STDEV
1	Frugal ICT	3,89	0,76
2	Collective Memories (CM)	3,83	0,61
3	Resource constrained security in the post-quantum era	3,78	0,68
4	Interaction in Virtual Spaces (IVS)	3,74	1,29
5	Advanced human machine interaction based on brain-computer interfaces	3,67	0,61
6	Multimodal data integration for precision health	3,61	0,94
7	Resilient Systems	3,49	0,61
8	Intuitive and effective human-robot physical interaction	3,39	0,76
9	Remote Teleoperation of Robots in an mixed environment of people (with disabilities) and robots	3,38	0,68
10	Cybersecurity and safety co-design	3,36	0,79
11	Physical Unclonable Functions based Hardware-Intrinsic Security	3,29	0,68
12	Deep Learning for Healthy Eating	3,28	0,72
13	Next Generation Intelligent Wearable Devices and Analytics	2,65	0,66

Combined ranking average score RFOs and Scientific Advisory Board

Rank	Topic Title	RFOs	SAB	Average
1	Advanced human machine interaction based on brain-computer interfaces	4,19	3,67	3,93
2	Resource constrained security in the post-quantum era	3,92	3,78	3,85
3	Interaction in Virtual Spaces (IVS)	3,90	3,74	3,82
4	Collective Memories (CM)	3,77	3,83	3,80
5	Multimodal data integration for precision health	3,97	3,61	3,79
6	Intuitive and effective human-robot physical interaction	4,15	3,39	3,77
7	Frugal ICT	3,65	3,89	3,77
8	Remote Teleoperation of Robots in an mixed environment of people (with disabilities) and robots	3,80	3,38	3,59
9	Cybersecurity and safety co-design	3,78	3,36	3,57
10	Resilient Systems	3,44	3,49	3,47
11	Deep Learning for Healthy Eating	3,62	3,28	3,45
12	Physical Unclonable Functions based Hardware-Intrinsic Security	3,60	3,29	3,44
13	Next Generation Intelligent Wearable Devices and Analytics	3,67	2,65	3,16

Analysis and Discussion

The results of the voting were discussed in the CHIST-ERA Call 2020 topic selection Workshop on the 27-28 of January 2020 in Prague, with the participation of the CHIST-ERA Steering Committee and the Scientific Advisory Board. On basis of the voting results and comments made as part of the voting process the topics were discussed and prioritized. The 13 topics were presented in reverse order of the combined ranking of SAB and RFOs votes.

Strengths, weaknesses, and complementarities/overlaps of each topic were discussed:

- In a first round of discussion on the topics: Next Generation Intelligent Wearable Devices and Analytics, Physical Unclonable Functions based Hardware-Intrinsic Security and Deep Learning for Healthy Eating are dropped out and not taken into account for further discussions.
- In a second round of discussion the topics were more profoundly discussed considering possible complementarity among them. On basis of this discussion the topics resilient systems and cybersecurity and safety co-design are dropped out.
- A first round of consultation and vote is organised where each participant is asked to vote for its two 'favorite' topics out of the 8 remaining topics. On basis of the voting and further discussion the topics: Remote Teleoperation of Robots in an mixed environment of people (with disabilities) and robots, Multimodal data integration for precision health, and Resource constrained security in the post-quantum era are dropped out.
- Complementarities are identified between the topics Advanced human machine interaction based on brain-computer interfaces and Interaction in Virtual Spaces (IVS). The two topics will be merged into one topic.
- A second round of consultation and vote is organised where each participant is asked to vote for its two 'favorite' topics out of the 4 remaining topics, with the following result:
 - ✓ *Advanced human machine interaction based on brain-computer interfaces/Interaction in Virtual Spaces (IVS)*: 19 votes.
 - ✓ *Frugal ICT*: 11 votes
 - ✓ *Collective Memories (CM)*: 6 votes
 - ✓ *Intuitive and effective human-robot physical interaction*: 6 votes

As outcome of the workshop the Steering Committee agrees to select the combined topic *Advanced human machine interaction based on brain-computer interfaces/Interaction in Virtual Spaces (IVS)* and the topic *Frugal ICT* for the CHIST-ERA Call 2020. Those two topics are, in cooperation with the topic proposers, further prepared for publication at www.chistera.eu taking into account comments and issues raised during the workshop.

Conclusion

On basis of the votes and workshop discussion CHIST-ERA steering committee has selected two topics for the CHIST-ERA call 2020 with the following descriptions and key words:

Topic 1. Advanced Brain-Computer Interfaces for Novel Interactions

Recently we have seen an explosion of brain-based technologies that capitalize on human capabilities to improve human-system interactions. Forerunners of this conception are brain-computer interfaces (BCIs), which have been largely focused on improving the quality of life for particular clinical populations such as paralyzed or “locked-in” patients. Near-term applications are primarily task-oriented and are targeted to overcome development obstacles. However, in the longer-term, a holistic approach to BCIs shall enable a range of task-oriented and opportunistic applications by leveraging pervasive technologies and advanced analytical approaches to sense and merge critical brain, behavioral, task, and environmental information. The objective of this topic is to consider BCIs for human-computer, human-to-human, or human-to-object interaction. Of particular interest are BCIs in Virtual Reality and Augmented Reality, without verbal commands.

Application sectors: Healthcare, Telemedicine, Assisted Living, Education & Training, Entertainment & Gaming, Simulation, Cultural and Creative Industries, Advertising

Keywords: Human-machine interaction, brain-computer interface, augmented brain-computer interface, pervasive sensing and computing, collaboration, virtual reality, augmented reality, cyber-physical systems, cyber-human systems.

Topic 2. Towards Sustainable ICT

The energy and resource footprint of ICT is rapidly increasing and is becoming a significant contributor to climate change and various kinds of pollution. At the same time, ICT is an ideal area where the entire technology involved may be rethought systemically. Sustainable ICT concerns all frugality aspects from computing hardware, over middleware and software, to networking and mobile computing, in an integrated manner. Novel and ambitious approaches are sought to design and build systems, software and protocols that minimise resource and energy usage as well as carbon footprint over their entire life cycle from resource extraction to end-of-life, and favour reusability, reparability and recycling. Reaching such a technology objective is likely to be insufficient on its own to keep the impact of ICT within the Earth system limits. Human factors should also be studied to allow rethinking jointly ICT and their usage, in particular minimise rebound effects, a traditional annihilator of many efficiency gains, and foster an environment-aware usage of ICT.

Application sectors: All application sectors of ICT

Keywords: ICT, carbon footprint, energy consumption, material footprint, life cycle analysis, environment-aware usage, frugality, sustainability

Annexes

A. SAB (Scientific Advisory Board)

SAB

Member	Institution	Country
Elisabeth André	Augsburg University	Germany
Luis Castedo Ribas	University of A. Coruña	Spain
Siobhán Clarke	Trinity College Dublin	Ireland
John Cunningham	University of Leeds	United Kingdom
Charles Despins	Prompt & University of Québec	Canada
Yiannis Kompatsiaris	Center for Research and Technology - Hellas	Greece
Mark Liberman	University of Pennsylvania	United States
Heiko Schuldt	University of Basel	Switzerland
Sharon Sputz	Columbia University	United Stated

B. Topic selection timeline for Call 2020

Timeline for topic selection CHIST-ERA Call 2020

30 September 2019	RFO and SAB s called to submit topic proposals	AEI
15 November 2019	Deadline to submit topic proposals	RFOs and SAB
28 November 2019	Publication of final list of topic proposals and call for votes	AEI
<i>3 weeks</i>	<i>Get internal agency feedback about topics and cast votes</i>	<i>RFOs and SAB</i>
19 December	Deadline for votes/ feedback	RFOs and SAB
	<i>Analysis of voting results</i>	<i>AEI</i>
mid-January 2020	Voting results and analysis sent to RFOs and SAB	AEI
27-28 January 2020	Workshop with SAB to discuss topics	RFOs and SAB
February 2020	Publication of topics CHIST-ERA Call 2020	CHIST-ERA SC

C.Template for topic suggestion**CHIST-ERA Call 2020
Topic suggestion**

Please send this form back to era-ict@aei.gob.es

Proposer

Institution / Initiative	
Contact(s)	

Topic definition

Topic title (2-10 words)	
Short description (30-100 words)	
Application sectors	
Keywords	

Selection criteria grid

Please provide based on the CHIST-ERA topic selection criteria grid, for each criteria a rationale of between 2-20 sentences

Criteria	Description	Score ¹
Scientific interest and innovation potential (Required for RFOs and SAB)		
Novelty & ambition	Describe the state-of-the-art, missing science, and expected outcomes (the topic should be far from existing knowledge and technology), and analyse potential S&T issues (the topic should be plausible)	
Multidisciplinary and/or transformative	Describe how knowledge and communities from different disciplines can be brought together to investigate unknown fields at the frontier of science and/or how the topic can be a game changer with a high scientific and technological impact	
Clarity and measurability	Describe how well defined the topic is and how scientific and technological performance can be objectively measured in the area (measurement methods, metrics, tools, infrastructures, ...)	
Timeliness	Describe which opportunities might be lost if the topic is not funded	
Potential impact	Describe the potential impact on future EU economy, environment and/or society, and analyse risks (social acceptance, legal issues, ...)	
Suitability for a CHIST-ERA call Required for RFOs, optional for SAB)		
Need for transnational cooperation	Describe how transnational cooperation in the framework of a joint call can bring added value (complementary national scientific strengths, need for critical mass, need for joint infrastructures, ...)	
Complementarity with existing calls	Describe closest calls (FET, H2020, ERA-NETs, ...) and how the topic complements and/or leverages them (the topic should not be redundant with other calls)	
Suitability of topic size	Describe how a significant contribution in the area can be obtained with a call of a few M€, possibly giving indications about the size of the main events, initiatives or structures in the area (conferences, programmes, teams, centres, professional associations, ...).	

¹ Range: 1 (minimum) to 5 (maximum)

References

Provide bibliographical references and/or web links