D8.2 – Dissemination, Communication and Community Building & Standardisation v1

WP8 – IMPACT: Dissemination, Exploitation and Standardisation

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ABSTRACT	This document identifies the main channels of dissemination and communication of the solutions being developed in the AIDEAS project and what content has been generated so far. It also includes the AIDEAS community growth strategy, explaining the actions to create, grow and disseminate the community. Additionally, information on the establishment of the Advisory Board is included, as well as the calendar of actions and some information on the first AB workshop. A general overview about standardisation is given and the relevant standards committees and standards are identified.		

Document History

VERSION	ISSUE DATE	STAGE	DESCRIPTION	CONTRIBUTOR
0.1	30-Mar-2023	ToC	Table of Contents creation and attribution of partners	UPV
0.2-0.6	05-Sep-2023	Working version	1st Draft available for internal review, including input on Dissemination and Communication, Community building, Advisory Board and Standardisation	UPV, FBA, IKERLAN, DIN
0.7	19-Sep-2023	Review	Conduction of Internal Review and plagiarism check	CERTH, FBA
0.8	22-Sep-2023	Draft	2nd Draft addressing the comments by the reviewers	UPV
1.2	30/09/2023	Final doc	Quality check and issue of final document	CERTH

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ABBREVIATIONS/ACRONYMS

AB	Advisory Board
AFNOR	French Standardisation Association
AI	Artificial intelligence
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Material
BSI	British Standards Institution, Federal Office for Information Security
CDM	Common Information Sharing Environment Service and Data Model
CEN	European Committee for Standardisation
CEN-CLC/JTC	CEN-CENELEC Joint Technical Committee
CENELEC	European Committee for Electrotechnical Standardisation
CEO	Chief Executive Officer
CPI	Ciudad Politechnica de la Innovaccion (Polytechnic City of Innovation)
CVPR	Computer Vision and Pattern Recognition (Conference)
CWA	CEN Workshop Agreement
D#	Deliverable #
DIH	Digital Innovation Hubs
DMIS	Digital Manufacturing Industrial Summit
DIN	German Institute for Standardisation
DKE	German Commission for Electrotechnical, Electronic, and Information Technologies of DIN and VDE
DSA	Data Sharing Agreement
EFTA	European Free Trade Association
EN standard	European standard
ETSI	European Telecommunications Standards Institute
EU	European Union
FBA	FundingBox Accelerator
GA	Grant Agreement
I4MS	ICT Innovation for Manufacturing SMEs
ICIEIM	International Conference on Industrial Engineering and Industrial Management
ICS	International Classification for Standards

ICT	Information and Communication Technologies
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IIRA	Industrial Internet Reference Architecture
ISO	International Organization for Standardisation
ITU	International Telecommunication Union
IWA	International Workshop Agreement
JTC	Joint Technical Committee
KPI	Key performance indicator
MDPI	Multidisciplinary Digital Publishing Institute
ML	Machine Learning
NSB	National Standardisation Body
PR	Public Relations
R&I	Research and Innovation
RA	Reference Architecture
RAMI	Reference Architectural Model for Industry
SAI	Security Artificial Intelligence
SC	Subcommittee
SDO	Standards Developing Organization
SEM	Search Engine Marketing
SME	Small-Medium Enterprise
SQuaRE	Software product Quality Requirements and Evaluation
T#	Task #
TC	Technical Committee
TR	Technical Report
TS	Technical Specification
UK	United Kingdom
UL	Underwriter Laboratories
UNE	Spanish Association for Standardisation
US	United States
WG	Working Group
WP	Work Package

Executive summary

Dissemination, Communication and Community Building, as well as Advisory Board and Standardisation related issues within the AIDEAS project are the main topics of this document, which presents the initial report of the actions completed during the first year of the project. The reporting of the aforementioned activities has two iterations in the AIDEAS project: This first version, in month 12, which, as indicated above, gathers and summarises everything that has occurred in this regard since the start of the project in October 2022 until month 12, and a second version, which will include the report on the activities carried out from month 13 until the end of the project in month 36.

As with all AIDEAS project activities, the ultimate goal of the dissemination strategy is that the overall project objectives are achieved, in this specific case through dissemination activities. To achieve this, the following four key objectives have been set: 1) to disseminate the AIDEAS project to various target audiences, 2) to increase the number of target stakeholders aware of AIDEAS activities, 3) to form partnerships and engagements with other projects, networks, entities, etc. with the potential to further what AIDEAS stands for and aspires to achieve, and 4) establish the procedures and methodology for monitoring and evaluating the impact of dissemination and communication activities throughout the project.

The project is ongoing and both the AIDEAS website and social media are up and running. The AIDEAS online community is also working. The first materials are already available, some notable events have taken place, the first scientific and technical articles have been published and the networking activities are starting to bear their first fruits. This first report sets out the key performance indicators (KPIs) that allow first estimates of the impact of dissemination and communication activities. In this respect, not only are the KPIs in line with expectations, but some of them are already exceeding the targets, which is proof of the degree of involvement of the consortium members.

The Advisor Board that will guide the project with recommendations and neutral feedback with the aim to maximise the impact and exploitation of the project have been established. Thus, 5 experts have been involved in a qualified and gender-balanced board made up of 3 men and 2 women with complementary profiles (market, technology, business, entrepreneurship, etc.). The operating protocol has been established, as well as the objective of each of the 4 expected AB workshops and their tentative calendar. The Service Agreement regulating the purpose, role, costs, confidentiality and other matters relating to the AB has been prepared and validated by the consortium and signed by all AB members before the first AB workshop, held online on 21 September 2023.

Regarding standardisation activities, great attention should be paid as they are very relevant to ensure a transnational harmonisation of standardisation documents, which is the basis of the joint economic area of the European Union. The main innovations of AIDEAS are AI technologies, which support the whole life cycle of industrial equipment. Therefore, it is essential to ensure the applicability, trust and compliance of AIDEAS. This requires that AIDEAS solutions comply with standards, technical specifications and procedures.

Document structure

Section 1: Introduction

Section 2: Dissemination, Communication and Community Building

Section 3: Advisory Board

Section 4: Standardisation

Section 5: Conclusions

1. Introduction

All the commitments acquired in relation to the dissemination and communication strategy, as well as those related to the standardisation for the AIDEAS project, are included in the DoA of the Grant Agreement and, in particular, those related to objectives, description of the activities, effort of the project partners, committed deliverables with their deadlines, milestones and list of critical risks.

The dissemination, communication and standardisation activities require the submission of two deliverables throughout the project: a) the deliverable D8.2 "Dissemination, Communication and Community Building & Standardisation v1", to be submitted in month 12, and whose beneficiary leader is UPV, and b) the deliverable D8.5 "Dissemination, Communication and Community Building & Standardisation v1", to be submitted in month 36, and whose beneficiary leader is DIN. In this document, deliverable D8.2, all the advances related to dissemination, communication and standardisation during the first 12 months of the project are presented, which have served to consolidate the committed strategies regarding: the communication channels such as the website or social media, the presentation of results through publications, presentations, participation in events, the building of the AIDEAS community, the holding of webinars and workshops, or the networking activities.

As for the milestones included in the first 12 months of the project with an impact on these activities, only number 3, "Project Dissemination Strategy implemented", is relevant, whose main purpose was that in month 3 the dissemination strategy of the project, in its first version, would be defined, the AIDEAS website would be established and functioning, and dissemination materials would already be available.

In the risk management strategy only one risk specifically concerns the activities covered in this document, namely 19, "Poor/ineffective dissemination", a low/medium level risk, the management of which seeks to ensure the linkage of the project with the industrial sector and other stakeholders in the project results in order to achieve maximum interaction with the different target groups.

Based on the above, the objective of this deliverable is to provide an overview of the organisation of the activities and to provide information on the monitoring of the dissemination and communication activities (project tasks T8.1 and T8.2), the activity of the advisory board (project task T8.3), and the standardisation activity (project task T8.7) and their results.

For this purpose, the document is divided into 5 sections, including this introduction. It has three main sections, separating the contents and information related to dissemination, communication and community building (section 2), advisory board (section 3) and standardisation (section 4). Finally, there is a common section of conclusions which brings together the main considerations, and which offers a first coherent picture after the first year of motion of the AIDEAS project, which of course takes into consideration the result of the monitoring of the KPIs by highlighting the main achievements.

2. Dissemination, Communication and Community Building

The following sections present and describe the approach adopted in the dissemination strategy from a strategic and planning perspective, addressing the objectives, roles and responsibilities, target groups and timeline, as well as the details of the established plan.

The fundamental objective of the dissemination strategy is to enhance the adoption of AIDEAS solutions by making the knowledge accessible in a format suitable for the target audiences, with an emphasis on businesses and end users. The project has established the objectives, targets and communication mechanisms to achieve this purpose.

2.1 Objectives

One general and four specific objectives can be highlighted in terms of dissemination and communication.

- **General objective**: the ultimate aim of the dissemination strategy is that the overall objectives of the project as a whole are achieved, in this particular case through dissemination activities.
- Specific objectives:
  - To disseminate the AIDEAS project among the different target audiences.
  - To increase the number of target stakeholders who are aware of AIDEAS activities.
  - To form partnerships and engagements with other projects, networks, entities, etc. with potential to further what AIDEAS stands for and aspires to achieve.
  - To establish procedures and methodology to monitor and evaluate the impact of dissemination and communication activities throughout the project.

2.2 Roles and Responsibilities

Three main roles and their respective responsibilities can be distinguished in the strategy approach and the development of the activity:

- **Task leader**. In the project, this role is carried out by UPV. Its main responsibilities consist of establishing the dissemination and communication strategy, developing the bulk of dissemination activities and monitoring the results.
- **Task vice-leader**. This role is performed by FBA, which is also WP leader. Its main responsibilities are to support the dissemination activities in general from a strategic and operative perspective, but especially in all matters related to community building.
- **The rest of the project partners**: In order to gather the greatest possible dissemination potential, all partners, although to a lesser extent than the previous ones, are involved in the activities. Their main responsibility is to support the project by publishing articles, participating in conferences and workshops, detecting possible news to disseminate and providing content, participating in the project's social networks, providing speakers at workshops, webinars and Q&A sessions, etc.

2.3 Dissemination Target Groups

Among the possible audiences for the dissemination activities of the project, the following potential target groups have been identified as the main ones:

- Businesses of the industrial sector: Each and every European machinery manufacturing company is a potential customer of AIDEAS solutions and is therefore the main target group.
- Academia: In general, the scientific & research audience is also important, especially those organisations that are interested in AIDEAS research approach and scientific outcomes.
- European initiatives and actions: Such as Digital Innovation Hubs and their networks (e.g. DIH4CPS, BOWI, DIHNET.EU, etc.), I4MS initiatives, sister projects and other EU funded projects.
- Certification/standardisation bodies and agents: such as ISO-IEC/TC, CEN-CENELEC/TC, IEEE committees or platforms such as the Industry 4.0 Platform.
- General public: those parties interested in the activities and results of the AIDEAS project, such as companies and other private or public organisations, individuals or, in general, society.

2.4 Timeline

The four main stages of the dissemination and communication process are summarised below.

The first year of the project is devoted to attracting the attention of the target groups. The main intention is to raise awareness of the project in general. The first and fundamental tool is the AIDEAS website, a living site that will grow and be optimised throughout the project. The other fundamental tools at this stage are social networks, marketing materials and the first newsletters.

The second year will be marked by the objective of engaging the relevant stakeholders. With needs and difficulties identified, preliminary results to offer and many demonstrative actions such as webinars or workshops. Networking starts to take centre stage and from then on, the relationship with EU initiatives will offer new opportunities to exchange ideas and compare dissemination efforts.

The promotion of the different results will take place in year 3. Specific dissemination plans will be developed with the partners based mainly on the results of the technical solutions, with a special emphasis on the integration of the solutions in the production of pilots for validation. Finally, dissemination and communication activities will be key after the end of the project to support the exploitation of the results (Figure 1).

Figure 1. Timeline of dissemination and communication activities

2.5 Target-Driven Dissemination and Communication Plan

The AIDEAS project's efforts to raise awareness, engage the audience, communicate with stakeholders and disseminate information will be guided by the principles of growth hacking. To this end, the dissemination and communication plan will be carried out using proven target-driven growth hacking approaches.

Growth hacking is a growth strategy that seeks to use as few resources as possible. Therefore, the ideal way to do this is to get your own consumers to become propagators of your product for which they receive some benefit or compensation. The AIDEAS way of looking at this involves testing various tools to carry out dissemination and communication activities through the selected channels through iterative cycles that allow for validation, as a method of finding the most effective ways to connect with and engage key stakeholders. It is about designing and diffusing relevant content to attract and retain target audiences with the ultimate intention of transforming audiences into customers and consumers.

2.5.1 Message to be conveyed

KEY MESSAGES

1

New digital tools of AI for supporting the entire life cycle of industrial equipment (design, manufacturing, use and repair/reuse/recycle)

2

Access to solutions for the sustainability, agility and resilience improvement of the European Industrial Equipment Manufacturers

2.5.2 Identity

2.5.2.1 Conceptual Identity

The AIDEAS brand is intended to abbreviate the project name "AI Driven Industrial Equipment Product Life Cycle Boosting Agility, Sustainability and Resilience" while still expressing what the project means and stands for and with an easy-to-remember register. For consistent branding of

the project, the project name must always be spelled correctly, regardless of the intended objective or the channel used.

On the other hand, the project slogan will be the following claim, reflecting its strategic mission and vision: "AIDEAS Project will develop AI technologies for supporting the entire life cycle of industrial equipment (design, manufacturing, use and repair/reuse/recycle) as a strategic instrument to improve the sustainability, agility and resilience of the European machinery manufacturing companies". The use of this slogan should usually be extended to all the communication channels used by the project in the development of its dissemination and communication strategy, be it the website, social media, marketing materials, newsletters, etc.

2.5.2.2 Visual Identity

The visual identity of AIDEAS is mainly based on its main logo (coloured) and the project colours, which are to be used in documents, presentations, marketing materials, website, social networks, etc. The first aim of the logo design is to ensure that the first impression it generates is simplicity, supported by the non-use of graphic resources beyond the letters of the brand itself and the use of only two colours, which highlights the presence of AI in the AIDEAS solutions.

Figure 2. AIDEAS main logo

ORANGE COLOUR

Colour model: **RGB**

Red: **197**

Verde: **90**

Azul: **17**

Hexadecimal: **#C55A11**

BLUE COLOUR

Colour model: **RGB**

Red: **68**

Verde: **114**

Azul: **196**

Hexadecimal: **#4472C4**

Figure 3. Main colours palette

In addition, the project has two (2) other secondary logos in which the only changes are their colours.

Figure 4. AIDEAS secondary logos

Likewise, there also exists the possibility to use additional colours**.** Figure 5 shows the complete colour palette.

Figure 5. AIDEAS complete colour palette

Regarding the typography, the typeface used by the AIDEAS project in its written communications is PT Sans (https://fonts.google.com/specimen/PT+Sans).

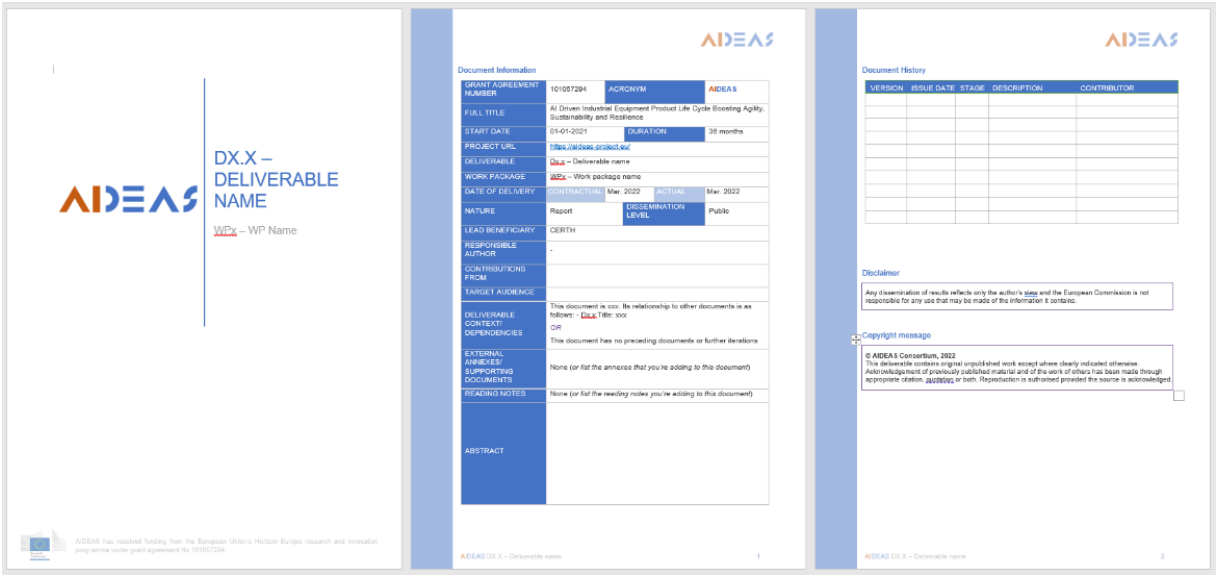


Figure 6. Aspect of the AIDEAS deliverables template (1)

As to templates, the project manages templates for deliverables, presentations and internal review forms. They all are uploaded to the AIDEAS SharePoint. Figure 6 to Figure 9 show some images to get a bird's eye view of its general appearance.

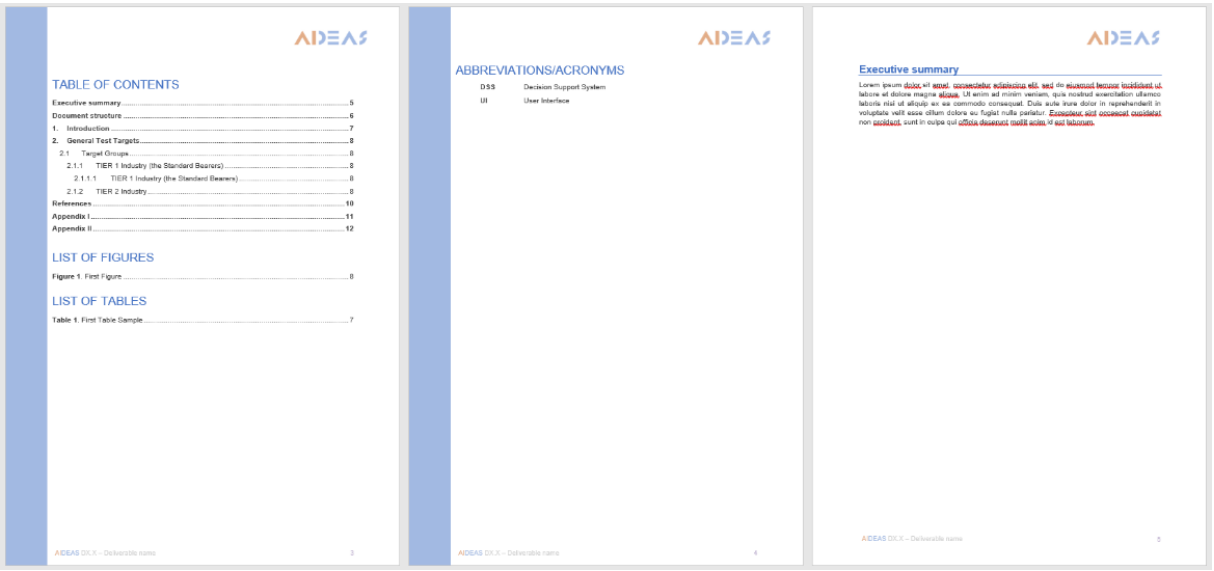


Figure 7. Aspect of the AIDEAS deliverables template (2)

Figure 8. Aspect of the AIDEAS PowerPoint template

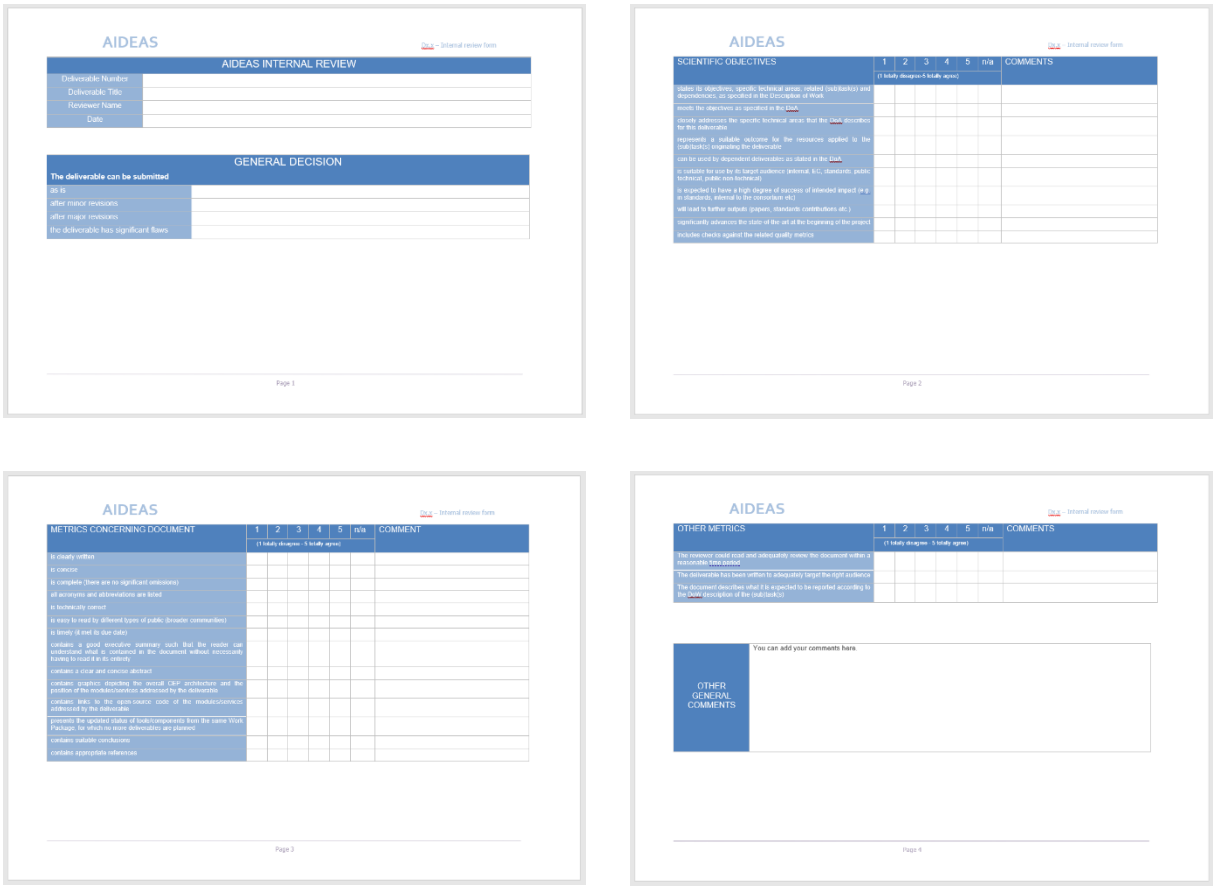


Figure 9. Aspect of the AIDEAS internal review form template

2.5.3 Expected impact: Key Performance Indicators and Monitoring

The ability to assess the diffusion and communication efforts is essential. It makes it possible for the project to set targets and to refocus our efforts in the event of problems. UPV and FBA will keep a careful eye on the events.

The DoA of the Grant Agreement establishes the KPIs that must be met (Figure 10 and Figure 11):

Figure 10. KPIs of the AIDEAS dissemination metrics (1)

How	Action	Target KPI
Publications in Industrial Specialised Press	Publication to industrial journals and magazines	> 6 publications
Presentations at Industrial Conferences	Attendance and speaking slots	5 speaker slots + 10 conferences + 4 project exhibitions
Publication of technical and scientific papers	Publication in scientific conferences and prestigious journals	> 10 scientific papers
Website	100 updates and Search Engine Optimisation (SEO)	50% yearly growth in website traffic yearly
Social Media	Sharing and Liking	150 new followers/year + 1 post/week + 3.000-5.000 impressions/year
eNewsletters	Regular eNewsletter	8 newsletters
Materials	To be distributed at project presentations / events	1 brochure + 1 banner provided to all partners + Posters per pilot + 2 flyers
AIDEAS online community	Setting up the community site, sharing updates about AIDEAS platform	300 community members

Webinars and Q&A sessions	Will be organised on AIDEAS Community Platform every 6 months	6 webinars/Q&A sessions within the project duration
Connection with the DIHs	Mapping and contacting the most important DIHs related to AIDEAS topic[9]	20 relevant DIHs engaged and added to the community + 10 DIHs involved in the roadshow
Stakeholders	Mapping and aggregating the stakeholders into a database for the e-newsletter	100 relevant stakeholders in EU mapped and contacted
Supporting partners	A set of partners who are spreading the word about AIDEAS in their specialised networks.	30 entities registered in community as Supportive Partners and spreading the word about AIDEAS project
EU networks	Dissemination through other relevant industry and EU clusters	10 EU Networks or projects invited to the community for cross-dissemination purpose
Workshops	AIDEAS hosted dissemination workshops	2 workshops / 20-50 participants each

Figure 11. KPIs of the AIDEAS dissemination metrics (2)

Two categories of KPIs can be visualised in the above list. On the one hand, there are indicators related to dissemination and communication actions that depend mainly on the involvement of the project partners, such as the communication of results through industrial or academic journals, participation in technical or scientific conferences or congresses, the publication of content on the website or social networks, or the use of marketing materials. On the other hand, indicators are distinguished for those activities that additionally involve, to a greater or lesser extent, networking actions or interaction with third parties, such as the establishment of the online community, the organisation of webinars and Q/A sessions, the search for connections with DIHs, the search and selection of stakeholders and supporting partners, the generation of cross-dissemination channels with other relevant European networks and projects, such as the sister projects, or the holding of dedicated workshops.

2.5.4 Marketing Materials

A tri-fold brochure adapted to this early stage of the project has been designed with basic information about the project in terms of project description, objectives, scope, pilots and consortium members (Figure 12 and Figure 13).

Figure 12. External part of the AIDEAS project tri-fold brochure.

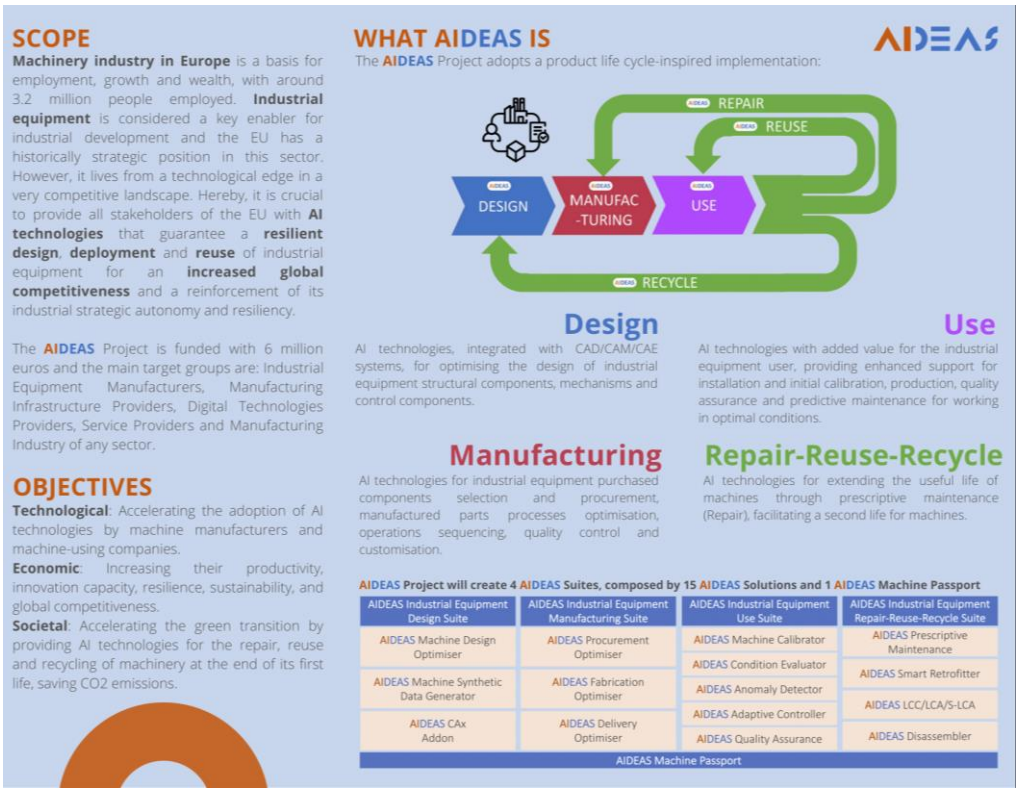


Figure 13. Internal part of the AIDEAS project tri-fold brochure.

A roll-up banner has also been designed (Figure 14).

Figure 14. AIDEAS project roll-up banner.

2.5.5 Website and Social Media

The online presence of the AIDEAS Project has been permanent since practically the beginning of the project and is based on two fundamental pillars of its dissemination and communication strategy: on the one hand, the AIDEAS website, which is permanently updated and growing in content, and on the other hand, the presence in social networks, which is based on the publication of project or related content on the LinkedIn, Twitter, Facebook and Zenodo networks.

The website (https://aideas-project.eu/) has been active since the first month of the project, initially in its most basic version, but gradually incorporating content up to its current version, which offers dedicated content on the project itself, suites and solutions, pilots, partners, the networks connected to the project, publications and news. As of the date of writing, the website

has had a total of 5268 visits. According to the KPIs it expects a growing of 50% in the next year of the project. According to the KPIs, a 50% growth in visits is expected annually.

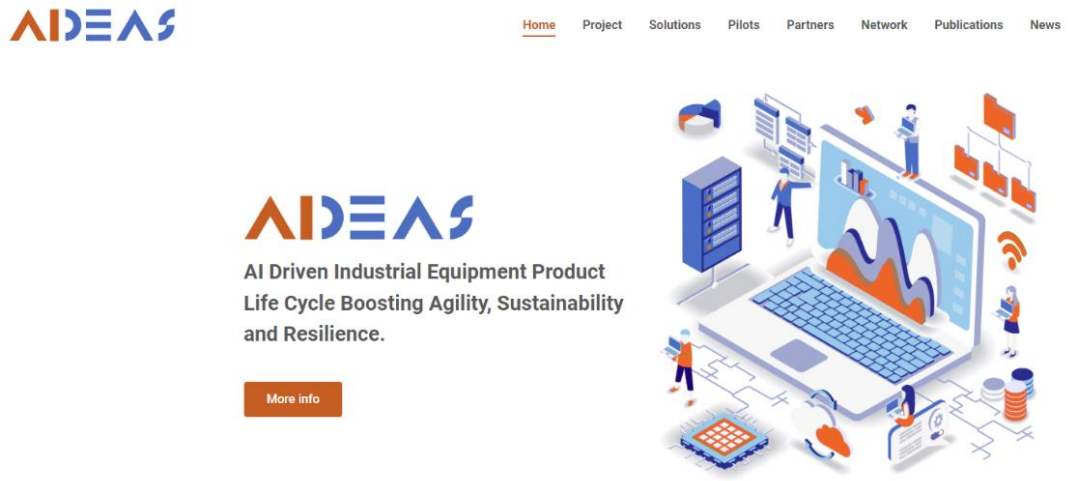


Figure 15. Image of AIDEAS website homepage.

With regard to social networks, as mentioned above, AIDEAS project is present on LinkedIn, Twitter, Facebook and Zenodo. Some monitoring data that may be indicative of impact is provided below (Figure 16).

Figure 16. Follow-up of the AIDEAS project on social networks and repositories.

The presence in social networks is based on the AIDEAS Social Media Plan[1], a second-level dissemination and communication plan dependent on the Target-Driven Dissemination and Communication Plan. It establishes both the publication dynamics with the planned dates, as well as the contents to be published and those responsible for them. To date, the contents have mainly dealt with the events of the project, the partners and pilots involved, and the first scientific publications produced under the umbrella of the project. According to the KPIs, social media impressions were expected to be 3000 to 5000 per year, however, they have been exceeded, and

[1] This document is inside the repository (Sharepoint) of the AIDEAS project

in almost one year, 21429 social media impressions have been achieved, tripling the expected figure. It is worth noting that the social network with the highest number of impressions is LinkedIn (Figure 17) and the second highest is Twitter, with an average of 500 monthly visits (Figure 18).

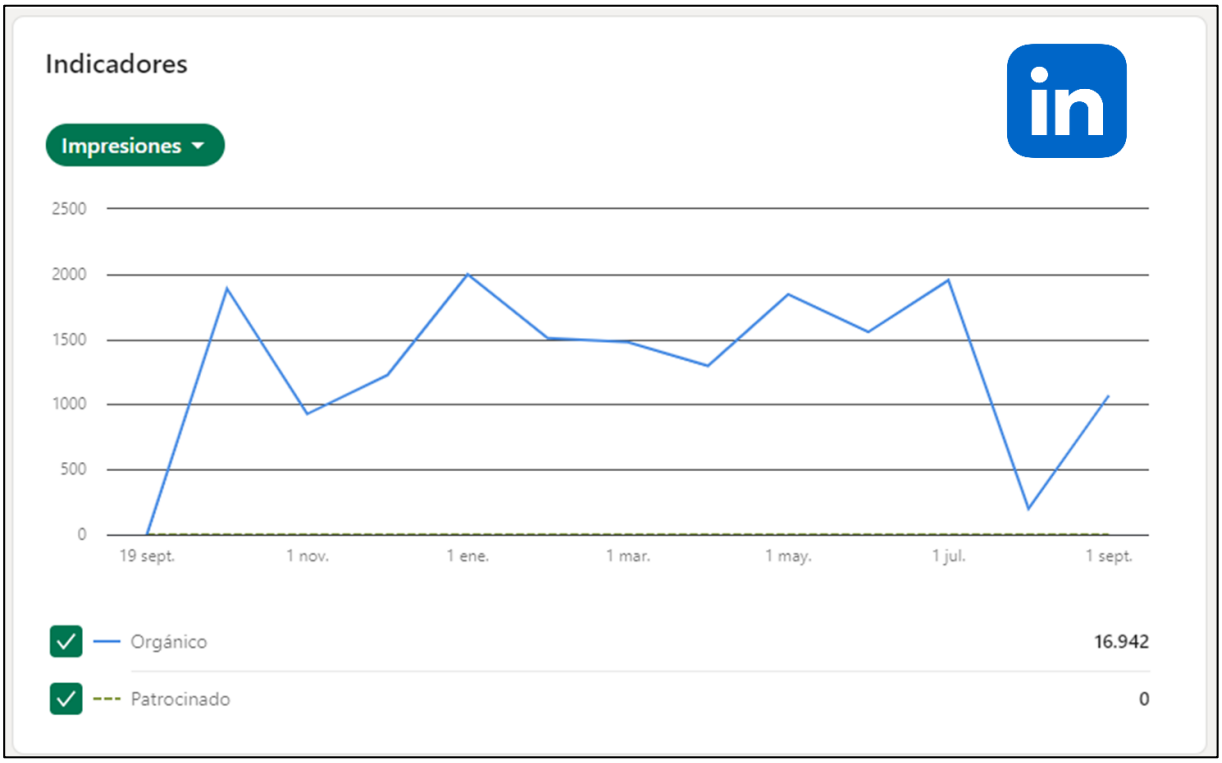


Figure 17. Total number of impressions on LinkedIn

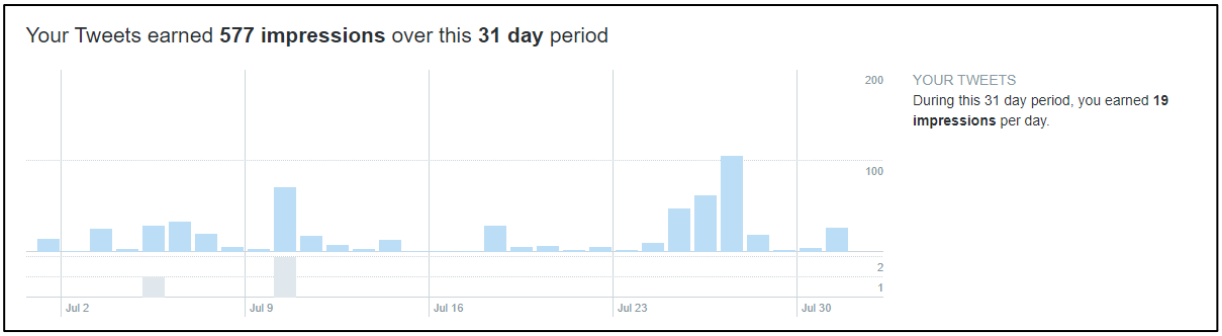


Figure 18. Twitter impressions in July

2.5.6 eNewsletters

Interested individuals and organisations will have the option to subscribe to the AIDEAS project newsletter by going to the homepage of the website. The newsletter will be accessible directly from the "News" page of the website but will also be sent to those who have subscribed and to all those on the project's mailing list. The first project newsletter was published in month 6 of the project to deeper introduce readers into the AIDEAS objectives and expected results (Figure 19). The second is planned for month 13, just following the plenary meeting in month 12, by which time much recent information will be available on the latest progress of the project.


View this email in your browser

Newsletter 1

AI Driven Industrial Equipment Product Life Cycle Boosting Agility, Sustainability and Resilience.

In October 2022, the AIDEAS project was successfully launched with the intention of developing artificial intelligence technologies to support the entire life cycle (design, manufacture, use, and repair/reuse/recycling) of industrial equipment as a strategic tool to improve the sustainability, agility, and resilience of machinery manufacturing companies. This ambitious R&D initiative is granted with 6 million euros by the European Commission under the Horizon Europe framework programme, and 16 partners from 8 European countries are involved in it, among them some prestigious Universities from Spain, Finland, Portugal, and Italy, as well as several industrial partners, who are mainly machinery manufacturers supplying industrial equipment to different industrial sectors such as metal, stone, plastic, and food.

Figure 19. Header of the first AIDEAS newsletter.

2.5.7 Activities for dissemination of results

These are a series of activities more typical of the stages in which the results of the project begin to be visualised, such as the second or third year, and aim at translating these results into practical applications and, above all, into opportunities for commercialisation and market adoption, thus boosting the equipment manufacturing sector.

During this first period of time, efforts have been made to raise awareness among the partners of the importance of this type of dissemination and communication activities so that from the second year onwards they can begin to materialise. In addition, a collaborative log file has been created in the project's SharePoint and also disseminated, where partners can fill in all these actions.

2.5.7.1 Conferences and Events

The objective of the Target-Driven Dissemination and Communication Plan in terms of participation in scientific or industrial conferences and congresses is to enhance the impact and visibility of AIDEAS by generating opportunities to present and explain the project results to the attendees of those events. The context provided by them also serves to establish contacts with stakeholders and thereby open the way for future collaborations in the field of digital technologies that support design, manufacturing, use and repair/reuse/recycling. The following is a description of the project partners' participation in the various congresses to date:

Participation in the Digital Manufacturing Industrial Summit (Valencia, Spain, from 25/04/2023 to 27/04/2023). The following titles were presented: "Machine Passport: Multimodal Indexing and

Fusion of machine-generated Data and Metadata" and "Deep Reinforcement Learning for Optimal Configuration" by CERTH partner, and the presentations "A Framework for Optimisation Algorithms and their Application in Different Models of industrial, commercial and governmental organisations" and "Visual inspection technologies boosting quality assurance in manufacturing industries" by ITI partner. Also, the UPV and UNINOVA collaborated in the organisation of the event.

Participation in the 17th International Conference on Industrial Engineering and Industrial Management (ICIEIM) (Barcelona, Spain, from 06/07/2023 to 07/07/2023) and presentation of "Enhancing Machinery Design through using Artificial Intelligence", "Artificial Intelligence decision systems to support the industrial equipment Manufacturing", "Optimising the Use of machinery by applying Artificial Intelligence" and "Repair-Reuse-Recycle assisted with Artificial Intelligence: An equipment industry case" by UPV. Beatriz Andres, Raul Poler, Miguel Angel Mateo and Juan Pablo Fiesco.

Participation in the XXVIII AIDI' Francesco Turco' Summer School (Genova, Italy, from 05/09/2023 to 08/09/2023) and presentation of the article "Systematic Literature Review of Artificial Intelligence in production scheduling problems in real cases" by UNIVPM. Mateo Del Gallo, Giovanni Mazzuto, Filippo Emanuele Ciarapica, Maurizio Bevilacqua.

Participation in Benicàssim Tech 2023 Artificial Intelligence & e-Math Workshop (Benicàssim, Spain, from 20/09/2023 to 21/09/2023) and presentation "AI-Driven Industries: the AIDEAS Horizon Europe project" by UPV, Raul Poler.

Also, other partners participate in different conferences to disseminate the project. IKERLAN participated in two conferences on the AIDEAS-Machine Passport and presented the AIDEAS project. The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) (Vancouver, Canada, from 18/06/2023 to 22/06/2023) and Basque Circular Summit 2022 (Irun, Gipuzkoa, from 23/11/2022 to 25/11/2022). Finally, CERTH participates in two conferences. The Data Week is the spring gathering of the Big Data and Data-Driven AI research and innovation community in Europe (Lulea, Sweden from 13/06/2023 to 15/06/2023) and Workshop: FoF and MiE projects: challenges and opportunities (online workshop via WEBEX, 27/06/2023).

2.5.7.2 Webinars, Q&A sessions and Workshops

What was said above for conferences and events in terms of opportunity generation, networking, and collaboration promotion can also be applied to this type of action, although in the case of webinars, Q&A sessions, and workshops.

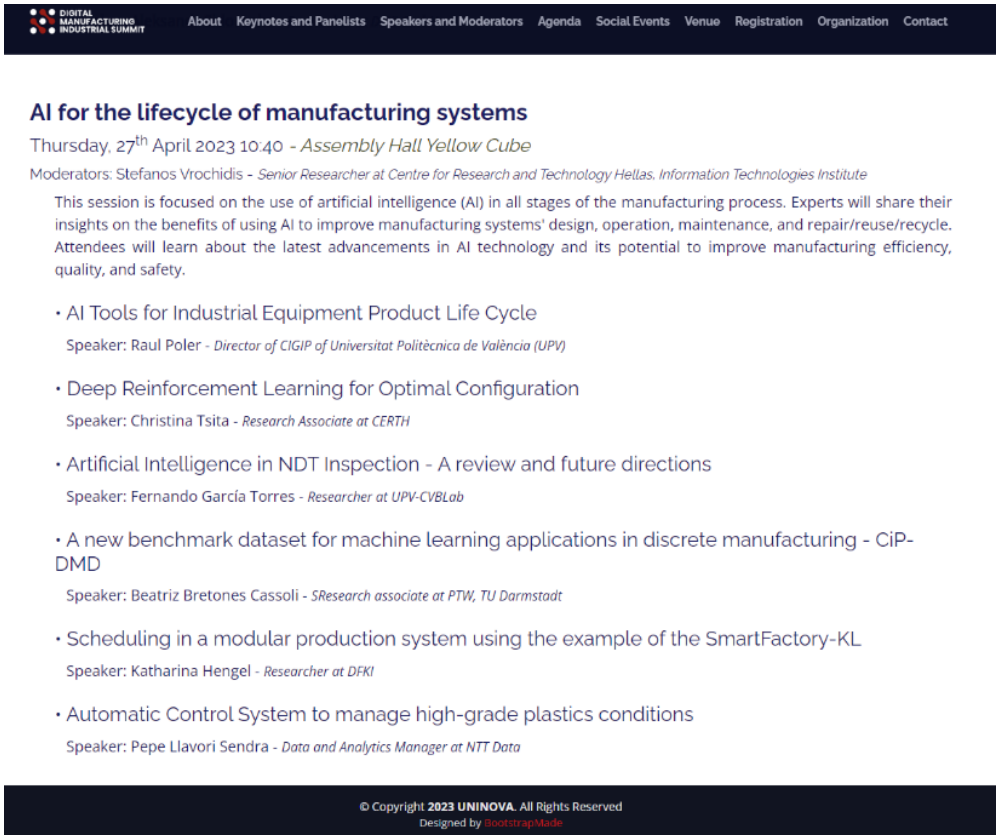


Figure 20. Workshop of AIDEAS Project inside the DMIS 2023 agenda.

Part of the sessions will be organized by the project, leveraging the AIDEAS Community Platform established on the FundingBox Community Platform. The rest of the sessions will be carried out within conferences, congresses or other events of a technical or scientific nature as discussed in the previous section.

It is important to highlight the participation of AIDEAS Project in the Digital Manufacturing Industrial Summit (DMIS 2023) held in Valencia between the 25th and 27th of April 2023. Several of the project partners provided speakers and session moderators but, additionally, on the 27th of April a workshop called "AI for the lifecycle of manufacturing systems" was held in the Assembly Hall Yellow Cube of the building complex called Ciudad Politécnica de la Innovación (CPI) of the Vera Campus of the Universitat Politècnica de València (UPV). In this session, held for more than two hours, a total of six presentations were given on various topics of interest (Figure 20).

2.5.7.3 Technical and Scientific Publications

In accordance with the principles of the DoA of the grant agreement, scientific and technological findings will be submitted both to prestigious technical and scientific journals, specialised industrial press, conferences and workshops.

In order to comply with the requirements of open access to the research results of the project, the published articles and papers will be available both on the project website (https://aideas-project.eu/publications/) and in the Zenodo repository (link to the AIDEAS community space in Zenodo).

All publications produced under the umbrella of AIDEAS must mention the funding of the project by the Horizon Europe Programme. This should be done in the acknowledgements section using the following text: "*The research leading to these results received funding from the European Union Horizon Europe Programme with grant agreement No. 101057294 "AI Driven Industrial Equipment Product Life Cycle Boosting Agility, Sustainability and Resilience" (AIDEAS)*".

For the time being, five articles have already been published and several more are in the pipeline (Table 1).

Table 1. Publications of the AIDEAS project.

Year	Authors	Title	Publication	Publisher
2023	Alimam, Hassan; Mazzuto, Giovanni; Ortenzi, Marco; Ciarapica, Filippo Emanuele; Bevilacqua, Maurizio;	Intelligent Retrofitting Paradigm for Conventional Machines towards the Digital Triplet Hierarchy	Sustainability	MDPI
2023	Concetti, Lorenzo; Mazzuto, Giovanni; Ciarapica, Filippo Emanuele; Bevilacqua, Maurizio;	An Unsupervised Anomaly Detection Based on Self-Organizing Map for the Oil and Gas Sector	Applied Sciences	MDPI
2023	Martin, Xabier A; Hatami, Sara; Calvet, Laura; Peyman, Mohammad; Juan, Angel A;	Dynamic Reactive Assignment of Tasks in Real-Time Automated Guided Vehicle Environments with Potential Interruptions	Applied Sciences	MDPI
2023	Pietrangeli, Ilaria; Mazzuto, Giovanni; Ciarapica, Filippo Emanuele; Bevilacqua, Maurizio	Smart Retrofit: An Innovative and Sustainable Solution	Multidisciplinary Digital Publishing Institute	MDPI
2023	Eisenmann, Matthias; Reinke, Annika; Weru, Vivienn; Tizabi, Minu Dietlinde; Isensee, Fabian; Adler, Tim J; Ali, Sharib; Andrearczyk, Vincent; Aubreville, Marc; Baid, Ujjwal	Why is the winner the best?	arXiv 2023	ARXIV
2023	Angel A. Juan, Carolina A. Marugan, Yusef Ahsini, Rafael Fornes, Javier Panadero, Xabier A. Martin	Using Reinforcement Learning to Solve a Dynamic Orienteering Problem with Random Rewards Affected by the Battery Status	Batteries	MDPI

2.5.8 Community Building

The AIDEAS Community goal is to create a rich and dynamic ecosystem of active members, representing all relevant stakeholders, fostering them to interact, chat, exchange knowledge, find synergies and get value from a community of peers in AI for Machines Design, Manufacturing, Use and Reuse by:

- Sharing best practices, use cases, and general news and events related to AI technology and manufacturing.
- Learning about the project's value proposition.
- Finding information about the project.
- Networking.

This section explains the growth hacking techniques, strategy and actions that will be followed and implemented during the project duration to achieve the community goal. The final objective of this plan is to disseminate, populate and bring relevant traffic to the AIDEAS community. We will achieve this goal by following 3 phases: acquisition of members (bring members to the community), retention of members, (incentivize members to stay and participate), referral of members (encourage members to invite partners and potential members).

The community will contain all relevant information of the project - framework and partners, opportunities within the project's EoIs, success stories, articles, events, updates on milestones and findings and other relevant information. The community will be updated on a regular basis by FBA.

2.5.8.1 Target audiences and approach

As defined in the Grant Agreement, the AIDEAS Community will focus all its efforts on a wide range of targets:

- The **European Industrial Equipment Manufacturers** are the primary target group. They will benefit from the results of the AIDEAS project by having a comprehensive system, based on AI technologies, for the improvement of processes throughout the entire life cycle of industrial equipment (design, manufacture, use and repair/reuse/recycling.
- The **European Manufacturing Industry** is the secondary target group. They will benefit from the AIDEAS Industrial Equipment Use Suite, which Industrial Equipment Manufacturers will provide together with the machines sold.
- The **Manufacturing Infrastructure Providers** will benefit from the results of the AIDEAS project by optimising the components (mechanical, hydraulic, electronic, electric motors, tools) that they supply to Industrial Equipment Manufacturers, through the use of the AIDEAS Industrial Equipment Design Suite (design optimisation) and the AIDEAS Industrial Equipment Manufacturing Suite (manufacturing optimisation).
- The **Digital Technologies Providers** will benefit from the results of the AIDEAS project by providing hardware or software that connects to the AIDEAS Solutions thanks to their interoperability.
- The **Service Providers** are a heterogeneous target group that will be able to benefit from several of the solutions provided by the AIDEAS project depending on the service they provide to their customers.
- The **Human Workforce of the Industrial Equipment Manufacturers** will benefit from the advantages provided by the AIDEAS Industrial Equipment Manufacturing Suite, which will optimise their work in the machinery manufacturing process.

2.5.8.2 Community engagement strategy

The main focus will be to raise awareness of the AIDEAS solutions and engage the members to create and share information within their ecosystems. In a nutshell, the high-level AIDEAS community engagement strategy will consist of three phases:

1. **Acquisition:** The first step is acquiring visitors, which means to attract them according to inbound marketing. It is the first contact a guest is going to have with the community, so it is important to develop some actions to create some brand awareness and trust to make that guest become a visitor:

- Website of the project: All pertinent project material will be available on the website, including the project's structure and partners, opportunities within project calls, success stories, milestone updates, findings, and other pertinent data. Additionally, it will have call-to-action buttons for the community, expression of interest, and all social media outlets.
- Platform and Marketplace: The AIDEAS community will serve as a one-stop shop for AIDEAS network members and EoI participants.

Following a growth hacking strategy, the objective is to achieve the largest dissemination of content with the least amount of funding by converting the deal-flow of applicants and important players identified in the industry into active users within the community. FBA will develop a plan for luring, engaging, and keeping community members during the project's execution and beyond.

- PR campaigns: A solid PR strategy is essential to building brand recognition and luring in new community members. The number of press articles that are published as well as the number of new community members that are added during the press releases' introduction will be used to gauge the success of the campaign.
- Social Media: Social Media accounts that are held by AIDEAS will act as less formal avenues of communication to foster the community, guarantee ongoing visibility of the project, and most importantly, to increase the growth of the community. The community growth will be done by organising social media campaigns to widely disseminate the Community within the manufacturing ecosystem. It will be done by applying highly effective growth hacking strategies, using the different channels (Twitter, LinkedIn and YouTube) through owned media, shared media and paid media for reaching specific targets/objectives. The social media channels of the partners will boost the AIDEAS project's social media presence and introduce potential members to the community.
- Mailing: A first email will be sent to a whole database collected with the help of all project partners. The idea to get the first members of the community. There are few main targets in the first wave: European Industrial Equipment Manufacturers, European Manufacturing Industry, Manufacturing Infrastructure Providers, Digital Technologies Providers and Service Providers. Once we'll have our first members of the community, we can actively start publishing content. Email campaigns will be an effective tool to promote following activities: webinars, Q&As, expression of interest, and other events.
- Newsletters: Newsletters will be one of the main regular communication tools to inform the AIDEAS community about the project updates. The newsletter will be disseminated among subscribers to improve dissemination activities, materials, events by sharing links to articles hosted in the AIDEAS community.
- SEM (Search Engine Marketing) and paid campaigns: Our target is online, so they do some research to find something they have questions about. We need to make sure that our community, is visible when they search. Adwords campaigns can give visibility and attract future users.
- Project Partners networks: In order to spread the word about the initiative and educate opinion leaders, project partners will make use of their existing networks in their respective areas. These channels will be utilized to reach potential AIDEAS community members throughout Europe.
- Supportive partners program: All the stakeholders will be contacted through the consortium partners and will be invited to become part of the AIDEAS Community. The most relevant ones will be invited to act as "supportive partners'' for the project. This role entails a win-win cooperation between AIDEAS and the stakeholders, meaning that each time that there is a relevant communication milestone in the project we will provide a communication toolkit including graphic and textual contents for stakeholders to disseminate within their own ecosystems. The win-win cooperation will operate along the following lines:

1. AIDEAS promises to give stakeholders visibility within its community by (1) sharing their logo, website link, and description, and (2) by allowing stakeholders to participate in special activities for community members, including (but not limited to) Q&A sessions, webinars, AIDEAS workshops, and more.
2. Supportive partners commit to give visibility to the project and spread the word about the activities of the project. AIDEAS aims to engage a minimum of 30 supportive partners registered in the community throughout the duration of the project.

In this respect, for example, a first contact has been established with the projects "self-X Artificial Intelligence for European Process Industry digital transformation" (s-X-AIPI) and "AI Platform for Integrated Sustainable and Circular Manufacturing" (Circular TwAIn) to jointly address the study of cross-dissemination possibilities.

2. **Retention:** this strategy will be oriented to ensure that the members stay and participate in the Community. It encompasses content production, communication structure (when, what and how to share), onboarding of new members, and surveys to keep the members engaged. It is crucial to offer added value to them to keep them informed about AIDEAS, highlighting its benefits. For that, email notifications and other channels, will be very important:

- Content: The content is the most important thing in the community and we will use this as a hook to keep the users interested in logging in to the community again, in order to increase his loyalty and make him come back. It will focus on the following main topics: funding opportunities (expressions of interest), articles/success stories, Q&A sessions, webinars, workshops, project partners, curators and others and helpdesk. We'll also regularly publish interesting news and events related to the industry.
- Social Monitoring: Social media networks (Facebook, Twitter and LinkedIn and YouTube) will be used to share content, interact with our users and get feedback. We'll study where the traffic comes from to understand the performance of the actions and campaigns to improve the results. For that we'll use Twitter, LinkedIn and YouTube Analytics tools, as well as Google Analytics. We will use shared media, disposing with Partners' social media channels and FundingBox social media.

3. **Referral**: this action will have the objective to encourage AIDEAS Community members to invite new ones. We will execute some actions to motivate them, such as gathering testimonials and success stories about the SMEs; launch of contests; and give more visibility and relevance in AIDEAS social media and newsletter, as highlighted content.

The engagement approach will be centered on a single overarching initiative divided into numerous tactical content projects; we will reframe our messaging and reinforce the most successful content initiatives. As soon as the outcomes of the activities are available, the process will be updated.

The engagement strategy will be based on three verticals:

1. AIDEAS activities and solutions.
2. AIDEAS project and solutions and their impact at the European level.
3. Technical & pilots stories: such as AIDEAS stories as industry change-makers and AIDEAS leading the conversation.

2.5.8.3 Structure of the AIDEAS Community

The platform hosting AIDEAS Community is FundingBox Spaces, and it is a part of the following community: https://spaces.fundingbox.com/c/SmartManufacturing. This way, the AIDEAS community will benefit from existing and engaged ecosystems focused on manufacturing, which will facilitate the acquisition, retention and referral of the AIDEAS community.

Regarding the advantages of the FundingBox platform, below are listed a set of essential benefits that AIDEAS will benefit thanks to the adoption of this tool:

1. **Mobile friendly website**: Mobile connectivity is essential for fostering communities. Users can post and engage in chats with great immediateness thanks to it. For this reason, FundingBox has made the website accessible via mobile phone.
2. **A community of makers, entrepreneurs, startups and tech SMEs**: There are currently more than 45,000 registered users on FundingBox Community. These members have interests in a variety of fields, including robotics, artificial intelligence, smart mobility, accelerating startups, decentralized technology, and digital innovation hubs. These industries are related to manufacturing, which will be helpful for AIDEAS in its efforts to target an appropriate membership base.
3. **Community of communities:** Within the AIDEAS Community, we can give space and capacity to other players to connect and build their own communities.

   Entrepreneurs and innovators can find support, inspiration, and connections through spaces, which are communities that provide information (trends, news, events, technology news, funding opportunities), information (exclusive content curated by experts and interlocutors: live chats, Q&As), information (expert advice, members can create synergies and build partnerships, helpdesk), and connections (by networking with people interested in related sectors/technologies).

   To benefit from the synergies and power of collaboration across the online European community efforts aiming to digitalize the manufacturing industry, the AIDEAS project will establish a community integrated within the Smart Manufacturing Community.

   The inclusion of AIDEAS Community in the Smart Manufacturing Community suggests a sizable advantage in terms of member acquisition:

   - Some Communities will share the same collections, which means that AIDEAS events, news, and pilots will be displayed on the same collection pages as I4MS.
   - AIDEAS will have a dedicated space within the Smart Manufacturing Community homepage. Members who sign up to be part of the Smart Manufacturing Community can access the AIDEAS area.

3. Advisory Board

The objective of the Industrial Advisory Board (AB) activity was defined in the GA as "to guide the project with recommendations and neutral feedback and provide a fresh and relatively neutral view on the project and its developments in order to maximise the impact and exploitation of the project". An additional important nuance is that it will be consulted "with a strong focus on the applicability of AIDEAS in the marketplace".

Keeping that in mind, the first step of the activity was to establish an optimum AB that encompasses all the skills and knowledge needed to provide high-quality feedback. For that, a list of desirable characteristics was presented in the kick off meeting of the project, and a collaboration of all the partners was required to identify potential members.

After making initial contact through partners and exchanging information and clarifying doubts through e-mails and telcos, 5 experts were recruited to be members of the AIDEAS AB. This way, a skilled gender balanced board made up of 3 men and 2 women with complementary profiles (market, technology, business, entrepreneurship, etc.) was validated and officially established in late November (M2). The members are:

Table 2. AB members information

AB MEMBER	COMPANY AND ROLE	CURRICULUM
David Ciudad	CEO & Co-Founder at Deep Detection	https://www.linkedin.com/in/davidciudad/
Alejandro Alija	Co-founder and Managing Director at Galeo	https://www.linkedin.com/in/alejandroalija/
Danijel Skočaj	Professor at University of Ljubljana, Faculty of Computer and Information Science	https://www.linkedin.com/in/danijel-sko%C4%8Daj-59a40b13/
Raluca Cibu-Buzak	Founder and CEO at Luminspino	https://www.linkedin.com/in/raluca-ioana-cibu-buzac-7259443/
Anelia Pergoot	Managing Director and owner Europack Bulgaria	https://www.linkedin.com/in/pergoot-anelia-564338/

The definition of the operating protocol was the next step. On the one hand, a specific folder for AB was created in the SharePoint where the project information is stored, and access permissions were granted to AB members. A specific mailing list was also created for the direct contact with the AB members.

In addition, the objective of each of the 4 expected AB workshops and their tentative calendar were established. The rough dates of the workshops shown below were set considering not only their objective, but also the progress and milestones of the project and the plenary meetings to be held:

Table 3. Tentative calendar

WORKSHOP	DATE	OBJECTIVE
1st AB workshop	Around M10 of the project: July 2023	Feedback focused on the specifications of the solutions to be developed
2nd AB workshop	Around M19 of the project: April 2024	Feedback focused on solutions (first approach)
3rd AB workshop	Around M27 of the project: December 2024	Feedback focused on solutions (demo-based)
4th AB workshop	Around M33 of the project: June 2025	Feedback focused on validated solutions and exploitation strategy

The Service Agreement regulating the purpose, role, costs, confidentiality and other matters relating to the AB was then prepared and validated by the consortium and shared with the AB member for signature. As expected, the signature process was finalised before the first AB workshop.

The first AB workshop was held online on 21 September 2023, a couple of months later than expected due to scheduling problems of the AB members. The consortium worked on the definition of the meeting, considering the progress of the project and the information/documentation available.

The following agenda was shared with the members in the project's SharePoint folder generated for this purpose (Table 4).

Table 4. 1ST AB WORKSHOP AGENDA (21 September 2023. Time 09:00 – 12:30, Location: Online)

Start	Subject	Presenter
09:00	Welcome and agenda review	CERTH
09:10	AB members intro and short round table	All
09:30	Project overview: vision, objectives, and pilots	CERTH
10:00	Feedback	AB members
10:15	AIDEAS Suites and Solutions	UPV
10:45	Feedback	AB members
11:00	Coffee Break - Group Picture	All
11:15	Exploitation and Dissemination Plan	FBA/UPV
11:45	Feedback	AB members
12:15	Summary and next steps in AB activity Final Feedback from the AB members	CERTH AB members
12:30	Closure	

After considering different options it was decided that the consortium members would prepare presentations on different topics and the AB members would provide corresponding feedback (that is why a slot has been allocated for them after the presentation of each topic). The main

reason for choosing this approach was to reduce the time and effort required of the experts. However, it was suggested that they review some documentation before the meeting: Deliverable D1.1 as main suggestion to get an overview of the project, and D1.2, D1.3 and D2.1 as additional information. These suggestions were added to the agenda:

Main information:

- D1.1 Project Vision and Guide: Reference/guide document of the project that includes the position of the project in terms of business, research and technological objectives and use case scenarios. It describes also the results and corresponding elevator pitch.

Complementary information:

- D1.2 Demonstration Scenarios and Monitoring KPIs Definition: Selection of the Pilots Use-Cases, mapping of AIDEAS solutions vs Pilots needs and definition of AS-IS and TO-BE scenarios. It includes the KPIs definition to assess the AI-solutions effectiveness through DESIGN, MANUFACTURING, USE and REPAIR-REUSE-RECYCLE phases.
- D1.3 Benchmarking, Requirements Analysis and Functional Specification v1: State of the Art of the AIDEAS project technologies, Evaluation Framework for the AIDEAS solutions, and preliminary high level Requirements Analysis. The objective is to present the AI and digital technologies landscape and its multiple dimensions to systematise the knowledge about industrial equipment design, manufacturing, use and repair-reuse/recycle AI technologies. A multi-dimensional benchmarking analysis for each of the proposed AIDEAS solutions. First high-level version of the requirements generated from the User Scenarios.
- D2.1 AIDEAS Reference Architecture & AIDEAS Viewpoints v1: Conceptualisation of the AIDEAS Reference Architecture (RA), following the ISO/IEC/IEEE 42010 “Systems and software engineering – Architecture” standard. It starts from a deep understanding and alignment among the most common reference architectures in the manufacturing domain, such as IIRA (mainly), RAMI4.0, IDSA, and IMSA. Framework that will iteratively address the architectural issues that may arise during its conception.

As the date of the first AB workshop was very close to the uploading of this deliverable, it has not been possible to collect all the information and draw conclusions accordingly. Consequently, that information will be included in the next release of the deliverable.

4. Standardisation

4.1 General

Standardisation [2] is of great importance both at national and European level. Although European standardisation activities are in the foreground of the EU-funded research project AIDEAS, which is coordinated by the Centre for Research and Technologies Hellas (CERTH), international and relevant national standardisation is presented, as a transnational harmonization of standardisation documents is considered highly relevant and is the basis for the common economic area in the European Union.

AIDEAS is about AI technologies, supporting the entire life cycle of industrial equipment. Thus, it is essential to ensure the applicability, trust, and conformity of AIDEAS. Therefore, it is a necessity that AIDEAS solutions are compliant with standards, technical specifications, and procedures. This is a crucial aspect to guarantee that the developed solution / system is working properly and the project results are trustworthy. For this reason, AIDEAS has integrated standardisation as an essential element of the project. Regarding the work structure of AIDEAS (Figure 21), standardisation is integrated in one work package, namely WP8, in task 8.7.

In WP8 – IMPACT: Dissemination, Exploitation and Standardisation Task 8.7 – Standardisation is integrated. The objective of this task is to create a well-grounded documentation/overview of the current standards and standardisation documents as well as relevant technical committees on national, European, and international level related to AIDEAS. This will provide an overview of the state of the art of the standardisation landscape that is relevant for AIDEAS and thus ensure the compliance of the project's results with what is already on the market. The knowledge about existing standards is of importance for the AIDEAS consortium to align its products, processes, services, and solutions with the current state of the art. The identification of relevant technical committees is the basis for the direct transfer of AIDEAS results into ongoing standardisation activities.

One chapter of the present deliverable D8.2 "Dissemination, Communication and Community Building & Standardisation v1" belonging also to Task 8.7, the chapter delivers an overview of the standardisation landscape and highlights the most relevant standards for AIDEAS as well as their impact and implication.

Besides the necessity to know about ongoing standardisation activities, this knowledge also provides the opportunity to raise awareness for standardisation needs in this area. Therefore, this deliverable supports the activities in Task 8.2 in WP 8.

In general, this standardisation overview serves as the basis for further standardisation activities in AIDEAS. Knowing about existing standardisation documents makes it possible to build on existing knowledge and avoid unnecessary duplication of work. Additionally, existing gaps in standardisation can be better identified and impulses for new standardisation activities can be developed.

[2] Standardisation covers all types of standardisation documents and is used here in general manner.

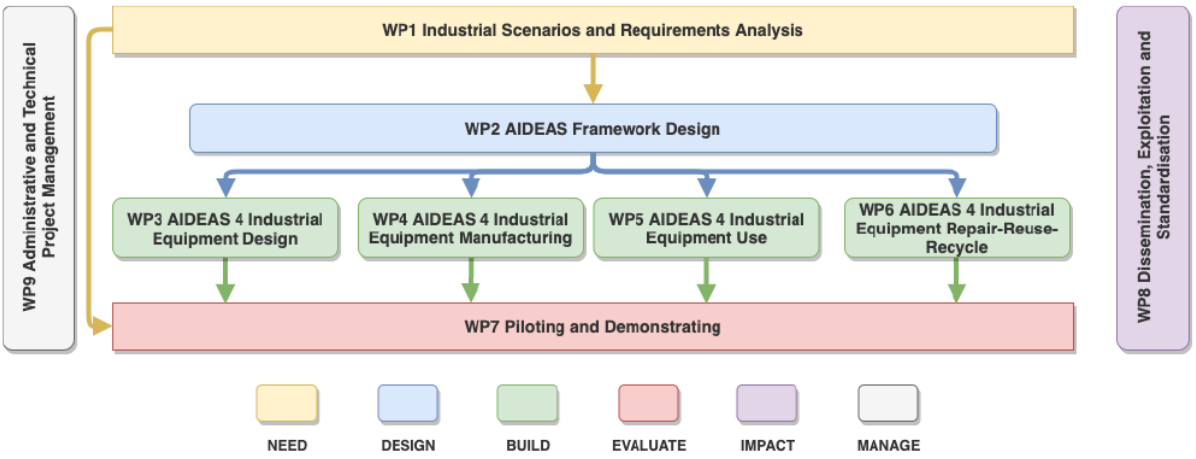


Figure 21. working structure of AIDEAS

In contrast to patents, knowledge about standardisation is less pronounced, especially in the area of research and innovation. For this reason, the basic principles of standardisation are presented in this report (see clause Basics of standardisation) as well as the different facets of standardisation at international (subclause International standardisation), European (subclause European standardisation), and national level (subclause National standardisation). Subsequently, the various types of standardisation documents (subclause Standardisation documents), the function of standardisation in the context of research projects (subclause Standardisation in research projects), and the process for creating a CWA (subclause Specification) are presented in more detail. The results of the standardisation research for AIDEAS are presented by explaining the approach to the standards research (clause Methodology of the Standards Research for) and finally by giving an overview of the related standardisation landscape (clause Overview of the AIDEAS Standardisation Landscape). Besides a general overview of the standardisation landscape of AIDEAS (clause General), the relevant international (subclause Standardisation activities on international level), European (subclause Standardisation activities on European level), and national standardisation activities (subclause Standardisation activities on national level) are examined. The standards highlighted as relevant for the project are focused on more closely, especially with regard to AIDEAS (section 4.5.2).

4.2 Basics of standardisation

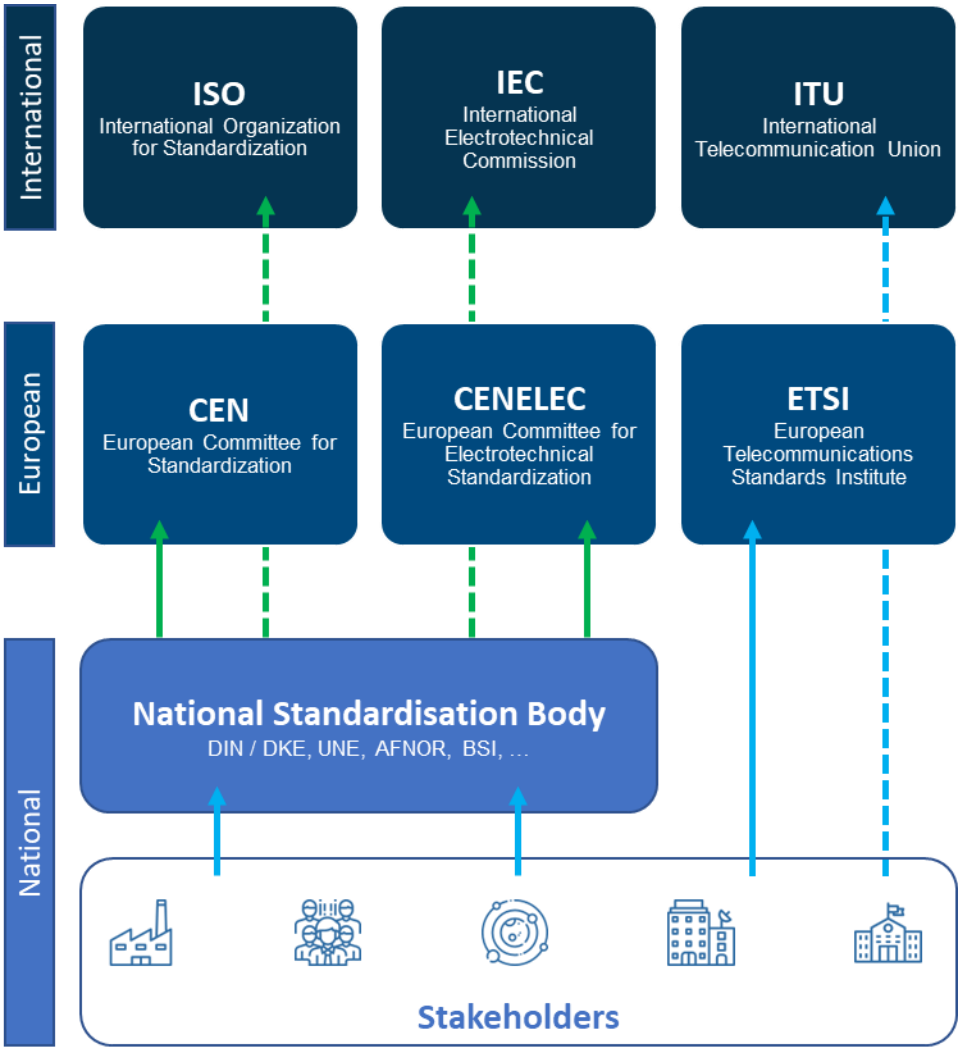
4.2.1 General

Within AIDEAS the standardisation part can support the development of AI driven industrial equipment as well as sustainability and resilience for the machine industry. Therefore, it is important to clarify the characteristics of a standard. In general, a standard is a consensus-based document that is approved by a recognized body or organization, reflecting the state of the art. It

should be based on the consolidated results of science, technology, and experience, and aim to promote optimal community benefits [1].[3]

Standardisation is used to agree on terminologies, methodologies, requirements, characteristics, etc. in specific areas to make a product, process, or service fit for its purpose. Thus, standardisation can drive innovative outcomes by agreeing on common product requirements such as interoperability, quality or safety, and provide guidelines for achieving them. Standardisation supports the development of a generic language, which is understandable for everyone and thus helps to create a common basis. The result of the standardisation process is a document, which provides rules, guidelines or characteristics for activities or their results.

Figure 22. Overview of the organizational structure of the standardisation world



4.2.2 Standard developing organisations

An essential aspect of standardisation is to ensure that standardisation documents do not contradict each other, especially since European and international standardisation have gained

[3] CEN/CENELEC, "EN 45020:2006: Standardisation and related activities - General vocabulary", 2006

significant importance. This is reflected in DIN's statistics, which show that European and international standards account for 90% of all standardisation projects nowadays. The following clauses give a brief description of the framework of formal standardisation on international, European, and national level. Figure 22 provides a general overview of the different types and levels of standardisation .

4.2.3 National standardisation

On national level, there are different structures and standardisation bodies in different countries, as e. g. German Institute for Standardisation (DIN), German Commission for Electrotechnical, Electronic, and Information Technologies (DKE), Spanish standardisation body (UNE), the French Standardisation Association (AFNOR) and the British Standards Institute (BSI). In general, each country has one or more recognized national standardisation bodies (NSB). Within the NSB's experts from different stakeholders, e.g. from organizations belonging to industry, commerce, the public sector, or research, are developing national standards. These NSB's are also responsible for keeping the national standardisation repository updated.

To represent national positions at European or international level, so-called mirror-committees are set up and coordinated by the NSB's. In these national committees, the work and existing results of corresponding European and international standardisation committees are discussed, a national opinion is developed, and the final drafts of standards are agreed upon. When European or international draft standards are published for comment, the mirror committees also vote on whether the standard should be published or not.

Here it is important to mention that experts working on European or international level need to be members of the national mirror committee and must be delegated by these committees.

An important non-European country, which must be taken into account in the context of standardisation is the USA. The United States (US) standardisation landscape differs somewhat from the European approach. The American National Standards Institute (ANSI) is a private, non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the US. The organization also coordinates US standards with international standards. ANSI accredits standards that are developed by representatives of other standards organizations, government agencies, consumer groups, companies, and others [2].[4] It acts as an umbrella organisation of sorts by coordinating 240 Standards Developing Organizations (SDOs), such as Underwriter Laboratories (UL), American Society of Mechanical Engineers (ASME), and Institute of Electrical and Electronics Engineers (IEEE). Many of them develop standards for the US-market and provide certification or accreditation services as well, e. g. UL. The American Society for Testing and Material (ASTM), which is an ANSI-accredited standards developer,[5] is another important national standardisation body in the US. Some standards are implemented in federal laws, others are viewed more as guidelines for industries. This is the case for many of the standards developed by US-SDOs.

[4] https://ansi.org/american-national-standards/ans-introduction/overview

[5] https://share.ansi.org/Shared%20Documents/Standards%20Activities/American%20National%20Standards/ANSI%20Accredited%20Standards%20Developers/DEC2022ASD.pdf

4.2.4 European standardisation

The main goal of European standardisation is the development of European standards, that are valid and accepted within the EU. These European standards are the basis for the European single market. The European standardisation organisations CEN[6] (European Committee for Standardisation), CENELEC[7] (European Committee for Electrotechnical Standardisation), and ETSI[8] (European Telecommunications Standards Institute) are responsible for the organisation of European standardisation work. CEN is responsible for all non-electronic activities and CENELEC for electrotechnical standardisation activities, while ETSI is responsible for the standardisation activities in the field of telecommunication at European level.

There is a particularly close cooperation between CEN and CENELEC, which are made up of national standardisation organisations from the EU and EFTA (European Free Trade Association) member states, as well as states seeking membership. In contrast, the members of ETSI are directly European companies, institutes, and organizations.

The so-called delegation principle applies to CEN and CENELEC. This means, that the mirror committees of the national standardisation bodies of their member states, send national experts to the technical committees and workings groups at CEN or CENELEC to develop European standards. The European standard (EN) will only be published, when a sufficiently large majority of the national standardisation organisations has approved the final draft.

European standards (EN) must automatically be adopted by member states of the EU and opposing national standards must be withdrawn. As a result of this mandatory adoption, the EN standards in Germany then became DIN EN standards (e.g. DIN EN 16575). There are situations in which it is possible to complement EN standards with additional national standards, for instance to set more detailed requirements to meet specific needs of the member state.

European specifications are referred to as CWA as well as CEN TS or CENELEC TS, depending on the type of development and their adoption by the member states is voluntary (e.g. DIN CEN/TS 17045), unlike the adoption of European Standards.

4.2.5 International standardisation

The international standardisation organisations ISO[9] (International Organization for Standardisation), IEC[10] (International Electrotechnical Commission), and ITU[11] (International Telecommunication Union) are responsible for the organisation of international standardisation work. ISO is responsible for all non-electronic and IEC for electrotechnical standardisation activities, while the ITU is in charge of standardisation activities in the field of telecommunications.

[6] www.cen.eu
[7] www.cenelec.eu
[8] www.etsi.org
[9] www.iso.org
[10] https://www.iec.ch/
[11] https://www.itu.int

ISO and IEC are made up of the national standardisation organisations, with e.g. DIN and DKE representing German interests on an international level. The ITU, on the other hand, is a special unit of the United Nations, whose 191 member states develop recommendations together with companies from the private sector and other regional and national organisations. Only when they are adopted by normative organizations such as ISO, ANSI (USA) or ETSI as well as by national regulatory authorities, such as the Federal Network Agency in Germany, they acquire the character of standards.

The so-called delegation principle also applies to ISO and IEC, meaning that the national standardisation organisations send their experts to the working groups and technical committees of the international standardisation bodies. An international standard (ISO) is only accepted, when a sufficiently large majority of the national standardisation organisations has voted for its draft. International specifications are called IWA as well as ISO TS or IEC TS, depending on the type of development.

In contrast to European standardisation, there is no obligation to adopt international standards in national standards. However, since internationally applicable standards are relevant for international trade or for global stakeholders, conflicting national or European standards should be avoided. There is the possibility of transferring international standards in European and national standards. The resulting documents have the characteristics and names listed in Table 5, depending on the background. There are also parallel processes for developing standards at international and European level. It is possible to directly develop EN ISO or EN IEC standards without first developing the standard on international level and then adopting it at European level.

Table 5. International Standards

NAME	DESCRIPTION
ISO XXXXX	International standard adopted on neither national nor European level
DIN ISO XXXXX	International standard adopted only on national (Germany) level
DIN EN ISO XXXXX	International standard adopted on European and national level

4.3 Standardisation documents

4.3.1 General

There are several types of standardisation documents that differ in their development process, the degree of consensus to be reached, and the openness to participation (Figure 23). Standardisation documents describe products, systems or services by defining their characteristics and requirements and in many cases are publicly available.

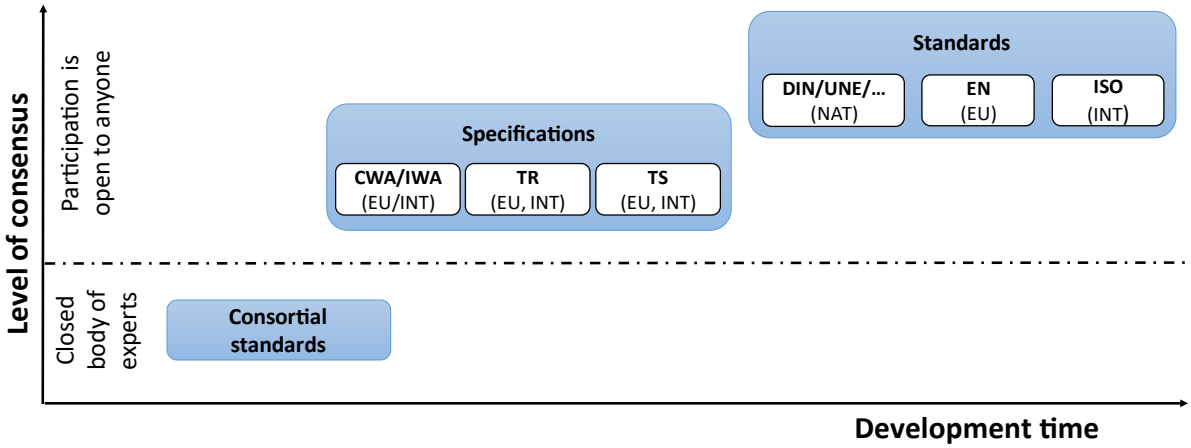


Figure 23. Types of standardisation documents

4.3.2 Standard

According to Figure 23, standards in the narrower sense are developed within the formal standardisation system where all interested parties have to be included in the development process of the document and consensus, meaning the general agreement of all participants and the lack of sustained objection to central content, must be reached. The main objective of the consensus is to take into account the views of all interested parties concerned and to dispel any counter-arguments. The development of a European standard is shown in Figure 24.

Figure 24. Development of a standard

First of all, anyone who has identified a need for a standard can submit a proposal for a new standard. In most cases this has to be done via the national mirror committee. The associated standards committee evaluates the need and whether standardisation activities are already taking place or if standards that cover the described need exist. If the need is confirmed, a standard is then developed in a standardisation committee. Attention is paid to a balanced composition of these committees with all interested parties concerned (science, consumers, industry, etc) in order to guarantee the neutrality of the documents. A final draft, approved by the standards committee, is then released for public comment. All comments have to be discussed before the final standard is approved by the standardisation committee. Due to the high level of transparency and the

involvement of the public, the development time increases from national to European and international level. National standards usually require 18 months to develop, while the development of European and international standards normally takes more than two years due to the involvement of the national standardisation bodies [3].[12] Due to the high degree of consensus, standards have a high level of acceptance in society.

4.3.3 Specification

To better understand the difference between the various standardisation documents, the terms specification and standard are used. However in many cases both documents will be called standards. In contrast to a standard created in consensus, the standardisation activities in research projects focus mainly on the development of **specifications**. Compared to a standard, consensus is not mandatory in specifications and the involvement of all interested parties is not obligatory. The development of a specification, e. g. CWA on European level, is shown in Figure 25.

Figure 25. Development of a specification

Anyone can submit an application to develop a specification. The scope of the specification will be compared with the existing standardisation repository. If no conflicting standards exist, the standardisation organization publishes the business plan for public comment and a call for cooperation from interested organizations. In contrast to standards, specifications are created in workshops (temporary committee). A standardisation organisation acts as a secretary to ensure the procedural requirements and to support the members of the workshops in developing the specification. The workshop also decides whether a draft should be published for comment and once a specification has been successfully adopted by the workshop, the specification will be published.

There are different types of specifications. A Workshop Agreement on European (CEN/CENELEC Workshop Agreement, CWA) or international (International Workshop Agreement, IWA) level is

[12] https://www.iso.org/developing-standards.html

developed in a temporary workshop, which is designed to meet an immediate need and forms the basis for future standardisation activities led by a national standardisation body. Even if there are not as strict rules for developing a specification as there are for standards, it is important to ensure the coherence of the standardisation regulations to protect the credibility of international, European, and national standardisation . The workshop is open to direct participation by anyone who is interested in the development of the agreement but consensus is not required. The development of a Workshop Agreement is fast and flexible, on average between 10 and 12 months and therefore also attractive for research projects. Temporary workshops also develop national specifications, such as DIN SPECs (e.g., DIN SPEC 91392) in Germany.

Specifications can also be developed within standards committees if, for example , no final consensus can be reached. These documents are then referred to as CEN or ISO TS (Technical Specifications). A TS on European level may not conflict with a European standard but conflicting national standards may continue to exist. Technical Reports (TR) are de-facto documents that are developed and approved by a technical committee. A TR provides information on technical content and standardisation work.

4.3.4 Consortial standards

Regarding the development time, the fastest ones are **consortial standards** (see Figure 23), also called industry, informal or de-facto standards. Among other things, they are characterised by the fact that not all interested parties need to be included in the development process. These closed group of experts can be, e. g. industry-specific consortia that have been formed from different companies. Although these documents have some characteristics of a standardisation document, such as defined procedures or documentation rules, consortial standards are often not freely accessible and are developed in private.

4.3.5 Standardisation in research projects

It is crucial for an R&I project to know the state of the art in the areas relevant for or connected to the project. Since standards reflect this state of the art in a specific area it is essential for R&I projects to have an overview of the standardisation landscape related to the project. This knowledge enables the project to tailor its results or findings to current market requirements and helps ensure that they are interoperable with existing solutions. R&I projects need to consider the developments within other relevant activities. Irrespective of the technical merits of the R&I project developments, these efforts will be inconsequential if developed in isolation and the market decides to follow another path.

Furthermore, the knowledge about related standards also enables the R&I project to overcome additional challenges and go beyond the current state of the art. On the one hand, an overview of the related standardisation landscape offers an R&I project the advantages described above. On the other hand, awareness is raised on where standardisation is still needed. This opportunity can be used by the R&I project to implement project results in already ongoing standardisation activities or by developing new standards from project results.

For AIDEAS in particular, aspects of standardisation play an important role. The European research framework program Horizon Europe addresses the topic of standardisation in a series of calls for proposals.

4.4 Methodology of the Standards Research for AIDEAS

To provide an overview of the standardisation landscape related to AIDEAS, a standard's research was conducted. The approach for the standards research is summarised in Figure 26 and is divided into three main phases; the actual standards search (phase I), the standards analysis (phase II), and the result dissemination (phase III). The three phases are described in more detail below.

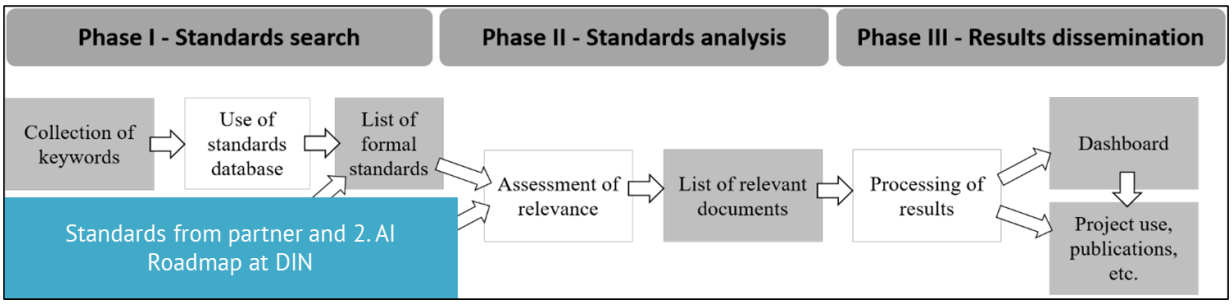


Figure 26. Methodology of standards research

In order to conduct research for standards relevant for AIDEAS (phase I), keywords were collected from the partners of the different work packages of AIDEAS. A section of the collected keywords is listed in Table 6.

Besides keywords, relevant information such as the name and organisation of the partner as well as the intention for the keyword were collected. With this information it is possible to address a partner in case of questions towards a keyword. Additional to the given keyword, the keyword got adopted regarding additional results. For example, additional to the keyword "data mining machine tools" an adapted version "data mining" has been included in the research. The adapted keywords can be recognized since they are not assigned to a partner/organisation.

Table 6. Random section of supplied keywords from AIDEAS partners, organisations and intention for the standards research.

KEYWORD	PARTNER/ ORGANISATION	INTENTION
Data mining machine tools	Angelo Merlo (CeSI)	Belonging to domain of Ind 4.0
Data mining		
Deep learning anomaly detection	Angelo Merlo (CeSI)	Belonging to domain of Ind 4.0
Deep learning		
anomaly detection		
Predictive maintenance machine tools	Angelo Merlo (CeSI)	Belonging to domain of Ind 4.0
Predictive maintenance		
machine tools		
Digital twin machine tools	Angelo Merlo (CeSI)	Belonging to domain of Ind 4.0
Digital twin		

AI for Design	Angelo Merlo (CeSI)	Extracted from AIDEAS GA
artificial intelligence for design		
Adaptive control machine tools	Angelo Merlo (CeSI)	Extracted from AIDEAS GA
Adaptive control		
Prescriptive maintenance	Angelo Merlo (CeSI)	Extracted from AIDEAS GA
maintenance		
Smart retrofitting	Angelo Merlo (CeSI)	Extracted from AIDEAS GA
Smart retrofit		
retrofitting		
Explainable AI	Angelo Merlo (CeSI)	Extracted from AIDEAS GA
explainable artificial intelligence		
Packaging optimisation	Samuel Afolaranmi (TAU)	Extarcted from AIDEAS GA
Packaging		
Storage optimisation	Samuel Afolaranmi (TAU)	Extracted from AIDEAS GA
Storage		
Delivery optimisation	Samuel Afolaranmi (TAU)	Extracted from AIDEAS GA
Delivery		
Smart factory	Samuel Afolaranmi (TAU)	Belonging to domain of Ind 4.0
factory		
Risk-based Planning & Scheduling (RPS)	Samuel Afolaranmi (TAU)	Belonging to domain of Ind 4.0

For the standard research, mainly the search engine Nautos[13] was used to find formal standards. The database includes national standards as well as standards from the European organisations CEN, CENELEC, ETSI, and international organizations such as ISO, IEC, and ITU. Regulations, technical documents, and reports on these levels have been considered for the analysis. In case of national standards, it should be noted that due to language barriers mostly those providing at least one English title have been considered. All the hits from the Nautos search, using a total of 145 keywords, of which 88 came directly from the partners, while 57 were adapted, resulted in a list of about 2500 standards. After removing the standards which existed twice in the list, 1991 standards remained.

Besides the keywords used for the Nautos research, standards from the second DIN Artificial Intelligence Roadmap and direct input from the partners were also considered for the results. AI Standards in the field of industrial automation and energy/environment were identified within the roadmap via desk research.

[13] https://nautos.de/

An analysis and assessment of the standards relevant and important to AIDEAS was conducted by the consortium (phase II). To guarantee an applicability of the standardisation landscape, it is necessary to narrow down the high amount of 1991 standards. Therefore, three steps in a row were initiated. In the first step the relevant standards thematically close to the field of AIDEAS were filtered via the relevant ICS-classes (International Classification for Standards). The following ICS classes were considered thematically close to AIDEAS: 01, 13, 19, 21, 25, 27, 29, 35, 53, 55. After the first filtering process, the remaining 1002 standards were thematically grouped into categories before they could be rated by the partners. Using the AIDEAS "Domains and Competences" table, the corresponding partner could be assigned to a thematically close category for the rating process. One category got rated by two partners. The rating scale and the decision criteria can be seen in the following table.

Table 7. rating scale and rating criteria

RATING SCALE	DECISION CRITERIA
0 - not relevant	1 and 0 = out
1 - maybe relevant	1 and 2 = in
2 - highly relevant	1 and 3 = in
3 - we will use it	2 and 2 = in
	2 and 3 = in
	3 and 3 = in

As soon as a standard got rated with a three "we will use it", this standard is certainly brought into the list of relevant standards.

After the first rating process with 230 remaining standards, the second rating process could be initiated. Here each partner rated all of the remained standards. After the second round of rating, a mean value of all input from the partners was drawn for each standard. If this mean value is above 1.0, the standard is considered relevant and is included in the list of relevant standards.

The overview of the relevant formal standards (phase III) was spread in form of a dashboard (Figure 27) among the partners. The standards highlighted as relevant in the second rating process are listed and discussed in more detail in section 4.5.2.

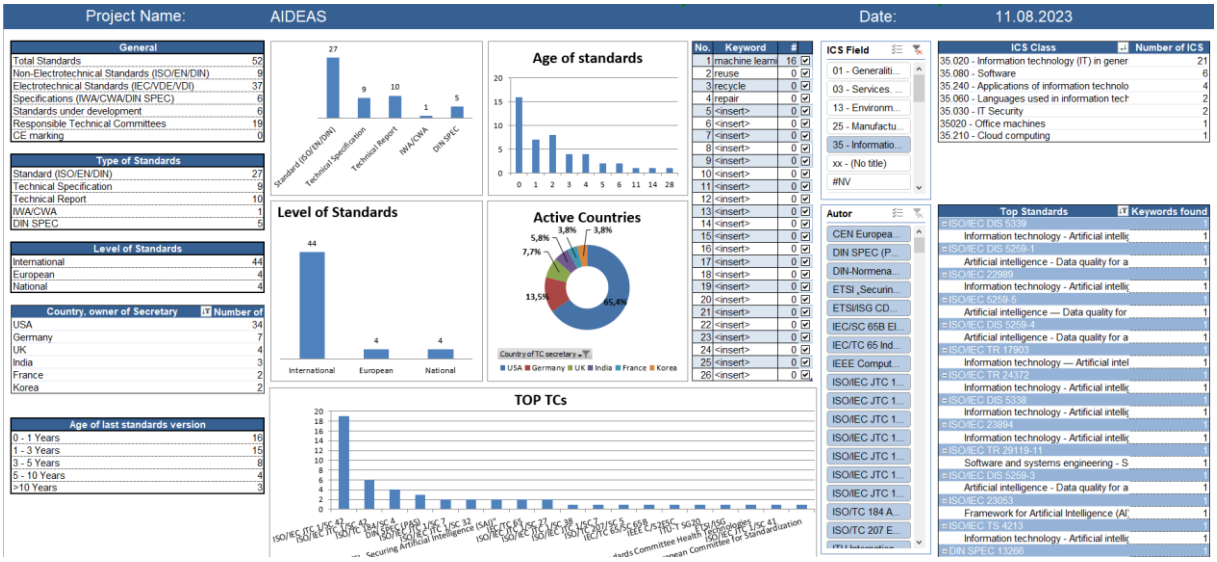


Figure 27. Dashboard with the relevant standards for AIDEAS

An initial version of the dashboard with relevant standards after the second rating process, was provided in August 2023. The dashboard is an Excel template, which was developed specifically for the research of standards and provides an overview of the main information regarding the relevant standards. It can be used to search for specific standards by keywords or to get an overview of the standards within a specific ICS (International Classification for Standards) field or developed by a specific technical committee. The ICS is intended to serve as a structure for catalogues of international, regional, and national standards and other normative documents, and as a basis for standing-order systems for international, regional, and national standards [4]. This dashboard was shared within the whole AIDEAS consortium.

4.5 Overview of the AIDEAS Standardisation Landscape

4.5.1 General

This clause gives an overview of the standardisation landscape related to AIDEAS. Using this knowledge, it is possible to assess results from AIDEAS that have the potential to initiate new standardisation activities. Furthermore, standardisation is a significant instrument to support both dissemination and exploitation of AIDEAS results. By considering the topic of standardisation at an early stage of the project, the interoperability of the project results with products already on the market is ensured. The planned standardisation activities in WP8 will foster a sustainable transfer of project results to the market by providing e.g. standardisation documents or input to already ongoing standardisation activities. As a whole, standardisation has a positive effect on the entire innovation process, from fundamental research to marketing of new products. For this reason, an overview of the standardisation landscape for AIDEAS, is given in this clause of the deliverable. Furthermore, standards highlighted after the second rating process for AIDEAS are looked at more closely. Within this deliverable the term *relevant standard* means a standard which is relevant for AIDEAS and resulted after the second rating process for the standardisation landscape.

To provide an overview of the standardisation landscape related to AIDEAS the results of the standards research, the dashboard (see section 4.4), is used as a basis. The dashboard contains 52

formal standards (out of 1991), which were highlighted as relevant for the project by the AIDEAS partners. The number of highlighted relevant standards out of the different evaluation steps is visualised in Figure 28.

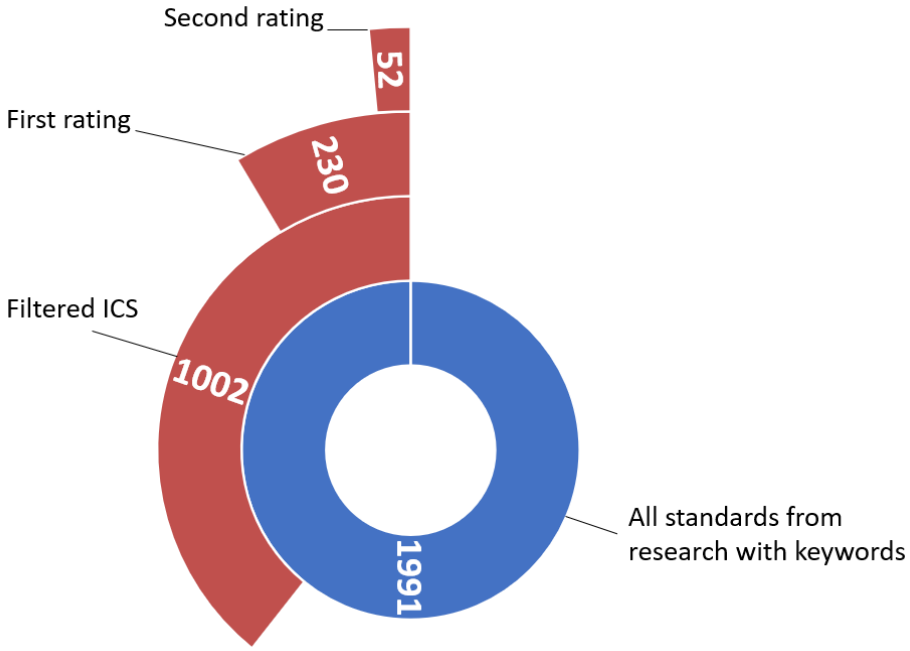


Figure 28. Number of relevant standards

The dashboard was used to provide some general information on standards relevant for AIDEAS. In Figure 29 the origin of these is visualised. The majority (84.6%) of the standards were developed on international level, whereas 7.7% originated on national level, and 7.7% on European level too (Figure 29). The countries providing the most secretaries within the TCs, for the standards relevant for AIDEAS, are USA and Germany, since 34 of these standards (65.4%) have their secretary in USA, and 7 (13.5%) in Germany (Figure 30).

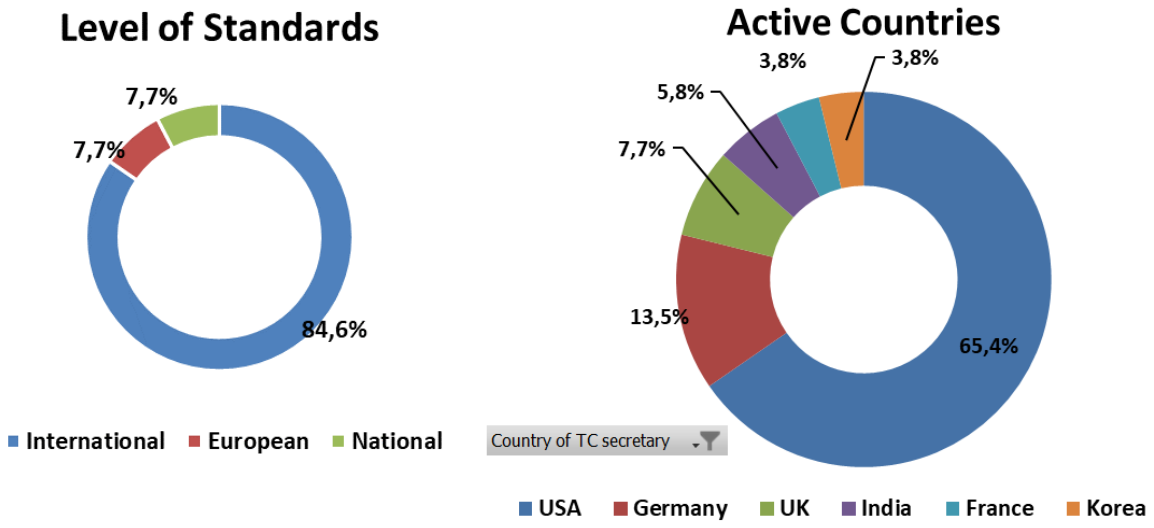


Figure 29. Level of relevant standards

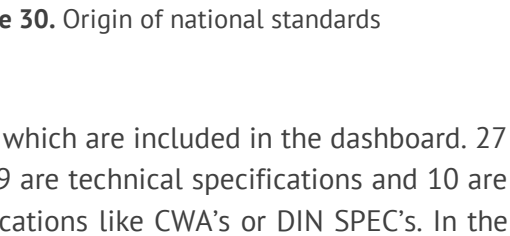


Figure 30. Origin of national standards

There are different types of standardisation documents, which are included in the dashboard. 27 are standards like ISO- / EN- or national standards but 9 are technical specifications and 10 are technical reports. The remaining documents are specifications like CWA's or DIN SPEC's. In the last 5 years, around 39 of those formal standards have been published.

4.5.2 Relevant standards for AIDEAS

The standards identified as relevant after the second rating process are enlisted in the following. The ISO/IEC JTC 1: "Information technology" represents with almost 34 standards the highest number of relevant standards for AIDEAS. The secretary here is the American National Standards Institute (ANSI). Most of the sub committees (SC) within the ISO/IEC JTC1 belonging to the SC 42 "Artificial intelligence" (ISO/IEC JTC 1/SC 42 Artificial intelligence). This emphasis the importance of AI standards within AIDEAS.

Table 8. Relevant standards identified after the second rating process

DOCUMENT NUMBER	TITLE	TECHNICAL COMMITTEE
ISO/TR 14049	Environmental management - Life cycle assessment - Illustrative examples on how to apply ISO 14044 to goal and scope definition and inventory analysis	ISO/TC 207/SC 5
ISO/IEC 23751	Information technology - Cloud computing and distributed platforms - Data sharing agreement (DSA) framework	ISO/IEC JTC 1/SC 38
ETSI GR CDM 001 V 2.1.1	Common Information Sharing Environment Service and Data Model (CDM) - Use Cases definition - Release 2	ETSI/ISG
ISO/IEC 19075-8	Information technology - Guidance for the use of database language SQL - Part 8: Multidimensional arrays	ISO/IEC JTC 1/SC 32
ISO/IEC 19075-1	Information technology - Guidance for the use of database language SQL - Part 1: XQuery regular expressions	ISO/IEC JTC 1/SC 32
ISO/IEC/IEEE 24748-5	Systems and software engineering - Life cycle management - Part 5: Software development planning	ISO/IEC JTC 1/SC 7
ISO/TS 10303-4442	Industrial automation systems and integration - Product data representation and exchange - Part 4442: Domain model: Managed model-based 3D engineering domain	ISO/TC 184/SC 4
ISO 10303-238	Industrial automation systems and integration - Product data representation and exchange - Part 238: Application protocol: Model based integrated manufacturing	ISO/TC 184/SC 4

ISO/TS 10303-1816	Industrial automation systems and integration - Product data representation and exchange - Part 1816: Application module: Model based 3D geometrical dimensioning and tolerancing representation	ISO/TC 184/SC 4
ISO/TS 10303-3001	Industrial automation systems and integration - Product data representation and exchange - Part 3001: Business object model: Managed model based 3d engineering	ISO/TC 184/SC 4
IEC 62832-1*CEI 62832-1	Industrial-process measurement, control and automation - Digital factory framework - Part 1: General principles	IEC/TC 65
IEC/PAS 63088*CEI/PAS 63088	Smart manufacturing - Reference architecture model industry 4.0 (RAMI4.0)	IEC/TC 65
ISO/IEC TR 30166	Internet of things (IoT) - Industrial IoT	ISO/IEC JTC 1/SC 41
ITU-T Y.4003	Overview of smart manufacturing in the context of the industrial Internet of things	ITU-T SG20
CWA 17918	Zero Defects Manufacturing - Vocabulary	CEN European Committee for Standardisation
IEC 61297*CEI 61297	Industrial-process control systems - Classification of adaptive controllers for the purpose of evaluation	IEC/TC 65/SC 65B
ISO/IEC 23053	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)	ISO/IEC JTC 1/SC 42
DIN SPEC 13266	Guideline for the development of deep learning image recognition systems	DIN Standards Committee Health Technologies
ISO/IEC TR 24027	Information technology - Artificial intelligence (AI) - Bias in AI systems and AI aided decision making	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24372	Information technology - Artificial intelligence (AI) - Overview of computational approaches for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24028	Information technology - Artificial intelligence - Overview of trustworthiness in artificial intelligence	ISO/IEC JTC 1/SC 42
ISO/IEC 25012	Software engineering - Software product Quality Requirements and Evaluation (SQuaRE) - Data quality model	ISO/IEC JTC 1/SC 7
IEEE 7002	IEEE Standard for Data Privacy Process	IEEE C/S2ESC
ETSI DGR SAI 002	Securing Artificial Intelligence (SAI); Data Supply Chain Report	ETSI “Securing Artificial Intelligence (SAI)”
ETSI DGS SAI 003	Securing Artificial Intelligence (SAI); Security Testing of AI	ETSI “Securing Artificial Intelligence (SAI)”

DIN SPEC 92001-1	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 1: Quality Meta Model; Text in English	DIN SPEC (PAS)
DIN SPEC 92001-2	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 2: Robustness	DIN SPEC (PAS)
ISO/IEC 22989	Information technology - Artificial intelligence - Artificial intelligence concepts and terminology	ISO/IEC JTC 1/SC 42
ISO/IEC 23894	Information technology - Artificial intelligence - Guidance on risk management	ISO/IEC JTC 1/SC 42
ISO/IEC 5259-2	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 2: Data quality measures	ISO/IEC JTC 1/SC 42
ISO/IEC 5259-5	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 5: Data quality governance	ISO/IEC JTC 1/SC 42
ISO/IEC TR 5469	Artificial intelligence — Functional safety and AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TS 5471	Artificial intelligence — Quality evaluation guidelines for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC 24029-2	Artificial intelligence (AI) - Assessment of the robustness of neural networks - Part 2: Methodology for the use of formal methods	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24029-1	Artificial Intelligence (AI) - Assessment of the robustness of neural networks - Part 1: Overview	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-1	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 1: Overview, terminology, and examples	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-3	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 3: Data quality management requirements and guidelines	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-4	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 4: Data quality process framework	ISO/IEC JTC 1/SC 42
ISO/IEC FDIS 8183	Information technology - Artificial intelligence - Data life cycle framework	ISO/IEC JTC 1/SC 42
ISO/IEC TS 6254	Information technology — Artificial intelligence — Objectives and approaches for explainability of ML models and AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TR 29119-11	Software and systems engineering - Software testing - Part 11: Guidelines on the testing of AI-based systems	ISO/IEC JTC 1/SC 7
ISO/IEC DIS 5338	Information technology - Artificial intelligence - AI system life cycle processes	ISO/IEC JTC 1/SC 42

ISO/IEC TS 4213	Information technology - Artificial intelligence - Assessment of machine learning classification performance	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5339	Information technology - Artificial intelligence - Guidance for AI applications	ISO/IEC JTC 1/SC 42
ISO/IEC 25059	Software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Quality model for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC 27005	Information security, cybersecurity and privacy protection - Guidance on managing information security risks	ISO/IEC JTC 1/SC 27
ISO/IEC TR 17903	Information technology — Artificial intelligence — Overview of machine learning computing devices	ISO/IEC JTC 1/SC 42
DIN SPEC 92001-3	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 3: Explainability; Text in English	DIN SPEC (PAS)
ISO/IEC 20547-3	Information technology - Big data reference architecture - Part 3: Reference architecture	ISO/IEC JTC 1/SC 42
ISO/IEC 20547-4	Information technology - Big data reference architecture - Part 4: Security and privacy	ISO/IEC JTC 1/SC 27
ISO/IEC TR 20547-5	Information technology - Big data reference architecture - Part 5: Standards roadmap	ISO/IEC JTC 1/SC 42
ISO/IEC 20546	Information technology - Big data - Overview and vocabulary	ISO/IEC JTC 1/SC 42

4.5.3 Standardisation activities on international level

Most of the relevant standards are international standards (84,6%) whereas USA is in the lead for placing the secretary in the creation of those standards.

Table 9. international Standards relevant for AIDEAS

DOCUMENT NUMBER	TITLE	TECHNICAL COMMITTEE
ISO/TR 14049	Environmental management - Life cycle assessment - Illustrative examples on how to apply ISO 14044 to goal and scope definition and inventory analysis	ISO/TC 207/SC 5
ISO/IEC 23751	Information technology - Cloud computing and distributed platforms - Data sharing agreement (DSA) framework	ISO/IEC JTC 1/SC 38
ISO/IEC 19075-8	Information technology - Guidance for the use of database language SQL - Part 8: Multidimensional arrays	ISO/IEC JTC 1/SC 32
ISO/IEC 19075-1	Information technology - Guidance for the use of database language SQL - Part 1: XQuery regular expressions	ISO/IEC JTC 1/SC 32

ISO/IEC/IEEE 24748-5	Systems and software engineering - Life cycle management - Part 5: Software development planning	ISO/IEC JTC 1/SC 7
ISO/TS 10303-4442	Industrial automation systems and integration - Product data representation and exchange - Part 4442: Domain model: Managed model-based 3D engineering domain	ISO/TC 184/SC 4
ISO 10303-238	Industrial automation systems and integration - Product data representation and exchange - Part 238: Application protocol: Model based integrated manufacturing	ISO/TC 184/SC 4
ISO/TS 10303-1816	Industrial automation systems and integration - Product data representation and exchange - Part 1816: Application module: Model based 3D geometrical dimensioning and tolerancing representation	ISO/TC 184/SC 4
ISO/TS 10303-3001	Industrial automation systems and integration - Product data representation and exchange - Part 3001: Business object model: Managed model based 3d engineering	ISO/TC 184/SC 4
IEC 62832-1*CEI 62832-1	Industrial-process measurement, control and automation - Digital factory framework - Part 1: General principles	IEC/TC 65
IEC/PAS 63088*CEI/PAS 63088	Smart manufacturing - Reference architecture model industry 4.0 (RAMI4.0)	IEC/TC 65
ISO/IEC TR 30166	Internet of things (IoT) - Industrial IoT	ISO/IEC JTC 1/SC 41
ITU-T Y.4003	Overview of smart manufacturing in the context of the industrial Internet of things	ITU-T SG20
IEC 61297*CEI 61297	Industrial-process control systems - Classification of adaptive controllers for the purpose of evaluation	IEC/TC 65/SC 65B
ISO/IEC 23053	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24027	Information technology - Artificial intelligence (AI) - Bias in AI systems and AI aided decision making	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24372	Information technology - Artificial intelligence (AI) - Overview of computational approaches for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24028	Information technology - Artificial intelligence - Overview of trustworthiness in artificial intelligence	ISO/IEC JTC 1/SC 42
ISO/IEC 25012	Software engineering - Software product Quality Requirements and Evaluation (SQuaRE) - Data quality model	ISO/IEC JTC 1/SC 7
IEEE 7002	IEEE Standard for Data Privacy Process	IEEE C/S2ESC
ISO/IEC 22989	Information technology - Artificial intelligence - Artificial intelligence concepts and terminology	ISO/IEC JTC 1/SC 42
ISO/IEC 23894	Information technology - Artificial intelligence - Guidance on risk management	ISO/IEC JTC 1/SC 42
ISO/IEC 5259-2	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 2: Data quality measures	ISO/IEC JTC 1/SC 42

ISO/IEC 5259-5	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 5: Data quality governance	ISO/IEC JTC 1/SC 42
ISO/IEC TR 5469	Artificial intelligence — Functional safety and AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TS 5471	Artificial intelligence — Quality evaluation guidelines for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC 24029-2	Artificial intelligence (AI) - Assessment of the robustness of neural networks - Part 2: Methodology for the use of formal methods	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24029-1	Artificial Intelligence (AI) - Assessment of the robustness of neural networks - Part 1: Overview	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-1	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 1: Overview, terminology, and examples	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-3	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 3: Data quality management requirements and guidelines	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5259-4	Artificial intelligence - Data quality for analytics and machine learning (ML) - Part 4: Data quality process framework	ISO/IEC JTC 1/SC 42
ISO/IEC FDIS 8183	Information technology - Artificial intelligence - Data life cycle framework	ISO/IEC JTC 1/SC 42
ISO/IEC TS 6254	Information technology — Artificial intelligence — Objectives and approaches for explainability of ML models and AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC TR 29119-11	Software and systems engineering - Software testing - Part 11: Guidelines on the testing of AI-based systems	ISO/IEC JTC 1/SC 7
ISO/IEC DIS 5338	Information technology - Artificial intelligence - AI system life cycle processes	ISO/IEC JTC 1/SC 42
ISO/IEC TS 4213	Information technology - Artificial intelligence - Assessment of machine learning classification performance	ISO/IEC JTC 1/SC 42
ISO/IEC DIS 5339	Information technology - Artificial intelligence - Guidance for AI applications	ISO/IEC JTC 1/SC 42
ISO/IEC 25059	Software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Quality model for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC 27005	Information security, cybersecurity and privacy protection - Guidance on managing information security risks	ISO/IEC JTC 1/SC 27
ISO/IEC TR 17903	Information technology — Artificial intelligence — Overview of machine learning computing devices	ISO/IEC JTC 1/SC 42
ISO/IEC 20547-3	Information technology - Big data reference architecture - Part 3: Reference architecture	ISO/IEC JTC 1/SC 42

ISO/IEC 20547-4	Information technology - Big data reference architecture - Part 4: Security and privacy	ISO/IEC JTC 1/SC 27
ISO/IEC TR 20547-5	Information technology - Big data reference architecture - Part 5: Standards roadmap	ISO/IEC JTC 1/SC 42
ISO/IEC 20546	Information technology - Big data - Overview and vocabulary	ISO/IEC JTC 1/SC 42

4.5.4 Standardisation activities on European level

European standards relevant for AIDEAS are only 7.7% of all standards within the AIDEAS standardisation landscape. They are dominated by ETSI standards, which is based in France and focus mainly on secure artificial intelligence.

Table 10. European Standards relevant for AIDEAS

DOCUMENT NUMBER	TITLE	TECHNICAL COMMITTEE
ETSI GR CDM 001 V 2.1.1	Common Information Sharing Environment Service and Data Model (CDM) - Use Cases definition - Release 2	ETSI/ISG
CWA 17918	Zero Defects Manufacturing - Vocabulary	CEN European Committee for Standardisation
ETSI DGR SAI 002	Securing Artificial Intelligence (SAI); Data Supply Chain Report	ETSI "Securing Artificial Intelligence (SAI)"
ETSI DGS SAI 003	Securing Artificial Intelligence (SAI); Security Testing of AI	ETSI "Securing Artificial Intelligence (SAI)"

4.5.5 Standardisation activities on national level

Since the 2. AI Roadmap also lists German specifications, the following specifications relevant for AIDEAS are listed with 13.5% total of all relevant standards in the AIDEAS standardisation landscape. They are exclusively DIN standards, based in Germany and focus mainly on life cycle processes and quality requirements for artificial intelligence.

Table 11. National Standards relevant for AIDEAS

DOCUMENT NUMBER	TITLE	TECHNICAL COMMITTEE
DIN SPEC 13266	Guideline for the development of deep learning image recognition systems	DIN Standards Committee Health Technologies
DIN SPEC 92001-1	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 1: Quality Meta Model; Text in English	DIN SPEC (PAS)

DIN SPEC 92001-2	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 2: Robustness	DIN SPEC (PAS)
DIN SPEC 92001-3	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 3: Explainability; Text in English	DIN SPEC (PAS)

5. Conclusions

This document provides an overview of the project activities related to dissemination and communication on the one hand, and standardisation on the other hand, in the first stage of the project's development in its first year of life.

5.1 Dissemination, Communication and Community Building

This document outlines the most important aspects of the target-driven dissemination and communication plan. Initially, its general objectives are set out, the roles and responsibilities to be played by the project partners in its deployment are indicated, the target groups of the dissemination and communication work are indicated, and the planned timeline is discussed. It also sets out the key message to be conveyed, details some aspects of the conceptual and visual identity of the project, and provides information on the KPIs to monitor the impact of the activities, before going on to comment on how each of the activities has been developed during this first 12-month period.

The results are, to date, remarkable:

- Tri-fold brochure and roll-up banner already available.
- The project website is fully operational.
- The social networks are also working with a practically weekly publication rhythm and meeting the first expectations, by far exceeding the number of annual followers and having achieved a number of impressions within the range established in the definition of KPIs.
- The first eNewsletter has already been published and the second is planned for November 2023.
- In the first year, five scientific articles have already been published under the project, which is already very close to the 6 planned for the whole project.
- The AIDEAS Community, hosted on the FundingBox Spaces platform, also accessible via mobile phone, has been launched. Currently, there are more than 45,000 registered users among makers, entrepreneurs, startups, and tech SMEs.
- A first contact has been established with the projects "self-X Artificial Intelligence for European Process Industry digital transformation" (s-X-AIPI) and "AI Platform for Integrated Sustainable and Circular Manufacturing" (Circular TwAIn) to jointly address the study of cross-dissemination possibilities.

In the beginning of the second year of the project, the remaining activities will be addressed:

- Participation in conferences and events.
- Impartation of webinars and Q/A sessions.
- Efforts will be made to initiate contacts with DIHs.
- Supporting partners will continue to be identified and selected.

5.2 Advisory board

A strong AB was established in the first months of the project, and the necessary steps were taken to start operating. The main related results are:

- Advisory Board established: a consistent and gender balanced expert group, with comprehensive knowledge and experience on market, technology, business, entrepreneurship, European funding programs and so on.
- Operating protocol and facilities (SharePoint, etc.) set up.
- Service Agreement drawn up and signed.
- Iteration plan defined, including tentative dates and targets.
- First Workshop held on 21 September.

5.3 Standardisation

Generally, the present deliverable provides an overview of the standardisation landscape related to AIDEAS and therefore summarizes one section of the results in Task 8.7 - Standardisation. The knowledge about existing standards is important for the project since it enables the development of solutions which are compliant with the latest standards and further paves the way for upcoming liaison activities with relevant technical committees. Therefore, a standards database in form of a dashboard was created, which includes 52 standards that could be relevant for the project. On the one hand, this dashboard offers the opportunity to search for specific standards. On the other hand, the overview of this dashboard provides the opportunity to identify standardisation gaps and is therefore the basis for the following activities in WP8. Within this deliverable, the dashboard was used to describe the standardisation activities on national (AI Roadmap), international and European level related to AIDEAS. Specific focus was put on areas that have a high relevance for the project. Besides listing relevant standards, this deliverable offers an overview of the TC's that are working on standards related to AIDEAS. Since the interaction with relevant standardisation committees is envisaged within AIDEAS, an overview of current work items of the most relevant TC's is provided. In this context it is also worth mentioning the importance to really focus on specific areas within a broad field like Artificial Intelligence, industrial equipment and sustainability. The next steps include to focus further on these areas to initiate targeted standardisation activities within AIDEAS. Within AIDEAS the contribution to ongoing or the initiation of new standardisation activities is sought. A workshop will be held to analyse the need for standardisation and thus the existence of possible standardisation gaps in connection with AIDEAS 's work. This will then lead directly to the initiation of standardisation activities. Altogether, through the work done in T8.7, awareness for standardisation was raised throughout the consortium and the foundation was laid for the continuation of the task.

6. Bibliography

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