

# **Artificial intelligence, Data and Robotics** ecosystem

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Al, Data and Robotics

## **Document summary**

This report presents a comprehensive account of the development of the Strategic Research, Innovation, and Deployment Agenda (SRIDA), a defining framework for the AI, data and robotics association. As part of WP1, this document gives recommendations for the SRIDA process based on the work in Adra-e WP1 Task 1.3. The SRIDA outlines the vision, overarching goals, main technical and non-technical priorities, investment areas, and a roadmap for research, innovation and deployment. By meticulously documenting the step-by-step process and milestones of creating the SRIDA, this paper offers valuable insights into the progress, potential benefits, and drawbacks of the chosen approach, facilitating some reflections on its efficiency and provides recommendations for future improvement. Thus, this study lays a strong foundation for future work, guiding the formulation of subsequent Strategic Research, Innovation and Deployment Agenda.

## **Table of Contents**

1.	Introduction	7
	1.1 About the SRIDA	7
2.	Organization	9
	2.1 Organizational bodies involved in the SRIDA development	9
3.	Formulating the Research, Innovation, and Deployment Roadmap	11
	3.1 The SRIDA progress and results	11
	3.1.1 Defining the Vision, Mission and Goals11	
	<b>3.1.2 Identifying global challenges and trends</b>	
	3.1.3 Research, Innovation, and Deployment Roadmap (Big Tickets & Moonshot)	13
4.	Timeline of the SRIDA Development Progress, Milestones and Activities	14
	4.1 June 16, 2022 – Kick-off task-force	14
	4.2 October 27, 2022 – Launch of a 10-Pager Process	14
	4.3 December 16, 2022 – Consultation with Adra members	15
	4.4 January 30, 2023 – Release of first draft of the "10-pager" to the Adra members	15
	4.5 March 14, 2023 – SRIDA Workshop at ERF'23	15
	4.6 April 23, 2023 – Consultation with Adra Members on "10-pager"	16
	4.7 June 12, 2023 – Consultation with national representatives on HE CL4	16
	4.8 June 26, 2023 – Public presentation "Strategic Orientation towards an AI, Data and Robo Roadmap 2025-2027"	
	4.9 July 5, 2023 – "SRIDA deep-dive" workshop	17
	4.10 August 28, 2023 – Deadline for Big Ticket sections	17
	4.11 September 19, 2023 – The SRIDA Industry Roundtable Discussion	17
	4.12 October 25, 2023 – An interactive Q&A with the SRIDA Editing Committee at EBDVF23.	18
	4.13 November 9, 2023 – Public release of the Adra SRIDA 2025-2027	18
	4.14 January 11, 2024 – Publishing the final version of the Adra SRIDA 2025-2027	18
5.	Reflecting on the Process, Feedback, and Recommendations	18
	5.1 Benefits	19
	5.2 Drawbacks	19
	5.3 Contributors Feedback	20
	5.4 Reflections on Efficiency	21
	5.5 Recommendations for Improvement	22

	<b>D.</b> <i>e</i>	Al, Data and Robotics ecosystem
C. Constitute		

6. Conclusion	23
7. Glossary	

Al, Data and Robotics

## 1. Introduction

The objective of Work Package 1 is to support the community and the implementation of the Strategic Research and Innovation Agenda (SRIDA) by aiding in the update and implementation of SRIDA and the development of the ADR partnership. This support is provided through the coordination of the portfolio of projects and by offering actionable recommendations for Adra and the ADR partnership. This activity is connected to the overall project objectives, aiming to facilitate convergence between communities and disciplines, particularly for topics and areas that benefit from cross-fertilization. This involves consultation with relevant initiatives (WP2), outreach and awareness (WP3), the increase in adoption of ADR technology (WP4), and the establishment of effective standards and regulation (WP5). The objectives of the deliverable D1.5 involve providing a comprehensive account of the process of creating SRIDA, analysing the activities performed, and proposing actionable recommendations for the update of SRIDA.

Within Work Package 1, task 1.3, "Actionable recommendations and support for updating the SRIDA," consists of two parts, resulting in two distinct deliverables. This first deliverable 1.5, due in December 2023, presents a use case for writing the SRIDA, outlining the actual work on the first version of the new SRIDA, focusing on its content creation. A first generation of the SRIDA (see the announcement<sup>4</sup>, and the document<sup>5</sup>) served as the basis for the ADR Partnership. However, it was published in June 2019, long before the convergence between the three communities had started. Siloed as it was, it could not be simply updated, and the decision to start a "new generation" of SRIDAs from scratch was taken early in the process. This current deliverable focuses on the writing process of the new SRIDA and its outcomes, addressing both their positive and negative aspects. Additionally, it offers recommendations for future update iterations based on feedback from the collaborators involved in the development of the SRIDA.

The updated version of "Actionable recommendations and support for updating the SRIDA," deliverable 1.6, will be due at the project completion in June 2025. This deliverable will provide a comprehensive methodology for implementing SRIDA, including detailed instructions on the writing process, stakeholder involvement strategies, and a step-by-step timeline with proposed timings.

## 1.1 About the SRIDA

The Strategic Research and Innovation Agenda (SRIDA) is a comprehensive roadmap for the advancement of Artificial Intelligence, Data, and Robotics (ADR) in Europe. It serves as a consensus document outlining a mid-to-long-term strategy for fostering innovation and growth in the European ADR sector. The SRIDA aims to align research and development efforts across Europe, ensuring that ADR technologies are harnessed to address societal challenges and enhance economic competitiveness. At the same time, it aims to serve as the principal inspiration for the European Commission to develop its Horizon Europe work programme.

The development of the Strategic Research and Innovation Agenda (SRIDA) must solve various challenges, including ensuring several balances. It must address the balance between the three communities and represent different stakeholders, as scientists representing AI, Data, and Robotics must be involved equally with the industry representatives, including large corporations, small and medium-sized enterprises, and start-ups. At the same time, the SRIDA must strike a balance between long-term objectives, such as transforming Europe into a society powered by safe, reliable,

<sup>&</sup>lt;sup>4</sup> <u>https://www.bdva.eu/bdva-and-eurobotics-publish-joint-srida-european-ai-ppp</u>

<sup>&</sup>lt;sup>5</sup>https://www.bdva.eu/sites/default/files/AI%20PPP%20SRIDA-Consultation%20Version-June%202019%20-%20Online%20version.pdf



and beneficial ADR technologies, and short-term objectives, such as fostering collaboration among ADR stakeholders and accelerating the development and deployment of ADR technologies with immediate societal impact. Finally, the optimal frequency and method for updating the SRIDA must be determined, as this document must reflect the most recent developments in the field. All these issues are going to be addressed in this report as part of discussion on a process of creating SRIDA.

The deliverable report follows a structured format with the following key sections:

1. "Introduction" chapter (here) provides an overview of the document's purpose and content.

2. "Organization" chapter describes the roles of key participants, emphasizing their contributions to the collaborative writing process.

3. "Formulating the Research, Innovation, and Deployment Roadmap" chapter summarizes the creative results of collaborative and iterative writing approach.

4. "Timeline of SRIDA Development Progress, Milestones, and Activities" chapter offers insights into the multifaceted stakeholder engagement process through presenting a timeline of the process of creating SRIDA.

5. "Reflecting on the Process, Feedback, and Recommendations" chapter explores the benefits and drawbacks of the SRIDA development process. It reflects on its efficiency and provides recommendations for future iterations, incorporating feedback received during the collaborative writing process.

6. "Conclusion" of the report sums up key findings and presents key recommendations derived from the SRIDA development process.

Al, Data and Robotics

## 2. Organization

This section outlines the organizational aspect of writing the SRIDA. A diverse team comprising experts from academia, industry, and government agencies was assembled to contribute their unique perspectives and insights. This process commenced with ideation and a comprehensive assessment of the current state of affairs within the domain of interest. Work on the document was performed by a variety of participants, all with a specific experience within the areas of AI, Data, and Robotics.

### 2.1 Organizational bodies involved in the SRIDA development

Before describing the Strategic Research and Innovation Agenda (SRIDA) methodology and creation process, it is imperative to acknowledge and highlight the roles of the key participants whose involvement was instrumental in ensuring the high-quality outcome.

SRIDA was developed with the contributions of various internal and external organizational bodies. These contributors played crucial roles in the brainstorming, writing, editing, and feedback processes, ensuring that the SRIDA aligns with Adra's vision and objectives. Internal Adra contributors maintained constant communication and collaborated daily, while external bodies provided their feedback during specific events and sessions. Adra actively engaged with external experts, and these external contributors provided their feedback independently, ensuring that the SRIDA remains objective and unbiased.

Internal bodies	External bodies
Adra Board of Directors Board of Directors played a crucial role in reviewing and approving the SRIDA creation progress, ensuring that it is developing in line with the Adra's vision and goals. It consists of Jon Agirre Ibarbia, Nozha Boujemaa, Freek Bomhof, Konstantina Bereta, Edward Curry, Francesco Ferro, Emanuela Girardi, Fredrik Heintz, Morten Irgens, Christophe Leroux, Stefan Leijnen, Petri Myllymäki, Juha Röning, Seppo Tikkanena, Stefan Van Baelen, Rich Walker, Anne Waltenberger, Clemens Wasner.	<b>European Commission</b> EC Representatives actively participated in the SRIDA development, providing regulatory insight, strategic direction, and aligning the agenda with broader policy objectives, which was crucial for developing the SRIDA. They participated in various physical and online events, and WP meetings.
Adra Members A wider group of stakeholders, academics, business representatives and experts who are collaborating with Adra on different goals were able to provide their feedback and share valuable input on different stages of the SRIDA creation. The number of Adra members is constantly growing together with Adra development. To name few, AI Sweden, BDVA, Brush AI, Green0meter, euRobotics, Intellico, MT, MED4CAST, Quantile, etc.	Larger Stakeholder Community A broader community was involved via various activities, conferences, webinars, and community workshops. Interactive sessions organized to gather input and perspectives from a wide community of stakeholders, helping to foster inclusivity and democratic participation in shaping the SRIDA agenda.
Adra-e Support Providing technological assistance, Adra-e Support team managed the website, organized digital events, designed and formatted the paper's outline, playing crucial roles in operational and technical procedures. It	<b>Member States</b> The Member States are the nations within the European Union. Each member country appoints to the European Commission a European Commissioner, the commissioners do not represent their member state but work

Al, Data and Robotics ecosystem		
consists of Joanne Ahern, Viviane Habert, Niccolò Zazzeri.	collectively in the interests of all the member states. They contributed with feedback from the EC at the final stage of the process.	
Coordination Team	NoE Representatives and Representatives	
A specialized group tasked with orchestrating	Al-on-Demand Platform	
and harmonizing the efforts of various stakeholders involved in SRIDA development, coordinators actively participated in Editing Committee meetings and were constantly in touch with the Adra-e Support team, ensuring the smoothness of the process. It consists of Ana Garcia (BDVA Secretary General), Philip Piatkiewicz (Adra Secretary General), Jozef Geurts (interim Adra Secretary General), and	Representatives of these expert groups, involved in AI, Data and Robotics research and on-demand AI services, contributed their expertise to the SRIDA development process during various events, workshops, and conferences.	
Katerina Linden.		
Editing Committee This committee, consisting of three editors who were responsible for the evaluation of content in the areas of AI, Data and Robotics respectively, undertook the responsibility of structuring and editing the text. They formulated the main themes and directions while actively engaging in the ongoing scientific discussions. Weekly online meetings facilitated constant collaboration and feedback collection. It consists of Fredrik Heintz (lead, AI), Edward Curry (Data), and Nabil Belbachir (Robotics).		
Reference Group		
Various experts were consulted by the Editing Committee during the development of the SRIDA, offering insights, feedback, and guidance to ensure the document alignment with diverse perspectives. It consists of Jon Agirre Ibarbia, David Bisset, Freek Bomhof, Rita Cucchiara, Hans De Canck, Anne Hermsen, Morten Irgens, Christophe Leroux, Petri Myllymäki, and José Saenz.		
	external bodies	
Big Tickets Contributors		

ADR experts, both from Adra and other organizations, were involved in creating the identifying key areas known as "Big Tickets": they collaboratively submitted valuable contributions and provided first-hand information about technological developments in the relevant fields. This group includes Daniel Alonso, Freek Bomhof, Rafiqul Haque, Agirre Ibarbia, Samuel Kaski, Yiannis Kompatsiaris, Marko Grobelnik, Stefan Leijnen, Christophe Leroux, Paul Lukowicz, Jessica Montgomery, Chokri Mraidha, Alin Olimpiu, Marc Schoenauer, Morayo Sdedjouma, Rebecca Schedl-Warpup, Philipp Slusallek, and Emmanuel Vincent.

As can be seen from the list of creative bodies involved in the process, stakeholder engagement and consultation were present on every level of work. Engaging with stakeholders from various sectors was a cornerstone of the SRIDA development. Throughout the creation of the agenda, multiple channels were utilized to gather input and perspectives from a diverse range of experts.

This diverse array of inputs has ensured that the work on the SRIDA incorporates knowledge and expertise from various sectors, first of all including academia, industry, and regulatory bodies. This diversity contributes to making SRIDA strategically accurate and reflective of as many aspects as possible.

## 3. Formulating the Research, Innovation, and Deployment Roadmap

This section encapsulates the key concepts of the SRIDA, the product of this iterative writing and review process, such as the vision, mission, and goal formulation, the identification of trends, challenges, and gaps, and the research, innovation, and deployment roadmap (Big Tickets, or key priorities, and the AI Moonshot, or the strategy strengthening the European position in ADR technologies), in the form of findings, concepts, and actionable proposals.

### 3.1 The SRIDA progress and results

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The Strategic Research, Innovation, and Deployment Agenda (SRIDA) was crafted through a collaborative and iterative writing process. This methodology involved multiple cycles of drafting, feedback gathering, revision, and further input solicitation, ensuring that the final document reflects a diversity of perspectives and continuous content refinement. This approach fosters inclusivity, draws upon a wide range of viewpoints to guarantee comprehensive coverage and accuracy, promotes a sense of community, and aligns with academic standards. This iterative process does not only elevate the quality of the text but also establishes a collaborative framework for ongoing scholarly progress and enables the formulation of precise and overarching ideas, aims, and goals.

The whole process of writing SRIDA can be divided into three following broad stages.

## 3.1.1 Defining the Vision, Mission and Goals

The first stage of the SRIDA development process focused on defining the overarching vision and specific goals. Extensive consultations were conducted with relevant stakeholders to ensure alignment with the broader strategic objectives of the European ADR co-Programmed Partnership. In result, Adra came up with a list of missions and goals aimed to achieve a Vision for ADR success in Europe.

With an ADR-vision in mind, Adra aims to empower a responsible AI-powered society by 2030, with a shared secure data infrastructure, enhanced efficiency through autonomous robotic systems, and effective AI-based decision support. Europe will lead the way towards a promising future for all. To achieve this vision, these six ADR missions were formulated:

1. Creating a strong, coherent, and effective ecosystem for AI, Data, and Robotics.

2. Maintaining and strengthening European industrial leadership in robotics, computer vision, and trustworthy AI.

3. Integrating and connecting the European research landscape around AI, data and robotics.

4. Developing a powerful strategy for skills development and attracting talent to Europe.

5. Developing ADR technologies with high socio-economic impact to reinforce Europe's strong and globally competitive position.

6. Ensuring societal trust in AI, data and robotics.

While working on these missions, the ADR Partnership is committed to contributing to the following four high-level goals:

1. Boosting Europe's AI, data, and robotics industry, increasing its competitiveness and accelerating its digital and green transformation in accordance with the Digital Decade.

2. Achieving European strategic autonomy in AI, data and robotics.

3. Achieving global research impact in AI, data and robotics.



4. Maximising the societal and environmental benefits of AI, data and robotics to tackle major societal challenges on climate, food, energy, health, and security.

## 3.1.2 Identifying global challenges and trends

Subsequently, the second stage of the SRIDA development process was focused of identifying the main global challenges and major trends that would drive research, innovation, and deployment efforts. Careful consideration was given to striking a balance between cutting-edge technological advancements and societal considerations. Collaboratively, experts and editors came up with main ADR trends and highlighted gaps that need to be addressed.

**Trends in large language models:** Generative AI, Text and image generating models, Sound and video generation, Reducing bias and inappropriate content, Multi-modal content generation. **Gaps in large language models:** Size of models growing faster than availability of data, Verifying generated content, Extracting more valuable content from data, Capacity to develop and deploy large-scale models.

**Trends in learning from human feedback:** Few-shots to zero-shot learning, Personalizing models, Reducing the need for data.

**Gaps in learning from human feedback**: Dealing with complex data, Incorporating physical knowledge into learning algorithms, Combining symbolic and neural representations.

**Trends in AutoML:** Configuring machine learning pipelines, Selecting model architectures, Performing hyperparameter optimization.

**Gaps in AutoML:** Scaling up to larger and more complex pipelines and models, e.g., involving heterogeneous data types.

**Trends in data sharing:** Promoting the free flow of data, Sharing data and breaking data silos; Standardization for trust, connectivity, and scalability.

**Gaps in data sharing:** Interoperability, Global trust and governance frameworks, Tools and methods for compliance with regulations.

**Trends in robotics:** Modularity, Design, certification, and validation tools, Processes for accelerating time to market.

**Gaps in robotics:** Community building, Dealing with regulatory issues, Standardization, Sector-specific solutions.

**Trends in integrating AI, data, and robotics:** Self-awareness, Understanding of an environment and planning, Soft robotics, Small-scale robots, Flying robots, Water robots.

**Gaps in integrating AI, data, and robotics**: Human-robot interaction and collaboration, Robotrobot interaction and collaboration, Swarm robotics, Biomimetic perception and control, Extended reality in robotics, Dexterous grasping, manipulation, and navigation, Localization and mapping, Linkage between materials and robotics, Networks of excellence.

**Trends in data infrastructure:** Access to world-class, large-scale, federated, and secure infrastructure, HPC and test environments, Convergence of computing, big data management, and machine learning.

**Gaps in data infrastructure:** Lack of accessible and high-quality infrastructure, Balance the need for privacy and the need for effective and correct information that is interoperable with the rest of the world.

**General Trends:** New data and AI regulations, Data intermediaries, New markets, Novel applications, European-wide federated secure experimentation environments, Large-scale industry pilots and applications.

General Gaps: Tools and support for compliance, Data access and exchange, Data quality, Right



to explain and trustworthiness, Methods, tools for compliance, Support and access to experimentation, Privacy, trust, security, and ethics, Talent education, Business opportunity understanding.

Next, the following three global challenges were formulated. These are the issues that Europe is going to face which can potentially damage European sustainable development and welfare:

1. Europe's dependency on world supply for essential resources (such as energy and rare materials) makes its society and industries vulnerable to global crises.

2. Europe's increasing workforce needs make it vulnerable to demographic changes and global competition.

3. Europe's dependency on the world supply of key technologies and materials (such as semiconductors and active pharmaceutical ingredients) makes its society and industries vulnerable to global disruptions.

# 3.1.3 Research, Innovation, and Deployment Roadmap (Big Tickets & Moonshot)

On a final, third stage of the SRIDA development process, editors and contributors concentrated on formulating the Research, Innovation, and Deployment Roadmap for the Next Strategic Plan. In result of their efforts, SRIDA presented the strategy to achieve the defined objectives. An iterative approach was adopted to draft the strategy, encompassing regular feedback from various stakeholders to ensure its effectiveness and feasibility.

The new strategic plan should address the following technological concerns:

- Large-scale general purpose ADR technology. For example, open, large-scale, GDPR compliant European language models handling both European language and cultural differences. This includes speech-to-text, text-to-text, and text-to-speech.
- Large-scale complex ADR testbeds, together with end-users, such as in healthcare, food production, transportation and mobility, energy, or smart cities.
  Multi-stakeholder development, verification, validation, and integration of automated decision making in socio-technical systems, both for the public and private sectors.
- Collaborative autonomous systems interacting with both the environment and people. This includes autonomous drones in controlled airspace, last mile delivery, and self-driving vehicles.
- Metrics for measuring progress in ADR, with a special emphasis on trustworthy ADR technology.

To address these technological issues, the SRIDA proposes to carefully evaluate six Big Tickets in AI, Data and Robotics for 2025-2027, written in collaboration with a broad array of stakeholders:

1. Ground-breaking technological foundations in ADR (autonomy, high-performance and predictability).

2. Effective and Trustworthy General-Purpose ADR (generative AI, generality, continuous learning, trust, scale and complexity).

3. An interoperable and integrated framework for data and model ecosystems (operations, governance, privacy, and security).

4. Next-generation smart embodied robotic systems (soft robotics, autonomy, manipulation, configurability, human robot interaction and collaboration).

5. Developing ADR technology for the sciences (from data to knowledge and understanding).

6. Research, innovation, and tools for compliance (trust, privacy, security beyond compliance).

Finally, the concept of a **European Al Moonshot** was proposed, with an overarching goal of establishing European Al technologies and techniques, which align with its fundamental rights,



regulations, and values along the value chain. The expected outcomes encompass a collection of APIs, toolboxes, hardware elements and standards, which can strengthen and widen Europe position on strategic control points along the supply chain of generative AI, by developing AI-powered systems, products and services aligning Europe with its fundamental rights, regulations and values and improving its position on strategic control points along the supply chain of the supply chain of generative AI.

These three stages of SRIDA's development, namely writing, natural development, and refinement, are intertwined with the actual timeline of events and activities that shaped the SRIDA document.

# 4. Timeline of the SRIDA Development Progress, Milestones and Activities

This section presents a timeline of the SRIDA development, highlighting key milestones and activities undertaken from its inception to its publication. It offers insights into the multifaceted stakeholder engagement process and showcases the collaborative and iterative writing approach that involved multiple cycles of drafting, feedback gathering, revision, and further input solicitation, ensuring that the final document reflects a diversity of perspectives. The majority of these events are described in detail in other deliverables of WP1 (see D1.7, D1.1, D1.3), relevant announcements and post-releases can be found on the Adra website<sup>6</sup>.

## 4.1 June 16, 2022 – Kick-off task-force

Constitution, discussions with EC, internal discussion, group coordination

The work on the SRIDA officially began with the decision of the Adra Board of Directors to establish a task-force in charge of the development of the SRIDA. The task-force was composed of the three editors (one for each discipline) and a reference group of individuals with specific expertise relevant for the development of the SRIDA. The kick-off meeting, held at the beginning of the project, brought together all stakeholders and team members to ensure everyone was on the same page and that the project was off to a successful start. This task force served as a central hub for coordinating discussions, including with the European Commission, facilitating internal consensus, and ensuring initial alignment with various perspectives. The event also served as a starting point for introducing team members and stakeholders, discussing project timelines and milestones, and assigning roles and responsibilities.

## 4.2 October 27, 2022 – Launch of a 10-Pager Process

Launch process for a 10-pager as a stepping stone to the SRIDA

The launch of work on the "10-pager," also known as the "Strategic Orientation Towards an AI, Data, Robotics Roadmap 2025-2027" (or "ADRA 10-pager"), marked a crucial step in the development of SRIDA. This document was proposed as an initial short paper to identify the principal orientations of the future SRIDA. As a result, the created document was intended to provide a structured framework for gathering input from stakeholders, with the goal of identifying the key challenges and objectives for the future SRIDA. The subsequent process of circulating a draft document for feedback helped to ensure that the SRIDA development aligned with the needs and expectations of stakeholders, as it allowed stakeholders to share their thoughts on all objectives, priorities, and overall directions.

Due to previous experience in their respective partnerships, the Data and Robotics representatives in the task-force were fairly familiar with the process of authoring a SRIDA. This was not necessarily

<sup>6</sup> https://adra-e.eu/events

Al, Data and Robotics

the case for all members of the task-force. In order to get all task-force members up-to-speed, Adrae organized a workshop session "SRIDA task-force 101" (November 23, 2022) that introduced the purpose and objectives of a SRIDA.

## 4.3 December 16, 2022 – Consultation with Adra members

#### Collecting feedback on objectives and priorities

The initial consultation with Adra members included a broad spectrum of representatives from industry, academia, and research institutions, who participated in discussions on preparing SRIDA. For this first consultation a questionnaire was prepared to inquire to what extend the General Objectives (GO) and Operational Objectives (OO) as described in the partnership proposal<sup>7</sup> needed to be updated or extended. The members were asked to evaluate the descriptive text for the operational objectives, the listed activities that are to contribute to achieving the operational objective and provide justification/argumentation if one or more of the operational objectives should be prioritized for the success of the partnership. Additionally, the members were requested to provide justification/argumentation if one or more of the indicated actions should be prioritized for the period 2023-2025. The members were also asked for input on the following questions: What are the technical/scientific grand challenges at the crossroads of AI, Data, and Robotics for 2030? What are the key efforts to be undertaken for 2025-2026? What are the technical/scientific challenges to support the implementation of the future AI act, Data act, GDPR, and AI best practices? A total of eight detailed responses were received, providing valuable contributions to the further shaping of the SRIDA.

## 4.4 January 30, 2023 – Release of first draft of the "10-pager" to the Adra members

Validating and refining the initial orientations of the "10-pager" with Adra members

The first draft of the "10-pager" was distributed as an internal document to Adra members to solicit their initial feedback before it was made public to the larger ADR community. This consultation played an important role in refining the content of the future SRIDA and ensuring its relevance to the needs of the AI, Data and Robotics community. This consultation provided a platform for an exchange of ideas on objectives and priorities, enabling effective feedback gathering. This led to the preparation of the first public draft of the "10-pager" document.

## 4.5 March 14, 2023 – SRIDA Workshop at ERF'23

#### Identifying and prioritizing the key challenges

The SRIDA Workshop on Grand Challenges at the Cross-Roads of AI, Data and Robotics at ERF2023 brought together approximately 50 participants from diverse stakeholder backgrounds, fostering a collaborative environment to refine the strategic direction of the agenda. The workshop presented the public draft of the 10-pager, and aimed to identify and prioritize key challenges in these interconnected fields to advance European innovation and address societal issues. Participants engaged in discussions on four archetypal challenges: socio-economic (zero carbon emissions), application/sector-oriented (automotive), infrastructure (AI on-demand platform), and scientific/technological. The session sought input from stakeholders to refine these challenges and

<sup>&</sup>lt;sup>7</sup> Draft proposal for a European Partnership under Horizon Europe AI, Data and Robotics, 18 June 2020. Available at:

https://ec.europa.eu/info/sites/default/files/research\_and\_innovation/funding/documents/ec\_rtd\_he-partnerships-artificial-intelligence-data-robotics.pdf



guide the development of the SRIDA. This workshop facilitated open dialogue and enabled the identification of key priorities and areas for further development.

## 4.6 April 23, 2023 – Consultation with Adra Members on "10-pager"

Open discussion and collecting feedback

Continued engagement with Adra Members Representatives through focused consultations ensured that diverse viewpoints were considered throughout the development of the SRIDA. The "10-pager" was presented to Adra members for consultation and feedback in April 2023. This consultation provided valuable feedback (received 7 detailed responses) that contributed to the more precise refinement of the agenda's goals and objectives.

# 4.7 June 12, 2023 – Consultation with national representatives on HE CL4<sup>8</sup>

Informing member state representatives about the orientations of the future SRIDA for coordination, and alignment with national strategies.

The "10-pager" document was published in early June 2023 with the intent to solicit feedback from the relevant stakeholder communities active within the AI, Data, and Robotics partnership. These included Adra members, Horizon Europe partner countries (to allow for coordination with national strategies), Adra founding organizations, and the network of AI excellence centers (in particular, their joint SRA). Engaging with national representatives from various European countries served to align the SRIDA strategic orientations with broader policy objectives and gather insights from different perspectives across the continent. This specific consultation session ensured that the agenda reflected the diverse needs and priorities of the European AI ecosystem. During June 2023, feedback was collected in written form from Adra members and Horizon Europe partner countries and implemented in the next draft of the document.

## 4.8 June 26, 2023 – Public presentation "Strategic Orientation towards an AI, Data and Robotics Roadmap 2025-2027"

Public release and presentation during the webinar

Public presentation (webinar) of "Strategic Orientation towards an AI, Data and Robotics Roadmap 2025-2027" with the following Q&A was attended by more than 400 individuals. This digital meeting offered all ADR stakeholders the opportunity to learn the strategic orientations of the AI, Data, Robotics roadmap for the 2025-2027 work programme. The event also allowed attendees to learn about the key priorities emerging from the roadmap, the aspirations for how calls will support the discovery of new solutions to global challenges, as well as the opportunity to get involved directly. The webinar covered the following specific sections of SRIDA: Adra strategic position statement towards the next SRIDA, a detailed description of the journey towards the roadmap, and the identified key ambitions and key themes that will influence the 2025-2027 work programme. A discussion panel on Strategic priorities for the SRIDA and ADR partnership reflected on the challenges in the AI, data, and robotics landscape, such as the ethical and societal implications of AI, data privacy and security concerns, and the need for responsible and inclusive innovation. The webinar served a valuable opportunity for stakeholders to learn more about the SRIDA and to share their feedback. The input received was further used to refine the roadmap and ensure that it meets the needs of the European AI ecosystem.

Al, Data and Robotics

### 4.9 July 5, 2023 – "SRIDA deep-dive" workshop

Collaborating on the kick-off authoring of the SRIDA

The deep-dive workshop in Brussels involved more than 30 participants. This included representatives from the Adra Editing and Reference Committee, NoE representatives who are actively involved in the development of the joint SRA, representatives of the Al-on-Demand Platform, Adra-e, and EC representatives from A1 and G1. The workshop had four main goals: to define the table of contents (TOC) and priorities of the future SRIDA, to identify who would actively contribute to the writing, to define the process for moving forward, including assigning the Big Tickets writing teams, and to encourage participants to contribute to SRIDA with their respective knowledge. The overall objective of the Adra deep-dive workshop was to finalize the table of contents of the future SRIDA and its priorities, to identify individuals who would actively contribute to the writing, and to establish the process for moving forward over the summer months. Participation in the meeting was by invitation only, but the workshop participants represented all relevant stakeholder communities (AI, Data, and Robotics, as well as Industry and Research). The workshop resulted in dividing the collaborative work into the six Big Tickets (see Section 3.1.3), which were assigned among the participants for online work during the Summer, with the goal of finalizing the tickets by the end of August.

## 4.10 August 28, 2023 – Deadline for Big Ticket sections

#### Approaching the final SRIDA deadline

Once the submissions from the contributors to the six Big Tickets were received, the Editing Committee began the process of harmonizing these contributions and ensuring consistency with the overarching content of SRIDA, drawing from the text of the "Strategic Orientation Towards an AI, Data, Robotics Roadmap 2025-2027" (the "10-pager"). The primary objective of this phase was to unify the content received from diverse contributors and guarantee the overall logical flow and coherence of the entire SRIDA document. This involved meticulously reviewing and refining the contributions, ensuring that they aligned with the overall vision and objectives of SRIDA. The Editing Committee also addressed inconsistencies or ambiguities in the language, ensuring that the document was clear, concise, and easy to understand for a wide range of stakeholders.

## 4.11 September 19, 2023 – The SRIDA Industry Roundtable Discussion

#### Involving industries in active discussions

The SRIDA Industry Roundtable Discussion<sup>9</sup> provided a dedicated platform for industry stakeholders to share their insights and perspectives on the agenda's strategic direction. Industry participants included ABB, BMW, Bosch, Green0meter, PAL Robotics, Shadow Robot Company, and SiloAI. This roundtable discussion facilitated a deeper understanding of the industry's expectations and challenges, ensuring that the SRIDA addressed the needs of the private sector. It also served as an opportunity for companies to learn about the partnership comprehensive vision and Big Ticket themes from the SRIDA, as well as gather vital insights from Adra members, founding organizations (BDVA, CLAIRE, ELLIS, EurAI, euRobotics), and companies that develop or deploy ADR technologies and wish to engage and contribute to the process. Key objectives of the event consisted of presenting the latest version of the SRIDA, engaging in an interactive discussion to gather inputs, suggestions, and perspectives from Adra/FO industry members, fostering collaboration and

<sup>&</sup>lt;sup>9</sup> <u>https://adr-association.eu/blog/the-srida-industry-roundtable-discussion-on-the-strategic-orientation-of-the-ai-data-robotics-2025-2027/</u>

Al, Data and Robotics

knowledge-sharing among industry leaders and stakeholders, and shaping the future direction of the SRIDA to align with industry needs and advancements.

# 4.12 October 25, 2023 – An interactive Q&A with the SRIDA Editing Committee at EBDVF23

#### Getting feedback from the public in the format of a Community Workshop

The consultation session at EBDVF23 focused on "Visions on European AI, Data, and Robotics – shaping the SRIDA," providing an opportunity to gather perspectives from a wider audience and ensuring that the agenda reflected the evolving landscape of the AI industry from a variety of viewpoints. The panel on how to boost European competitiveness in ADR, Adra Strategic Research, Innovation, and Deployment Agenda, was followed by the panel asking for input on the SRIDA Big Tickets 2025-2027 and an interactive Q&A with the SRIDA Editing Committee. This allowed for gathering further input from a broader community of stakeholders, fostering inclusivity and democratic participation in shaping the SRIDA agenda.

### 4.13 November 9, 2023 – Public release of the Adra SRIDA 2025-2027

Officially presenting the document to the broader community

The AI, Data, and Robotics Forum (ADRF) was the venue for the official release of the SRIDA. The Editing Committee presented the document, which was available for downloading by the public from the Adra website. Emanuela Girardi presented a vision for sustainable growth and welfare — the European AI Moonshot — demonstrating the opportunities for Adra to boost European success in AI. Philip Piatkiewicz navigated the panel, consisting of academics and European Commission representatives, through the challenges around SRIDA.

Some feedback and recommendations for future improvements were given at this stage by both the panellists and the public in the audience.

# 4.14 January 11, 2024 – Publishing the final version of the Adra SRIDA 2025-2027

#### Finalizing the document, taking into account all inputs

After presenting the document to the public, the Editing Committee needs to consider the feedback, especially that received from the European Commission. The team is thoroughly addressing their questions and wishes with the goal to have the EC feedback being implemented into the final version of the document. Additionally, minor changes, such as language and style fixes, including better synchronization in the narrative of Big Tickets that should be connected to the AI Moonshot for consistency, need to be made. The planned date for the final document publication is January 11, 2024.

# 5. Reflecting on the Process, Feedback, and Recommendations

In the development of the Strategic Research and Innovation Agenda (SRIDA), a thorough examination of the chosen approach reveals both commendable aspects and potential areas for improvement. This chapter explores the benefits and drawbacks of the process, reflecting on its efficiency and offering recommendations for future iterations.

A critical concern for future SRIDA iterations is the effective engagement of diverse stakeholder groups in shaping the content and the writing strategy of the document. Attracting contributors from outside academia has proven challenging, particularly due to the time constraints and competing priorities of industry representatives. While industry feedback and participation in Adra events have



been valuable, their direct involvement in the writing process remains limited. For the next SRIDA edition, proactive efforts are needed to encourage active participation from industry members, including those from smaller companies and start-ups. Raising awareness among these groups and highlighting the impact of the SRIDA on their work is crucial to ensure their voices are heard.

Networks of Excellence, with their wealth of expert knowledge, offer another potential source of active engagement. While their feedback during this SRIDA iteration was voluntary and sporadic, their creative participation should be formally integrated into the future methodology.

Member states involvement and feedback are essential throughout the SRIDA development process, particularly during the initial stages of strategic orientation setting. However, their limited time and tendency to comment only on the final result can lead to challenges in accommodating substantial changes later. Engaging member states earlier and maintaining their engagement throughout the process is critical for the future SRIDA iterations.

Regarding the Big Tickets writing process, gathering comprehensive and objective expert input was paramount. Adra representatives played a significant role in this effort, but the contributions of experts from other academic organizations were equally valuable. While Adra holds the primary responsibility for navigating the creative process and making strategic and content decisions, maintaining productive communication and considering diverse perspectives from contributing bodies is essential for producing a well-rounded SRIDA document.

Overall, the current approach offers both advantages and disadvantages, which will be discussed in detail in the following sub-chapters:

### 5.1 Benefits

#### Inclusive and participatory approach:

The SRIDA development process involved extensive engagement with a wide range of stakeholders, including industry, academia, government, and civil society. This inclusive approach ensured that the SRIDA reflected diverse perspectives and addressed the needs of various stakeholders.

#### Structured iterative methodology:

The SRIDA development followed an iterative methodology, involving multiple rounds of consultation, feedback, and refinement. This approach allowed for continuous improvement of the document and ensured that it remained relevant and aligned with emerging trends.

#### Strong foundation for future ADR development:

The SRIDA provides a comprehensive framework for research, innovation, and deployment in ADR, setting clear goals, priorities, and pathways for future advancements. This foundation will serve as a valuable guide for policymakers, researchers, and industry leaders.

#### Enhanced transparency and accountability:

The SRIDA development process was transparent and accountable, with regular updates and opportunities for feedback. This transparency fosters trust and confidence in the SRIDA and its potential to drive ADR progress in Europe.

#### 5.2 Drawbacks

#### Time-consuming process:

The SRIDA development was a lengthy process, involving multiple rounds of consultation, feedback, and refinement. While this thoroughness ensured the quality of the document, it may have slowed down the overall timeline for its completion.



#### Social aspects require more coverage:

While the SRIDA aims to be an overarching document that encompasses all aspects of ADR development, certain topics remain inadequately addressed. For instance, there is a notable absence of a thorough discussion on education or social issues. This lack of coverage stems from the underrepresentation of experts from the humanities and social sciences in the SRIDA development process. Consequently, the SRIDA has a strong technical orientation, which calls for the inclusion of representatives from the social sciences in future dialogue and writing collaborations to establish productive connections.

#### Potential for stakeholder conflicts:

The inclusive approach to stakeholder engagement (especially if involving more industry leaders) could have led to conflicts or disagreements over priorities and directions. Careful management and negotiation were necessary to ensure consensus and alignment among stakeholders.

#### Ensuring the relevance of the SRIDA in a dynamic ADR landscape:

The ability of the SRIDA to adapt to the rapidly evolving ADR landscape is paramount. To maintain its relevance and effectiveness over time, continuous monitoring, evaluation, and updates will be essential. Balancing the constant need for updates with the academic desire to provide comprehensive and detailed coverage presents a methodological challenge that must be addressed.

### 5.3 Contributors Feedback

In November 2023, we reached out to the contributors to the Strategic Research and Innovation Agenda (SRIDA) who actively participated in various events (primarily, contributors to the Big Tickets and the Reference Committee participants), to gather their feedback on the overall process of working on the SRIDA<sup>10</sup>. The survey employed simple questions: what aspects of the process did you find most and least favorable, and what suggestions do you have for improvement? The responses were remarkably consistent, with several key themes emerging.

Contributors highlighted the following key strengths: an inclusive and distributed approach, ensuring that a wide range of topics and contributors were represented: an atmosphere of open communication and collaboration; a well-structured process guided by clear objectives; and the opportunity to contribute to the development of the SRIDA, recognizing its significance in shaping the future of ADR in Europe. Despite the overall positive feedback, survey participants also identified areas for improvement, primarily related to time constraints, communication, and collaboration: they expressed concerns about the limited timeframe for developing the SRIDA; participants indicated that communication could have been improved, as some of them felt that the writing Big Tickets groups operated in silos, with no opportunities for interaction with other groups. To enhance the SRIDA creation process in the future, participants proposed several improvements, primarily related to time allocation, communication, and collaboration. Allocating more time for the SRIDA development process would allow for more in-depth discussions, refined outcomes, and a more manageable workload. Early engagement and consultation with sectorial experts, including partnerships and professional associations, would facilitate gathering insights into expectations, market potential, and potential challenges. Providing more transparency regarding the overall process and the activities of other working groups would help ensure alignment, avoid duplication of efforts, and foster a sense of collective ownership. Encouraging transparent and collaborative interactions between different groups of collaborators was highlighted by the majority of the survey



participants, as it would promote knowledge sharing, cross-pollination of ideas, and a more cohesive approach to SRIDA development.

In December 2023, the European Commission provided constructive feedback, both in written and verbal forms, echoing their prior contributions. The feedback included requests for elaboration on specific points, suggestions for areas requiring further development, and acknowledgments of the document's strengths. For instance, the Big Tickets should be more closely interconnected with the AI Moonshot for consistency, with the Big Tickets serving as overarching technology descriptions and the AI Moonshot associating with practical implementation. This valuable input is currently being utilized by the Editing Committee as they prepare the final current version of SRIDA.

## 5.4 Reflections on Efficiency

The chosen approach for writing the SRIDA was generally efficient in achieving its objectives of producing a comprehensive, inclusive, and forward-looking AI strategy for Europe. The structured methodology, extensive stakeholder engagement, and iterative refinement process all contributed to the SRIDA quality and relevance.

There are, however, areas where the efficiency of the process could be improved in future iterations. One such area is streamlining the consultation and feedback processes, potentially through the utilization of technology platforms or more targeted engagement strategies. The collaborative Big Tickets writing process was complicated by the involvement of numerous groups and documents, coupled with a lack of transparency among the Big Tickets writers. This resulted in different groups of collaborators being unable to see each other's progress in real time, only gaining insights once individual work was completed. Full transparency throughout the processes would be desirable. Additionally, establishing clear criteria for evaluating feedback and prioritizing input could further enhance the efficiency of the decision-making process.

Considering the well-communicated desire for more time to collaborate on writing, an option worth exploring is to transform the existing teams of expert writers into topic groups. These groups would be allocated a year to develop their assigned BigTicket areas, allowing more time for in-depth discussions, reflections, and collaboration with other topic groups. This extended timeframe would enable more comprehensive and refined contributions to the SRIDA document.

Overall, the SRIDA development process was marked by regular self-reflection, open communication with the reference committee and the community, and continuous evaluation. This iterative approach enabled ongoing adjustments and improvements, ultimately contributing to the success of the final outcome. The SRIDA development process provides valuable lessons for future endeavors in crafting strategic frameworks within rapidly evolving fields. The emphasis on inclusivity, transparency, and adaptability will remain essential for formulating effective strategies that can guide and support innovation and progress.

The process benefited from the enthusiastic involvement and valuable insights of academia and networks. Engaging discussions during events fostered a genuine interest in making Adra a meaningful and impactful initiative. Participants demonstrated a remarkable ability to listen to each other, appreciate diverse perspectives, and work collaboratively. The collaboration among experts on AI, data, and robotics from across Europe was highly rewarding and intellectually stimulating.

Throughout the creation of the SRIDA, the Editing Committee regularly engaged in self-reflection and maintained open communication with the reference committee and the broader community to evaluate the effectiveness of the approach being taken. This critical assessment allowed for timely adjustments and improvements, thereby enhancing the final outcome. Weekly online meetings provided a valuable platform for editors to stay updated on developments in their respective fields, brainstorm ideas, and further refine the SRIDA framework. Various workshops, seminars, and a

Al, Data and Robotics

roundtable facilitated the collection of feedback from the external community, helping to validate and refine the proposed concepts.

## 5.5 Recommendations for Improvement

Drawing upon the collective insights and reflections of all participants involved in the SRIDA development process, the following recommendations are proposed to further enhance the effectiveness and efficiency of future SRIDA iterations.

#### 1. Enhancing Consultation and Feedback Processes

Streamlining consultation and feedback processes is essential for ensuring effective and efficient collaboration. The current approach, while valuable, can be optimized by incorporating technology platforms. These platforms can facilitate real-time communication, centralized feedback management, and streamlined decision-making. By providing a centralized hub for feedback and consultation, technology can enhance collaboration, reduce administrative burdens, and accelerate progress.

#### 2. Establishing Clear Evaluation Criteria

Clear and transparent evaluation criteria are crucial for prioritizing feedback and ensuring that the most relevant and impactful suggestions are incorporated into SRIDA's development. A well-structured evaluation framework should consider factors such as feasibility, impact, and alignment with SRIDA's overall goals. By establishing clear evaluation criteria, SRIDA can ensure that the feedback process is focused, efficient, and aligned with the project's objectives.

#### 3. Fostering Closer Industry Collaboration

Enhancing engagement with industries is vital for the SRIDA to remain relevant and responsive to market needs. By establishing closer ties with industry stakeholders, SRIDA can gain valuable insights into emerging trends, potential challenges, and stakeholder expectations. This knowledge will inform the development of the SRIDA, ensuring that it remains a forward-looking and industry-driven framework.

#### 4. Creating an Interactive Collaboration Platform

Establishing an online forum or interactive platform would provide a centralized space for real-time collaboration among contributors, fostering transparency and efficient collective writing. This platform could facilitate document sharing, real-time feedback, and discussions among contributors, ensuring that everyone is on the same page and that progress is tracked effectively. An interactive platform would promote transparency, collaboration, and efficiency, streamlining the writing process and ensuring that all contributors have a voice<sup>11</sup>.

#### 5. Encouraging Active Participation from Member States

<sup>&</sup>lt;sup>11</sup> Such service is typically what the AlonDemand platform could offer to the community.



Encouraging more detailed contributions and feedback from member states throughout the various stages of SRIDA development is essential for ensuring a comprehensive and inclusive approach. By actively seeking input from member states, the SRIDA can tap into a wealth of diverse perspectives and experiences, ensuring that the framework reflects the needs and priorities of all EU stakeholders. Member states should be provided with opportunities to provide detailed feedback at each stage of development, ensuring that their voices are heard and that their input is carefully considered.

#### 6. Social Aspects Require Comprehensive Coverage

Thorough consideration of social issues is essential for the effective and responsible development of ADR technologies. To achieve this, future SRIDA iterations should incorporate the expertise of humanities and social science experts into the dialogue and the writing process. This multidisciplinary approach will foster productive connections between the technical and social sciences, ensuring that social considerations are fully integrated into the SRIDA framework.

In conclusion, the SRIDA development process is offering valuable insights for future strategic frameworks in rapidly evolving fields. Emphasizing involvement, transparency, and adaptability remains essential for crafting effective strategies that guide innovation and progress.

## 6. Conclusion

This document has presented a comprehensive account of the process involved in supporting the creation of the Strategic Research, Innovation, and Deployment Agenda (SRIDA) for the AI, Data, and Robotics Association (Adra). By offering a detailed understanding of the steps undertaken, potential benefits, and challenges faced, this report serves as a valuable guide for future endeavors in formulating subsequent SRIDAs. Ultimately, the SRIDA represents a critical tool in shaping the research, innovation, and deployment landscape to address societal needs and foster technological advancements.

To sum up, The SRIDA development process was marked by several key findings:

- **Inclusivity and Transparency:** The process was characterized by a strong commitment to inclusivity and transparency, with active participation from a diverse range of stakeholders. This inclusive approach ensured that the SRIDA reflects the needs and priorities of all stakeholders.
- Adaptability and Agility: The process was designed to be adaptable and agile, allowing for adjustments and improvements to be made throughout the development phase. This flexibility was essential for ensuring that the SRIDA remained relevant and responsive to changing circumstances.
- **Collaboration and Partnership:** The process was underpinned by a strong emphasis on collaboration and partnership, fostering a spirit of cooperation among stakeholders. This collaborative approach was crucial for achieving consensus on the goals and objectives of SRIDA.

Key recommendations include:

• Strengthen Collaboration with Member States, with Industry, and with Social Sciences: Enhance engagement with member states, industry representatives and academics from humanities to gain valuable insights into market trends, stakeholder needs, human behavior, and emerging challenges. This engagement will increase the chances that the SRIDA remains relevant and aligned with the priorities of society, industry and member states.

Al, Data and Robotics

- Use an Interactive Collaboration Platform: Implement an online forum on some interactive platform to facilitate real-time collaboration among contributors, fostering transparency and efficient collective writing. This platform would provide a centralized hub for document sharing, real-time feedback and discussions, ensuring that all contributors are on the same page.
- Streamline Consultation and Evaluation Processes: Utilize targeted engagement strategies to streamline consultation and feedback processes, promoting efficiency and responsiveness. Establish clear criteria for evaluating feedback and prioritizing input to ensure that the most relevant and impactful suggestions are incorporated into SRIDA.
- Ensure Adaptability to Rapidly Changing ADR Landscape: Recognize the dynamic nature of the ADR landscape and incorporate mechanisms to adapt to sudden changes. This adaptability will be crucial for maintaining SRIDA's relevance and effectiveness in a rapidly evolving technological environment.

Given the rapid and transformative changes within the ADR landscape, SRIDA must be equipped to adapt to these sudden shifts. This adaptability is crucial for maintaining the framework's relevance and effectiveness in a constantly evolving technological environment.

The current version of SRIDA is the first attempt of creating such document. Despite the limited timeframe and the diverse nature of the contributing community, the overall result is reasonably satisfactory. The process of crafting the initial "10-pager", identifying key areas (the "Big Tickets"), and subsequently refining it into a more comprehensive document, the SRIDA itself, through a series of feedback loops and contributions, proved effective. Next step is to develop a comprehensive methodology for the SRIDA creative progress, including detailed instructions on the writing process, refined procedures for establishing Big Tickets, effective stakeholder engagement strategies, and a step-by-step timeline with proposed timings.

The Strategic Research, Innovation, and Deployment Agenda plays a crucial role in shaping the European Commission's Horizon Europe work programme, providing guidance and direction for EU-funded ADR research and innovation initiatives. The SRIDA development faced several challenges, including ensuring stakeholder representation, balancing long-term and short-term objectives, and determining the optimal update frequency. Despite these challenges, SRIDA stands as a statement of the European commitment to ADR and its potential to transform society and the economy. It represents a critical step forward in shaping the future of ADR research, innovation, and deployment in Europe. By providing a comprehensive framework for guiding and supporting these activities, the SRIDA aims to contribute to addressing societal needs, fostering technological advancements, and enhancing European competitiveness. In the next steps, by implementing the recommendations outlined in this report, the SRIDA development process can be further refined to ensure that the SRIDA remains a dynamic, adaptable, and impactful tool for shaping the future of AI in Europe, contributing to economic development, sustaining European leadership, and navigating disruptive technologies effectively.

## 7. Glossary

- Editing Committee: a group responsible for refining and polishing the content of the SRIDA document, ensuring clarity, coherence, and adherence to established standards.

- Reference Group: a select assembly of experts or stakeholders consulted during the development of the SRIDA, offering insights, feedback, and guidance to ensure the document aligns with diverse perspectives.



- NoE Representatives: representatives from Networks of Excellence (NoEs) involved in AI research, contributing their expertise and perspectives to the SRIDA development process.

- Representatives AI-on-Demand Platform: Individuals designated to represent the AI-on-Demand platform, playing a crucial role in integrating on-demand AI services into the SRIDA framework.

- EC Representatives: officials from the European Commission who actively participate in the SRIDA development, providing regulatory insight, strategic direction, and aligning the agenda with broader policy objectives.

- Coordination Team: a specialized group tasked with orchestrating and harmonizing the efforts of various stakeholders involved in the SRIDA development, ensuring effective collaboration and progress towards defined goals.

- Community Workshop: an interactive session organized to gather input and perspectives from a broader community of stakeholders, fostering inclusivity and democratic participation in shaping the SRIDA agenda.

#### Abbreviations:

- ADR: AI, Data, and Robotics
- Adra: AI, Data, and Robotics Association
- AI: Artificial Intelligence
- EC: European Commission
- EU: European Union
- HPC: High Performance Computing
- ML: Machine Learning
- NoEs: Networks of Excellence
- SRIDA: Strategic Research, Innovation, and Deployment Agenda
- WP: Work Package