Artificial intelligence, Data and Robotics ecosystem

https://adra-e.eu/

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[1] **PU:** Public**; CO:** Confidential, only for members of the consortium (including the Commission Services)

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Author(s):	Christophe Leroux (CEA), Iddo Bante (UT), Françoise Hacque (CEA)
Reviewers:	Cees Snoek (UvA)
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[2] **R**: Report, **DEC:** Websites, patent filling, videos; **DEM:** Demonstrator, pilot, prototype; **OTHER:** Software Tools
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Document summary

This document outlines the objectives, activities, and outcomes of the European Convergence Summit (ECS) organised in 2024 as part of the ADRA-e project. The ECS is an event designed to benefit ADRA, developing a new approach of work in innovation and research in AI, big data and robotics. Indeed, the ECS is the highlight for how AI, big data, and robotics research and innovation stakeholders can address a key socioeconomic challenge facing Europe and propose impactful solutions. In 2024, the ECS focused on exploring how AI, data, and robotics technologies could contribute to achieving the European Commission's decarbonisation goals by 2050.

Following an introduction to the concept of the ECS and its connections with various events relevant to the ADR partnership—such as the ERF, EBDVF, and ADRF forums—this document details the methodology and communication strategy underpinning the ECS. It also provides a brief overview of the EU's Net Zero objective, a summary of the preparatory workshops, and a detailed presentation of the ECS 2024 agenda and logistics.

The ECS 2024 featured three sessions discussing European strategies in ADR, environmental issues, and public involvement and normative concerns. These sessions were preceded by an introductory session to reaffirm the objectives for participants and concluded with a foresight panel to distil key takeaway messages and recommendations summarized below. The complete argumentation is provided at the end of this report.

☑ **General recommendations**:

To achieve affordable automation, a robust computing continuum, and a strong European data strategy, it is essential to invest in safe and intelligent robotics, integrate cloud and edge infrastructure, enhance data interoperability and trust, and foster collaboration between public and private sectors while ensuring ethical standards and global competitiveness.

☑ **Specific recommendations**:

To advance sustainability and green digitalization, enhance energy efficiency in AI, and improve manufacturing and rail transport, it is crucial to adopt sustainable practices, invest in HPC hardware, optimize data usage, involve the public in AI development, and promote interdisciplinary collaboration and education.

☑ **Long-term Recommendations for Europe:**

To enhance global competitiveness, Europe should scale up and enter global markets, maintain public investments in AI and robotics, ensure adaptable and proactive regulation, build necessary infrastructure, and focus on market demand and ecosystem support.

☑ **Ethical and Legal Compliance**:

To ensure ethical and legal compliance, developing and applying ethical principles in AI are crucial, then, transparency and fairness should be ensured to comply with regulations like the European AI Act. Furthermore, prioritizing consumer protection and human rights through public involvement and a human-centric approach are key.

☑ **Cross-Technology and Cross-Sector Collaboration:**

To foster cross-technology and cross-sector collaboration, it is essential to develop a technology-enabled EU investment plan for decarbonization, stimulate collaboration and

knowledge sharing, prioritize sustainability, support companies in developing skills, and outline business models to keep pace with technological innovation.

The document concludes with lessons learnt and suggestions for the ECS 2025.

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1 Introduction

This document presents the activities on the European Convergence Summit (ECS) undertaken in the ADRA-e Coordination and Support Action[4] funded by the European Commission in favour of the association ADRA and the co-programme partnership AI Data and Robotics. These activities are part of a work package (WP4) about "*Boosting the adoption of AI technology"*.

The document presents the concept of the ECS. It presents the role of the event to support the actions of the ADRA association for the ADR partnership and its complementarity to the events of interest for ADRA organized in Europe like the ERF, the EBDVF and the ADRF forums.

A section is dedicated to the preparatory workshops and to the topics explored. We then present the ECS held in June 2024, the participants and the outcomes.

We conclude the document with some tracks for the ECS to be held in 2025.

[4] Coordination and Support Action portal: https://adra-e.eu/

2 Concept and principles of the ECS

2.1 ECS Concept

For the Horizon Europe Framework programme (2021- 2027), the European Commission decided to gather the three R&D disciplines of AI, Big Data and Robotics (ADR) to address major European challenges in the global technological race. To contribute at the global level, this requires new ways of thinking and collaborating among the three disciplines from key European players in the fields of AI, Big Data and Robotics. The consortium has thus designed a special tool: the European Convergence Summit (ECS).

The European Convergence Summit (ECS) is a prestigious meeting to bring together influential figures from different fields to support co-programming of the Artificial Intelligence Data and Robotics (ADR) partnership. The main objectives are to set guidelines for ADR research and innovation in Europe, taking into account socio-economic considerations, and to promote consensus among stakeholders. The overarching theme of the event is about the impact of ADR on a specific societal challenge.

The ECS format aims to build a consensus taking into account different point of views and considerations. It is organized as a place to meet and to agree on a direction for R&I in ADR research in Europe for policy makers, decision makers, techno providers, end users, jurists, ethicists and representatives of the society.

The ECS is a one-day event helping to elaborate take away messages on the way the convergence of the AI, Big Data and Robotics technologies can contribute to address some socio-economic challenges of interest for European citizens. The messages are expected to result from the dialogs between stakeholders interested in ADR technologies. To structure these dialogs, a set of workshops are planned with experts on different topic connected to a topic selected each year. The aim is to move from different silos to consensual governance, exchange of best practices and sharing of research and innovation efforts.

The outcome of the ECS represents a consensus between acceptability, market and scientific ambitions for Europe.

The ECS is foreseen as a yearly event organized by the ADRA-e CSA to support the ADRA association, the private part of the ADR co programmed partnership of Horizon Europe. ADRA gathers European stakeholders in research and innovation in AI, robotics and Big Data. ADRA is the organization which should ensure the sustainability of the ECS after the end of ADRA-e CSA.

The consensus message coming out from the ECS will provide input for the EC strategy in AI, Big Data and Robotics. In particular it should be used to fuel the Strategic Research, Innovation and Deployment Agenda (SRIDA) of ADR and spread through various communication channels such as the ADR Forums, the AI Alliance, the EBDVF or the ERF.

2.2 ECS and related ADR forums

The ECS event comes as a complement to the networking events organized by the ADRA association[5] and the five funding organizations of ADRA: BDVA[6], CAIRNE[7], ELLIS. EURAI and euRobotics[8]: It brings a new approach of designing RDI work by gathering for the First time ever the experts in the 3 technologies that are robotics, artificial intelligence and big data dedicated to come to integrated solutions to answer a given EU societal challenge. ECS aims at developing a dialogue between experts in the technologies and the stakeholders that are looking for solutions to answer this societal challenge. It complements the events listed below that focus on the technologies.

- ERF[9] the European Robotics Forum organized traditionally in March each year

- EBDVF[10] the European Big Data Value Forum organized in October on a yearly basis

- ADRF[11] the AI Data and Robotics forum held in November

[5] https://adr-association.eu/
[6] https://bdva.eu/
[7] https://cairne.eu/ (formerly CLAiRE)
[8] https://www.robotics-portal.eu/home-users
[9] https://eu-robotics.net/european-robotics-forum/
[10] https://european-big-data-value-forum.eu/
[11] https://adrforum.eu/

These networking events are dedicated to people from specific communities, industries and research organizations to share information, point of views and opportunities for collaboration.

2.3 General flow plan

Each ECS focuses on only one socioeconomic challenge at a time. The challenge is chosen by the partners of ADRA-e. The ECS is organized on one day to exchange point of views between technological experts of different profiles. In order to stimulate the debate preparatory workshops are organized before the ECS. The workshops enable to segment the analysis on how ADR technologies can contribute to address the socioeconomic challenge chosen. They should lead to the identification of propositions were a combination of AI, Data and Robotics technologies can contribute to solve the discussed societal challenge. The outcomes helps structuring the European Convergence Summit. The process is summarized on the figure below

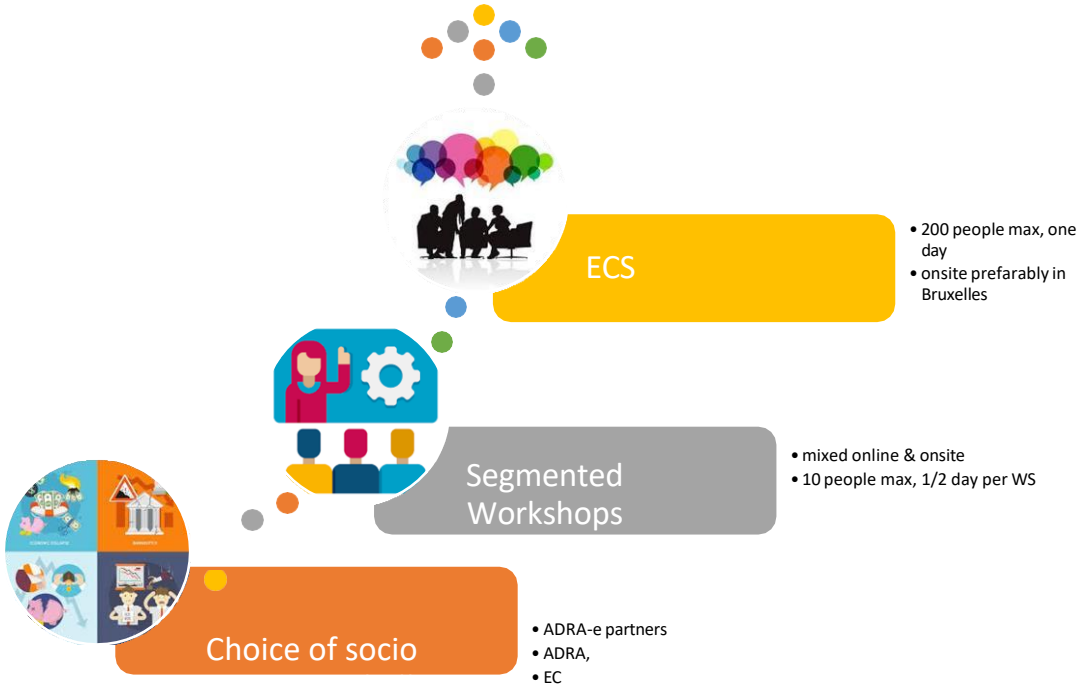


Figure 1: Overview of the ECS process

Ideally the ECS is expected gather 200 to 300 people max. Brussels is seen as a central easy to catch location to facilitate participation of the EC, European associations and experts and

representatives of stakeholders involved in the design and analysis of European policies.

2.4 ECS Methodology

The Convergence Summit is the implementation of a strategy to promote and stimulate research, development and deployment of ADR technologies in Europe, as a concrete answer to socioeconomic challenges.

The methodology to organize a European Convergence Summit consists in the following steps

1. Analysing a set a **socio-economic challenge of interest** for Europe of the year to come
2. Choosing **one topic** amongst the set of challenges with the ADRA-e partners. The topic chosen is aimed to serve as a red thread, to analyse the possibilities to apply a combination of AI, Big Data and Robotics technologies to address this topic
3. Agreeing on a **format**, a **location** and agreement on the **duration** of the Summit
4. Producing a **mapping,** presenting experts in their sectors of application or in their domains (technological, social science based on the PESTEL analysis) and interested in the chosen topic. The mapping consists of a list of people with their expertise, a level indicating the proximity of the expert with the people in the consortium: close relation, known from some relation or unknown and indications on the way to contact these experts (mail, phone, LinkedIn, other),
5. Organizing a set of **preparatory workshops** using the information collected in the mapping to take the point of views of representative of different sectors on the selected topic and on the perspectives for research and innovation in ADR technologies. The workshops are organized online to reduce costs. Each workshop is planned for half a day. Workshops are gathered on the same days. ADRA-e coordinators of the workshops are ideally gathered in Brussels.
6. Preparing the **Convergence Summit**: contact with potential participants from the EC, the Member States, experts from the mapping, organizing the catering, the sessions and panels, implementing the communication and dissemination plan following a retro-planning.
7. Elaborating a **take away message** representing the outcome of the Summit and ensuring the ECS follow-up (e.g. messages of thanks to speakers…)
8. Dissemination of the conclusions of the ECS through social networks and making use of the channels offered by influencers and of key moments

3 ECS 2024 topic

3.1 The socio-economic challenge for 2024

ADRA community agreed to focus the 1st ECS on reduction of CO2 emissions in August. The other candidate topics suggested were

- How ADR technologies combined can contribute to reduce CO2 emission by 2030?
- How ADR can help fragile and ageing people?
- How can ADR contribute to increase resilience of Europe in crisis situations (conflict, pandemics, natural disaster, etc.)?

The question investigated was *how AI, data and robotics combined could contribute to CO2 emission reduction*. This issue was selected as CO2 emission resulting from human activity- being one of the causes of the climate change and risks for global warming[12]. Global warming represents a central concern for the population in European countries as the impact is already visible on the environment, in particular with the increase in severe weather events. We are hearing more and more and observing day after day, for example the dramatic impact on agriculture, food production and consequently on the well-being or even survival of the population in some regions of the planet[13].

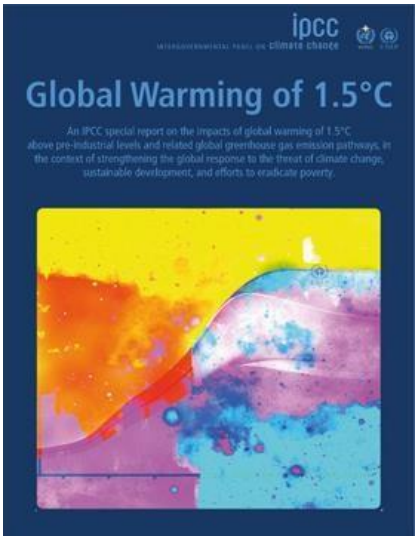


Figure 2: Report on global warming from IPCC[14]

[12] https://en.wikipedia.org/wiki/Special_Report_on_Global_Warming_of_1.5_%C2%B0C
[13] The Shift project: https://theshiftproject.org/en/home/
[14] *Valérie Masson-Delmotte; Panmao Zhai; Hans-Otto Pörtner; Debra Roberts; Jim Skea; Priyadarshi R. Shukla; Anna Pirani (2022). Global Warming of 1.5°C: IPCC Special Report on impacts of global warming of 1.5°C above pre-industrial levels in context of strengthening response to climate change, sustainable development, and efforts to eradicate poverty (PDF). Cambridge University Press. doi:10.1017/9781009157940. ISBN 978-1-009-15794-0. Wikidata Q123675901. Archived (PDF) from the original on 2023-06-12.*

This issue of CO2 emissions and energy consumption is all the more interesting as it leads to the energy consumption of data centres. These data centres demand more and more energy to train the AI applications and develop generative AI techniques[15].

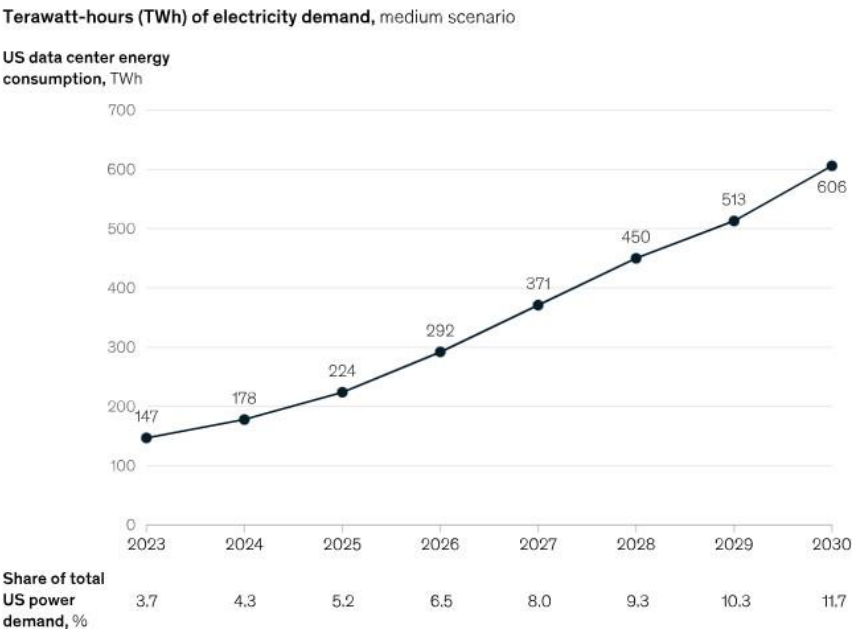


Figure 3: source: Global Energy Perspective 2023 McKinsey, October 18 2023

3.2 EU 2050 decarbonization objective

The European Union (EU) has set an ambitious goal to become climate-neutral by 2050. This objective is central to the European Green Deal and is legally binding under the European Climate Law. The aim is to achieve an economy with net-zero greenhouse gas emissions, aligning with the EU's commitments under the Paris Agreement[16].

The Key Points of the EU's 2050 Decarbonization Strategy

1. **Climate Neutrality by 2050**: The EU aims to be the first climate-neutral continent by 2050, which means achieving net-zero greenhouse gas emissions[17].
2. **Interim Targets**: To reach this goal, the EU has set interim targets, including reducing net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels[18].

[15] See What the data centre and AI boom could mean for the energy sector https://www.iea.org/commentaries/what-the-data-centre-and-ai-boom-could-mean-for-the-energy-sector
[16] European Commission. 2050 long-term strategy. EU Climate Action. https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en .
[17] Climate Action Tracker. Climate Action Tracker https://climateactiontracker.org/countries/eu/
[18] European Commission. Climate strategies & targets. European Commission https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en

3. **European Green Deal**: The European Green Deal is a comprehensive plan to make the EU's economy sustainable by turning climate and environmental challenges into opportunities across all policy areas and making the transition just and inclusive for all.
4. **Sector-Specific Actions**: The EU's strategy involves actions across various sectors, including energy, industry, transport, and agriculture. This includes increasing the use of renewable energy, improving energy efficiency, and promoting sustainable agriculture[19].
5. **Innovation and Technology**: The EU emphasizes the role of innovation and technology in achieving decarbonization. This includes investing in research and development of low-carbon technologies and promoting the use of digital technologies to improve energy efficiency[20].
6. **Policy and Regulation**: Significant changes to policies and regulations are required to achieve the EU's climate goals. This includes implementing the European Climate Law, which enshrines the 2050 climate-neutrality target into law, and other regulatory measures to support the transition to a low-carbon economy[21].
7. **International Cooperation**: The EU aims to lead global efforts in climate action through international cooperation and partnerships. This includes supporting developing countries in their decarbonization efforts and promoting global climate diplomacy[22].

Besides, industry represents 20% of the European economy (compared to 38% in China). When it comes to the technologies needed for the energy transition, the European Commission deplores the fact that the European Union (EU) is a net importer. The Union's trade balance is particularly negative for these technologies: nearly a quarter of electric vehicles and batteries, and most PV modules and fuel cells are imported, mostly from China. In other sectors where European industry is strong—wind turbines and heat pumps—our trade balance is deteriorating.

Today, the 27 Member States collectively rank third among the world's economies, behind the United States and China. The European Union must absolutely take measures to ensure that the 27 Member States remain the world's third-largest economy in 10 years.

However, industrial policies are decided at the national level in each country. To develop a European industry for the green transition, the Commission proposed a coordinated action to the Member States with in particular "NZIA" (Net Zero Industry Act).

With the Green Deal Industrial Plan for the Net-Zero Age, a new phase was opened, with the Commission focusing on industry coordination and research for technological deployment. Its aim is to accelerate the EU's manufacturing capacity needed to achieve the "Net Zero" objective by 2050.

[19] McKinsey & Company. (2020). How the European Union could achieve net-zero emissions at net-zero cost. https://www.mckinsey.com/capabilities/sustainability/our-insights/how-the-european-union-could-achieve-net-zero-emissions-at-net-zero-cost .
[20] European Commission. 2030 climate targets. https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-targets_en .
[21] European Commission. (2020). Committing to climate-neutrality by 2050: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_335
[22] Center for Climate and Energy Solutions (C2ES), (2024). 2040 Climate Target: How the EU Plans to Cut Emissions by 90 Percent. https://www.c2es.org/2024/02/2040-climate-target-how-the-eu-plans-to-cut-emissions-by-90-percent/

4 Defining the strategy of influence

Once the socio-economic challenge is identified, our objective is to mobilize and engage the 3 communities to work together in a cross-disciplinary approach to propose concrete combined innovative and research solutions.

4.1 Communication strategy

First, we developed a complete communication strategy to engage stakeholders. This communication strategy is based on an analysis of the environment.

This communication strategy is based on an analysis of the environment. A first approach to the ECS was to develop a complete communication of influence strategy involving the European AI, Big Data and Robotics stakeholders in 3-points: Mobilisation, Valorisation, Exemplarity[23].

The ECS is built on Europe's stated commitment, through the European Commission, to carry out actions to strengthen the European Strategic Autonomy and Economic Security. It brings together the interconnected worlds of Robotics, AI and Big Data in order to initiate programmes at the crossroads of research and the operational deployment of new solutions born in Europe. This is an ambitious mission that meets the need to offer increasingly complex solutions adapted to current environmental, social, economic, ethical and technological challenges.

- identification of the levers to make the ECS known and to make this new concept understood among research and innovation communities.
  Working on opinion leaders seems reasonable to arouse interest, inform and then convince both researchers and economic players to come to the annual event.
- Engaging decision-makers
  We also aim to inform political decision-makers and their entourages concerned by the approach.

This communication strategy relied on 3 points: Mobilisation, Valorisation, Exemplarity[24]:

- **Mobilization** through the associations, hubs and networks identified who, by their nature, are interested in the subject. These are the core target participants.

- **Valorisation** through the media to publicise the approach to European technical, economic and political presses in order to promote the action undertaken and to highlight those who participate in it.

- **Exemplarity** because it is interesting to show that "it is possible!" and that some European players have already successfully achieved the desired model. It is also an opportunity to invite those involved to come and share their successful experience during the day.

[23] This work was supported by Anne-Sophie Brousseau, *Corporate, crisis and influencer communications Consultancy*
[24] This work was supported by Anne-Sophie Brousseau, *Corporate, crisis and influencer communications Consultancy*

Although initiated in 2022, the stakeholders' communication strategy is keeping its pertinence and interest for all the following ECS and for the ADRA partnership and events.

4.1.1 Mobilisation

The ecosystem represents thousands of individual players at European level who could be concerned and interested in the ECS. Coming from both research, entrepreneurship and large industrial groups, it is impossible to reach them all directly and individually. However, they are often organised in order to be able to deploy their activities or make their actions and positions known within associations, networks and hubs.

At this level, they represent more than 75 entities that can be thematic at national level, such as the AI associations that have sprung up in almost all European countries and bring together research laboratories, start-ups and large groups. Some provide professional representation by sector at European level or promote specific targets such as Women in Big Data. Finally, others share global, cross-cutting reflections on specific aspects around the impact of actions not only at environmental level but also ethical or security, for example. In all cases, these players need to move the lines and promote their actions that are useful to the sector. The annual and thematic ECS falls within the scope of their action or the interest of their members. Informing them and, in some cases, inviting them will bring a certain virality to the event.

4.1.2 Valorisation

In order to reinforce the interests and the effect of the CS, we propose to give it visibility beyond the traditional media in the field of research.

We have identified nearly 30 media outlets, or about fifty journalists and influencers focused on technological popularisation, and its political, social, environmental and economic impact as well as on the theme of the edition: well-established classic newspapers, YouTubers and influencers who are looking for the opportunity to talk about an emerging subject or from a new angle, which is what the ECS offers. Reference players in their field, they are interested in what is new and concrete. Some of them are extra-European but are followed here.

4.1.3 Exemplarity

Encouraging through demonstration, affirming through the results of an experiment that the path is credible and solid. These are all assets offered by exemplarity. In our case, the search for ecosystem players has revealed, thanks to certain European networks and programmes, success stories that reflect the dynamics hoped for by the CE and Adra-E. The cartography was elaborated in 2022.

4.2. Defining tactics to engage stakeholders

The map of relevant stakeholders was issued in 2022, based on an analysis of the environment. It has served to contact and engage relevant stakeholders.

4.1.4 Stakeholders' mapping

The analysis conducted resulted in the stakeholders' mapping presented below Figure 4. This mapping gives the name and affiliation of stakeholders. For reasons of compliance with the GDPR, the names and affiliation of the stakeholders have been kept accessible to the partners of the ADRA-e project only and are voluntarily kept slightly blurred in the graphic illustration.

The ellipses in the picture illustrate the *proximity* between the partners in the consortium with the stakeholders: the project partners being represented at the centre of the graphic, the outer layer corresponding to stakeholder accessible to the partners indirectly for whom specific communication actions are needed.

The sectors indicate the domain of expertise of the stakeholders, following the PESTEL[25] categorisation:

- Economic,
- Environmental
- Legal
- Political
- Social or societal
- Technological

[25] See variants of the PEST analysis: https://en.wikipedia.org/wiki/PEST_analysis

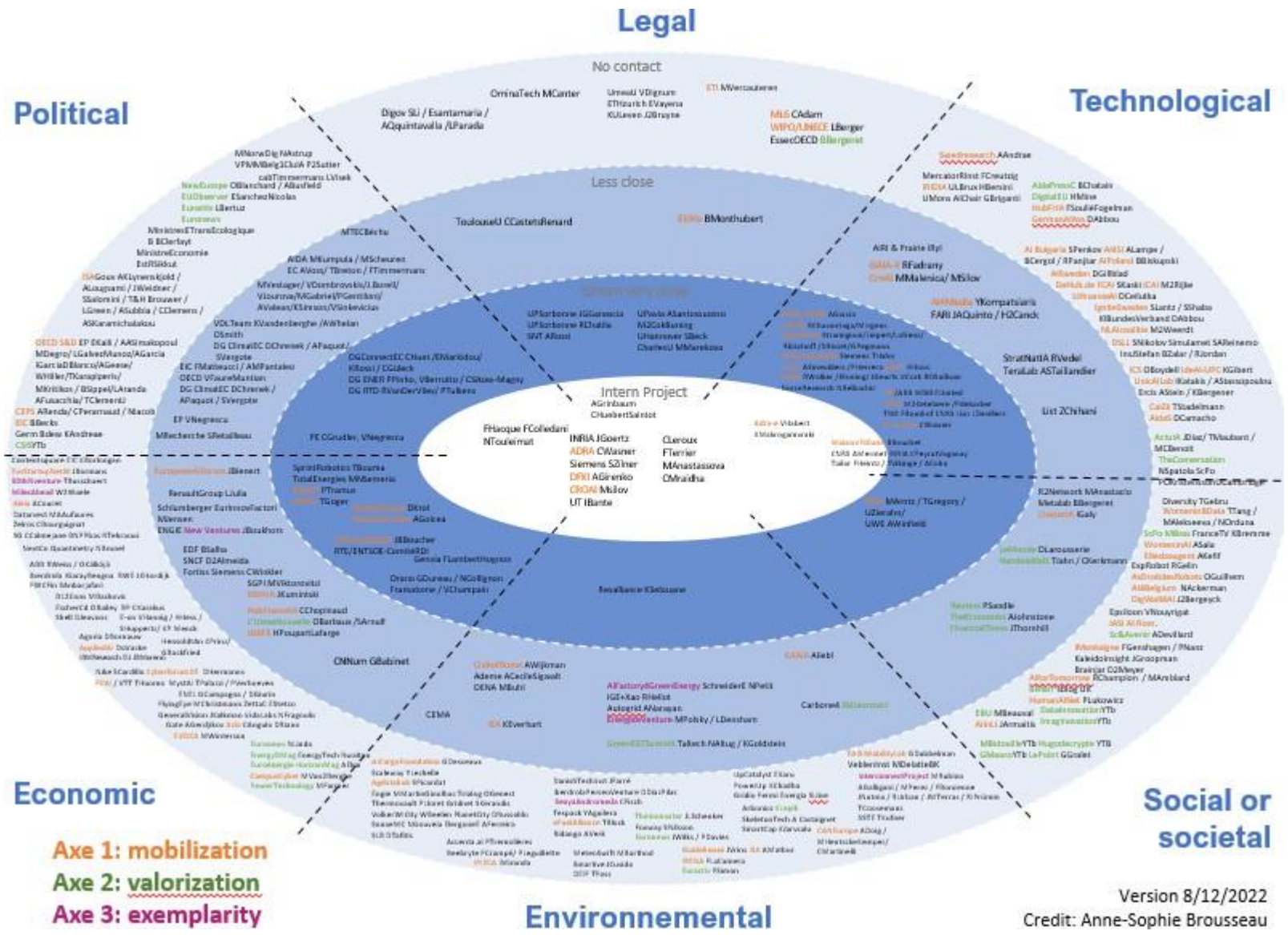


Figure 4: ECS stakeholder mapping - 2022

4.2.2. The tactics to engage stakeholders

For each relevant stakeholder, we decide the tactics for engagement following one of the 3 axes: mobilisation, valorisation and exemplarity. In the mapping (Figure 4) the chosen tactic is indicated by different colour

- **Axe 1: mobilization: orange**
- **Axe 2: valorisation: green**
- **Axe 3: exemplarity: purple**

5 The preparatory workshops

Three workshops were organized at the end of March 29, 30 and 31st. CEA, CroAI and UvA gathered in Brussels at the Maison Irene et Frédéric Joliot Curie[26] to supervise the workshops The latter was online. All the communication infrastructure with the speakers was organized by the Trust-IT team from ADRA-e. Each workshop gathered approximately 20 participants.

- March 29, workshop *ADR opportunities in manufacturing and Energy production and distribution sectors*
- March 30, workshop on *ADR opportunities in Transport ways and Hubs management*
- March 31, workshop on *ADR in Cities and Country sectors of application*

Workshop details are provided in the Appendix 8.1.

[26] https://www.maison-joliot-curie.eu/

6 The ECS 2024

6.1 ECS 2024 flow plan

Decarbonization issues concern a very wide range of activities and concerns relevant to European society and economy. For the 2024 Convergence Summit we decided to segment our work in three sessions:

1. **European strategies in ADR (see 6.4)**: The European Artificial Intelligence, Robotics and Big Data research and innovation players facing international competition.
2. **ADR facing environmental issues (see 6.5)**: The paradox related to the risk of increasing energy consumption due to the development of ADR vs the ambition to reduce CO2 emissions and increase sustainability
3. **Public involvement and normative issues (see 6.6)**: The impact of the combination of these technologies in terms of public acceptance, ethical, regulatory and socio-economic issues, in particular on employment

These three sessions were introduced (section 6.3) to recall the objectives, the context within which this ECS was organized and a key note speech to kick start the discussion about AI, Big Data, robotics and decarbonization.

The ECS was concluded by a *foresight panel* (see 6.7) gathering the outcome and recommendations of the previous sessions emphasizing the key takeaway message of the ECS 2024 presented in 7.2.

In parallel to the ECS 2024 an exhibition about success stories in research and Innovation in Europe in AI, Big Data and Robotics technologies was set up (see section 9). For more information about this exhibition, the participants, please refer to the document *D2.7 – ADR Exhibition & Foresight Panel report 2* available on the ADRA portal.

A recap of logistics and organization is presented in section 6.2.

6.2 ECS logistics

Decision was taken to organize the ECS at the Borschette Centre in Brussels. This choice is motivated by the central location of Brussels to reach out organizations and people interested, and motivated to take part to the orientation of research and innovation in ADR technologies.

The date for the Convergence Summit was initially fixed on the 3rd of July at the Borschette Conference Centre from the EC. Decision was made with the EC in May to postpone the Summit in October 2023 to gain some time for the organization. This date was finally cancelled.

In November 2023 the ADRA-e partners decided to organize the ECS online. An online conferencing platform was selected by the Technical Committee after review, with the following criteria: quality of the plenary online conference space, capacity for exhibition space and breakout rooms, online registration, back-office facilitation, analytics following the event, and value for money.

The ECS took place on the 19th of June 2024 from 9h00 to 17h00. This first edition was organized online together with a virtual exhibition representing success stories in ADR technologies in Europe (see Appendix 9).

Speakers and panellists included high-level experts in various domains including industrials, jurists, specialists of ethics of certification bodies, public authorities and socio economists.

The targeted audience of this event were experts willing to have their say about research and innovation in ADR in the European Union. The audience also include influencers and communication experts to disseminate the results of the Summit, as well as professionals and researchers currently working in these domains within EU-funded R&D projects.

The one-day summit consisted of three main sessions, each organized to facilitate thought provoking and insightful discussions. The sessions featured a combination of expert presentations and panel discussions with individuals known for their expertise and interest in AI, Data, and Robotics technologies, as well as their deep understanding of energy-related issues related to CO2 reduction. A final session, the foresight panel was organized to recap the results of the previous sessions and draw the conclusions

The issues investigated in these sessions are described in the following sections.

All the videos were edited and published on the Adra-e YouTube channel

6.3 Introduction to the summit

The summit started with a brief presentation of the context: the ADR partnership, the ADRA association, followed by a presentation of the objectives of the ECS for the audience.

Introduction	Name	Organisation
ADR partnership, ADRA	Philip Piatkiewicz	Secretary General ADRA
ECS objectives, Schedule, message	Christophe Leroux	CEA, ADRA BoD
Key note speech on ADR and microelectronics in EU	Tanguy Coenen	IMEC

In its key note speech Tanguy Coenen from IMEC pointed out that the rise of AI presents significant energy challenges, particularly in data centres and model training. Innovations are emerging to mitigate this impact, such as neuromorphic computing inspired by the brain and cryogenic computing, which enhances energy efficiency at low temperatures. Probabilistic computing offers tailored solutions for specific complex problems while limiting energy consumption. He underlined

the importance of Edge which AI enables local data processing, reducing reliance on the cloud, improving privacy, and optimizing renewable energy use. Applications include energy management in buildings and intelligent personal assistants. In his conclusions, Tanguy relates to the **iMac Net Zero** tool from IMEC, to model the carbon footprint of current and future semiconductor technologies. These tools are intended to inform industry stakeholders, but require data spaces to share reliable data. IMEC proposes to apply this global approach to the semiconductor industry through multilateral governance. This includes data standardisation, stakeholder integration and the creation of a market for exchanging data and services. The objective is to promote ecological transparency and cooperation in a global industry.

6.4 Session 1: European Strategies in ADR

6.4.1 Focus and organization of the session

The opening segment of the Summit focused on assessing Europe's current position in the ADR industry compared to the global landscape. Speakers and panellists were asked to examine the intensifying competition among leading countries and address the indispensable role of AI, Data and Robotics in the European Union. With the increasing demand for intelligent systems in various industries, especially in the energy sector, this session aimed to bring together energy specialists, industrials from various sectors, ADR researchers, and policy makers from the European Union. The overall goal was to identify key avenues for ADR research that can effectively contribute to achieving CO2 reduction targets. Key points that will be addressed include:

- In the context of the ADR industry, how does Europe's current standing compare to the global landscape? What are the unique strengths and challenges that Europe faces in this field?
- Considering the pressing need to reduce CO2 emissions, how can ADR research make a significant contribution to achieving such targets?
- Are there specific areas within AI, Data, and Robotics where further investment, collaboration, or regulation is required?
- How can interdisciplinary efforts and cross-sector partnerships drive impactful advancements in CO2 reduction through ADR?

The moderator of this session on "*European strategies in ADR: The European Artificial Intelligence, Robotics and Big Data research and innovation players facing international competition*" was **Philip Piatkiewicz** Secretary general from ADRA

Role	**Name**
Moderator	Philip Piatkiewicz, secretary general ADRA
Keynote speaker session 1	Thilbauld Jongen, Generative Robotics, CEO and founder
Panel Session 1	Bjoern Juretzki, EC DG Cnect
	Stefan Martinic, Kramaric & Partners, LLM. Harvard Law School
	Antoine Couret, Hub FranceIA,
	Golboo Pourabdollahian, IDC

6.4.2 Key note and panel discussion highlights

Thibauld Jongen, Generative Robotics

The speaker highlights the need for affordable automation to replace manual labour in Europe's high-value, low-volume manufacturing sector, where automation is complex and costly. Advancements in robotics and AI offer opportunities to enhance productivity and competitiveness in this critical industry. He advocates that automating manual work in aerospace, will expand to other industries like healthcare and construction. Robots need to be safe, dexterous, intelligent, and capable of cumulative learning. Challenges include ensuring safety, trustworthiness, repeatability, and data standardization for physical-world tasks. A stepwise approach to automation aims to replace manual work gradually, using technologies like teleoperation and assistive systems. This shift improves productivity, quality, sustainability, and local manufacturing while addressing future labour shortages.

Golboo Pourabdollahian, highlighted the importance of a **computing continuum** for the convergence of ADR technologies. Computing continuum integrates cloud, edge, and IoT infrastructure to optimize data processing and analysis based on specific use case needs, such as AI training in the cloud and real-time processing at the edge. While it enhances scalability, flexibility, and performance, its adoption faces challenges like interoperability, standards, and ROI clarity. Collaboration across European initiatives is crucial to tackle these gaps effectively.

For a solid basis for ADR, Bjoern Juretzki, and Stefan Martinic both insist on the importance of the European Data Strategy (2020) aiming to establish a strong, competitive, and innovative European data economy through **legislative initiatives** and **funding programs**. The strategy and regulations, such as the Data Act and AI Act, focus on increasing data availability, interoperability, and trust while safeguarding fairness and innovation. They aim to empower start-ups and SMEs, enable advanced services, and ensure ethical standards, positioning Europe as a competitive force in the global digital and AI economy. Key legislative tools include the **Data Act**, which grants IoT device users, full control over data and facilitates business-to-government data sharing and cloud switching. The **Data Governance Act** introduces neutral data intermediaries, while the **Open Data Directive** mandates public access to high-value datasets like geospatial and meteorological data.

The strategy promotes **common European data spaces** supported by €750M, fostering innovation in areas like healthcare (e.g., a cancer image repository) and interoperability across sectors. These measures aim to empower SMEs and start-ups by democratizing data access, fostering innovation, and accelerating digital transformation, ultimately driving Europe’s data economy and global competitiveness.

Antoine Couret from Hub France IA highlighted the critical challenges Europe's tech and AI industry faces: limited market share (2-5%), insufficient computing power, data access barriers, and lack of global competitiveness. To address this, Europe must invest in robust AI infrastructure, bridging its gap in GPU resources against global giants like Meta. Data ecosystems need streamlined copyright policies, funding, and standardization to foster AI innovation. Collaboration between start-ups, scale-ups, and large companies is essential to compete globally. Market openness is crucial; closed ecosystems (e.g., Microsoft 365 tied to Azure) hinder competition and innovation. Europe should promote interoperability, fair competition, and encourage start-ups to think beyond local markets. By tackling these, Europe can aim for a 20% global market share and secure a stronger presence in AI.

During the panel discussion, **Thibauld Jongen** spoke on his side on the urgent need Europe faces to act decisively in AI and technology development. While it has strong talent, research, and industrial users, it lacks "super integrators" like Meta or Google to connect innovation with the market. Key challenges include insufficient private investment, risk appetite, and the absence of foundational public infrastructure to manage and standardize data, as well as to provide high-performance

computing. There is a call for a "CERN for AI"—a unified European initiative combining infrastructure, certification, and long-term technology roadmaps to channel contributions into market-ready solutions. Without immediate action, Europe risks losing the AI race, which could jeopardize its industrial future and strategic autonomy.

Access to data is key for ADR research and innovation. **Bjoern Juretzki** mentioned how Europe is addressing data regulation differently than the U.S., particularly in managing gatekeepers and data brokers. Through the Digital Markets Act, Europe imposes restrictions on big tech companies classified as gatekeepers, barring them from accessing data made available under the DATA Act to prioritize data access for smaller, data-poor companies. The Data Governance Act strictly regulates data intermediaries, ensuring neutrality and preventing them from acting in the interests of larger corporations.

He also exposed the need for computing capacities, the debate between some that call for a centralized European "super integrator" for AI, others advocate a decentralized approach. Europe's initiatives, such as data spaces and projects like the Cancer Imaging Data Space, are fostering innovation through distributed networks, supporting start-ups and smaller players. This decentralized model aligns better with AI's fragmented development landscape, unlike fields like semiconductors, which benefit from centralization.

6.4.3 Recommendations for Europe in 10 years

Europe must scale up and aggressively enter global markets to compete with the U.S. and China. Unlike these regions, Europe lacks an investment-friendly environment that facilitates significant private funding. The U.S. and China are pouring vast resources into key technologies like generative AI and data-driven innovations. While Europe has strong solutions, it needs more robust financial and structural support to bridge the gap. This includes fostering initiatives that help European players expand beyond regional markets and compete on the global stage.

Golboo Pourabdollahian: Sustaining public investments in AI, robotics, and data spaces is crucial but challenging, given competing demands from defence, climate change, and a Eurosceptic public reluctant to fund Brussels. Maintaining these investments amid budget constraints would already be a significant achievement.

Stefan Martinic: The public sector must remain adaptable and proactive in regulating rapidly evolving technologies like AI. It needs to stay ahead of global regulators, continue investing, and continuously adjust its approach as the AI landscape evolves.

Antoine Couret: The goal for Europe in the next decade is to become a global tech leader, aiming for 25-30% market share in AI and cloud. To achieve this, Europe must leverage its strengths in research and industry, invest in both infrastructure and private sector development, and focus on becoming a key player with global solutions. The first priority is to build the necessary infrastructure.

Europe should focus on creating a thriving business ecosystem, ensuring both the infrastructure and market conditions are in place to allow businesses to grow. The emphasis should be on market demand and ecosystem support, rather than just technology or regulation push.

6.5 Session 2: ADR and Environmental Issues

6.5.1 Focus and objective of the session

The second segment of the summit was meant to highlight the dichotomy between ADR technologies and environmental sustainability. While ADR holds immense potential for improving the energy sector, sustainable agriculture, smart mobility, and other areas, it also contributes to the growing environmental footprint, especially with the advent of Generative AI systems. This session will address key issues such as reversing the trend in carbon emissions by developing innovative technologies without compromising efficiency, considering the global impact of ADR benefits that justify its significant carbon footprint, and the need for stronger regulations to ensure a globally beneficial trade-off.

High-profile participants from ADR research, industry, high-performance computing, mass data processing, and the environmental/climate sector will come together to discuss these alternatives and provide valuable insights to decision-makers and guide Europe on the path to sustainable ADR and a sustainable society. Key points that will be addressed include:

- To what extent can the rise in CO2 emissions attributed to ADR be mitigated through the development of frugal technologies that maintain efficiency?
- Should the issue be approached on a global scale, taking into account the potential benefits of ADR technologies that justify their substantial carbon footprint?
- What is an acceptable balance between these factors?
- Should there be stricter regulations in place to ensure a globally favourable trade-off in the utilization of these technologies?

Ana Garcia, Secretary General of BDVA moderated this session dedicated to *ADR facing Environmental issues: The paradox related to the risk of increasing energy consumption due to the development of ADR vs the ambition to reduce CO2 emissions and increase sustainability*

Role	**Name**
Moderator	**Ana Garcia,** secretary general BDVA
Keynote speaker session 2	**Monique Calisti, Martel Innovate**
Panel Session 2	**Jean-Philippe Nominé**, Secretary General ETP4HPC
	Armando Carillo, Secretary General EURNEX
	Enzo Tartaglione, IMT, Institut Polytechnique de Paris **Jan-Willem van de Meent**, University of Amsterdam ELiAS, the European Lighthouse of AI for Sustainability
	Chris De Cubber, Effra association
	Petri Mylimaki, U Helsinki

6.5.2 Key note and panel discussion highlights

Monique Calisti, Martel Innovate

Viewpoint

- Discusses the environmental challenges humanity faces, including pollution, biodiversity loss, and extreme weather events.
- Points out the dual role of ICT: both a solution and a contributor to environmental issues.

- Stresses the urgency of addressing these challenges through collaborative efforts involving research, industry, policymakers, and citizens.

Recommendations

- Adopt sustainability by design in technology development.
- Implement policies and regulations to enforce sustainability.
- Educate and raise awareness among all stakeholders.
- Promote a holistic and multi-disciplinary approach to green digitalization.

Petri Myllymäki, University of Helsinki

Viewpoint:

- Highlights the significant energy consumption of AI models, such as training a Llama 2 model producing CO2 equivalent to an average US citizen's 16-year footprint.
- Advocates for a more collaborative and open approach to AI development to reduce duplication and increase efficiency.

Recommendations:

- Invest in HPC hardware and optimize current data centre solutions.
- Develop and share more energy-efficient AI algorithms.
- Consider the full stack of AI, including edge computing and IoT, to leverage Europe's strengths.
- Promote open-source and collaborative AI development to accelerate progress.

Chris De Cubber, EFFRA

Viewpoint

- Discusses the use of AI and data in manufacturing to optimize processes and improve energy efficiency.
- Highlights the importance of data quality and the need for informed decision-making.

Recommendations:

- Focus on obtaining and utilizing high-quality data.
- Implement AI to optimize manufacturing processes and reduce energy consumption.
- Promote the use of lightweight and efficient AI solutions tailored to specific industrial needs.

Armando Carrillo, Secretary General EURNEX

Viewpoint:

- Emphasizes the environmental benefits of rail transport and the potential of AI to enhance its efficiency and flexibility.
- Discusses the challenges and opportunities in improving rail transport through AI and data.

Recommendations:

- Use AI to optimize rail traffic management and maintenance.
- Address regulatory and administrative challenges to improve rail transport efficiency.

- Invest in AI-driven solutions to enhance the capacity and flexibility of rail networks.

Jean-Philippe Nominé, Secretary General ETP4HPC

Viewpoint:

- Discusses the role of HPC in serving various applications, including those focused on environmental sustainability.
- Highlights the challenges and opportunities in optimizing HPC for energy efficiency.

Recommendations:

- Optimize HPC infrastructure and components for energy efficiency.
- Monitor and fine-tune HPC systems to balance energy use across different applications.
- Collaborate with manufacturers to promote sustainable and localized production.
- Develop software layers to manage energy more efficiently in HPC sites.

Jan-Willem van de Meent, University of Amsterdam

Viewpoint:

- Focuses on the potential of AI to address sustainability challenges, such as energy usage in buildings and climate modelling.
- Highlights the need for AI methods that can handle complex simulations and provide fast approximations.

Recommendations:

- Develop AI methods for material science and climate modeling to identify sustainable solutions.
- Promote research mobility and collaboration through programs like Elias.
- Encourage the development of AI methods that can scale up and have a significant impact on sustainability.

Enzo Tartaglione, IMT

Viewpoint:

- Discusses the energy consumption of deep neural networks and the need for more efficient AI algorithms.
- Highlights the importance of reducing data requirements and optimizing training and inference processes.

Recommendations:

- Develop AI algorithms that require less data and are more energy-efficient.
- Optimize the usage of AI models to reduce energy consumption during inference.
- Promote the use of edge computing to reduce latency and energy costs.

6.5.3 Summary

Viewpoint:

- Highlights the paradox of increasing energy consumption due to AI, data, and robotics versus the need to reduce CO2 emissions and increase sustainability.
- Emphasizes the importance of balancing the benefits of these technologies with their environmental impact.

Recommendations:

- Focus on sustainability by design.
- Promote transparency and accountability in technology development.
- Educate stakeholders on sustainable practices.
- Foster a multi-stakeholder and multidisciplinary approach to green digitalization.

The speakers collectively emphasize the importance of balancing the benefits of AI, data, and robotics with their environmental impact. They recommend a multi-stakeholder and multidisciplinary approach to green digitalization, focusing on sustainability by design, transparency, education, and efficient use of resources. Specific strategies include optimizing HPC infrastructure, developing energy-efficient AI algorithms, and leveraging edge computing to reduce energy consumption.

6.6 Session 3: Public Involvement and Normative Issues

6.6.1 Focus and organization of the session

Rapid technological advances have accelerated the pace of change in our world, presenting both unprecedented opportunities and significant challenges. Climate change, one of the most pressing threats of our time, makes it necessary to explore how the convergence of key 21st century technologies, such as AI, Data, and Robotics, can help reduce CO2 emissions and address these challenges. The third segment at the 2023 Convergence Summit aimed to bring together experts representing diverse perspectives in ethics, law, economics, and technology to discuss this critical issue. Discussions will revolve around the need for legal, ethical, and regulatory frameworks for the use of ADR technologies to ensure their responsible and ethical use while realising their potential to combat climate change. In addition, the session will analyse the socio-economic impacts of ADR technology, considering the implications for industry, the labour market, and economic growth. Key points that will be addressed include:

- What are the necessary legal, ethical, and regulatory frameworks that should govern the deployment of ADR technology to ensure its responsible and ethical use while maximizing its potential in combating climate change?
- How can collaboration between governments, industry stakeholders, and research institutions facilitate the establishment and enforcement of effective regulatory frameworks for ADR technology in the context of climate change?
- In what ways can ADR technology contribute to the transformation of industries, such as energy, transportation, and agriculture, while minimizing negative impacts on job markets and employment patterns?

This session on "*Public involvement and normative issues: The impact of the combination of these technologies in terms of public acceptance, ethical, regulatory and socio-economic issues, in particular on employment*" has been moderated by Holger Hoos, Professor of Artificial Intelligence at RWTH Aachen University,

Role	**Name**

Moderator	**Holger Hoos,** RWTH Aachen
Keynote Speaker session 3 **Title: When codes are not enough: Ethical assessment and legal compliance in the age of the AI Act**	**Albert Sabater Coll,** Serra Húnter Associate Professor of Sociology, Director of the Observatory for Ethics in Artificial Intelligence (OEIAC in Catalan), and Coordinator of Studies of the Master in Business Economics at the Faculty of Economic Sciences and Business at the University of Girona.
Panel Session 3	**Reinhard Lafrenz**, Secretary General of euRobotics
	Andrea Čović, Deputy Head of Representation and Head of Media, European Commission in Croatia
	Tea Žakula, Associate Professor and Head of the Laboratory for Energy Efficiency, Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb
	Chiara Venturini, Head of Digital Transformation and Economic Development at Eurocities

6.6.2 Key note and panel discussion highlights

Here is a summary of the points of view expressed by each person in the text, along with their recommendations:

Dr. Alberto Sabater Coll, University of Girona

Viewpoint

- Emphasizes the importance of ethical principles and legal compliance in the age of AI.
- Highlights the need for AI systems to be transparent, fair, and explainable.
- Discusses the European AI Act and its focus on risk-based regulation.
- Stresses the importance of sustainability and the environmental impact of AI systems.

Recommendations:

- Develop and apply ethical principles in AI systems.
- Ensure transparency, fairness, and explainability in AI.
- Comply with the European AI Act and focus on high-risk AI applications.
- Consider the environmental impact and sustainability of AI systems.

Andrea Čović, Representation EC in Croatia

Viewpoint

- Discussed the importance of regulation in ensuring consumer protection and human rights.
- Emphasizes the need for public involvement and the human-centric approach in technology development.

Recommendations

- Implement regulations that protect consumers and human rights.
- Ensure public involvement in the development and deployment of AI technologies.
- Promote a human-centric approach in AI development.

Chiara Venturini, Eurocities

Viewpoint

- Discussed the role of cities in deploying technologies to achieve policy goals.
- Highlights the need for European technologies to be tailored to local needs and the importance of collaboration and standardization.

Recommendations

- Develop technologies that are tailored to the specific needs of European cities.
- Promote collaboration and standardization to ensure interoperability and competitiveness.
- Increase funding and support for cities to scale up successful solutions.

Tea Zakula, University of Zagreb

Viewpoint

- Focuses on the need for human-centric design and public involvement in AI development.
- Discusses the importance of education and interdisciplinary collaboration in developing AI technologies.

Recommendations

- Involve the public and users in the design and development of AI technologies.
- Promote interdisciplinary collaboration, including psychologists and other experts, in AI development.
- Focus on education and public awareness to increase acceptance and understanding of AI technologies.

Reinhard Lafrenz, euRobotics

Viewpoint

- Discussed the importance of AI and robotics in addressing societal and industrial needs.
- Highlights the need for public acceptance and safety in AI and robotics.

Recommendations

- Invest in AI and robotics to address societal and industrial needs.
- Ensure public acceptance and safety in the development and deployment of AI and robotics.
- Promote education and awareness to increase public acceptance of AI technologies.

Holger Hoos (Moderator), RWTH Aachen

Viewpoint

- Highlighted the importance of public involvement, normative issues, and the balance between regulation and innovation.

Recommendations

- Ensure a balance between regulation and innovation to promote the development of AI technologies.
- Focus on public involvement and normative issues in the development and deployment of AI technologies.
- Promote education and awareness to increase public acceptance and understanding of AI technologies.

6.6.3 Summary

The discussion highlights the importance of ethical principles, legal compliance, and public involvement in the development and deployment of AI technologies. The European AI Act and its focus on risk-based regulation are emphasized, along with the need for transparency, fairness, and explainability in AI systems. The environmental impact and sustainability of AI systems are also discussed. The role of cities in deploying technologies to achieve policy goals is highlighted, along with the need for European technologies to be tailored to local needs. The importance of education, interdisciplinary collaboration, and public awareness in increasing acceptance and understanding of AI technologies is emphasized. The discussion also highlights the need for investment in AI and robotics to address societal and industrial needs, along with ensuring public acceptance and safety.

6.7 Foresight Panel

6.7.1 Focus and organization of the session

To wrap-up, two main events were organised to provide recommendations for R&D funding priorities.

- A foresight panel discussed on the outcomes of the rest of the panels.
- The Exhibition showcases outlined future promising paths for ADR.

The Foresight Panel supported the creation of key takeaway messages to be broadly disseminated at the end of the Summit.

The session "*Foresight panel – overview of results, connection of remarks with the ADR SRIDA, draft of ECS message; Now work together towards a sustainable Europe*" was moderated by Iddo Bante from University Twente (NL). The panel was composed of participants from each of the sessions.

Role	Name	Organization
Moderator	Iddo Bante	University of Twente

Panellist	Ana Garcia	Secretary general BDVA
	Reinhard Lafrenz	Secretary general euRobotics
	Philip Piatkiewicz	Secretary general ADRA
	Kimmo Rossi	European Commission
	Fredrik Heinz	University Linköping, BoD ADRA
	Petri Myllymäki	University of Helsinki, BoD ADRA

6.7.2 Panel discussion highlights

Iddo Bante, University of Twente, Moderator

Viewpoint

- Emphasizes the value of convergence in AI, data, and robotics technologies.
- Highlights the importance of scaling up and removing barriers to compete globally.
- Stresses the need for sustained public investments and flexible regulation.
- Advocates for Europe to take a leadership role and move away from a follower mentality.
- Emphasizes the importance of strengthening the link between research and the market.

Recommendations

- Focus on the convergence of AI, data, and robotics technologies.
- Scale up and remove barriers to foster innovation and global competitiveness.
- Ensure sustained and coherent public investments.
- Promote flexible regulation to stimulate technology transfer and commercial outputs.
- Strengthen the link between research and the market.

Philip Piatkiewicz, Secretary General of ADRA

Viewpoint

- Highlights the tangible value in the convergence of AI, data, and robotics.
- Emphasizes the need for scale-up and removing barriers to fragmentation.
- Stresses the importance of sustained public investments and flexible regulation.
- Advocates for Europe to establish a new pathway and move away from a follower mentality.
- Emphasizes the importance of strengthening the link between research and the market.

Recommendations

- Focus on the convergence of AI, data, and robotics technologies.
- Scale up and remove barriers to foster innovation and global competitiveness.
- Ensure sustained and coherent public investments.
- Promote flexible regulation to stimulate technology transfer and commercial outputs.
- Strengthen the link between research and the market.

Anna Garcia, Secretary General of BDVA, moderator of Panel Two

Viewpoint

- Discusses the trade-off between using technologies for environmental benefits and their energy consumption.
- Highlights the need for sustainability by design and control measures.
- Emphasizes the importance of education and collaboration.
- Provides examples from manufacturing and transport sectors on the benefits of AI, data, and robotics.
- Mentions the role of HPC in optimizing energy consumption.

Recommendations

- Focus on sustainability by design and control measures.
- Promote education and collaboration.
- Optimize energy consumption in HPC.
- Utilize AI, data, and robotics for efficiency and sustainability in various sectors.

Reinhardt (Secretary General of euRobotics)

Viewpoint

- Discusses the importance of developing ADR technologies in Europe.
- Emphasizes the need for a balance between innovation and ethics/regulation.
- Highlights the role of the AI office and the importance of sandboxes in regulation.
- Stresses the need for non-biased and non-discriminatory implementation of regulations.
- Advocates for market pull and understanding actual needs rather than technology push.

Recommendations

- Develop ADR technologies in Europe to meet local needs and regulations.
- Balance innovation with ethics and regulation.
- Utilize sandboxes for effective regulation.
- Ensure non-biased and non-discriminatory implementation of regulations.
- Focus on market pull and understanding actual needs.

Fredrik Heinz, University Linkoping, panellist

Viewpoint

- Emphasizes the importance of scaling and defragmentation of initiatives.
- Advocates for pooling resources and ensuring large-scale initiatives.

Recommendations

- Focus on scaling and defragmentation of initiatives.
- Pool resources to ensure large-scale initiatives.

Petri Myllymäki, University of Helsinki, panellist

Viewpoint

- Discusses the importance of scaling and the need for Europe to pool resources.
- Highlights the role of AI factories and the holistic view of the full stack of AI.
- Emphasizes the need for Europe to invest in HPC and collaborate on AI development.

Recommendations

- Focus on scaling and pooling resources.
- Invest in HPC and collaborate on AI development.
- Take a holistic view of the full stack of AI.

Kimmo Rossi (European Commission)

Viewpoint

- Discusses the role of the European Commission in creating favourable conditions for scaling.
- Emphasizes the need for market pressure and actual needs.
- Highlights new instruments like TEFs, AI factories, and data spaces for scaling.
- Mentions the European Digital Infrastructure Consortium (EDIC) as a new funding instrument.

Recommendations

- Create favourable conditions for scaling.
- Focus on market pressure and actual needs.
- Utilize new instruments like TEFs, AI factories, and data spaces.
- Leverage the European Digital Infrastructure Consortium (EDIC) for funding.

6.7.3 Summary

The discussion highlighted the importance of convergence, scaling, and sustained public investments in AI, data, and robotics technologies. The need for flexible regulation, education, and collaboration is emphasized. The role of the European Commission in creating favourable conditions for scaling and the importance of market pressure and actual needs were discussed. The utilization of new instruments like TEFs, AI factories, and data spaces, as well as the European Digital Infrastructure Consortium (EDIC) for funding, was recommended. The need for a holistic view of the full stack of AI and the importance of pooling resources were also emphasized.

7 Conclusions

In the first part of this concluding section we provide some general observation about AI, Big Data and Robotics and Net zero goals. We then provide a set of general comments. The Key take away messages of this ECS 2024 are provided in section 7.3. We terminate this section with some lessons learnt on the organization of this ECS for the organization of the ECS 2025.

7.1 ADR and Net zero goals

Exhibit: Robotics and data already showed their added value in the past; now AI is finally starting to deliver real-life benefits to companies too. Several use cases demonstrated the effectiveness of robotics and AI in helping organizations decarbonize to achieve their Net Zero goals. The deployment of climate technologies that avoid, reduce, or capture emissions and can replace carbon- intensive incumbent technologies has accelerated significantly in the past decade. Scaling of these climate technologies is now more critical than ever. When combined with a robust decarbonization strategy that includes the use of renewable energy and sustainable business practices, ADR technologies will become essential building blocks in helping organizations reduce their carbon emissions.

Innovation: While the AI and decarbonization markets are both growing in size and importance, innovation where the two meet is much less than in several other areas where AI is being adopted more readily. Much of the AI adoption outside of the tech sector is at an early, experimental stage and only a few firms have deployed it at scale. This adoption pattern is widening the gap between digitized early adopters and others. Currently, ICT, telecommunications, financial services, high tech, are showing the highest rates of AI adoption and have the most ambitious AI investment plans. Innovation is critical to decarbonization, driving new solutions that will enable sectors to reduce their emissions. However, to decarbonize on a large scale requires a significant shift in traditional industry methods and practices. Advanced ADR technology innovation can be the driving force to provide new and disruptive opportunities, accelerating European decarbonization.

ELSE: Despite concerns about the impact of AI and robotics on jobs and the potential for AI to be misused, the technologies are also seen as a powerful tool in being able to combat climate change. Both technology and ELSE-readiness are essential to create economic and societal impact.

Cross-technology decarbonization exploration: Climate technologies rarely stand alone. ADR are only 3 of the many technologies that should be employed to address the global challenge. They cannot solve the climate crisis in isolation, and organizations should consider how other emerging technologies can help. AI, machine learning, the Internet of Things, robotics, and many other technologies can and will play an important role in the reduction of carbon dioxide. Decarbonization innovation is a complex system in which often multiple technologies has to converge to support the net zero ambitions. It's more than only the convergence between AI-Data-Robotics technologies.

Innovation ecosystem: Climate technologies are highly interdependent; these interdependent markets require cooperation across value chains and industrial ecosystems. The challenge is accelerating innovation and scale-up to achieve technical and commercial breakthroughs. Promising solutions need resources and networks if they are to maximize the potential of AI and robotics in addressing climate change. They need access to capital investments, decision makers, and trained practitioners, allowing them to be deployed at scale. Financial support can bridge the gap between academic research and at-scale deployment, connections to policymakers and corporate leaders

can help boost awareness and adoption, sharing knowledge on best practices and promising applications can help to speed-up the European scaling of solutions.

AI as a tool for informed decision making: AI and robotics can be integral parts of greener products and solutions itself, but often AI is a tool helping to make informed judgments about how to tackle climate challenges. AI as a tool is uniquely positioned to help manage complex issues. Due to its capacity to gather, complete, and interpret large, complex datasets, it can be used to support all stakeholders in taking a more informed and data-driven approach to combating carbon emissions and building a greener society.

7.2 General comments

Develop a technology-enabled EU investment & implementation plan for decarbonization: Companies can maximize decarbonization through investment in critical technologies. Businesses can consider synergies between the use of specific (e.g. ADR) technologies for decarbonization and their broader business-backed technology strategy. The plan can provide the basis for a model that can be frequently updated as new solutions become available.

Stimulate cross-sector collaboration and knowledge sharing in innovation chains: It's key to find sustainable and innovative ways for both society and business to move towards a low carbon circular economy and ensure sustainable growth. Bringing together cross-sector stakeholders within specific innovation chains, from AI and robotics start-ups to academics and large industry players and end-users, will be critical for ADR innovation to scale. Companies has to gear up to comply with increasingly complex sustainability regulations, and the social acceptance of the used ADR technologies require a real integral approach. To be able to create societal and economic impact next to technological impact, it’s important to bring together the academic and industrial developers of new technologies (‘Makers’) and the ELSE (Ethical, Legal, Societal Acceptance, Economic/Business Modelling) ‘Shapers’. We should look at the full European toolbox available in terms of legislation, non-legislative policies, education & skills, research and innovation funding, ethics and responsible design approaches, etc.

Stimulate a cross-technology decarbonization innovation eco-system: Decarbonization innovation requires a complex ecosystem of multiple converging technologies (more than only ADR) to support the net zero ambitions in specific application domains.

Prioritize sustainability and decarbonization in industrial sectors of the EU economy: Consider climate objectives in all impact assessments for future digital regulation, promoting the enabling impact of ADR technologies and vice versa.

Responsible innovation and building trust: Ensure coordination in EU efforts to provide roadmaps that support high carbon-emitting sectors in considering responsible AI and robotics adoption. Build trust and support the adaptation of shared standards and regulation to drive further innovation on decarbonization.

Enable skills pipelines and corporate agility: Support companies to develop ADR-skills and -knowledge. This will drive agility in traditional practices and increase the benefits that ADR can bring. This means outlining business models to ensure the EU can readily decarbonize, as well as keeping pace with technological innovation.

7.3 ECS 2024 Take away Message and recommendations

General Recommendations

☑ Affordable Automation:

- Develop safe, dexterous, intelligent robots capable of cumulative learning.
- Ensure safety, trustworthiness, repeatability, and data standardization for physical-world tasks.
- Adopt a stepwise approach to automation using technologies like teleoperation and assistive systems.

☑ Computing Continuum:

- Integrate cloud, edge, and IoT infrastructure to optimize data processing and analysis.
- Address challenges like interoperability, standards, and ROI clarity through collaboration across European initiatives.

☑ European Data Strategy:

- Increase data availability, interoperability, and trust while safeguarding fairness and innovation.
- Empower start-ups and SMEs, enable advanced services, and ensure ethical standards.
- Utilize legislative tools like the Data Act, Data Governance Act, and Open Data Directive.

☑ Investment and Infrastructure:

- Invest in robust AI infrastructure and bridge the gap in GPU resources.
- Streamline copyright policies, funding, and standardization to foster AI innovation.
- Promote interoperability, fair competition, and encourage start-ups to think globally.

☑ Public and Private Sector Collaboration:

- Foster collaboration between start-ups, scale-ups, and large companies to compete globally.
- Ensure market openness and avoid closed ecosystems that hinder competition and innovation.

Specific Recommendations

☑ Sustainability and Green Digitalization:

- Adopt sustainability by design in technology development.
- Implement policies and regulations to enforce sustainability.
- Educate and raise awareness among all stakeholders.
- Promote a holistic and multi-disciplinary approach to green digitalization.

☑ Energy Efficiency in AI:

- Invest in HPC hardware and optimize current data center solutions.
- Develop and share more energy-efficient AI algorithms.
- Consider the full stack of AI, including edge computing and IoT.
- Promote open-source and collaborative AI development.

☑ Manufacturing and Rail Transport:

- Focus on obtaining and utilizing high-quality data.
- Implement AI to optimize manufacturing processes and reduce energy consumption.
- Use AI to optimize rail traffic management and maintenance.
- Address regulatory and administrative challenges to improve rail transport efficiency.

☑ High-Performance Computing (HPC):

- Optimize HPC infrastructure and components for energy efficiency.
- Monitor and fine-tune HPC systems to balance energy use across different applications.
- Collaborate with manufacturers to promote sustainable and localized production.
- Develop software layers to manage energy more efficiently in HPC sites.

☑ Education and Public Involvement:

- Involve the public and users in the design and development of AI technologies.
- Promote interdisciplinary collaboration, including psychologists and other experts, in AI development.
- Focus on education and public awareness to increase acceptance and understanding of AI technologies.

Long-term Recommendations for Europe

☑ Global Competitiveness:

- Scale up and aggressively enter global markets to compete with the U.S. and China.
- Foster initiatives that help European players expand beyond regional markets.
- Maintain public investments in AI, robotics, and data spaces despite budget constraints.

☑ Regulation and Adaptability:

- Ensure the public sector remains adaptable and proactive in regulating rapidly evolving technologies like AI.
- Stay ahead of global regulators, continue investing, and adjust approaches as the AI landscape evolves.

☑ Infrastructure and Market Conditions:

- Build necessary infrastructure and focus on creating a thriving business ecosystem.
- Emphasize market demand and ecosystem support rather than just technology or regulation push.

Ethical and Legal Compliance

☑ Ethical AI Development:

- Develop and apply ethical principles in AI systems.
- Ensure transparency, fairness, and explainability in AI.
- Comply with the European AI Act and focus on high-risk AI applications.
- Consider the environmental impact and sustainability of AI systems.

☑ Consumer Protection and Human Rights:

- Implement regulations that protect consumers and human rights.
- Ensure public involvement in the development and deployment of AI technologies.
- Promote a human-centric approach in AI development.

Cross-Technology and Cross-Sector Collaboration

☑ Decarbonization and Sustainability:

- Develop a technology-enabled EU investment and implementation plan for decarbonization.
- Stimulate cross-sector collaboration and knowledge sharing in innovation chains.
- Prioritize sustainability and decarbonization in industrial sectors of the EU economy.
- Ensure responsible innovation and build trust through coordination and shared standards.

☑ Skills and Corporate Agility:

- Support companies to develop ADR skills and knowledge.
- Outline business models to ensure the EU can readily decarbonize and keep pace with technological innovation.

By following these recommendations, Europe can aim to become a global tech leader, achieve significant market share in AI and cloud technologies, and ensure sustainable and ethical development in the field of AI, data, and robotics.

7.4 Lessons learnt for the organization of the next ECS

Initially planned in May 2023, the first ECS was finally organized on 19 June 2024 after having been postponed several times for various reasons. This postponing had several consequences. The delay between the preparatory workshops organized in March 2023 and the ECS was more than one year which is much more than planned.

Planned on site in Brussels, in the premises of the EC the ECS was finally held online which reduced the capability to interact between participants which was one of the important aspects of the ECS concept.

These issues motivated to push for an onsite organization of the ECS 2025 and to limit the delay between the preparatory workshops and the ECS.

The preparatory workshops in this ECS 2024 focused on the exploration of CO2 emissions in different sectors. This segmentation of the analysis appeared interesting to mobilize point of view of different categories of end users. For the ECS 2025 it was suggested to reinforce this approach and to increase the effort on the preparation of a message to be presented at the ECS during these workshops.

Despite these inconveniences, the ECS 2024 mobilized a broad set of high-level experts. It enabled to discuss key issues regarding ADR technologies and decarbonization. It showed the interest of the approach for this policy making event to help decision making. It demonstrated the relevance of starting from a socioeconomic topic of interest for the EC and analysing where AI, Data and Robotics can propose solutions that can be acceptable by the population, and that represent a potential impact for the European economy.

This ECS 2024 opened the door for the onsite ECS 2025.

8 Appendices

8.1 Contributors

List contributors to the ECS 2024

- Ahern, Joanne - Trust-IT Services
- Ben Hamida, Amira - IRT SystemX
- Bereta, Konstantina - MarineTraffic
- Bante, Iddo - University of Twente
- Belbachir, Nabil - NORCE
- Bogicevic, Manja - Kagera AI
- Brell-Cokcan, Sigrid - RWTH Aachen University
- Calisti, Monique - Martel Innovate
- Chocarro Ruiz, Blanca - EIT Manufacturing
- Coll, Albert Sabater - University of Girona
- Couret, Antoine - Hub FranceIA
- De Cubber, Chris - EFFRA Association
- Dragun, Dino - Hidrocabile
- Easthill, Philip - European Boating Industry
- El Haddad, Elizabeth - INRIA
- Frigerio, Nicla - POLIMI
- Gallego, Belen - EVIDEN
- Geurts, Joost – INRIA
- Girenko, Andrey - DFKI
- Goger, Thierry - FEHRL
- Gotz, Josie - MTC
- Habert, Viviane - INRIA
- Heinz, Fredrik - University of Linköping
- Hoos, Holger - RWTH Aachen
- Horvat, Andrijana - Hidrocabile
- Iglesias Diaz, Maitena - UvA (University van Amsterdam)
- Jongen, Thilbaud - Generative Robotics
- Juric, Andrian - OptimoRoute
- Juretzki, Bjoern - EC DG CNECT
- Klanjcec, Dora - CROAI
- Leroux, Christophe - CEA
- Lepik, Kristjan - Arbonics
- Makrogamvraki, Katerina - UvA
- Makris, Sotiris - Laboratory for Manufacturing Systems & Automation
- Martinic, Stefan - Kramaric & Partners, LLM, Harvard Law School
- Matzoros, Violeta - Smart Freight Centre
- Meent, Jan-Willem van de - University of Amsterdam, ELiAS
- Mylimaki, Petri - University of Helsinki
- Nominé, Jean-Philippe – CEA, Secretary General, ETP4HPC,
- Novoselnik, Filip - Protostar Labs
- Panic, Ivan - Green Pal Energy
- Piatkiewicz, Philip - Secretary General, ADRA
- Pourabdollahian, Golboo - IDC
- Rubio Domingo, Gabriela - Smart Freight Centre
- Rybicka, Justyna - Manufacturing Technology Centre
- Sallé, Damien - TECNALIA

- Schoenauer, Marc - INRIA
- Silov, Martina - CROAI
- Stoevelaar, Mark - Municipality of Amsterdam
- Šašić, Tihomir – AGRIVI
- Thonissen, Marlies - DFKI
- Vanden Bosch, Joel - Alsymex Alcen
- Veen, Audrie van - EscherCloud
- Venturini, Chiara - Eurocities
- Villar Acevedo, Eloisa - EVIDEN
- Zakula, Tea - University of Zagreb
- Zazzeri, Niccolò - Trust-IT Services

8.2 Preparatory Workshops

8.2.1 Announcing

Figure 5: ECS 2023 preparatory workshops

You are interested in expressing your sectorial needs to reduce CO2 emission and are curious to know how AI, robotics, data can contribute to solve this major challenge.

We have the pleasure to invite you to join the ADRA-e project the 3-dayevent, which will take place on 29 to 31 March 2023 in Brussels

Maison Irène et Frédéric Joliot-Curie (MIFJC)

Rue du Trône 100, B-1050 Brussels, Belgium

or online

Depending on your interest, you will have the possibility to attend one day or more.

The European Commission decided to gather the three R&D disciplines of AI, big Data and Robotics, **ADR**, to address major European challenges in the global technological race.

This requires new ways of thinking and collaborating among the three disciplines from the European key players in the AI, Big Data and robotics. Most of these actors are gathered within the ADRA-e project.

This year, the members of ADRA-e are working on "**How the combination of AI, Big Data and Robotics can accelerate by 2030 the reduction of CO2 emissions, to achieve the objectives of climate neutrality in Europe in 2050?"**

We would be very honoured to have you on board of this exiting endeavour. In this workshop, we would be thrilled to collect your needs and those of your organisation and listen to your suggestions. This work will allow **joining the R&D efforts of the European ADR actors.**

Mobilise – Engage – Empower will be the drivers of our work.

We will present our results to engage with stakeholders e.g. investors, representatives of civil society, policy makers including the European Commission during the **European Convergence Summit 2023**.

European Robotics – AI - Big Data Convergence Summit 2023

3 July 2023

Borschette Conference Centre

Rue Froissart 36, Brussels, Belgium

8.2.2 Agendas of the workshops

Day 1 - 29.03.2023

Manufacturing, Energy production and distribution - Oil/gas, nuclear, PV, wind turbine, hydro

Time		Session
09.00 - 09.15		Hi from Adra-e - short intro about workshops and project Adra-e
09.15 - 09.30	Industry lectures	**EFFRA - Chris Decubber, General Consultant**
09.30 - 09.45		**TECNALIA - Damien Sallé, Coordinator of Robotics & Automation**
09.45 - 10.00		EscherCloud - Audrie van Veen, Director Strategic Partnerships
10.00 - 10.15		**POLIMI - Nicla Frigerio, Senior Researcher in the Department of Mechanical Engineering**
10.15 - 10.25		Q&A
10.25 - 10.35	*Break*	
10.35 - 10.50	Startup lectures	Manufacturing Technology Centre - Justyna Rybicka, Technical Specialist
10.50 - 11.05		**EIT manufacturing - Blanca Chocarro Ruiz, Project Manager Circular Economy & Water Scarcity**
11.05 - 11.20		Protostar Labs - Filip Novoselnik, Co-Founder & CEO
11.20 - 11.35		Kagera Ai - Manja Bogicevic, CEO & Founder
11.35 - 12.20	Panel	Panel discussion Manja Bogičević - Josie Gotz - Yesika Aguilera - Audrie van Veen - Nicla Frigerio
12.20	*Wrap up*	

Day 2 - 30.03.2023

Transport ways and hubs - Rail, route, train, transport hubs : ports, airports, waterways, sea

Time		Session
09.00 - 09.05		Hi from Adra-e - short intro about workshops and project Adra-e
09.05 - 09.20	Industry lectures	**University Linkoping - Fredrik Heintz, Professor of Computer Science**
09.20 - 09.35		FEHRL - Thierry Goger, Secretary General
09.35 - 09.50		European Boating Industry - Philip Easthill, Secretary General
09.50 - 10.05		MarineTraffic - Konstantina Bereta, Research Coordinator
10.05 - 10.15		Q&A
10.15 - 10.30	*Break*	
10.30 - 10.45	Startup lectures	OptimoRoute - Andrian Juric, Implementation Consultant
10.45 - 11.00		**Hidrocabile - Andrijana Horvat**
11.00 - 11.15		**Smart Freight Centre - Violeta Matzoros, Technical Manager**
11.15 - 11.30		**Norce - Nabil Belbachir, Research Director DARWIN**
11.30 - 12.15	Panel	Panel discussion Konstantina Bereta - Dino Dragun - Andrian Juric - Gabriela Rubio Domingo
12.15	*Wrap up*	

Day 3 - 31.03.2023

City & Country - Smart city, construction, agriculture, agri-food, forestry, sea farming –

Time		Session
09.00 - 09.05		Hi from Adra-e - short intro about workshops and project Adra-e
09.05 - 09.20	Industry lectures	Laboratory for Manufacturing Systems & Automation - Sotiris Makris, Professor
09.20 - 09.35		Alsymex Alcen - Joel Vanden Bosch, Business Development Automation & Robotics
09.35 - 09.50		RWTH Aachen University - Sigrid Brell-Cokcan, Chair of Individualized Production
09.50 - 10.05		Municipality of Amsterdam - Mark Stoevelaar, Project Manager
10.05 - 10.15		Q&A
10.15 - 10.30	*Break*	
10.30 - 10.45	Startup lectures	Arbonics - Kristjan Lepik, CEO & Co-Founder
10.45 - 11.00		Green Pal Energy - Ivan Panic, Co-Founder
11.00 - 11.15		**IRT SystemX - Amira Ben Hamida, Innovation Team Leader and Projects Manager**
11.15 - 11.30		**AGRIVI - Tihomir Šašić, Partner Sales Executive Manager**
11.30 - 12.15	Panel	Panel discussion Tihomir Šašić - Ivan Panic - Amira Ben Hamida
12.15	*Wrap up*	

Presentations can be found on the ADRA-e portal[27]

8.3 Communication material

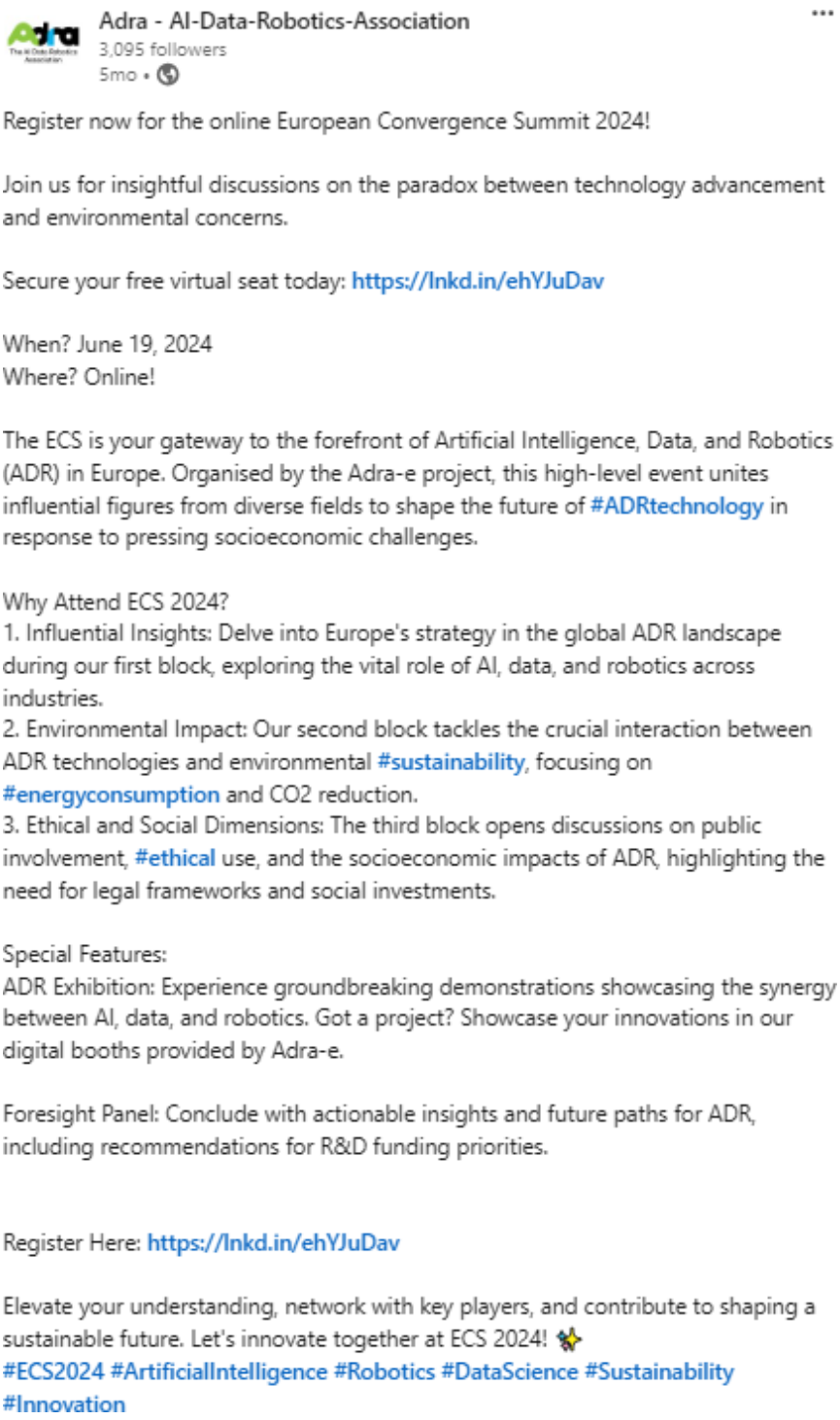
8.3.1 Logos

Logos elaborated by Trust-IT for the communication about the ECS

[27] https://adra-e.eu/node/28

8.3.2 Announcing of the ECS24

Through LinkedIn[28]



Adra - AI-Data-Robotics-Association
3,095 followers
5mo •

Register now for the online European Convergence Summit 2024!

Join us for insightful discussions on the paradox between technology advancement and environmental concerns.

Secure your free virtual seat today: https://lnkd.in/ehYJuDav

When? June 19, 2024
Where? Online!

The ECS is your gateway to the forefront of Artificial Intelligence, Data, and Robotics (ADR) in Europe. Organised by the Adra-e project, this high-level event unites influential figures from diverse fields to shape the future of #ADRtechnology in response to pressing socioeconomic challenges.

Why Attend ECS 2024?
1. Influential Insights: Delve into Europe's strategy in the global ADR landscape during our first block, exploring the vital role of AI, data, and robotics across industries.
2. Environmental Impact: Our second block tackles the crucial interaction between ADR technologies and environmental #sustainability, focusing on #energyconsumption and CO2 reduction.
3. Ethical and Social Dimensions: The third block opens discussions on public involvement, #ethical use, and the socioeconomic impacts of ADR, highlighting the need for legal frameworks and social investments.

Special Features:
ADR Exhibition: Experience groundbreaking demonstrations showcasing the synergy between AI, data, and robotics. Got a project? Showcase your innovations in our digital booths provided by Adra-e.

Foresight Panel: Conclude with actionable insights and future paths for ADR, including recommendations for R&D funding priorities.

Register Here: https://lnkd.in/ehYJuDav

Elevate your understanding, network with key players, and contribute to shaping a sustainable future. Let's innovate together at ECS 2024!
#ECS2024 #ArtificialIntelligence #Robotics #DataScience #Sustainability #Innovation

8.3.3 Invitation to Commissioner Thierry Breton

Dear Commissioner, Cher Thierry Breton,

The European stakeholders from research and innovation in artificial intelligence, robotics and big data communities will gather on July 3, 2023 at the Borschette Center in Brussels for the First European Convergence Summit.

I have the great honour to invite you on their behalf to introduce the Summit at 9:00 am.

The objective of the Summit is to prepare the construction and the realization of solutions to the major European problems with the participation of industrialists, researchers, lawyers, specialists in ethical, socio-economic or social sciences issues

The European Convergence Summit is organized within the framework of the ADRA strategic partnership, supported by the European Commission. This year, the Summit focuses on how by combining AI, robotics and big data, the European players can provide innovative solutions to accelerate the reduction and prevention of CO2 emissions in 2030.

Three sessions will structure our work:

- The European Artificial Intelligence, Robotics and Big Data research and innovation players facing international competition.
- The paradox related to the risk of increasing energy consumption due to the development of AI in the face of the ambition to reduce CO2 emissions
- The impact of the combination of these technologies in terms of public acceptance, ethical, regulatory and socio-economic issues, in particular on employment

This one-day high-level Summit will alternate presentations by specialists and panel discussions with key actors selected for their expertise and interest in AI, robotics and Big Data technologies and their knowledge of energy issues related to the CO2 reduction challenge. An exhibition will run in parallel to present European success stories in these technologies. I will be delighted to guide you through it.

[28] https://www.linkedin.com/posts/adr-association_adrtechnology-sustainability-energyconsumption-activity-7190655816297820160-ar4M/

I will be very pleased to provide you any further information that you may need.

Looking forward to welcoming you on July 3rd,

Yours Faithfully,

On behalf of ADRA Association

Christophe Leroux,

Member of the Board of Directors of the ADRA association, Member of the Board of Directors of the euRobotics association

9 ADR Exhibition

9.1 Objectives and Principle

One of the primary objectives of ADRA-e is to showcase successful endeavours in the fields of AI, Data, and Robotics through a dedicated ADR Exhibition specifically designed for this purpose. In that perspective, in addition to the ECS, several demonstrations of successful interaction between the three technologies were shown in the ADR Exhibition. This gave EC-funded projects the opportunity to showcase the technologies emerging at the frontiers of the disciplines to outline promising future paths for ADR by exhibiting demonstrations of interaction between at least two of the three technologies.

The exhibition was run concurrently with the ECS agenda, allowing project representatives to give short presentations. Attendees were able to visit each exhibitor's virtual booth, interact with their managers, ask them live questions, or have private conversations in separate rooms.

Prominent EC funded projects that exemplify the fruitful intersection of these disciplines had the opportunity to captivate participants with compelling presentations of their work.

Participating projects were provided a dedicated virtual space to exhibit and promote their efforts to encourage broader adoption, use, and impact of their results. In addition, this Exhibition has served as a conducive environment for building connections and collaborations within the ADR community, identifying common interests, and fostering synergistic partnerships.

Exhibitors were in turn be able to decide what content to display at any given time during the day. This could include videos as well as interactive demos, live connections or talks.

9.2 Required slots within the ECS agenda

As both the ECS and the exhibition were held fully online, special efforts was made to ensure high levels of interaction and attendance with the project exhibitors, notably:

- ✓ At the end of “Panel Discussion 1” and just before the coffee break: **PITCH SESSION** (10-15 minutes).
- ✓ At the end of “Panel Discussion 2” and just before the lunch break: **PITCH SESSION** (10 minutes).