

CEN Workshop “Methods for enhancing industrial human-robot collaboration and cooperation”

Workshop description form

- PART A – Workshop Summary
- PART B – Project Plan



PART A – Workshop SUMMARY

1	WS details	
1.1.	Organization	<input checked="" type="checkbox"/> CEN <input type="checkbox"/> CENELEC <input type="checkbox"/> Joint with <input type="checkbox"/> CEN lead <input type="checkbox"/> CENELEC lead
1.2.	Title	CEN WS Methods for enhancing industrial human-robot collaboration and cooperation
1.3.	Scope	<p>This workshop will provide industrial users with human-centred artificial intelligence (AI)-based solutions to create a more efficient, resilient, digital, sustainable and high-quality European manufacturing industry. To do so, we will develop an integrated and scalable environment with two solutions adapted to dynamic and unpredictable manufacturing scenarios that require tasks that are difficult to automate and where speed and versatility are essential to meet users' needs. Furthermore, the solutions will be specific to semi-automated and collaborative manufacturing in flexible production processes and will not require specific robotic programming skills. Considering the AI-PRISM solutions ecosystem with four main pillars:</p> <ul style="list-style-type: none"> • A human-centred collaborative robotic platform oriented to ease hard-to-automate manufacturing tasks. • A human-robot cooperative environment powered by trustworthy AI. • Social human-agent-robots teams' collaboration — AI-based safety monitoring and robot control mechanisms to detect and avoid unsafe situations and ensure social and physical safety. • An open-access network portal to offer compliant infrastructure. <p>This workshop will focus on understanding of human-robot interaction, combining quantitative experiments and qualitative workshops, to investigate various facets of this interaction. The primary aim is to enhance the efficiency, safety, and satisfaction of operators working with robotic systems. To this end, ethical aspects to be taken into account in this human-robot interaction will also be integrated into the activities of this workshop. This workshop proposes the development of two different CWAs:</p> <ul style="list-style-type: none"> -CWA Methodology for human-centred design of industrial human-robot applications -CWA Methodology for the identification of human skills requirements for work in industrial human-robot collaboration
1.4.	Does this WS stem from an EU Research project?	<input checked="" type="checkbox"/> YES Name of the project: AI-PRISM Grant number: 101058589 End date SEPTEMBER 2025 <input type="checkbox"/> NO
1.5.	Financial support	<input checked="" type="checkbox"/> EU Research project <input type="checkbox"/> EC/EFTA Grant reference: Type here <input type="checkbox"/> Other Specify, if needed: Type here
1.6.	WS Proposer/Proposed Chair WS proposer	Name: Dr Sarah Fletcher PhD Organization: Cranfield University Postal address: Cranfield, Bedfordshire MK43 0AL Email: s.fletcher@cranfield.ac.uk Phone: +44 (0) 1234 758234 Webpage: www.cranfield.ac.uk s.fletcher@cranfield.ac.uk

		Contact person (name and email):	
1.7.	WS Secretariat	Organization: Postal address: Email: Phone: Webpage: WS Secretary name: Email: Phone:	Spanish Association for Standardization UNE C/Genova 6 28004 Madrid info@une.org (+34) 915 294 900 www.une.org Francisco Luis Arribas Martin farribas@une.org +34 636455756
1.8.	CEN and CENELEC Management Centre (CCMC) contact	Organization: Postal address: Webpage: CCMC Project Manager name: Email: Phone:	CEN and CENELEC Rue de la Science 23B - 1040 Brussels, Belgium https://www.cencenelec.eu/Pages/default.aspx Claire Van Thielen +3225500831 +32478793545
1.9.	Tentative date and place of the Kick-off Meeting	Date: 27th May 2025	Place: Virtual
1.10.	Does the proposed Workshop fall within the scope of existing CEN and/or CENELEC Technical Bodies?¹	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Specify: Type here
1.11.	Are there other Technical Bodies or Joint Advisory and Coordination Groups potentially interested in the Workshop? ²	<input checked="" type="checkbox"/> YES Specify: CEN TC 310, ISO/TC159/SC4 <input type="checkbox"/> NO	
1.12.	Are the following aspects affected?	Safety matters Management system aspects Conformity assessment aspects Security matters	YES ³ <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES ⁴ <input type="checkbox"/> 7 <input checked="" type="checkbox"/> YES ⁵ <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES ⁶ <input type="checkbox"/> NO <input checked="" type="checkbox"/> 8
		Add information/explanations if Management System aspects and Conformity Assessment aspects are affected: Type here	
2	WS Deliverables		
2.1.	CWA #1		
2.1.1	Title	<input type="checkbox"/> Same as WS title (1.2) <input checked="" type="checkbox"/> Other: METHODOLOGY FOR HUMAN-CENTRED DESIGN OF INDUSTRIAL HUMAN-ROBOT APPLICATIONS	

¹ Part A and Part B of this form shall be sent by the WS secretary to the secretary of the Technical Bodies identified in this section to inform them about the creation of the WS and register any possible objection within 30 days (45 during the holiday period).

² Part A and Part B of this form should be sent by the WS secretary to the Bodies identified in this section to inform them about the creation of the WS.

³ Work on the proposed CEN and/or CENELEC Workshop shall not be initiated.

⁴ The CEN and/or CENELEC Workshop proposal shall be submitted to the CEN/CENELEC BT(s) for decision.

⁵ CEN-CENELEC Internal Regulations - Part 3, Clause 33 applies.

⁶ For projects dealing with security matters the security risk analysis provided in Annex I shall be carried out.

⁷ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

⁸ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

2.1.2	Scope		<p>This document will provide production system designers, integrators and owners with an effective methodology for ensuring the human-centred design of industrial human-robot applications. It is designed to address a current gap in the availability of practical and reliable human-centred design guidance and techniques for the design of collaborative human-robot systems in industry, as identified within the work of the ‘AI-PRISM’ project (funded by Horizon Europe Innovation Actions Grant Agreement number: 101058589). AI-PRISM has successfully integrated Social Science and Humanities (SSH) analysis to enhance the human-centred design of AI-driven technologies and robotics for production systems. This Workshop details the successful multi-component methodology that has been tested in the AI-PRISM project for identifying and evaluating human factors requirements, including the impacts of robot / system characteristics. It provides empirical knowledge on effective quantitative and qualitative data analysis procedures – including behavioural analysis and modelling, task analysis, co-creation, and ethical risk assessment – that can be applied to optimise human-centred design and thereby enhance the safety, efficiency and well-being of industrial human-robot applications. Circulation of this human-centred design methodology and its individual component assessment techniques will facilitate the development of systems that bring a more efficient, resilient, flexible, digital, sustainable and ethical European manufacturing industry in the future.</p>
2.1.3	Does the proposed CWA conflict with a published EN	<input type="checkbox"/> <input checked="" type="checkbox"/>	<p>YES Specify: Type here</p> <p>NO (In case the answer is ‘yes’, the development of the CWA shall be stopped)</p>
2.2	CWA #2		
2.2.1	Title	<input type="checkbox"/> <input checked="" type="checkbox"/>	<p>Same as WS title (1.2)</p> <p>Other: METHODOLOGY FOR THE IDENTIFICATION OF HUMAN SKILLS REQUIREMENTS FOR WORK IN INDUSTRIAL HUMAN-ROBOT COLLABORATION</p>
2.2.2	Scope		<p>This document sets out a methodology for identifying the human skills that will be needed by operators working in industrial human-robot systems. This methodology is an output currently needed by production system designers, integrators and owners who currently lack a means of evaluating what skills and training they need to provide and design for. The current gap in the availability of a practical and reliable methodology has been identified within the work of the ‘AI-PRISM’ project (funded by Horizon Europe Innovation Actions Grant Agreement number: 101058589). The AI-PRISM project has integrated Social Science and Humanities (SSH) analysis in a number of project tasks and this workshop presents an overview of the methodology that has been tested in the AI-PRISM project to develop a framework for assessing and developing human skills and abilities for working with robots in collaborative industrial systems. This incorporates new knowledge concerning operators’ social and emotional needs as well technical skills, and a review of current training programmes and best practices, and empirical data from experimental behavioural studies to test a skills and abilities training programme specifically for this context. Circulation and application of this methodology and its individual component assessment techniques will facilitate the development of skills that bring a more efficient, resilient, flexible, safe and ethical European manufacturing industry in the future.</p>
2.2.3	Does the proposed CWA conflict with a published EN	<input type="checkbox"/> <input checked="" type="checkbox"/>	<p>YES Specify: Type here</p> <p>NO (In case the answer is ‘yes’, the development of the CWA shall be stopped)</p>

PART B – Project Plan

1 Status of the project plan

Draft project plan for public commenting (Version 1.0)

This draft project plan is intended to inform the public of a new Workshop. Any interested party can take part in this Workshop and/or comment on this draft project plan by sending an email to the WS secretary.

All those who have applied for participation or have commented on the project plan by the deadline will be invited to the kick-off meeting of the Workshop on **2025-05-27**.

2 Workshop proposer and potential Workshop participants

2.1 Workshop proposer

Person (and organization) 1:

Dr Sarah Fletcher PhD, Cranfield University

Postal address: Cranfield, Bedfordshire MK43 0AL, United Kingdom

Email: s.fletcher@cranfield.ac.uk

Phone: +44 (0) 1234 758234

Webpage: www.cranfield.ac.uk

Short description and interest in the subject:

Dr Sarah Fletcher leads the Industrial Psychology and Human Factors (IPHF) group in the Centre for Robotics and Assembly at Cranfield University where she has been conducting research to enhance the safe and effective integration of people in new processes and with new technologies for 25 years. Sarah leads the SSH and ethical analysis on many UK and EU projects in the manufacturing sector and has additional experience of human-systems interaction development in the defence, automotive and transport sectors. She is an active participant in a number of ISO and BSI standards committees involving robotics, ergonomics and ethics.

2.2 Potential participants

This CWA will be developed in a Workshop (temporary body) that is open to any interested party. The participation of the following persons/organizations would be helpful and is desired. It is recommended that:

- Manufacturers
- Industry associations

- Service providers
- Environmental organizations
- Academic institutions

take part in the development of this CWA.

Already known participants are:

- Sarah Fletcher (Cranfield University)
- Iveta Eimontaite (Cranfield University)
- Francisco Fraile (Universidad Politecnica de Valencia)
- Daniel Jimenez (NTTD ES)
- Ana Gonzalez (NTTD ES)
- Raquel Carro (Australo)
- Carlos Calleja (IKERLAN)
- Andrei Rusu (NTTD RO)

3 Workshop objectives and scope

3.1 Workshop background

This workshop stems from the collaborative efforts within European Projects, particularly those funded under Horizon 2020 and Horizon Europe programmes, to develop manufacturing technologies and AI applications in industrial settings. The workshop and its activities are supported by EC/EFTA funding, aligning with European initiatives to promote innovation in manufacturing and digital technologies across the continent. Moreover, this workshop is based on the strong EU ordinance for Social Sciences and Humanities (SSH) integration in its funded projects: “Effective SSH integration is considered an important requirement for fostering better science and increased societal and economic impact of research and innovation. As such, the integration of SSH throughout Horizon Europe, including missions and partnerships, is a key cross-cutting priority” (European Commission, 2023).

The AI-PRISM project is integrating SSH with AI and robotics to develop new solutions that not only exploit the advanced capabilities of AI and robotics technologies but also the inimitable creativity and flexibility of human operators. The project is particularly focusing on applying SSH in the design of these sophisticated human-robot systems to enhance the performance of tasks that have traditionally been difficult to automate, require speed and versatility, and would be more flexible if they were designed to not require specific robotic programming skills. Integration of SSH in product and system design is now widely advocated in the EU and its integration with engineering and technology development in AI-PRISM brings an underpinning human-centred approach that is enhancing the user / workforce safety, performance, acceptance and well-being.

This workshop proposes the development of two different CWAs:

- **CWA Methodology for human-centred design of industrial human-robot applications**

This CEN Workshop Agreement (CWA) is designed to fulfil the EU motivation for SSH integration by relaying practical guidance on how this can be achieved that anyone can utilise. The document provides an overview of the human centred design methodology, including its individual quantitative and qualitative analysis techniques such as behavioural analysis and modelling, task analysis, co-creation design, and ethical risk assessment. Whilst the individual techniques are largely derived from existing social science procedures and standards, their design and amendment for application to this specific industrial context is novel. In this way, this is a document that will directly address a current gap and identified industrial need. i.e. for human-centred evaluation and design guidance specifically relevant to the design of human-robot collaboration applications in industrial settings. In addition, as the SSH work within the AI-PRISM project is inherently based on ethical principles and includes ethical risk evaluation, this document further supports EU objectives for ethical guidelines and design of AI systems.

- **CWA Methodology for the identification of human skills requirements for work in industrial human-robot collaboration**

This CEN Workshop Agreement (CWA) is designed to fulfil the EU motivation for SSH integration by issue practical guidance on how to evaluate human operator skills requirements and make it accessible for anyone to use. The document provides an overview of the human skills requirements assessment methodology, including its individual quantitative and qualitative analysis techniques. Whilst the individual techniques are largely derived from existing social science procedures and standards, their design and amendment for application to this specific industrial context is novel. In this way, this is a document that will directly address a current gap and identified industrial need. i.e. for identifying human skills requirements in the specific context of industrial human-robot task performance collaboration. In addition, as the SSH work within the AI-PRISM project is inherently based on ethical principles and includes ethical risk evaluation, this document further supports EU objectives for ethical guidelines and design of AI systems.

4 Workshop programme

4.1 General

The kick-off meeting is planned to take place on 27-05-2025 as virtual meeting. A draft for public commenting will be published for 30 days.

A total of 4 Workshop meetings (kick-off meeting and Workshop meetings) and web conferences will be held, during which the content of the CWA(s) will be presented, discussed and approved.

The working language (language of meetings, minutes, etc.) of the WS will be English. The CWA will be written in English.

4.2 Workshop schedule

Table 1: Workshop schedule (preliminary)

CEN/CENELEC Workshop	M01	M02	M03	M04	M05	M06	
Initiation	█						
1. Workshop description form submission and TC response	█						
2. Open commenting period on draft project plan (mandatory)		█					
Operation			█				
3. Kick-off meeting			█				
4. CWA(s) development			█				
5. Open commenting period on draft CWA(s) (optional)					█		
6. CWA(s) finalized and approved by Workshop participants					█		
Publication						█	
7. CWA(s) publication						█	
Dissemination (see 6)		█				█	
Milestones			K	V		V/A	P



Legend

- K** Kick-off
- M** Workshop meeting
- V** Virtual Workshop meeting
- A** Adoption of CWA
- P** Publication of CWA
- D** Online distribution of CWA

5 Resource planning

The CEN Workshop is financed by the European research project AI-PRISM (AI Powered human-centred Robot Interactions for Smart Manufacturing). This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101058589.

All costs related to the participation of interested parties in the Workshop's activities have to be borne by themselves. The copyright of the final CEN Workshop Agreements will be at CEN. The final documents will include the following paragraph: "Results incorporated in this CEN Workshop Agreement received funding from the European Union's Horizon Europe research and innovation programme under grant agreement number 101058589 AI-PRISM.

6 Workshop structure and rules of cooperation

6.1 Participation in the Workshop

The Workshop will be constituted during the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

- a. expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
- b. the expansion would not result in the Workshop taking longer to complete;
- c. the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;
- d. the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
- e. the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
- f. the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who approved the publication of the CWA or its draft will be named as authors in the European Foreword, including the organizations which they represent. All Workshop participants who did not approve the publication of the CWA will not be named in the European Foreword.

6.2 Workshop responsibilities

The Workshop Chair is responsible for content management and consensus building. The Workshop Chair is supported by the Workshop Vice-Chair (if any) and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair. The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

- Content related contact point for the Workshop
- Presides at Workshop meetings
- Ensures that the development of the CWA respects the principles and content of the adopted project plan
- Manages the consensus building process, assesses when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received
- Ensures due information exchange with the Workshop secretariat
- Represents the Workshop and its results to exterior

The Workshop secretariat, provided by a CEN and/or CENELEC Member, is responsible for organizing and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organized by the Workshop secretariat in consultation with the Workshop Chair. The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

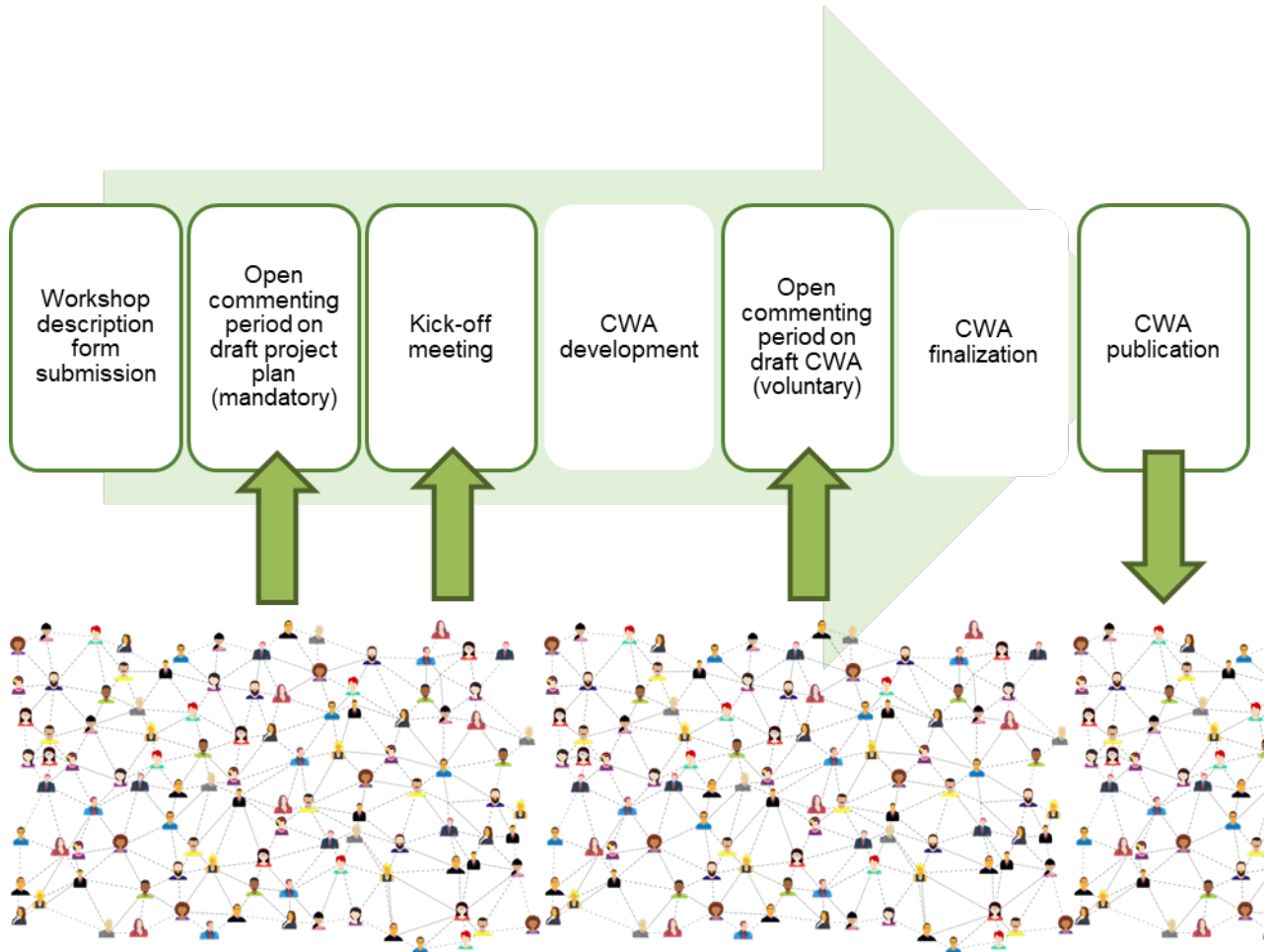
- Administrative and organizational contact point for the Workshop
- Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29
- Formally registers Workshop participants and maintains record of participating organizations and individuals
- Offers infrastructure and manages documents and their distribution through an electronic platform
- Prepares agenda and distributes information on meetings and meeting minutes as well as follow-up actions of the Workshop
- Initiates and manages CWA approval process upon decision by the Workshop Chair
- Interfaces with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships
- Advises on CEN-CENELEC rules and brings any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC)
- Administrates the connection with relevant CEN or CENELEC/TCS

6.3 Decision making process

The CEN and/or CENELEC Workshop Chair is responsible for ensuring that the development of the CWA follows the principles and content of the project plan described in this document and the requirements of CEN-CENELEC Guide 29. The CEN and/or CENELEC Workshop Chair may take decisions on the conduct of the CEN and/or CENELEC Workshop on the basis of the comments expressed by the participants and of CEN-CENELEC Guide 29.

Decisions shall be taken based on consensus of the WS participants.

7 Dissemination and participation strategy



Potential participants identified in section 2.2 and potential interested stakeholders identified in Part A should be informed of the open commenting phase, if any, and of the publication of the CWA.

Description and project plan form submission

The Workshop description and project plan will be disseminated to the following relevant stakeholders and bodies for consultation:

- standards committee, working group etc.
- publisher of technical rules
- others

Open commenting period on draft project plan

The project plan will be disseminated to the following relevant stakeholders and bodies for commenting:

- standards committee, working group etc.
- publisher of technical rules
- others

In addition to the CCMC website, the description and project plan and the date of the kick-off meeting will be advertised on the project website to raise awareness. Interested parties are requested to contribute either through commenting of the project plan (short term) or through Workshop participation (long term)

Open commenting period on draft CWA

The draft CWA will be disseminated to the following relevant stakeholders and bodies for commenting:

- standards committee, working group etc.
- publisher of technical rules
- others

In addition to the CCMC website, the draft CWA will be advertised on the project website to raise awareness. Interested parties are requested to contribute through commenting of the draft CWA (short term).

CWA publication

The final CWA will be disseminated to the following relevant stakeholders and bodies:

- standards committee, working group etc.
- publisher of technical rules
- others potential interested stakeholders identified should be informed of the open commenting phase, if any, and of the publication of the CWA.

In addition to the CCMC website, the final CWA might be advertised on:

- sector specific newsletter
- social media, such as
 - Facebook
 - Instagram
 - LinkedIn
 - X
- Research Gate
- EC Newsroom
- Others