openZDM

OPEN PLATFORM FOR REALIZING ZERO DEFECTS IN CYBER PHYSICAL MANUFACTURING

Plan for impact management activities

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WP	6
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Abstract	The dissemination activities as well as the communication activities and tools regarding the first six months of the project have been presented in this document. Moreover, the exploitation strategy as well as the exploitable results of the project are described
Keywords	Dissemination, communication, exploitation, marketing strategy
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Dissemination Level:	
PU	Public, fully open
SEN	Sensitive, limited under the conditions of the Grant Agreement
Classified R-UE/EU-R	EU RESTRICTED under the Commission Decision No2015/444
Classified C-UE/EU-C	EU CONFIDENTIAL under the Commission Decision No2015/444
Classified S-UE/EU-S	EU SECRET under the Commission Decision No2015/444
Type	
R	Document, report (excluding the periodic and final reports)
DEM	Demonstrator, pilot, prototype, plan designs
DEC	Websites, patents filing, press & media actions, videos, etc.
DATA	Data sets, microdata, etc.
DMP	Data management plan
ETHICS	Deliverables related to ethics issues.
SECURITY	Deliverables related to security issues
OTHER	Software, technical diagram, algorithms, models, etc.

Version History

Version	Date	Owner	Author(s)	Changes to previous version
0.1	2022-09-12	F6S	F6S	Outline
0.2	2022-11-03	F6S	INTRA	Exploitation inputs
0.8	2022-11-16	F6S	F6S, INTRA	Full draft for review
0.9	2022-11-25	F6S	INTRA	Review
1.0	2022-12-06	F6S	LMS	Review and submit

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List of Abbreviations & Acronyms

DIH	:	Digital Innovation Hub
EPC	:	European Patent Convention
ER	:	Exploitable Results
HW	:	Hardware
ICT	:	Information and communication technology
IoT	:	Internet of Things
IP	:	Internal Protocol
IPR	:	Intellectual Property Rights
KER	:	Key Exploitable Results
KPI	:	Key Performance Indicator
LCA	:	Lifecycle analysis
NDI	:	Several non-destructive inspection methods
SME	:	Small and medium-sized enterprises
SOD	:	Segmentation of Duties
SW	:	Software
WP	:	Work Package

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Executive Summary

Purpose of this document is to provide a first version of the plan for the impact activities regarding openZDM project. The Deliverable 6.1 Plan for impact management activities describes openZDM maximisation plan, as defined in Task 6.1 of Work Package 6 - Impact management, which aims to maximise the impact of openZDM by engaging stakeholders and interested parties outside the consortium using a targeted dissemination and communication outreach strategy and channels, establishing interactions and liaisons with other EU projects, EU initiatives (EFFRA, BDVA/DAIRO, GAIA-X, INSME, AIOTI), Digital Innovation Hubs, and other relevant communities.

WP6 aims to maximise the visibility and to gather feedback on the project outcomes, paving the way for the exploitation and adoption of the project outcomes into future products, services, and policies in a sustainable manner and beyond the project lifetime. F6S leads the management and implementation of dissemination and communication activities.

The document includes a detailed dissemination and communication plan addressing how the results will be disseminated among targeted communities of interest, how awareness around the project vision will be raised and how exploitation activities will be deployed during the project to ensure the sustainability of its results. The plan also includes a detailed calendar of events for the whole project duration and monitoring and assessment strategy.

1   Introduction

The openZDM project addresses the challenge of the manufacturing industry to deliver high-quality products while minimizing waste and energy consumption. As an answer to this challenge, openZDM will develop an open platform for realizing zero defects in cyber-physical manufacturing and test it through five production lines in real-life operational conditions.

With the aim of enabling zero-defect processes, openZDM is also focusing on the "grand challenge" of Sustainable Manufacturing to significantly improve the production sustainability of cyber-physical production systems. In that way, the initiative will increase the capacity for cost savings through waste reduction, while promoting production sustainability through online process control and adaptation.

To understand the aim of the openZDM Plan for impact management activities is important to note the specific objectives of WP6, which are:

- Disseminate the project results via appropriate communication channels.
- Perform market, technology and IPR watch to continuously analyse the surrounding ecosystem.
- Manage the IPR and the Foreground knowledge in the project.
- Identify the 'unique selling points' in relation to the rest of the products in the market and main competitors.
- Develop a strategic roadmap & business model for the openZDM platform (Sales & Pricing Strategy).
- Facilitate the (post-project) uptake of results through the deliberate identification and management of the project's exploitable results.
- Prepare contribution to suitable standardisation bodies or pre-normative activities. Standardization efforts aim at facilitating the acceptance and utilization by the market of the developed solutions.
- Create links to other European activities in ZDM.

To reach the specific objectives, three lines of strategy will be deployed within the openZDM initiative lifetime:

- **Communication strategy**: The management and overall implementation of dissemination and communication activities are led by F6S (WP 6 – Impact Management), although all partners will be involved in the activities proposed and updated about the results. Monthly meetings are set up to discuss the advancements of the WP, as well as announcements and reports. The communication plan wants to answer the three phases of the market-driven phased approach focusing on developing a society awareness communication strategy. For that purpose, different activities, tools, and channels will be used that are described in section 4 Communication strategy.

- **Dissemination strategy**: Aligned and agreed with openZDM partners will be focused on a unique strategy for disseminating and exploiting the results of the project targeting the European Manufacturing Ecosystem. The strategy will be designed and implemented at different geographical levels (local, regional, and national via the direct involvement of local partners and at the European/international level under the WP leader's coordination and management of the Project's Impact Maximization activities). This will enable to identify better the benefits and value proposition of each target considering different geographical contexts. openZDM partners will disseminate the results through a set of dissemination channels that include participation in external conferences, workshops, fairs and other events, organisation of Project's events, mobilisation of key stakeholders' and end-user's associations, and clustering with other projects and initiatives. The dissemination plan aims to answer the objective set up by market driven

phased approach in its first phase of market awareness which is to communicate early results to the target audience.

- **Exploitation strategy**: The openZDM consortium sets the premises to facilitate the exploitation of the innovative services, processes and components that will come out of the project-specific technical work packages and use cases. To this end, we design and implement two core strategies in the project, which provide the methodologies, processes and tools that will be used during the project to ensure the proper exploitation of its results: the Innovation Management and Exploitation Plan, as well as the IPR Management Strategy of the project. The former deals with the identification of the results, and the design of individual or joint exploitation paths and go-to-market models. The latter constitutes a strategy that defines partners' involvement in the IP developed by the project. Besides, it also facilitates IP agreements and application of licenses and protection measures to the project's exploitable results. These activities will be coordinated by T6.2 "Exploitation and business plan" leader, namely INTRA, while given the collaborative nature of this activity, all partners should be involved in the exploitation and IPR management activities of the project and validate the exploitation plans that will be designed, accordingly. The Innovation Management and Exploitation plan of the project (including the IPR Strategy) are presented in Section 6, while Section 7 presents an initial list of the openZDM Exploitable Results. In Section 8, we offer some initial plans for exploitation along with an indicative list of contributors per exploitable result.

2 Impact management activities plan overview

2.1 Impact management activities approach

As mentioned before, D6.1 includes a dissemination and communication plan that will be followed during the project execution. However, in order to comprehend the effect of openZDM impact maximization plan it is crucial to distinguish between the two ideas and their different purposes (as stated by the EC), as these are necessary to develop a clear plan alongside the project's exploitation.

2.1.1 Theorical approach

In order to achieve the communication and dissemination goals, we adhere and take inspiration from the recommendations in the booklet Making the Most of Your H2020 Project (Figure 1) from the European IPR Helpdesk:

Communication	Dissemination	Exploitation	
"Communication on projects is a strategically planned process that starts at the outset of the action and continues throughout its entire lifetime, aimed at promoting the action and its results. It requires strategic and targeted measures for communicating about (i) the action and (ii) its results to a multitude of audiences, including the media and the public and possibly engaging in a two-way exchange." (Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	"The public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium." (Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	"The utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities." (Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	Definition
Reach out to society and show the impact and benefits of EU-funded R&I activities, e.g. by addressing and providing possible solutions to fundamental societal challenges.	**Transfer knowledge & results** with the aim to enable others to use and take up results, thus maximising the impact of EU-funded research.	**Effectively use project results** through scientific, economic, political or societal exploitation routes aiming to turn R&I actions into concrete value and impact for society.	Objective
Inform about and **promote** the project AND its results/success.	**Describe** and **ensure results available** for others to **USE** ➡ focus on results only!	**Make concrete use** of research results (not restricted to commercial use.)	Focus
Multiple audiences beyond the project's own community incl. media and the broad public.	Audiences that may take an interest in the potential **USE** of the results (e.g. scientific community, industrial partner, policymakers).	People/organisations including project partners themselves that make concrete use of the project results, as well as user groups outside the project.	Target Audience

Figure 1: Making the most of your H2020 project

The openZDM plan for impact management activities aims to integrate the communication, dissemination, and exploitation concepts to maximise the results and outcomes of the project. This deliverable provides an overview of the actions being implemented to reach a wide stakeholder base and create tangible value from the contributions the consortium work.

2.1.2 Communication, dissemination, and exploitation activities related to impacts

The impact identified by the project will create a roadmap that will be thoroughly addressed by the communication, dissemination, and exploitation activities (Table 1). The following preliminary impacts were identified:

1. Demonstrate a significant increase in sustainable production through improved control systems and non-destructive inspection methods.

2. Develop methodologies and tools to prevent the generation of defects at the component level and their propagation to the system level

3. Create new diagnostic methods for in-situ monitoring of industrial production

4. Ensure efficient use of materials, repair strategies, and reduced production cost and time

5. Accelerate the digital and green transformation of the production systems

6. Create a new green, flexible and digital manufacturing paradigm, leading to sustainable, flexible, responsive, and resilient factories and value chains.

Complemented by the impacts beyond the program, identified as follows:

a. The project will offer opportunities for investigating NDI solutions for manufacturing, digital twin, AI and AAS, and their deployment in industrial environments, working in tandem with European associations and working groups on how to promote further research based on the results of the project

b. Reduction of time to repair/realign and associated cost, bringing new sensors to the market, and reduction of waste

c. Reduction of environmental impact and safeguard of occupational levels.

Table 1: Impacts related to communication, dissemination and exploitation strategies

Strategy	Activities	Impact
Communication	Inform about the technologies and project milestones through communication channels and tools.	1, 2, 3, 4, 5, 6
	Creation of graphic assets and audio-visual content.	1, 2, 3, 4
	Deployment of social media campaigns.	1, 2, 3, 4, 5,6
	Participation of industry events.	1, 2, 3, 4, 5, 6
Dissemination	Publications in scientific papers and conferences	1, 2, 3, 4, a, b, c
	Dissemination of public deliverables	1, 2, 3, 4, a, b, c
	Coordination of the project communication channels with task and WP leaders to collect and process project outcomes	1, 2, 3, 4, 5, 6, a, b, c
	Definition of joint agreements and activities with projects and communities	a, b, c
	Organisation of joint events and joint white papers	1, 2, 3, 4, a, b, c
Exploitation	Definition of the project's Exploitable Results (ER) and Key Exploitable Results (KERs)	1, 2, 3, 4, 5, 6, a
	Identification of the joint and the individual exploitation paths of partners	1, 2, 3, 4, 5, 6, a
	Management of the project's IP and potential protection of the KERs	1, 2, 3, 4, 5, 6, a
	Organisation of exploitation workshops and online surveys	1, 2, 3, 4, 5, 6, a

Strategy	Activities	Impact
	Development of dedicated business models for the project's KERs	1, 2, 3, 4, 5, 6, a
	Development of the project's go-to-market plan	1, 2, 3, 4, 5, 6, a

3 Impact management activities framework

The openZDM plan for impact management activities is based on the following identified pillars:

- **Targeted stakeholders:** Section 3.1 describes who are the stakeholders to be addressed throughout the Project.
- **Communication and Dissemination activities:** The foreseen actions in the field of communication and dissemination are found in Sections 4 and 5.
- **Communication dissemination tools and channels:** The platforms and tools that will be used to perform the communication and dissemination activities are described in Section 4.
- **Exploitation Plan and IPR Strategy:** Section 6 explains the openZDM innovation management and exploitation plan, as well as the strategy employed to manage the project's IPR.
- **Impact assessment:** Section 9 details the method that will be followed to measure quantitatively and qualitatively the different impacts of the initiative.
- **Conclusion:** The conclusion Section 12 some of the outcomes until next deliverable (6.2 M24) will be summarised.

The dissemination, communication, and exploitation of openZDM Activities will be launched in a series of stages along with the project's lifetime (Figure **2**). There will be several occasions to increase project communication efforts, especially during project milestones, the following is an overview of the actions to be taken during each phase.

Stage 1: Market awareness

- Establish visual identity
- Promote brand value proposition
- Develop a communication and dissemination strategy
- Develop community of stakeholders leveraging partners own networks
- Distribution of press releases
- Articles published on the opeZDM website
- Attend project events and presentations
- Establish cooperation with similar projects and other EU funded initiatives
- Google Analytics to track and monitor
- **Phase 1 of exploitation plan:** Further identify the innovative exploitable assets/results and their taxonomy as well as their potential use as stand-alone future market offerings or as aggregations into value-added services and product offerings
- **Phase 2 of exploitation plan:** systematic online surveys to extract several marketing plan key ideas. mappings of assets, market analysis and potential approach.

Stage 2: Market posititioning

- Dissemination and exploitation efforts
- Events attendance to engage stakeholders
- Publication in journals, scitific conferences attendance, white papers
- Dissemination workshops
- openZDM success promotion
- Google analytics to track and monitor
- **Phase 3 of exploitation plan:** IPR management, royalties Background/Foreground, joint exploitation opportunities as per IPRHelpdesk.EU guidelines, KER submission in the recommended EC platforms
- **Phase 4 of exploitation plan:** Exploitation workshop will assist partners both in their individual as well as their joint plans

Stage 3: Market outreach

- Sustainable and viable cooperative models with DIHs, clusters and other EU funded actions
- Communication and dissemination of projects outcomes (tested and ready)
- Publication in journals and key conferences
- International, european, national and local events showcases available
- Google analytics to track and monitor external interest and final developments over time
- **Phase 5 of exploitation plan:** Direct industry links with European industry mid-caps, SMEs and start-ups, as well as potential adopters and envisioned first customers, 5 key synergies from the real market based on their pre-existing networks of clients, vendors, collaborators etc
- **Phase 6 of exploitation plan:** Exploitation workshop shall extract optimal business model and key pathways to commercialization.

M1   M18   M36   M42

Figure 2: **Stages of dissemination, communication, and exploitation actions**

3.1 Target stakeholders of openZDM impact management activities plan

The openZDM target groups are categorised in six distinct types of stakeholders: i) Public Sector, ii) Industry Sector, iii) ICT Sector, iv) Digital Innovation Hubs; v) Research, Academia, and open-source communities, and vi) General Public. Key messages will be created for each stakeholder group that they will be able to access through specific channels, see table below (Table 2):

Table 2: openZDM target stakeholders

Sector	Description	Key messages	Communication, dissemination & exploitation actions	Channel
Public sector	EU Institutions, Government organisations, and policy makers	The results and outcomes of the experiments will benefit the economic growth and innovation index of the European manufacturing SMEs fostering the development and competitiveness of the sector. The most relevant results will be disseminated for publication and evaluation	Liaison activities	Website, social media, best practices, videos, press releases

Sector	Description	Key messages	Communication, dissemination & exploitation actions	Channel
Industry sector	Manufacturing companies, OEMs	openZDM will provide the European manufacturing industry with a digital platform that builds on the state-of-the-art Reference Architecture Model for Industry 4.0 and Asset Administration Shell, non-destructive inspection (NDI) methods and data-driven quality assessment techniques for online defect identification and quality assessment. Furthermore, a Digital Twin, key enabling technology for online process adaptation and waste reduction.	Deployment of communication and dissemination strategy Innovation Management IPR Management Strategy Business Modelling and Planning	Website, social media, newsletter, videos, press releases, printed materials, events, newspapers and sector magazines, blogs, openZDM exploitable results, partners' exploitation paths, business models, Innovation Radar platform
ICT Sector	System integrators, technology providers, SDOs, etc.	openZDM will provide harmonization, interactions, and contributions to emerging and new standards, such as ETSI GS, OneM2M, FIWARE, AIOTI, etc.	Deployment of communication and dissemination strategy Innovation Management Plan IPR Management Strategy Business Modelling and Planning	Website, social media, newsletter, videos, press releases, printed materials, events, newspapers and sector magazines, blogs, workshops, trainings, technical publications, standards, openZDM exploitable results, partners'

Sector	Description	Key messages	Communication, dissemination & exploitation actions	Channel
				exploitation paths, business models, Innovation Radar platform
DIHs & Clusters	Digital Innovation Hubs	openZDM will engage with associations and networks of organisations to reach all relevant key players and/or market actors that can benefit from the results of the pilots.	Liaison activities	Website, social media, newsletter, videos, press releases, printed materials, events, newspapers, and sector magazines
Research & academia	Research institutions, Universities, Students, etc.	Academia and research institutes will leverage the activities and results developed within openZDM to develop additional innovative research and synergies in the manufacturing field.	Dissemination strategy deployment Innovation Management Plan	Website, social media, newspapers and sector magazines, blogs, workshops, technical publications, scientific events and conferences, workshops, trainings, openZDM exploitable results, Innovation Radar platform
General public	Citizens and Innovators	The results and outcomes of the pilots will be shared with the public to create awareness of the journey into the digital transformation of	Communication strategy deployment Innovation Management Plan	Website, social media, newsletter, videos, press releases, printed

Sector	Description	Key messages	Communication, dissemination & exploitation actions	Channel
		the European manufacturing sector.		materials, openZDM exploitable results, Innovation Radar platform

4 Communication strategy

4.1 Communication activities

To perform a robust communication strategy, we have conveyed a set of communication activities with an aim to increase awareness, stimulate the interest of specific tech-stakeholders, including wider non-technical public and ensure the strong impact of the management strategy. Therefore, the **Plan for impact management activities – initial version (D6.1)** is consisted of proactive and well-planned communication efforts, with an efficient and intriguing messaging – both in terms of content and in the way the content is communicated.

The following table (Table 3) presents the high-level openZDM communication plan meant mostly for a wider non-technical audience with an aim to accelerate the uptake of the openZDM concept and methodology, benefits, goals, and key results.

Table 3. openZDM Communication plan with KPIs

Communication Tools and Channels	Communication activities	KPIs
Project website	Online project website designed and developed by F6S, updated throughout the project.	Website ready by M02 >7.000 visitors by M42
Social media channels	Online presence on social media channels such as LinkedIn, Twitter, spreading the news about the project.	>1000 stakeholders >200 monthly impressions
Newsletters	Newsletters will be circulated via email lists providing an overview of the main project activities and outcomes.	>6 newsletters >1000 contacts reached
Video Clips	Multimedia video podcasts presenting the project, its innovation, and its key outcomes.	>3 videos produced >2.000 views on YouTube

Communication Tools and Channels	Communication activities	KPIs
Printed materials	Brochures, leaflets, flyers for events, roll-up banners, and posters, are also available online for printing through the project's website.	>2.000 printed copies distributed >4 roll-up banners/posters
Public events	Public events with public, schools and higher education institutions to inform them about the project and its impact on the everyday life.	>4 public events >3 open days at schools >100 participants/event
Newspapers, magazines	Non-technical articles and press releases in local newspapers and magazines to reach a broader audience providing visibility of the project and its main achievements.	>3 press releases in newspapers and magazines
Digital Innovation Hubs (DIH)	Promotion of project results in various DIH to amplify the project's outreach for early adoption.	>30 DIHs contacted
Fora & Blogs	Promotion of periodic non-technical reports (publications) to fora and blogs to create awareness of the openZDM potential and features.	>5 publications to blogs >5 blogs/fora to post
Other projects and activities	Liaison with other projects to coordinate the activities of openZDM considering the ongoing activities in other projects. For these reasons, liaison delegates will be identified.	>8 relevant projects to liaise

4.2   Communication tools and channels

The goal of the previously described communication strategy is to conceptualize openZDM overall values and deliver a coherent visual brand identity through different assets of digital communication. Therefore, in the following section, the various communication tools and channels are outlined in more detail to help comprehend how they will be utilized in the project's communication strategy.

4.2.1   Visual identity and graphics

openZDM visual identity is a language that communicates project's philosophy and values, establishes brand voice, and builds an emotional and professional connection with target audiences. Following the idea of a digital platform that will provide solutions for zero defects processes, the openZDM project's visual identity and graphics are envisioned as a representation of **perfection, completion, and cyclic movement**.

Detailed elaboration of the visual identity and graphics are being developed since M1 and provided in M3, in the **openZDM Brand Guideline** (Figure **3**) document, available to all partners in the project folder.

Figure 3**: Screenshot of the openZDM Brand Guideline – Cover Page**

The Brand Guideline document consists of instructions describing the idea behind the branding concept and the proper usage of the branding elements – logo, colours, typography and visuals (Figure 4).

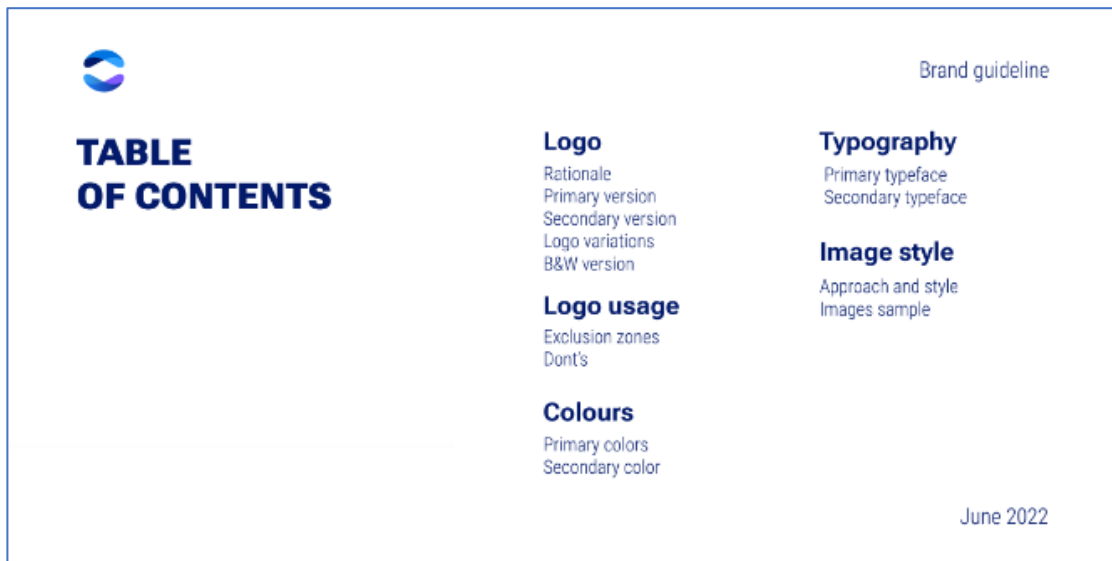**Figure** 4**: Screenshot of the openZDM Brand Guideline**

In the following subsections of the deliverable, we will thoroughly describe each element of the document.

4.2.1.1 Logo

Building the idea of movement and inspired by notions of totality and wholeness, the first part of openZDM logo is composed of two semicircle shapes, formed by interlocking waves. The second part

of the logo represents the acronym of the project's key description: **Open** *platform for realizing* **z**ero **d**efects *in cyber-physical* **m**anufacturing *(*Figure 5*,* Figure 6*,* Figure 7Figure 7*,*Figure 8 *).*

Figure 5: Horizontal openZDM Logo – Primary logo

Figure 6: Horizontal openZDM Logo – Secondary logo

Figure 7: Vertical openZDM Logo – Coloured variation

Figure 8: Horizontal openZDM Logo – Black and white variation

The logo envisions **elegance, perfection and partnership** between relevant stakeholders focused on the same mission - to realize zero defects in a production environment.

4.2.1.2   Colour Palette

For openZDM's visual identity and graphics, we have chosen 3 primary colours (Figure 9) and 1 secondary colour (Figure 10):

- **Dark Blue** symbolising integrity, knowledge, power, seriousness;
- **Blue** symbolising stability, trust, confidence, cleanliness, order, technology;
- **Purple** symbolising transformation, wisdom, enlightenment, honour, temperance and
- **Grey** symbolising diplomacy, balance, neutrality and compromise.

Figure 9: openZDM Colour Pallete – Primary colours
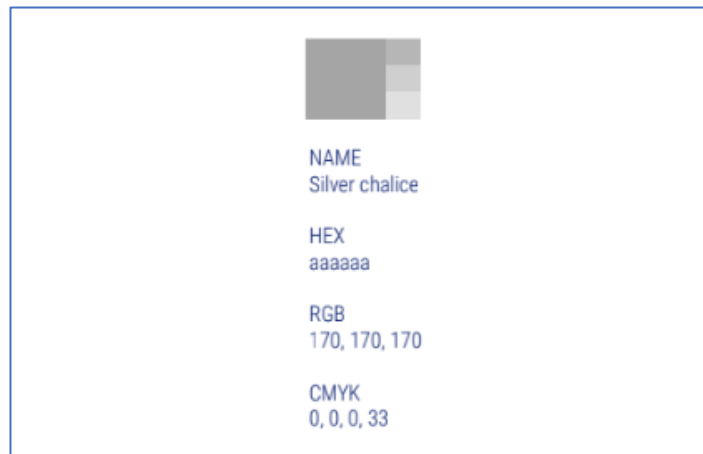

Figure 10: openZDM Colour Pallete – Secondary colour

4.2.1.3   Typography

The project communication materials adopted free Google open-source font family - **Roboto Flex** as a primary typeface and **Roboto Condensed** as a secondary typeface (Figure **11**).

Figure 11**: openZDM Typography**

4.2.1.4 Image style

Visual materials represent a great part of openZDM communication strategy and its brand identity (Figure **12**). That is why the Brand Guideline document is consisted of a list of a useful recommendations to follow when choosing the proper image:

- An Image should be used to support and illustrate a story.
- If the image showcases people is preferrable that characters involved should be acting natural in technological context and real-life scenarios. not posed.
- Use an image with a natural lighting, without any extensive postproduction, stage settings or dramatic colours.
- Use depth of field when capturing people or products in relation to their surroundings to help add visual interest to the image.

Figure 12**:** Example of openZDM Image Style

4.2.1.5 Key messages

The following is a list of projects' descriptions of different sizes to be used on different communication channels.

One line description

openZDM is an open platform for realizing zero defects in cyber physical manufacturing.

One paragraph description

The openZDM project addresses the challenge of the manufacturing industry to deliver high-quality products while minimizing waste and energy consumption. As an answer to this challenge, openZDM will develop an open platform for realizing zero defects in cyber-physical manufacturing and test it through five production lines in real-life operational conditions.

Two paragraph description

The openZDM project addresses the challenge of the manufacturing industry to deliver high-quality products while minimizing waste and energy consumption. As an answer to this challenge, openZDM will develop an open platform for realizing zero defects in cyber-physical manufacturing and test it through five production lines in real-life operational conditions.

With the aim of enabling zero-defect processes, openZDM is also focusing on the "grand challenge" of Sustainable Manufacturing to significantly improve the production sustainability of cyber-physical production systems. In that way, the initiative will increase the capacity for cost savings through waste reduction, while promoting production sustainability through online process control and adaptation.

Half-page paragraph description

The openZDM project addresses the challenge of the manufacturing industry to deliver high-quality products while minimizing waste and energy consumption. As an answer to this challenge, openZDM will develop an open platform for realizing zero defects in cyber-physical manufacturing.

With the aim of enabling zero-defect processes, openZDM is also focusing on the "grand challenge" of Sustainable Manufacturing to significantly improve the production sustainability of cyber-physical production systems. In that way, the initiative will increase the capacity for cost savings through waste reduction, while promoting production sustainability through online process control and adaptation.

The openZDM platform integrates advanced ICT solutions and innovative non-destructive testing, thus setting the foundations for a solution applicable to a large variety of manufacturing industries. Moreover, it includes prototyping, testing and demonstration in an operational environment, identification and detailed description of requirements, industrial use cases, data sources and reference architecture.
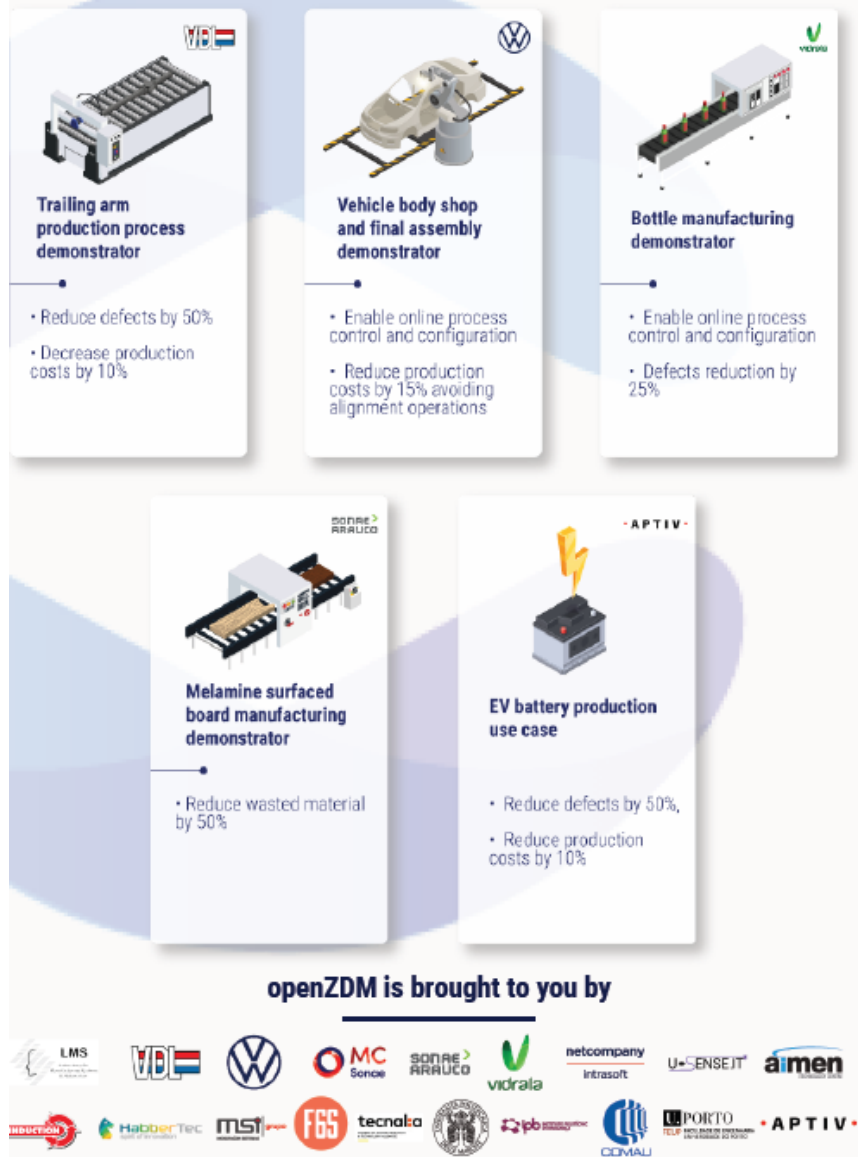
openZDM's innovative methodology will test and finalise the technological tools trough five industrial pilots from different industrial sectors, in real-life operational conditions; and then facilitate the adoption of the innovative platform solution.

4.2.2 Website

The openZDM website is available at www.openzdm.eu. The website is developed in M2 of the project and regularly updated by the Communication Manager throughout the project's lifetime (Figure **13**). It targets all identified stakeholders and consists of the basic information that elaborates the project's key points as well as several calls to action, available through the following website sections:

- **Home page** – This website section represents an overview of the project with a brief introduction of pilots, latest updates, and a call to action to the project's newsletter.
- **About** – This website section elaborates the concept behind the openZDM project, its methodology and main objectives.
- **Pilots** – This website section is further elevated in five subsections. Each subsection represents a detail elaboration of the pilot – its role, the specific challenge tackled, the undertaken methodology, expected goal(s), the impact and the brief representation of the company leading the pilot.
- **Insights** – In this website section, all interested parties have a possibility to discover the latest trends, updates and the news from the manufacturing, specifically zero-defect manufacturing industry.
- **Resources** – In this website section, all interested parties have a possibility to access to the latest (ready to download, print and use) openZDM public materials – press materials, brand identity materials, communication materials.
- **Partners** – This website section represents an overview of all respective partners involved in the project.
- **Let's talk** – This website section represents the possibility for all interested parties to contact us and leave any comment they feel is relevant.
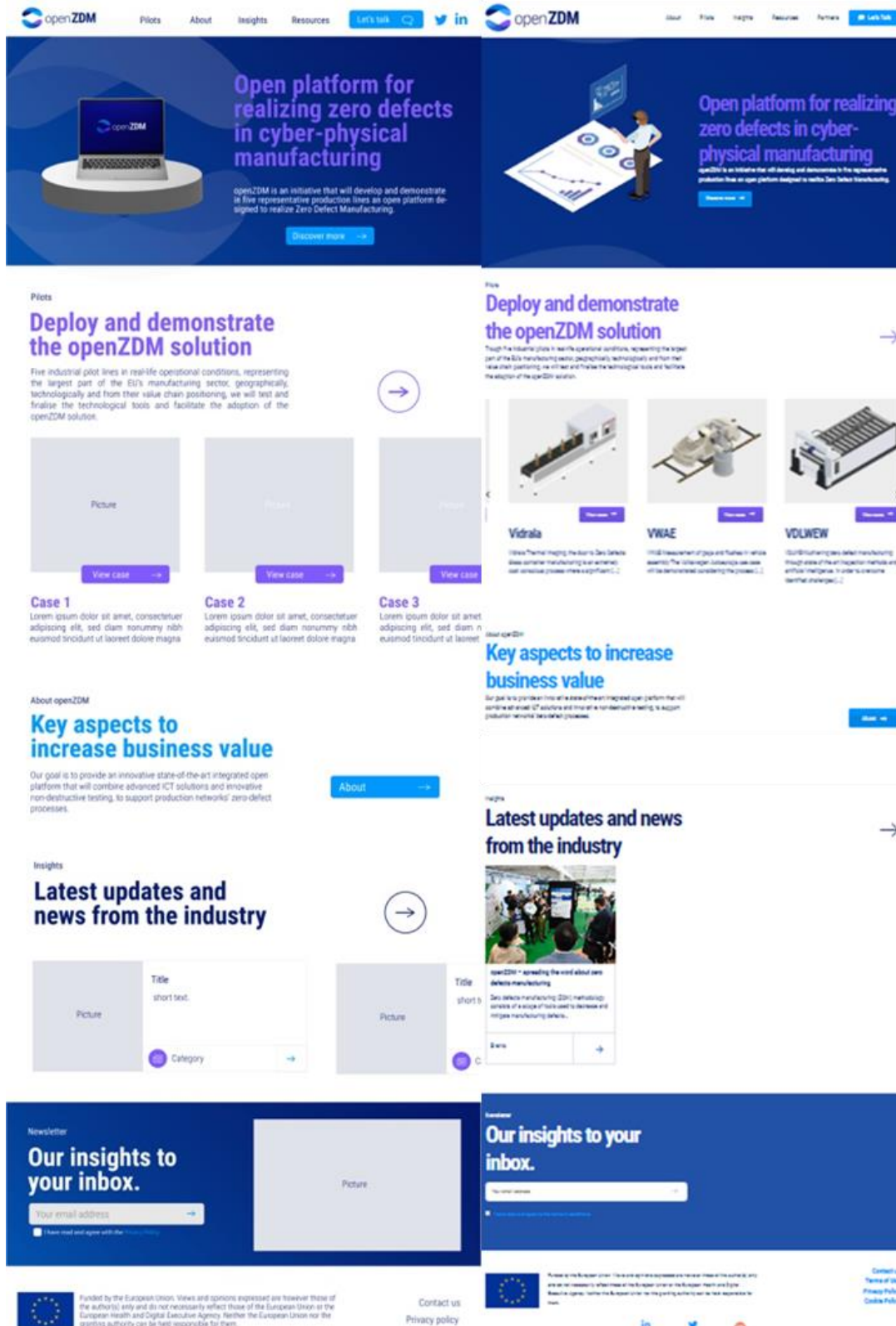
Figure 13: Mock-up (left) and the Final Look (right) of the openZDM website – Homepage

The content of the website will be displayed using the different social media channels of the project. The openZDM website statistics will be regularly monitored by Communication Manager to achieve the key performance indicator (KPI) of more than 7000 visitors until M42 of the project.

4.2.3 Blog posts and articles

A minimum of 6 blog publications targeting technology providers and vertical industry stakeholders will be written to create awareness of the openZDM potential and features (Table 4).

Table 4: The list of openZDM blog posts and articles

Blog release number	Tentative date/month	Title/Topic
1	M6 / November 2022	**openZDM – Spreading the word about zero defects manufacturing**
2	M7 / December 2022	How is Industry 4.0. disrupting the European manufacturing ecosystem?
3	M8 / January 2023	What is the role and expected impact of openZDM's industrial pilots?
4	M9 / February 2023	Discover the concept behind the openZDM innovative platform – step by step!
5	M10 / March 2023	openZDM is assessing 4 innovative technologies that will elevate the manufacturing industry
6	M11 / April 2023	What is an NDI system for zero defects?

Taking into the consideration the dynamic aspect of the project, the table above represents a preliminary calendar of content that might be a subject to changes.

4.2.4 Videos

A set of minimum 4 multimedia video podcasts presenting the project, its innovation and key outcomes will be developed during the lifetime of the project targeting all stakeholders. To achieve the key performance indicator (KPI) of more than 2000 views on openZDM official YouTube channel, the following openZDM video materials will be created:

- **OpenZDM launch video** – The first video will be produced at the very beginning of the project, elaborating the general information of the project.
- **Pilots explanatory video** – The second video will represent the role and the objectives of each openZDM's industrial pilot.
- **Pilot cases demonstration video** – The third video will showcase the key takeaways and outcomes gathered after the pilot cases demonstration.
- **Project results video** – The fourth video will display the key project results and the impact openZDM has left on the European manufacturing ecosystem.

Due to the agility of the project, the list above might be subject of changes.

4.2.5 Posters, brochures, and flyers

Posters (Figure 14), brochures(Figure 15, Figure **16**), and flyers following the project's visual identity have been developed to be used during internal and external events, as well as in one-to-one meetings. All materials will be available online for printing through the project's website, in the section Resources.

Figure 14: Screenshot of the openZDM poster

Figure 15: Screenshot of the openZDM brochure – Front

Figure 16: **Screenshot of the openZDM brochure – Back**

4.2.6 Press releases

During the lifetime of the project, a minimum of 4 non-technical articles and press releases will be created and published in local newspapers and magazines to reach a broader audience and provide visibility of the project and its main achievements. The list of press releases will be updated according to the reached milestones from the project. In the table below (Table 5) the list of press releases planned for the first 18 months of the project lifetime:

Table 5: The list of openZDM Press releases

Press release number	Tentative date/month	Title/Topic
1	M2 / 05.07.2022.	The game-changing zero-defect platform for European manufacturers
2	M7 / December 2022	openZDM - Enter the innovative world of zero-defect manufacturing
3	M12 / June 2023	openZDM platform_v1: Framework and designs completed
4	M18 / December 2023	openZDM approach - proof of concept

Below (Figure 17) is the preview of the first openZDM press release titled "The game-changing zero-defect platform for European manufacturers".

Figure 17: First openZDM press release

Due to the agility of the openZDM project, the table above represents a preliminary calendar of content that will be updated in the future according to the project's up-to-date activities and achieved milestones.

4.2.7 Social media

Following the communication strategy and target audiences, openZDM communication actions will extensively harness social media. Therefore, openZDM is present in the following social networks, to increase the awareness about the project's mission, visibility of the community-building activities and generate traffic to the website:

- **LinkedIn** (Figure 18) – **openZDM**
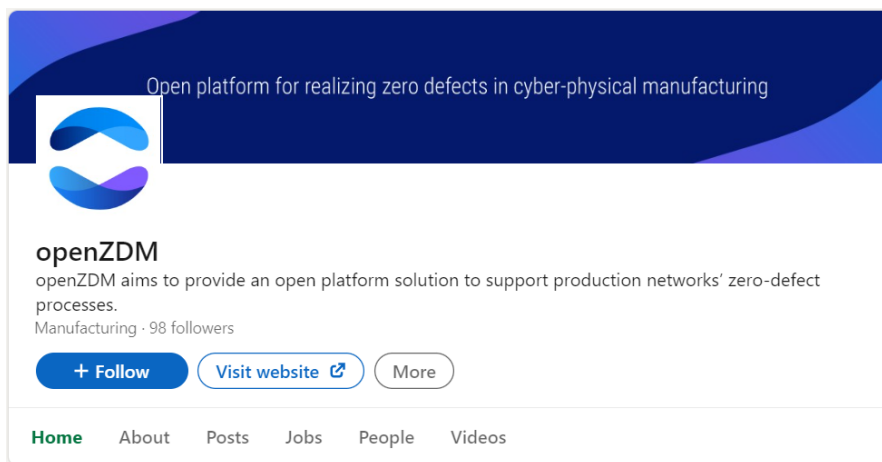
Figure 18: Screenshot of the openZDM LinkedIn account

- **Twitter** (Figure **19**) – **open_zdm**

Figure 19: Screenshot of the openZDM Twitter account

On the 15th of November 2022 (M6), the overview of the openZDM's social media total followers is the following (Table 6):

Table 6: openZDM Social Media followers

Social Network	Followers
LinkedIn	98
Twitter	33
Total	**131**

Additionally, the YouTube channel is created at the beginning of the project and will be furtherly exploited throughout the project (Figure 20).
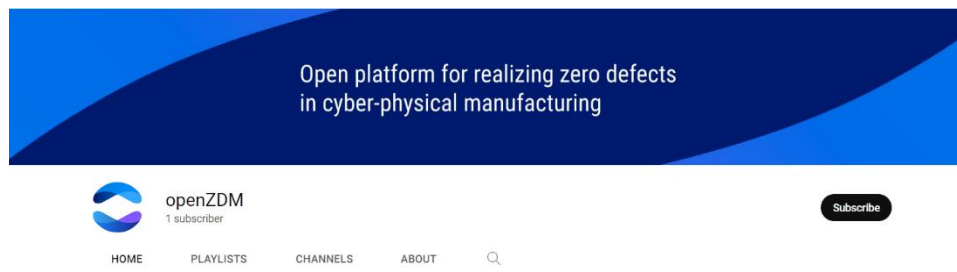
Figure 20: Screenshot of the openZDM YouTube account

4.2.8   Campaign strategy on social media

To increase awareness, drive traffic and engage with stakeholders, as a part of openZDM's communication and social media strategy, different campaigns were developed, while others are planned to be deployed henceforward (Table 7).

Table 7: openZDM Social Media campaigns

Campaign	Key messages	Links / Dates
Introduction campaign	The past 28th and 29th of June we had our kick off meeting 🚀 openZDM initiative aims to provide an open platform to support production networks' zero-defect processes, bringing together existing research and development, and creating an innovative state-of-the-art integrated solution ⚙️ Through five industrial pilots in real-life operational conditions we will test and finalise technological tools, and facilitate the adoption of the openZDM platform 💻 Our consortium formed by 18 European companies is coordinated by the Laboratory for Manufacturing Systems and Automation (LMS), from the University of Patras (Greece). The group of key industry players includes representatives from	**LinkedIn** **Twitter** June 2022

Campaign	Key messages	Links / Dates
	software development and technology providers; research and development organisations; Industrial end-users; and outreach and ecosystem growth experts. #openZDM #euprojects #horizoneurope	
Press release campaign	🔵 The open platform for realising zero defects in cyber-physical manufacturing (openZDM) initiative held its kick-off meeting on the 28th and 29th of June at BluePoint Brussels. The consortium formed by 20 industry leaders from 7 European countries (Portugal, Italy, Ireland, Luxembourg, Spain, The Netherlands, and Greece) held a two-day meeting where the project roadmap was presented. Read the full press release 👇 Laboratory for Manufacturing Systems and Automation | DIISM - UNIVPM | Habber Tec Portugal | U-Sense.IT srl | TECNALIA Research & Innovation| Vidrala | MSI Grupo. Mondragon Sistemas de Información | Netcompany-Intrasoft | Instituto Politécnico de Bragança | SONAE ARAUCO | Induction srl - Induction heating | Comau | AIMEN Centro Tecnológico | Universidade do Porto | Aptiv | Volkswagen Autoeuropa | VDL Weweler bv | F6S Innovation #industry40 #zerodefectmanufacturing #manufacturing #euprojects	**[LinkedIn](#)** July 2022
Awareness campaign	🔵 openZDM is the result of the strong partnership between relevant stakeholders focused on the very same mission - to realize #zerodefects in a production environment. 🤝 Together, we are working on creation of incentives for innovation, while connecting and strengthening the #manufacturing industry. Laboratory for Manufacturing Systems and Automation | DIISM - UNIVPM | Habber Tec Portugal | U-Sense.IT srl | TECNALIA Research & Innovation | Vidrala | MSI Grupo. Mondragon Sistemas de Información | Netcompany-Intrasoft | Instituto Politécnico de Bragança | SONAE ARAUCO | Induction srl - Induction heating | Comau | AIMEN Centro Tecnológico | Universidade do Porto | Aptiv | Volkswagen Autoeuropa | VDL Weweler bv | F6S Innovation	**[LinkedIn](#) [Twitter](#)** October 2022

Campaign	Key messages	Links / Dates
	#openZDM #techthursday #Industry40 #innovation #zdm #zerodefectmanufacturing #techinnovation	
Website launch campaign #1	#openZDM **website is online**! 🎉 Take a quick 👀 and find out all about our plan to develop an open platform for realizing #zerodefects in cyber-physical #manufacturing 🙌 👉 openzdm.eu Laboratory for Manufacturing Systems and Automation | DIISM - UNIVPM | Habber Tec Portugal | U-Sense.IT srl | TECNALIA Research & Innovation | Vidrala | MSI Grupo. Mondragon Sistemas de Información | Netcompany-Intrasoft | Instituto Politécnico de Bragança | SONAE ARAUCO | Induction srl - Induction heating | Comau | AIMEN Centro Tecnológico | Universidade do Porto | Aptiv | Volkswagen Autoeuropa | VDL Weweler bv | F6S Innovation #openZDM #techthursday #Industry40 #innovation #zdm #zerodefectmanufacturing #techinnovation	[LinkedIn](#) [Twitter](#) November 2022
Partners' introduction campaign	Upcoming	December 2022
Website launch campaign #2	Upcoming	December 2022
Pilots' introduction campaign	Upcoming	January – February 2023

4.2.9 Newsletter

Across the website sections, interested parties will have a possibility to subscribe to the openZDM newsletter and get the latest insights of the project. A total number of 6 project newsletters will be developed using the Mailchimp and circulated via email lists providing an overview of the main project activities and outcomes. The first newsletter will be sent in the M6 of the project with an aim to increase the project's awareness and promote the launch of the openZDM website.

The structure of the newsletter will be developed according to the project's up-to-date activities, and it may contain the following information:

- OpenZDM banner;
- Newsletter title;
- Project Highlights;
- Project Updates;
- Event promotion/dissemination;
- Social Media campaign communication.

4.2.10 Other activities

With an aim of elevating the openZDM's communication strategy, additional communication activities have been undertaken and additional materials have been created:

- **Awareness Toolkit** – A toolkit that contains power point presentation with the project's short messages, logos in png format, ready-to-use social media banners, suggested social media copies with a guideline for a proper usage of hashtags and the openZDM launch video. The goal is to make an easy-to-use system for all partners with an aim of creating the awareness around the project.
- **Power Point template** – A general template following the openZDM brand guidelines with the goal to unify openZDM communication internally, as well as externally.
- **Power Point presentation with general information about the project** – A presentation that elaborates project's methodology and objectives. This document is prepared for external usage with an aim to engage openZDM's targeted stakeholders.
- **Flickr account** – Flickr is an image hosting and video hosting service. An openZDM Flickr account will be established with the aim to increase awareness, drive traffic, and engage stakeholders.
- **Event coverage Toolkit** – A document elaborating the step-by-step guidelines, advice and event management tips to create an easy-to-implement system to promote and disseminate the openZDM's participation in both hosted and events to be attended.
- **Press Kit** – A document showcasing the openZDM's key points with an aim to drive traffic and engage with stakeholders.
- **Glossary of terms** – A list of the most relevant manufacturing terms related to zero defects manufacturing, explained to the project audiences, to facilitate the understanding of the technologies deployed by the project.

5   Dissemination plan

5.1   Dissemination activities

The specific dissemination activities carried out by partners will reinforce the openZDM impacts increasing stakeholders' dialogue and acceptance:

- **openZDM partners – LMS, VDLWEW, VWAE, SONAE, VIDRALA, INTRA, USIT, AIMEN, INDUCTION, HT_PT, MSI, F6S, TECNALIA, UNIVPM, IPB, COMAU, UPORTO, APTIV**

to disseminate awareness of the project, the technical activities, values, and advantages of the solutions developed by openZDM; to participate in relevant events and fairs for the manufacturing ecosystem; to support a proactive online presence, dissemination about openZDM outcomes in other innovation initiatives/associations and also commercial oriented context; to disseminate technical and scientific activities and outcomes through the publication of scientific peer-reviewed journals and in conference proceedings to broadcast its results and get feedback from the scientific and industrial community.

Outreach partner: F6S

Dissemination of the project outcomes through privileged channels (e.g consortium owned networks) and global events (like **Hannover Messe**). F6S will link openZDM to digital initiatives, the rise of digital talent through industries, and reflection on society's impact.

5.1.1 Events' participation M01-M06

Bellow are presented in detail the dissemination activities that have been accomplished during the first six months of the project.

Date / Period	June 2022				
Communication activity	IndTech 2022				
Communication type	Event				
Target audience	**Partners**	**General**	**Academia**	**Government**	**Industry**
	X	X			X
Involved partners	F6S				
Activity description, relevance to the project and impact	IndTech2022 is an impetus towards improving visibility of industrial technologies, identifying policy options and priorities, sharing of information and comparison of points of views, as well as a space for networking and finding common goals among industry stakeholders. Topics addressed: Green and digital transition Circularity and sustainability AI for manufacturing Human-centric technologies Emerging breakthrough technologies Youth in Science & Technology Link: https://indtech2022.eu/ The openZDM concept was presented by F6S				

Date / Period	September 2022				
Communication activity	European Manufacturing Conference				
Communication type	Event				
Target audience	**Partners**	**General**	**Academia**	**Government**	**Industry**
	X	X	X	X	X
Involved partners	LMS				
Activity description, relevance to the project and impact	The conference focuses on the future of manufacturing in Europe with speakers, panellists and participants diving into the challenges and opportunities at this critical point in time and exploring how public-private cooperation can help overcome them. openZDM presented via a poster (Figure 21).				

Figure 21: openZDM at European Manufacturing Conference in Brussels

Date / Period	September 2022				
Communication activity	TechChill				
Communication type	Event				
Target audience	**Partners**	**General**	**Academia**	**Government**	**Industry**
	X	X			X
Involved partners	F6S				
Activity description, relevance to the project and impact	The aim is to help start-ups succeed in the world. We do so by filling the gaps in knowledge, skills, and network. In practice, it means that we invite the best people from different fields to gather and build long-lasting business relationships. The project was presented as well as posters were circulated (Figure 22).				

Figure 22: openZDM at TechChill in Milan

Date / Period	October 2022
Communication activity	I4MS Stakeholders Event
Communication type	Event

Target audience	Partners	General	Academia	Government	Industry
	X	X	X	X	

Involved partners	F6S, LMS
Activity description, relevance to the project and impact	I4MS is one of the key initiatives of the European Commission to shape the pan-European network of Digital Innovation Hubs. openZDM project was presented through a poster and leaflets were circulated (Figure 23).

Figure 23: openZDM at I4MS in Budapest

Date / Period	November 2022
Communication activity	European Manufacturing Forum
Communication type	Event

Target audience	Partners	General	Academia	Government	Industry
	X	X	X	X	X

Involved partners	FEUP
Activity description, relevance to the	The 2022 edition of the World Manufacturing Forum will focus on key emerging topics relevant to redesigning manufacturing supply chains. Value chain resiliency, local and global ecosystems, new roles of SMEs, workforce gaps, the geopolitical landscape, and the digital and sustainable transition in

project and impact	manufacturing will be the main topics addressed in this prestigious edition. Several leaflets of the project were circulated (Figure 24).

Figure 24: openZDM at European Manufacturing Forum in Italy

5.2   Dissemination tools and channels

Globally, the same tools and channels will be used to disseminate the results of the project: Website, videos, blog articles, flyers and brochures, events, social media, newsletter. In addition, the project will publish its results in scientific journals and conferences and make visible the results through the publication of the public deliverable on the website, technical publications, workshops through associations, communities and clusters, trainings and standards.

5.2.1   Technical publications

Technical articles, white papers, joint publications with associations (Digital Factory Alliance, EIT Manufacturing, Zero Waste International Alliance, EFFRA, Manufuture, Manufacturing Clusters, etc), industry stakeholders/ clusters, among others.

5.2.2   Scientific publications and conferences

Open Access to publications to highly cited communities and journals, examples include:
- IEEE Industrial Electronics Society (IES)
- IEEE Industry Applications Society (IAS)
- IEEE Robotics and Automation Society (RAS)
- ACM Transactions on Autonomous and Adaptive Systems
- Journal of Inter. Measurements Confed. (IMEKO)
- ACM Transactions on Cyber-Physical Systems

Participation in scientific conferences, such as:
- IEEE International Conference on Emerging Technologies and Factory Automations
- IEEE International Workshop on Factory Communication Systems, International Conference on Technologies & Business Models for Circular Economy
- IEEE International Conference on Industrial Informatics
- CIRP Conference on Manufacturing Systems
- IEEE International Workshop Metrology for Industry 4.0 and IoT

5.2.3   Trade fairs/ exhibitions

Participation and presentations at major trade fairs and events, such as European ZDM, European ZDM Landscape: State of Play (EFFRA), International Conference on Zero Defect Manufacturing

ICZDM, International Conference on Zero Defect Manufacturing. Other events will be scouted by the consortium and analysed the value in terms of participation.

5.2.4 Workshops through associations, communities, and clusters

Outreach events through workshops for targeted alliances, associations and communities in which consortium partners are active members (e.g. EFFRA, Manufacture Technology Platform (ETP), European factories of the future research association, NEMA); clusters and partnerships (e.g. FIWARE, GAIA-X, European Circular Economy Stakeholder platform); related EU-funded projects.

5.2.5 Trainings

Online tutorials through webinars, presentations to schools/universities, curricula in BSc, MSc and/or PhD courses.

5.2.6 Standards

Harmonization, interactions, and contributions to emerging and new standards, such as ETSI GS, OneM2M, FIWARE, AIOTI, etc.

5.2.7 Dissemination of public deliverables

The public deliverables will be uploaded on the website. Each of these represents an opportunity to share early results and for external dissemination. The private deliverable will only be summarised. The public deliverables are listed below (Table 8).

Table 8: openZDM list of public deliverables

#	Deliverable name	WP	Lead	Type	Level	Due
D1.1	Data management plan	WP1	LMS	Other	Public	M6
D3.3	Methodology for calibration and uncertainty analysis and preliminary results	WP3	UNIVPM	R - Document, report	Public	M18
D3.6	NDIs SW apps integration to openZDM platform	WP3	INTRA	DEM — Demonstrator, pilot, prototype	Public	M36
D4.2	Methodologies and first implementations	WP4	LMS	R - Document, report	Public	M18
D4.5	Integrated platform and apps – final version	WP4	INTRA	DEM — Demonstrator, pilot, prototype	Public	M42
D5.3	Testbeds final implementation & Lessons learned	WP5	TECNALIA	R - Document, report	Public	M42
D6.1	Plan for impact management activities - initial version	WP6	F6S	R - Document, report	Public	M6
D6.2	Impact management activities - intermediate version	WP6	AIMEN	R - Document, report	Public	M24

#	Deliverable name	WP	Lead	Type	Level	Due
D6.3	Impact management activities - final version	WP6	INTRA	R - Document, report	Public	M42

6 openZDM Innovation Management and Exploitation Plan

The project focuses on ensuring that innovative ideas, architectures, methodologies, and Software (SW) and Hardware (HW) components will be fully identified and analysed in terms of their exploitation potential. From early stages, the consortium defines basic principles and dedicated processes, which will yield a solid innovation management framework for the Background (BG), the Foreground (FG) Intellectual Property Rights of the project and the Exploitable Results. To facilitate the proper uptake of the project results by relevant stakeholders, an exploitation plan for openZDM has been set in place, identifying, and describing the exploitable results, the potential users (target groups), as well as the activities and channels via which the project results will be exploited and protected. Since the exploitation and IPR management are collaborative exercises, this section was devised, and agreed upon, with the involvement of all partners, following online meetings and joint collaborative documents. This exploitation plan covers the following aspects:

- What kind of results are expected?
- How will background and results be organised and managed?
- How will joint ownership be treated?
- How will results be protected?
- How will results be made available and disseminated to the public?
- How will results be exploited?

The project's innovation management and exploitation plan support the creation of value of the exploitable results and facilitates successful innovation; the main objectives are the following:

- Describe the exploitation plan and how project partners will identify the Exploitable Results (ER) and the Key Exploitable Results (KER) and communicate their benefits and added value to relevant stakeholder groups.
- Describe the IPR management methodology to be followed within the context of the project.
- Manage the BG and FG IP knowledge of the project and define the respective access rights.
- Define and eventually dissolve any possible conflicts in IPs within the consortium and beyond.
- Identify the unique selling points and support the market research activities of the project.
- Develop a strategic roadmap and a business model for the openZDM platform and the key exploitable results (marketing and pricing strategy) to ensure their sustainability after the end of the project.

> To identify the ER and KER, the target groups, value propositions, partners' involvement in the development of each result and to devise the (joint and individual) exploitation plans, INTRA, as the exploitation manager of the project shared with project partners dedicated exploitation templates to gather their inputs – in .xlsx and .doc format. The exploitation activities until M6 were also coordinated during the monthly plenary calls of the projects, with the participation of all partners, as well as via ad-hoc and direct interactions between the exploitation manager and the partner involved. A pre-filled example of the templates was given as a guide (.xlsx template).
>
> Inputs, review, and validation were performed by all partners for the devised tables that follow in Sections 7 and 8.

We follow a practical exploitation plan, using six different phases and employing various tools to facilitate the identification, management, and further utilisation of the project's exploitable results, as presented below (Figure 25).

Innovation Management
- Analyse & classify ER and KER
- Individual Exploitation Paths
- Features, benefits and value added per asset
- Stakeholder groups, users and customer segments

IPR Strategy
- GA and CA analysis
- IPR Claims Table & IPR Matrix (FG, BG)
- IP protection, Access rights, Restrictions
- Licenses applied

Dissemination of Key Results
- Horizon Results Platform
- Innovation Radar
- Continuous communication and cooperation with the project's dissemination activities

Business modelling and Market Research
- Platform Business Model Canvas
- Market research
- Competition analysis
- SWOT analysis

Go-to-Market Strategy
- Business Planning
- Marketing strategy and channels
- Financial estimations
- Business risk - KPIs and operational model

Figure 25: Phases of the Exploitation Plan

6.1 Innovation Management and IPR Management Strategy

The IPR management strategy applies on a comprehensive framework which separates the IP management processes of the project in the following stages:

- Grant Agreement preparation stage.
- Project implementation stage.
- Post-project stage.

The following figure (Figure 26) illustrates the IPR management stages, as considered by the project. More details about these stages are presented in the sub-sections that follow.
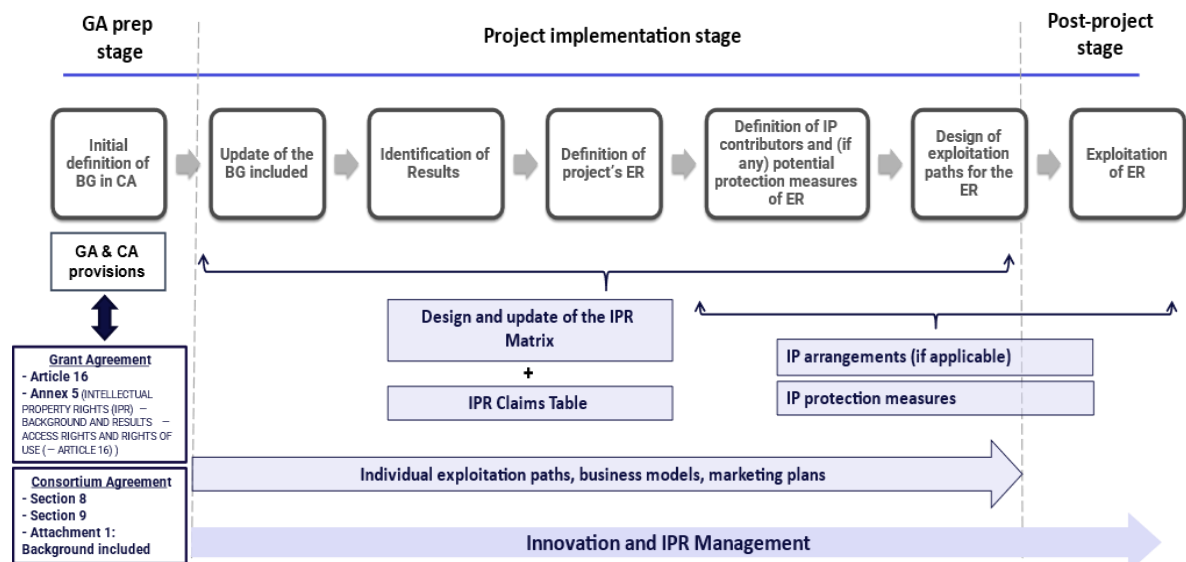
Figure 26: openZDM IPR Management Strategy

6.1.1 Grant Agreement preparation stage

Both **the Grant Agreement and the Consortium Agreement constitute documents which include a description of several issues related to IPR**. Their unique provisions represent a reference point for IPR issues within the project partners. In this respect, any further advancements regarding IPR actions to be put in place by project partners will be facilitated under the underlying provisions.

6.1.1.1 Grant Agreement

The Grant Agreement constitutes a contract which sets out the key rules and conditions of the project and is conducted between the EC and the project partners. It represents the main contractual basis for the project while its main points and sections referring to IPR are included in **Section 16 "INTELLECTUAL PROPERTY RIGHTS (IPR) – BACKGROUND AND RESULTS – ACCESS RIGHTS AND RIGHTS OF USE"**. Under this scheme, the management of the project IP is regulated, whereas access rights and obligations related to the background are set. In addition, the GA defines issues concerning the ownership and protection of the project's generated results, as well as their exploitation and dissemination outcomes. Finally, transferability and access rights to results are also defined in the project's GA.

6.1.1.2 Consortium Agreement

The Consortium Agreement constitutes a contract among the partners of the project consortium which aims to define rights and obligations during the partnership for the purposes of carrying out the project's foreseen actions and activities. The CA minimises the probability of later disputes as it provides rules and responsibilities during the project as well as defines the access rights to be granted to the partners concerning the project. In addition, rights and responsibilities are outlined among the consortium members concerning issues of the IP.

The project's Consortium Agreement main points and sections referring to IPR are contained in:

- **Section 8** "Results", that sets out provisions on ownership and joint ownership of results, as well as on their transfer and dissemination.
- **Section 9** "Access Rights", which clarifies the access rights governing principles along with the access rights for the exploitation and dissemination purposes. It also states specific provisions for access rights to the software.

- **Attachment 1** "Background included" that presents the initial list of usable background.

6.1.2 Project Implementation Stage

During the implementation stage of the project, IP handling procedures are foreseen to be applied among the partners to properly organise the management of the project's results/ assets. In this respect, as the project evolves, the focus will be on foreground identification, partners' contributions to results, access rights, results' protection, as well as their exploitation and commercialization. To do so, we employ an IPR management tool called IPR Matrix.

6.1.2.1 IPR Matrix Methodology

The IPR Matrix supports all project partners in identifying and managing the background, foreground knowledge and commercialization details (e.g., terms to use) of the exploitable results of the project. In this way, potential co-innovators have a full overview of the FG developed, about the IP protection and about the necessary steps that need to be taken to enable the successful exploitation of the project's offerings via collaboration/exploitation agreements. It will be implemented at a later stage of the project and its initial version will be documented in D6.2, while the final IPR matrix will be documented in D6.3. The methodology is comprised of 4 steps, as described below:
- **Step 1**: Identification of the Background IPs, their indicative protection measures, and definition of access rights among partners for using the BG within the project.
- **Step 2**: Identification of the results that constitute the Foreground IP of the project – matching each FG with the respective contributing BG (if relevant).
- **Step 3**: Identification of the partners' contributions and interest in the commercialization of the project's exploitable results/assets. In this step, we use as a tool the so-called IPR Claims Table. Each partner is called to highlight its contributions to the development of each of the project's exploitable assets/ results.
- **Step 4**: Definition of a preliminary framework of IPR protection for the defined project assets, the assets' conditions for use after the end of the project, the availability of pertinent documentation for the assets (e.g., via the web portal and/ or common marketplace), as well as any restrictions in the exploitation and commercialization of the assets.

6.1.2.2 Results' ownership

Partners will be asked (through the IPR Matrix) to elaborate further on the provisions of the CA with regard to the result's ownership. Special attention will be paid on handling joint ownership issues.

6.1.2.3 Joint Ownership Provision

Joint ownership is important due to the nature of the project assets. The term and its implications are exemplified in the "Joint Ownership Fact Sheet by the European IPR Helpdesk". According to the European IP Helpdesk guidelines, results are jointly owned if:
- they have been jointly generated by two or more participants and

it is not possible to:
- establish the respective contribution of each beneficiary, or
- separate them for the purpose of applying for, obtaining or maintaining their protection.

In most cases, joint ownership will occur in specific situations, mainly for results of technological nature. We regulate in the consortium agreement the rules on joint ownership of results. However, since this CA agreement is entered into force before the launch of the project and the creation of the results, partners might establish a separate joint ownership agreement during the project

implementation, defining the allocation and terms of exercising their ownership in concrete terms. If a joint ownership/ exploitation agreement is not deemed necessary by project partners, the IPR Claims and IPR Matrix that will be devised and agreed upon by all partners will suffice for our purpose.

6.1.2.4 IPR Conflict Resolution

In the unlikely (but still possible) event that conflicts among partners exist on IPR rights, the exploitation and IPR experts team takes measures in advance. The action-oriented methodology of the Contribution Benefits Matrix (Figure 27), which is known to be applicable in such cases, for fast and accurate friendly resolutions, is proposed by the exploitation team of experts.

Figure 27: Contribution-Benefits Matrix for IPR conflict friendly resolution

On top of that, to proactively avoid IP conflicts, project partners will be well-informed about IP rules and guided through the exploitation process not only via the IPR Matrix but also through the help of the Innovation Manager. The Innovation Manager will aid with the following indicative (and not exclusive) issues:

- Is there a possible misunderstanding about the definition of the exploitable result and therefore of the object of claims?
- Are there exploitation claims that should be further specified so that the partners can check the compatibility of their claims?
- Are the foreseen exploitation claims compatible with the ownership claims of the partners (related issue of access rights)?
- Are there any confidentiality issues e.g., on new knowledge of strategic importance for a partner and consequently the need for a confidential agreement?
- Are there any possible IP conflicts between the partners, both related to ownership and the related need for access rights and exploitation claims?

In terms of IP conflict, the Exploitation Manager will encourage conflicting parties to get in contact and proactively find solutions, making written agreements whenever necessary. In case no agreement will be achieved, internal mediation process will be kicked off following the provisions of the Consortium Agreement. In case the IP issues remain unresolved after this first mediation procedure, a further mediation process in accordance with the WIPO Mediation Rules will be applied (see Article 11.8 of the Consortium Agreement).

6.1.2.5   Protection of results

Effective exploitation of the innovative concepts and assets developed in the project depends on the protection of the project's results. In particular, the project's results must adequately be protected if:

- The project's results can reasonably be expected to be commercially exploited and.
- Protecting them is possible, reasonable and justified (given the circumstances).

In this respect, when considering IP protection project partners must consider their own interests along with the interests of the whole consortium. Project partners must safeguard the identified exploitable project results with adequate protection schemes, which will offer a decent protection period within a suitable geographical territory. The table that follows (Table 9), illustrates the different protection instruments that can be applied to a variety of subjects.

Table 9: Indicative Protection Instruments of Results

Subject Matter	Patent	Utility Model	Copyright	Trademark	Confidential Information
Invention	X	X			X
Software	X*	X	X		X
Scientific Article			X		
Technology Design			X	X	
Name of Technology				X	
Know How	X	X			X
Website			X	X	X
*Software patentability is still a debated issue given its exclusion as subject matter as by Article 52(2)(c) and (3) of the EPC.					
Source: IPR Helpdesk.					

IP protection constitutes a tool to create value through the licensing, sale or commercialisation of IP in the form of products and services. Moreover, its utilisation is vital for a prospective commercial or industrial exploitation as it can contribute to support the branding of products and services both to customers and investors. It should be noted that the IP protection of an asset is not always mandatory.

6.1.2.6   Exploitation of results

Exploitation of project's results means the utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating, and marketing a product or process, or in creating and providing a service, or in standardisation activities[1]. Therefore, exploitable assets can be a combination or part of a foreground result. Not all foreground items may meet the above conditions[2]. ER should be in principle re-usable with minor modifications and may bear licensing, IPR, or other ownership schemes due to background knowledge preceding the project, or foreground work performed within the project.

An ER typically has defined target stakeholder groups and/or market segments, as well as it also has usage either as a self-contained product/service or as a constituent part of a broader scheme of

solutions within any other project, product, service, research initiative or wider application. ERs will be presented and categorized in the following section.

In comparison to ERs, the project "Results in general" (i.e., a superset of ERs) are "Any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected.". In the broader sense, they can be commercial, societal, political, or for improving public knowledge and action.

KER (or Key Exploitable Results) are the selected subset of the above ERs (designated as "key") which present, according to the consortium view, the biggest potential in innovation, exploitability, market impact and readiness to market launch. These are measured, benchmarked, and handled properly by the well-known KER Methodology, also used in the CEB (common Exploitation Booster)[3], and its handling is presented in the next sections.

The identified KER of the project will be effectively investigated to be exploited for research/ commercial or any other relevant use. Among others, the consortium will mainly seek exploitation opportunities of the project's results, in (i) further research activities, (ii) developing, creating, or marketing a product or process, (iii) creating and providing a service, and (iv) using them in standardisation activities.

6.1.2.7 Dissemination of results

Project partners are set to select the appropriate means for dissemination of project results (e.g., scientific publications, publication on websites, conferences, open access, etc.), according to the conditions outlined in the CA and in other specific confidentiality agreements that might arise in order to maintain confidentiality during and after the end of the project. All partners should be aware that **they first ensure the protection of a project's exploitable result and then proceed to dissemination actions of the underlying result**.

Furthermore, our aim is to also utilise the EC services that support exploitation of innovations in R&I projects. These services are free of any charge and are available on demand. It is the project's ambition to produce novel outputs, that upon screening and careful selection, the 2-3 "key" indicative ones (likely the KER selection) which appear to be the most "promising" will be proposed to be submitted in the Official **Horizon Results Booster** and/or the **Innovation Radar**. The former could be used to (i) receive guidance and training for improving IRIS's existing strategy towards the effective exploitation, (ii) ensure the effective transfer of the openZDM project results to the industry, and (iii) promote results' visibility to stakeholder groups and maximise the impact of the project. The Innovation Radar platform is another significant dissemination tool of our KER, and it could be utilised to (i) get an idea of the overall innovation potential of our KER, (ii) search for innovators and synergies related to the openZDM project and (iii) increase the visibility of our innovations to potential customers and/or investors.

6.1.3 Post Project Stage

At the project's conclusion, D6.3 "Impact Management Activities – final version" will be submitted, including the final outline of the use that the consortium intends to make of its exploitable results and the related plans for exploitation. The document will also include the final version of the IPR Matrix, as well as business models for each of the KERs and a business plan for the project innovations to facilitate their further usage and sustainability after the end of the project.

7 Initial Project Portfolio of Results/ Exploitable Results/ Key Exploitable Results

7.1 Results Classification per Type

When devising the Exploitable Results list, in recursions, first with recommendations by the exploitation team and guidance by the technical partners, and then by one-to-one feedback and improvements by all partners (more on this below), we considered the categories that the results could fall into as follows (Table 10).

Table 10: Results Classification per Type

Type	Description
SW (integrated result)	The easiest to identify, being the main software output of the technical work packages, also being the reference list for many other deliverables.
SW (Module – side product, standalone) & SW (Module – side product, not standalone)	Under the term "side-products" we encompass all the interim output of the partner efforts in the various project Tasks, without which integration would not be possible. These can very well become stand-alone offerings themselves, could instigate further research, can become market offerings alone or combined with other modules, can be further used (probably with some modifications) in future projects, among others. We include: • Trainings (both Training Material and Knowledge on Trainings produced). • Intermediate modules/software. • Algorithms. • Framework Models.
HW	The results that constitute solely hardware components.
BOTH (SW & HW)	The results that operate as a combination of HW and SW components are offered as a consolidated solution after the end of the project.
Pilot	The deployments within the Pilots are constituting assets themselves as they produce a series of hardware, software, knowledge, datasets etc. that did not pre-exist before the project (or at least not in that form). These remain on the premises and can be further exploited, researched, improved, become a reference basis for future work etc. These "end-deployments" are in the form of integrated installations. • Will have substantial value, both in physical/tangible terms and in terms of knowledge. • Can be used and exploited further by the end-beneficiaries yielding opportunities for internal exploitation and further research. • Are a demonstratable "success story" for the project to any external stakeholder. • Have the possibility to be expanded, replicated or augmented in the future at the same or neighbouring premises. • In the above sense, the use-case based assets should be included in the EA list, having substantial intrinsic value in themselves.
Dataset	The project results that constitute datasets.

Type	Description
Intangible	• Knowledge (also pre-existing as background that is improved as foreground-see next chapter). • Academic courses, presentations etc. created based on the project outcomes. • Training Methods (not the material as per above but the method). • Scientific Publications in Journals. • Patents, Standardisation contributions, recommendations to governmental bodies and law formulation. • Assessment Methodologies. • Testing Methodologies. • All intangible foreground knowledge (usually in the participatory sense). • Proposed novel Business Models for expanding the project and penetrating the market.
Other	Any other type of result.

7.2   List of Project Results, Exploitable Results and Key Exploitable Results

The list of the openZDM results, exploitable results, and KER, as they perceived so far in the project based on partners' views, are presented in the table below (Table 11).

Table 11: Initial list of openZDM results

ID	Result Name	Related Task(s)	Result Type	TRL (current)	ER	KER
1	openZDM Platform	T3.6 & T4.6	SW (integrated result)	TRL 3	YES	YES
2	Smart laser line triangulation sensor	T3.2	HW	TRL 5	YES	YES
3	Infrared solution (for glass bottle thickness measurement)	T3.3	Both (SW/HW - integrated)	TRL 5	YES	NO
4	Data-driven analytics	T4.4	SW (Module - side product, standalone)	TRL 3	YES	YES
5	Vision-based techniques for inline defect detection	T3.3	BOTH (SW/HW - integrated)	TRL 5	YES	TBD
6	Decision making toolset	T4.3 & T4.4 & T4.5	SW (Module - side product, standalone)	TRL 3	YES	YES
7	AAS data models	T4.2	SW (Module - side product, standalone)	TRL 5	YES	TBD
8	Digital twin toolset	T4.3	SW (integrated result)	TRL 3	YES	YES

ID	Result Name	Related Task(s)	Result Type	TRL (current)	ER	KER
9	Laser line triangulation system	T3.2	BOTH (SW/HW - integrated)	TRL5	YES	YES
10	Infrared vision system	T3.3	BOTH (SW/HW - integrated)	TRL5	YES	TBD
11	3D dimension measurement system	T3.2	BOTH (SW/HW - integrated)	TRL5	YES	YES
12	Thermal cameras for high temperature steel bars	T3.3	BOTH (SW/HW - integrated)	TRL5	YES	YES
13	Off-line X-ray residual stress detection	T3.4	BOTH (SW/HW - integrated)	TRL5	YES	TBD
14	Steel parts production application	T5.1	BOTH (SW/HW - integrated)	TRL 4	TBD	NO
15	Automotive application	T5.2	BOTH (SW/HW - integrated)	TRL 4	TBD	NO
16	Glass containers production application	T5.4	BOTH (SW/HW - integrated)	TRL 4	TBD	NO
17	Battery trays production for EVs application	T5.5	BOTH (SW/HW - integrated)	TRL 4	TBD	NO
18	Wood-based panels production application	T5.3	BOTH (SW/HW - integrated)	TRL 4	TBD	NO
19	Knowledge base and brand name	All tasks	Intangible	-	YES	NO
20	Knowledge for standardisation	All tasks	Intangible	-	YES	NO

7.3 Description of Results

The table below (Table 12) presents the list of preliminary identified results of the project. The list is to be updated in the following deliverables throughout the course of the project.

Table 12: Descriptions of Identified Results

ID	Result Name	Description
1	openZDM Platform	Software platform with integrated applications for enabling quality assessment and online process adaptation towards ZDM.
2	Smart laser line triangulation sensor	A smart portable wireless IoT instrument of gap & flush by operators in assembly lines.

ID	Result Name	Description
3	Infrared solution (for glass bottle thickness measurement)	Deep model thermal vision-based for defects prediction in a container production line. SW and HW solution. Thermal camera for glass bottle thickness measurement.
4	Data-driven analytics	Single SW package combining multiple AI/ML algorithms for generating explainable data analytics for quality assessment and defects identification, capable of running upon digital twin data. It will be implemented and tested in the project use cases, getting multivariable inputs to support the various pilot applications.
5	Vision-based techniques for inline defect detection	Vision model to detect defects and predict them in a container production line. SW and HW solution.
6	Decision making toolset	Dynamic decision-making module based on digital twin information along with analytics, LCA, and NDI systems information. It assesses the current condition of a manufacturing process, evaluates alternative parameters' configurations, and proposes best-fit process/parameters adaptation.
7	AAS data models	A type 3 AAS common data model information of the openZDM components for all the pilots' lines which will be extended to support the platform functionalities.
8	Digital twin toolset	Digital twin framework for creating dynamic digital twin models and linking them to external data sources for real-time and high-fidelity real-world scenarios evaluation.
9	Laser line triangulation system	Laser line triangulation systems for measuring bar straightness down to 0.2 mm over a length up to 900 mm. It consists of triangulation sensors for low and high temperatures.
10	Infrared vision system	Infrared vision system for automated assessment and control of welding process.
11	3D dimension measurement system	One test station comprising: a) scanning device (either robot or linear stage), b) laser line triangulation sensor, c) vision system/s (telecentric). The system will detect 3D shape and a specific set of dimensions, defined by a specific control plan.
12	Thermal cameras for high temperature steel bars	Two infrared cameras, for high temperature metal parts, providing information on: a) temperature gradients, b) steel bar position with respect to furnace induction coil. Thermal cameras before and after descaling.
13	Off-line X-ray residual stress detection	Offline NDI sending data to the platform through Digital Thread Application, relating the reference with the offline results.

ID	Result Name	Description
14	Steel parts production application	Pilot implementation of the project solutions.
15	Automotive application	Pilot implementation of the project solutions.
16	Glass containers production application	Pilot implementation of the project solutions.
17	Battery trays production for EVs application	Pilot implementation of the project solutions.
18	Wood-based panels production application	Pilot implementation of the project solutions
19	Knowledge base and brand name	Includes the scientific knowledge created during the project, mostly in the form of research/ technical papers/ reports (deliverables), along with the project's network community and the knowledge and capacity gained by project partners via implementing and participating in the various project activities.
20	Knowledge for standardisation	Includes the scientific knowledge created during the project, mostly in the form of research/ technical papers/ reports (deliverables), along with the project's network community and the knowledge and capacity gained by project partners via implementing and participating in the various project activities.

7.4 Stakeholder and Value Proposition Analysis

The following table (Table 13) summarises the identified (so far) key stakeholder groups that could potentially utilise the project's ER and KER, as well as the respective benefits and value propositions.

Table 13: Key stakeholder groups and value proposition of the ER and the KER

ID	ER/ KER	Key Stakeholders/ Market Segments	Benefits/ Value Proposition
1	openZDM Platform	• Aerospace • Consumer goods • Medical • Automotive • Electronics	• Increased production efficiency (better reconfiguration of production) • Process optimisation • Reduced costs of production (reduced waste)
2	Smart laser line triangulation sensor	• Automotive • Household Appliance • Aeronautics	• Improved Human Centered Manufacturing • Defect reduction in final assembly • Time reduction for reworking

ID	ER/ KER	Key Stakeholders/ Market Segments	Benefits/ Value Proposition
			• Availability of Data through wireless connection
3	Infrared solution (for glass bottle thickness measurement)	• Producers of glass containers	• Better prediction of defects during the production process
4	Data-driven analytics	• Aerospace • Glass container market • Automotive	• Better assessment of product quality • Knowledge of bottle thickness/quality at earlier stages of the production line • Optimization of inspection parameters and prediction of problems based on the correlation of data among multi-stages.
5	Vision-based techniques for inline defect detection	• Metal components manufacturers	• Waste reduction during manufacturing process • Reduced costs
6	Decision making toolset	• Glass container market	• Increased production efficiency (better reconfiguration of production) • Process optimisation
7	AAS data models	• Software developers	• Flexible manufacturing • Fast reconfiguration • Customised-batches production
8	Digital twin toolset	• Software and engineering firms and developers • Technology integrators •	• Improved online process adaptation • Optimization of processes, product properties and quality • Effective remote asset monitoring to reduce down-time
9	Laser line triangulation system	• Producers of steel parts	• Early defect detection • Better control to the forming process • Reduction of defects • Improved process efficiency
10	Infrared vision system	• Consumer goods • Electronics	• Early defect detection • Better control to the forming process • Reduction of defects • Improved process efficiency
11	3D dimension measurement system	• Producers of steel parts	• Early defect detection • Better control to the forming process • Reduction of defects • Improved process efficiency

ID	ER/ KER	Key Stakeholders/ Market Segments	Benefits/ Value Proposition
12	Thermal cameras for high temperature steel bars	• Producers of steel parts	• Early defect detection • Better control to the forming process • Reduction of defects • Improved process efficiency
13	Off-line X-ray residual stress detection	• Producers of steel parts	• Early defect detection • Better control to the forming process • Reduction of defects • Improved process efficiency
14	Steel parts production application	• Producers of steel parts	• Better identification of defects during the production process. • Better assessment of quality. • Higher production sustainability through online process control and adaptation. • Enhanced production quality due to the capacity to perform data analytics and decision support.
15	Automotive application	• Automotive sector	
16	Glass containers production application	• Producers of glass containers (also Vidrala's plants)	
17	Battery trays production for EVs application	• Producers of battery trays	
18	Wood-based panels production application	• Producers of wood based panels	

8 Initial Partners' Joint and Individual Exploitation Intentions

This section illustrates an attempt to create an organized framework to answer the following questions:

1. Which partner has existing market access and ability (pre-existing client base) to promote project assets (irrespective if they own the assets or wish to acquire license for them)?

2. Which partner has the intention to produce the asset(s) - has the existing infrastructure/knowledge to do so?

3. Who intends to use the project assets internally and research further?

4. Who intends to offer license upwards in the value chain?

5. Who can produce publications, either in scientific journals or in other types such as handbooks, presentations, etc.?

The main reason for this exercise is to identify collaborations and licensing between partners in joint ventures. Furthermore, by doing so, we also drive partners into considering alternative exploitation options that they might have overlooked.

We consider this exercise as the cornerstone towards devising the individual exploitation plans for each partner. Before devising the business models (an initial version to be presented in M24), we wish to initiate ideas within partners and assist them, on how exactly the exploitable results produced by the project could become the basis of numerous types of exploitation that they might have not considered. We have codified potential alternative exploitation paths with "code letters" (see below). These are exploitation paths from the official PEDR guidelines, which we enhanced and then categorized with coding, so that they reflect the peculiarities of our project. Each partner considers its organisation's resources, networks, strategies, opportunities, market access and restrictions.

8.1   Joint and Individual Exploitation and Beneficiaries

The following table presents the partners involved in the development and exploitation of each of the project results. In fact, we distinguish two exploitation types. For the results that only one partner is involved in the development (and involved in the claims IP respectively), we foresee individual exploitation paths. Given the collaborative nature of the project, we also foresee joint exploitation paths where several partners are involved in the development and further exploitation of a result. For the latter case, our plan is also to elaborate on separate IP and exploitation agreements among the partners that are involved in the joint exploitation of results – this will be decided and worked upon towards the last months of the project (Table 14).

Table 14: openZDM Joint and Individual Exploitation and Beneficiaries

ID	Result Name	Type of Exploitation (Joint/ Individual)	Lead beneficiary	Contributing Partner(s)
1	openZDM Platform	Joint	INTRA	LMS, MSI
2	Smart laser line triangulation sensor	Individual	USIT	-
3	Infrared solution (for glass bottle thickness measurement)	Joint	TECNALIA	VIDRALA
4	Data-driven analytics for quality assessment	Joint	INTRA, COMAU, TECNALIA	LMS, VIDRALA, SONAE, IPB, HT_PT, UPORTO, MSI
5	Vision-based techniques for inline defect detection	Joint	AIMEN	VDLWEW
6	Decision making toolset	Joint	INTRA, TECNALIA	LMS, VIDRALA, SONAE, HT_PT, UPORTO, IPB, MSI
7	AAS data models	Joint	AIMEN	INTRA, LMS, VDLVEV, VWAE, SONAE, USIT, INDUCTION, MSI, TECNALIA, IPB, COMAU, UPORTO, APTIV, UNIVPM

ID	Result Name	Type of Exploitation (Joint/ Individual)	Lead beneficiary	Contributing Partner(s)
8	Digital twin toolset	Joint	LMS, INTRA, MSI	SONAE, TECNALIA, IPB, UPORTO, VIDRALA
9	Laser line triangulation system	Joint	UNIVPM	VDLWEV
10	Infrared vision system	Joint	COMAU	APTIV
11	3D dimension measurement system	Joint	UNIVPM	VDLWEV
12	Thermal cameras for high temperature steel bars	Joint	UNIVPM	VDLWEV, INDUCTION
13	Off-line X-ray residual stress detection	Joint	AIMEN	VDLWEW
14	Steel parts production application	Joint	VDLWEW	LMS, INTRA, UNIVPM, MSI, INDUCTION
15	Automotive application	Joint	VWAE	USIT, IPB, HABBER, INTRA
16	Glass containers production application	Joint	VIDRALA	MSI, TECNALIA, INTRA, UNIVPM
17	Battery trays production for EVs application	Joint	APTIV	COMAU, LMS, INTRA
18	Wood-based panels production application	Joint	SONAE	UPORTO
19	Knowledge base and brand name	Joint	All partners	-
20	Knowledge for standardisation	Joint	All partners	-

8.2 Initial Exploitation Paths from Partners per Exploitable Result

8.2.1 Guidelines to partners for filling Exploitation Pathways and Intentions

For each result, we distinguish the following potential exploitation paths (not mutually exclusive):

- **M – Potentially new service/ product in the market** (i.e., Sell, Technical Creation, Assembly, Production – common for industrial partners/ technology providers): Partner to be producing the asset as a new product or service in the market and selling it by using pre-existing sales' channels. (Ownership of the asset is not necessary, since the partner may request permission to sell through license agreement from another partner who owns the asset).
- **L – Licensing to 3rd parties in the EU**: Partner wishes to consider opportunities to license/assign their rights or knowledge on the result, to 3rd party entities that wish to exploit it, for an agreed fee (this option is common for universities without established sales force).
- **I – Use internal in the production processes** (common for pilot end-users): Partner foresees opportunities for internal use and expansion or replication in the future (typical for pilots, demonstrators, factories etc.), as well as for adoption in the company's production lines.
- **R – Use in further research activities (internal) and projects (international):** Partner aims to use the result either in further internal research activities (like internal R&D) so as to further develop

and mature the solution, in academic research activities (like Journal/Conference Publications), or in other research projects in the EU (e.g., further maturing the solution via an EU-funded project).

- **D - Dataset**: Partner can exploit datasets of the particular asset through online marketplaces, for experiments, further research, consulting services etc.
- **S – Exploitation via consulting services and training**: Partner willing to provide Services (complementing the asset) such as Consulting, Lectures, Technical Integration, Support, Maintenance, other Added Value Services around the main asset. Partner might also wish to produce Training Material and/or offer Training Services/ Methods (e.g., online test, webinar) related to the result.
- **G - Governmental**: Partner has links and can promote Asset to Governmental /EC Policy Recommendations.
- **ST – Standardisation**: Partner aims to make contributions to Standardization Bodies and Associations.

Moreover, we also use a toolbox proposed by the EC, offering a valorisation strategy for innovations stemming from R&I projects. It identifies and analyses the main channels that could be used to promote and uptake R&I results. These channels include (i) academia-industry joint research and mobility; (ii) the creation of research-driven spin-offs and start-ups; (iii) intermediaries and knowledge transfer professionals' support; (iv) the engagement of citizens and local communities; (v) intellectual property management and standardisation; and (vi) knowledge dissemination and policy uptake. The various valorisation channels, the actors and the respective tools are presented in the figure below (Figure 28).
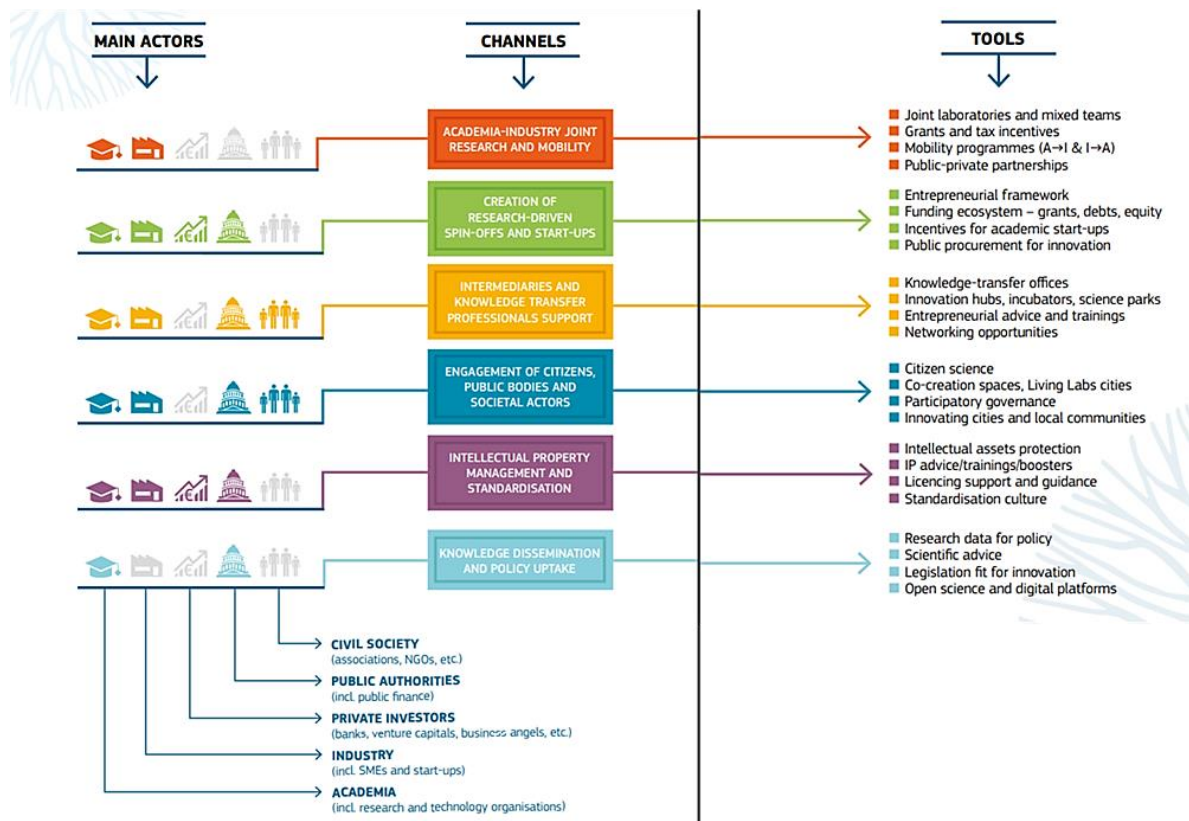
Figure 28: R&I Valorisation Channels and Tools.[1]

At this stage of the project, we have made an exercise to match the various ER identified so far, with the respective channels to be promoted, in line with the EC valorisation strategy toolbox, and also aligned with partners' views so far. This information is presented in the table below (Table 15).

Table 15:Initial Exploitation Paths per Exploitable Result

ID	ER/ KER	Exploitation Path (Indicative)	Channel to promote and uptake the result (Indicative)
1	openZDM Platform	M, R, S	2. The creation of research-driven spin-offs and start-ups
2	Smart laser line triangulation sensor	M, R, S	2. The creation/reinforcement of research-driven spin-offs and start-ups
3	Infrared solution (for glass bottle thickness measurement)	R, S	5. Intellectual property (IP) management and standardisation
4	Data-driven analytics	M, I, R, S	5. Intellectual property (IP) management and standardisation
5	Vision-based techniques for inline defect detection	L, R, S	1. Academia-industry joint research and mobility
6	Decision making toolset	M, I, R	1. Academia-industry joint research and mobility
7	AAS data models	L, R, D	1. Academia-industry joint research and mobility

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[1] https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/f35fded6-bc0b-11ea-811c-01aa75ed71a1

ID	ER/ KER	Exploitation Path (Indicative)	Channel to promote and uptake the result (Indicative)
8	Digital twin toolset	M, I, R, S	5. Intellectual property (IP) management and standardisation
9	Laser line triangulation system	L, I, R, S	1. Academia-industry joint research and mobility
10	Infrared vision system	L, I, R, S	1. Academia-industry joint research and mobility
11	3D dimension measurement system	L, I, R, S	1. Academia-industry joint research and mobility
12	Thermal cameras for high temperature steel bars	L, I, R, S	1. Academia-industry joint research and mobility
13	Off-line X-ray residual stress detection	L, I, R, S	1. Academia-industry joint research and mobility
14	Steel parts production application	I, R	5. Intellectual property (IP) management and standardisation
15	Automotive application	I, R	5. Intellectual property (IP) management and standardisation
16	Glass containers production application	I, R, S	5. Intellectual property (IP) management and standardisation
17	Battery trays production for EVs application	I, R	5. Intellectual property (IP) management and standardisation
18	Wood-based panels production application	I, R	5. Intellectual property (IP) management and standardisation
19	Knowledge base and brand name	R, S	1. Academia-industry joint research and mobility
20	Knowledge for standardisation	G, S	5. Intellectual property (IP) management and standardisation

9   Impact assessment

Communication and dissemination actions will be continuously monitored, the impact will be assessed following quantitative and qualitative indicators. As quantitative outcomes, the different KPIs previously described will be monitored each month, they define numerically what has been achieved among the communication and dissemination activities.

The qualitative indicators will be assessed monthly by the consortium partners and reported in the monthly report. Constant feedback will be gathered at events, conferences, from printable and general content, monthly feedback will be requested during the WP6 meetings.

9.1   Monitoring and reporting

Key Performance Indicators (KPI) and respective target values, as described above, have been defined for the various tools and channels proposed as part of the impact management activities. Qualitative indicators will be used to complement the quantitative indicators. The qualitative indicators provide information on the quality of the dissemination and communication activities that have been implemented.
Qualitative assessments will be recurrent during the project, and will be done for multiple dissemination and communication activities and with specific objectives, specifically:

- **Project website:** to understand if the contents being uploaded on the website are relevant and what else can be included; to understand if visitors are interested to return; to measure the effectiveness of online dissemination combined with Twitter and LinkedIn pages.
- **Newsletters:** to understand if the contents are relevant and accessible; to understand if there is interest in continuing to receive future editions of the newsletter; to measure the number of new subscribers resulting from parallel dissemination and communication activities.
- **Events:** to understand the quality of the event organisation, relevance of the contents presented and overall satisfaction with the event; analyse previous editions (if applicable) and expectations for the event to effectively use the marketing material accordingly to the target audience; measure the impact through networking activities and feedback received.

The strategy to evaluate these qualitative indicators will include periodic communication through emails and forms to assess the impact strategy is developed. The stakeholders will be reached and asked about the quality of the actions taken.

Every month the partners are requested to fill in information in the partner's reporting dashboard (Figure 29), a tool created to track about different communication and dissemination activities such as:

- **Press clippings -** reached by their entities' communication departments, some data is requested: magazines and newspaper name, date, country, and link of the news item featuring openZDM.
- **Events –** List of events consortium members have attended on behalf of the openZDM project including dates of the event, name, location, link, and proof of activity (pictures, presentation).
- **Social media –** Actions made by partners regarding openZDM in their owned social media channels. Emailing and newsletter – Reach of the emailing campaigns and newsletters published by the openZDM project.
- **Publications and blogposts –** Number of scientific publications and technical blog posts including date, title, name of the outlet, type of outlet, scientific journal or general, status, link and abstract. **Cooperation with DIHs –** Description of the outreach efforts to collaborate with DIHs including name of the DIH, description, contact name, email, website, cooperation activity, and description of activity implemented
- **Clustering activities –** Other actions implemented with EU funded projects including project name, website, contact name, email, description of actions.
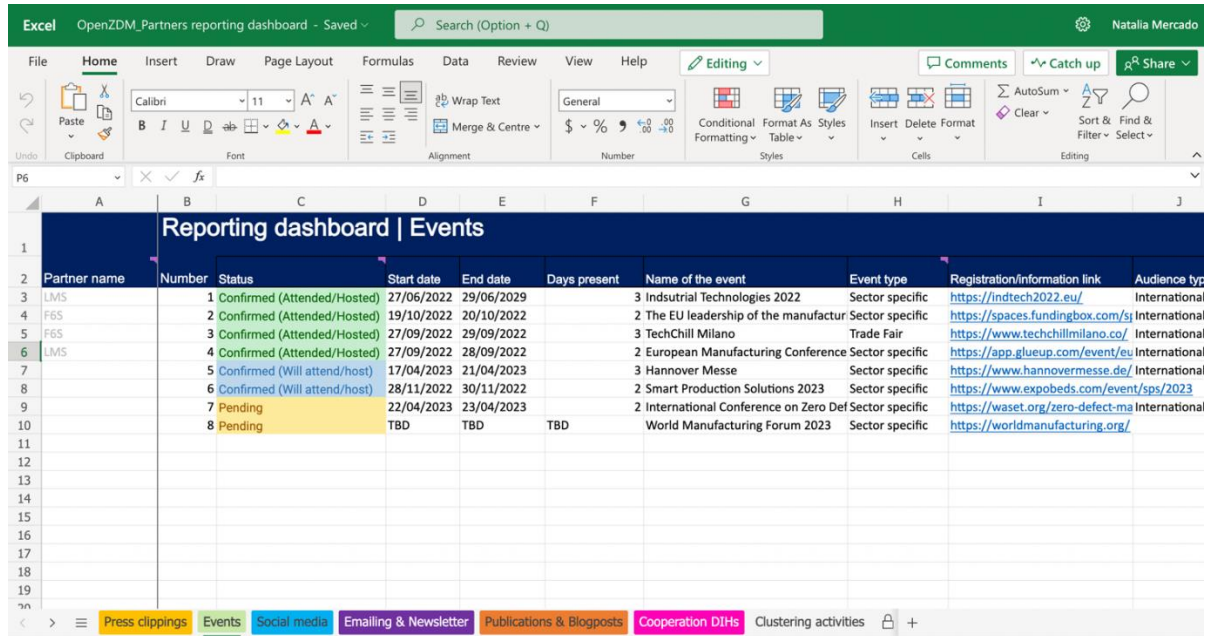
Figure 29: Partners reporting dashboard

10 Dissemination & Communication KPIs

Bellow in Table 16 are presented in detail the status of the KPIs regarding the communication and the dissemination of the project. The bellow values concerning the first six months of the project.

Table 16: KPIs status

Measure	Audience /Target Groups	Means	Current Value	Target KPI
Technical publications	ZDM communities, industry stakeholders	Technical articles, white papers, joint publications with associations (Digital Factory Alliance, EIT Manufacturing, Zero Waste International Alliance, EFFRA, Manufuture, Manufacturing Clusters, etc), industry stakeholders/ clusters.	0 – To start after M10	• >5 technical articles • >2 white papers
Scientific publications	Scientific and research communities	Open Access to publications to highly cited communities and journals, examples include: IEEE Industrial Electronics Society (IES), IEEE Industry Applications Society (IAS), IEEE	0 - To start after M10	• >15 publications in scientific journals • One book release

Measure	Audience /Target Groups	Means	Current Value	Target KPI
		Robotics and Automation Society (RAS), ACM Transactions on Autonomous and Adaptive Systems, Journal of Inter. Measurements Confed. (IMEKO), ACM Transactions on Cyber-Physical Systems.		
Scientific Conferences	Scientific, research and industrial communities	Participation in scientific conferences, such as IEEE International Conference on Emerging Technologies and Factory Automations, IEEE International Workshop on Factory Communication Systems, International Conference on Technologies & Business Models for Circular Economy, IEEE International Conference on Industrial Informatics, CIRP Conference on Manufacturing Systems, IEEE International Workshop Metrology for Industry 4.0 and IoT.	0 - To start after M10	• >15 publications and/or presentations delivered in major conferences
Trade fairs/ exhibitions	industry stakeholders, vertical industries	Participation and presentations at major trade fairs and events, such as European ZDM, European ZDM Landscape: State of Play (EFFRA), International Conference on Zero Defect Manufacturing ICZDM, International Conference on Zero Defect Manufacturing, etc.	0	• >10 participations in major events/trade fairs • >5 banners/ posters
Workshops through associations,	Application developers, ICT/IOT	Outreach events through workshops for targeted alliances, associations and	0	• >2 technical workshops

Measure	Audience /Target Groups	Means	Current Value	Target KPI
communities and clusters	industry suppliers, tech. providers	communities in which consortium partners are active members (e.g. EFFRA, Manufacture Technology Platform (ETP), European factories of the future research association, NEMA); clusters and partnerships (e.g. FIWARE, GAIA-X, European Circular Economy Stakeholder platform); related EU-funded projects, etc.		• >2 workshops presenting use case results
Training	Universities, Researchers, entrepreneurs	Online tutorials through webinars, presentations to schools/universities, curricula in BSc, MSc and/or PhD courses.	0	• >2 online training
Standards	SDOs, opensource SW communities	Harmonization, interactions and contributions to emerging and new standards, such as ETSI GS, OneM2M, FIWARE, AIOTI, etc.	0	• >4 SDOs involved • >4 standardisation contributions
Project website	All stakeholders	Online project website designed and developed by F6S, updated throughout the project.	Web site is ready Visitors: by M06 89	• Website ready by M02 • >7.000 visitors by M42
Social media channels	All stakeholders	Online presence on social media channels such as LinkedIn, Twitter, spreading the news about the project.	166 Followers LinkedIn: average 2533 per month Twitter: average 264 per month	• >1000 stakeholders • >200 monthly impressions
Newsletters	Tech. providers, vertical industry stakeholders	Newsletters will be circulated via email lists providing an overview of the main project activities and outcomes.	0 Newsletters 23 contacts	• >6 newsletters • >1000 contacts reached

Measure	Audience /Target Groups	Means	Current Value	Target KPI
Video clips	All stakeholders	Multimedia video podcasts presenting the project, its innovation, and its key outcomes.	1 video 28 views	• >3 videos produced • >2.000 views on YouTube
Printed material, flyers	All stakeholders	Brochures, leaflets, flyers for events, roll-up banners, and posters, are also available online for printing through the project's website.	100 printed copies (TechChill: 50 I4MS Stakeholder's event: 50) 1 poster has been created	• >2.000 printed copies distributed • >4 roll-up banners/posters
Public events	General public, students	Public events with public, schools and higher education institutions to inform them about the project and its impact on the everyday life.	0	• >4 public events • >3 open days at schools • >100 participants/event
Newspaper s, magazines	All stakeholders	Non-technical articles and press releases in local newspapers and magazines to reach a broader audience providing visibility of the project and its main achievements.	1 Press release	• >3 press releases in newspapers and magazines
Digital Innovation Hubs (DIH)	Tech. providers, vertical industry stakeholders	Promotion of project results in various DIH to amplify the project's outreach for early adoption.	0	• >30 DIHs contacted
Fora & Blogs	Tech. providers, vertical industry stakeholders	Promotion of periodic non-technical reports (publications) to fora and blogs to create awareness of the openZDM potential and features.	0	• >5 publications to blogs • >5 blogs/for a to post
Other projects and activities	Tech. providers, vertical	Liaison with other projects to coordinate the activities of openZDM considering the ongoing	0	• >8 relevant projects to liaise

Measure	Audience /Target Groups	Means	Current Value	Target KPI
	industry stakeholders	activities in other projects. For these reasons, liaison delegates will be identified.		

11 Conclusions

The dissemination, communication and exploitation strategic and operational plan presented in this document, aims to provide a thorough overview of the openZDM implementation, of what information will be generated to share with stakeholders, and through what means this information will be conveyed. We have also presented the innovation management and exploitation strategy of the project, along with the IPR management strategy which pertains all the IP management and protection processes to be followed within the project.

Over the next months, the exploitation activities will scale with a view to better positioning the project innovations in the market, supporting their further usage in academia or business applications. In further detail, the foreseen exploitation activities over the next months include the: (i) implementation of the IPR Matrix methodology, creation of an IP log – which will be recording the BG, FG, access rights, licenses applied and potential protection schemes of the project's assets, (ii) launch of one internal marketing survey, (iii) initial market research for the project's ER and KER, (iv) development of a draft business model canvas for the project's platform, and (v) organisation of an exploitation workshop among project partners.

The next deliverable 6.2 Impact management activities – intermediate version will reflect the progress of the impact management plan which will detail the actions taken in the first 24 months of the openZDM lifetime.