# ARTIFICIAL INTELLIGENCE AND BIG DATA CSA FOR PROCESS INDUSTRY USERS, BUSINESS DEVELOPMENT AND EXPLOITATION

UPDATE ON THE FIRST YEAR OF ACTIVITIES!

One year has already passed since AI-CUBE started and many are the progresses obtained by the project partners!

The Consortium explored the state of the art of digital technologies in the Process Industries from different points of view: the academic research conducted up to now concerning Artificial Intelligence (AI) and Big Data (BD) technologies in the SPIRE Process Industries, and a sectoral analysis of the industrial processes in Europe. These analyses led to the identification and mapping of processes and technologies, representing the dimensions and macro-areas that will guide the AI-CUBE project through its next phases, which have now been made available in the 'Glossary' page of the project website.

The key result of these activities has led to an updated CUBE design, represented in the following figure:
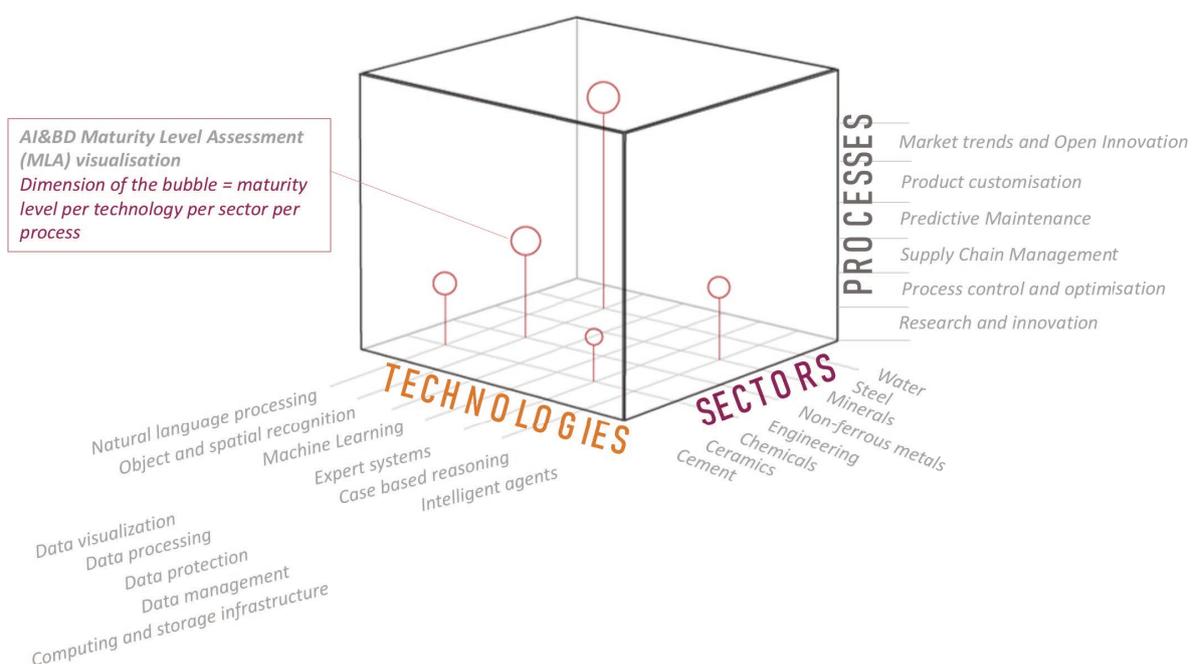
With the CUBE design in mind, the consortium developed a customized Maturity Level Assessment (MLA) framework for AI/BD in the process industry, analysing the interplay between each technology and process.

Discover all the advancements, achievement, and outputs reached within the first year of implementation reading the second issue of the AI-CUBE newsletter! Remember to subscribe to the AI-CUBE newsletter and follow the main updates visiting the project website and the LinkedIn and Twitter accounts!

Update on the first year of activities

In the first year of activities, **PNO**, project coordinator and leader of the Dissemination, Communication and Exploitation task, planned and developed the dissemination strategy of AI-CUBE with the aim to engage key players of the Artificial Intelligence and Big Data technologies sector and to maximize the project visibility. At the beginning of the activities, the AI-CUBE website was launched, as well as the LinkedIn and Twitter accounts, which are regularly updated with interesting news and outputs about the project activities, and events related to the initiative's scope. PNO also supported, coordinated and supervised the D&C activities performed by the other project partners, such as the joint drafting of a scientific paper, led by the CNR, which was submitted and accepted for presentation an publication by the IFIP-APMS 2021 congress. Part of PNO's activities also include contribution to the industry consultation work. PNO has analysed the current scenario of stakeholders, users and/or providers of digital technologies that operate in the SPIRE sectors. PNO identified and mapped these actors and developed an engagement strategy to establish contacts with them. The goal is to secure the involvement of stakeholders throughout the duration of the project, so that AI-CUBE outcome can be validated and empowered by the actors active in the relevant sectors. The identified stakeholders have been invited to provide feedback and input to the project through the participation in surveys, webinars, and industrial workshops. Next steps will involve one-to-one interviews and validation workshops on the analyses and output generated by the other partners of AI-CUBE. The aim is to create awareness and generate a shared vision for digital technologies developments, described in roadmaps that can be easily exploited and applied by industrial actors.
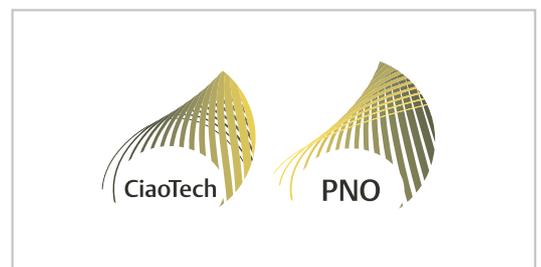
On their behalf, **Zaragoza Logistic Center**, leader of the Work Package (WP) 4 devoted to the Roadmap and Industry Synergies, that will be operative in the second year of the project, has supported and contributed to the previous activities of AI-CUBE. ZLC also leads the task on the Impact Assessment of Artificial Intelligence and Big Data technologies, currently on going. The main impacts on the SPIRE industry have been already identified and long listed, and their preliminary validation was performed during workshop organized within the CSCMP 2021. Additional impact validation and scenario creation actions are planned for the upcoming months. Since the beginning of AI-CUBE, ZLC contributed by elaborating the Data Management Plan to follow during the project. ZLC has also contributed to the Dissemination, Communications and Exploitation of AI-CUBE in its network through social media, ZLC's newsletter and academic sessions with the students. ZLC has supported and shared the coordinator's and the other partners' activities, initiatives, and regular updates from the project, and contributed to the joint drafting of a scientific paper that was submitted and accepted for presentation at the APMS 2021 conference.

The **Fraunhofer Institute for Material Flow and Logistics** (IML) developed a survey to assess the maturity level of AI & BD technologies in the process industry. The development, conduction and analysis are part of the WP 3 led by Fraunhofer IML. The work on the survey builds upon the results of the previous work packages and started with the development of the questionnaire in April. The survey has been distributed to the stakeholders and separates into two streams of respondents: users and providers of AI and BD. The expected results are a first step towards generating a sector specific overview on technologies and maturity levels in the cube diagram. The project team expects to generate a bundling of valuable knowledge building on the information shared by addressed expert groups. Thus, an estimation of maturity levels can be made and findings into transfer barriers can be gained. This will allow a broad insight into the current state of art in the European process industry to be achieved.

Over the first year of the AI-CUBE project, **IRIS** has led the work for WP1, Current landscape analysis: AI & BD technologies and industry applications. It is a key WP as it sets the basis for the rest of the project and has produced three associated deliverables: (1) AI & BD Technologies State-of-the-Art Review, (2)

Sectorial Analysis of Industrial Processes in Europe, (3) Review and Update of the Identified Macro Applications Areas Plan. This work has involved the definition of a detailed taxonomy for AI and BD technologies, followed by a major state of the art review for each technology. This was followed by a sectorial and a process-based review. Also, IRIS organized an industrial workshop in February 2021. The online stakeholder meeting goal was to obtain hand-on information about real AI and BD projects from industry experts invited as speakers. Finally, the CUBE definition was updated in terms of areas attached to the process and technology dimensions. As part of the dissemination effort, IRIS also participated in writing a scientific paper, led by CNR and submitted to the IFIP-APMS 2021 congress and accepted for publication.

During this period, **CNR** with the support of AI-CUBE partners developed the conceptual framework for the maturity level assessment (MLA) model. The MLA is structured to investigate the maturity level on AI and BD of the process industry along 4 domains: strategy, governance, people, and technology. The instantiation of the model was developed through a questionnaire and a scoring system to analyse the results. The MLA framework provides customized questions for the process industry taking into consideration AI andBD users and providers point of view; therefore, the results will provide insights to design tailored suggestions and identify potential gaps in the technological maturity levels for process industries. MLA framework and related questionnaire is developed as the multi-level approach to cover the multi-faceted aspects of digitalization in process industry where several different operations can benefit from it. The work was carried out within the Task 2.3 of the project and builds up the framework for the activities included in WP2 and WP3. In addition, CNR actively participated in all the other actions run under the project, contributing to the work led by other partners and sharing the effort in many of them. Finally, CNR led the consortium work of jointly drafting a scientific paper that has been submitted and will be presented in the IFIP-AMS 2021 Conference.

AI-CUBE first industrial workshop

The first AI-CUBE industrial workshop was held on 2nd February 2021, hosted by IRIS. The event highlighted the great potential demonstrated by the Artificial Intelligence and Big Data technologies as enablers for the process industry of the future. Representatives from SPIRE2030, Mabxience, Aqualia, Fraunhofer IPT, Universitat Politecnica de Catalunya and IRIS virtually gathered to share their experiences, vision, objectives, and challenges faced in the journey towards the process industry of the future, while presenting case studies related to the involvement of the AI and BD technologies in the SPIRE 2030 industries.

AI-CUBE workshop held in the frame of the CSCMP European Conference

The AI-CUBE project hosted its workshop "Impact Assessment of AI&BD Technologies in the Industry" in the frame of the CSCMP European Conference, on 11th June, 2021. The event, jointly organized by CNR-IEIIT and Zaragoza Logistics Center, focused on the impact of AI and BD in process industry and engaged relevant stakeholders to discuss those impacts and explore opportunities for enhancing the role of digital technologies in the industrial processes of SPIRE sectors. Take a look at the presentation made by the consortium!
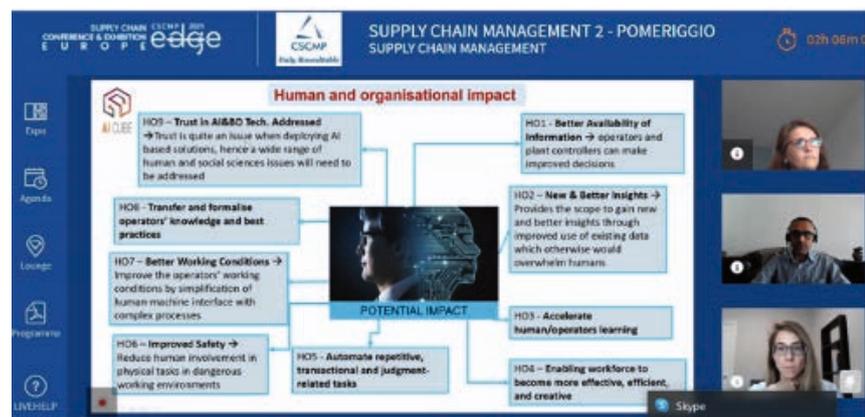
The AI-CUBE project featured in the IFIP newsletter

The AI-CUBE project was selected to appear in the latest newsletter of the International Federation for Information Processing (IFIP). IFIP is the leading multinational, apolitical organization focused on information and communications technologies and sciences for national societies working in the field of information

processing. In the newsletter, the aims and goals of the project were described, as well as the latest advancements related to the design of the CUBE and the development of a customized Maturity Level Assessment (MLA) framework for AI and BD in the process industry. Discover more downloading the newsletter here!

AI-CUBE is moving forward!

Among the results achieved in each Work Package, AI-CUBE hosted two workshops within the first year of implementation, aimed at engaging organizations, managers, researchers, scientists, and experts in the AI & Big Data technologies and/or Process Industries fields.

The AI-CUBE project has recently launched a second survey to consult the stakeholders of the SPIRE sectors on the level of penetration and maturity of the digital technologies in the processes of their industry; in addition, the survey also explores the impact that the application of AI and BD technologies is deploying and/or is expected to deploy in the future. All the information gathered through this survey will be analysed and elaborated to contribute to the design of specific roadmaps for future AI and BD technologies developments and applications, and the identification of best practices to be considered as models for potential cross-sectoral replication.

Help the AI-CUBE project enhance the understanding of the Artificial Intelligence & Big Data technologies application in the SPIRE industrial sectors!

Participate in the questionnaire as a user of AI and BD in the European process industry or as a provider of these technologies. Answering the survey will take you less than 15 minutes and to provide us with your valuable support in the understanding and future exploitation of the opportunities offered by digital technologies. You have time till mid-September 2021 to support the consortium to design specific roadmaps for future AI and BD technologies and processes application and best practices!

Do you want to be engaged in the digital transformation of the process industries and involved in the next events organized by the project? Contact us!

Are you curious to know more? Take a look at the Dissemination & Communication materials of AI-CUBE, available on the download page of the project website!

AI CUBE CONSORTIUM

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