



D5.1 Dissemination, communication, exploitation, standardisation and liaison activities plan

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COGNIMAN consortium members

Table 1 – Consortium members

Partner name	Short code	Website link
NORCE NORWEGIAN RESEARCH CENTRE AS	NORCE	https://www.norceresearch.no/en/
ITAINNOVA	ITA	https://www.itainnova.es/tech/en/
IDEKO S COOP	IDEKO	https://www.ideko.es/en/home
SINTEF AS	SINTEF	https://www.sintef.no/en/
DEEP BLUE SRL	DBL	https://dblue.it/en/
GOIMEK S COOP	GOIK	https://www.goimek.com/en
ALDAKIN SL	ALD	http://www.aldakin.com/
CROOM PRECISION TOOLING LIMITED	CROOM	https://www.croomprecision.com/
MONTIMAGE EURL	MI	https://www.montimage.com/
EYDE-KLYNGEN	EYDE	https://www.eydecluster.com/en/
INSTITUT DE RECHERCHE TECHNOLOGIQUE JULES VERNE	IRT	https://www.irt-jules-verne.fr/en/
EIT MANUFACTURING CENTRAL GGMBH	EITM	https://www.eitmanufacturing.eu/
Acciaierie Bertoli Safau S.p.A.	ABS	https://www.absacciai.com/en/
IBM IRELAND LIMITED	IBM	https://www.ibm.com/ie-en/
3B-FIBREGLASS	3BFG	https://www.3b-fibreglass.com



Table of contents

- COGNIMAN consortium members2
- Table of contents 3
- List of figures5
- List of tables 6
- List of abbreviations7
- Disclaimer 8
- Statement for open documents and copyrights8
- Executive summary 8
- 1 Introduction10
 - 1.1 COGNIMAN project goals 10
 - 1.2 COGNIMAN project target groups 11
 - 1.3 Targeting each audience 11
- 2 Communication and dissemination strategy12
 - 2.1 Communication and dissemination objectives 12
 - 2.2 Target groups and audiences 13
 Messaging framework 15
- 3 Communication and dissemination tactics18
 - 3.1 Branding 18
 - 3.1.1 Brand book 18
 - 3.1.2 Templates 19
 - 3.2 Tools and channels 19
 - 3.2.1 COGNIMAN website 20
 - 3.2.2 Social media 21
 - 3.2.3 Events and conferences 22
 - 3.2.4 Media relations 24
 - 3.2.5 Papers and scientific publications 25
 - 3.2.6 Channels from other EU-funded projects 26
 - 3.3 Communications material 27
 - 3.3.1 One-pager fact sheet for each pilot 27
 - 3.3.2 Newsletters 27
- 4 Mapping tools and target audiences29
- 5 Monitoring 31
 - 5.1 Communication and dissemination metrics and KPIs 31
- 6 Communication and dissemination management policies33
 - 6.1 Partners roles and responsibilities 33
 - 6.2 Acknowledgement of EU funding 33
- 7 Partner engagement34
 - 7.1 Partners’ action plan 34
- 8 Standards monitoring, impact and compliance35



8.1	Standards and Standards supporting organisations.....	35
8.2	Standardisation roadmap and action plan – project plan and standards application	37
8.3	ISO SC41 IoT and Digital Twins.....	37
8.3.1	Goal of the standard	37
8.3.2	History of the standard	37
8.4	Digital Twin standard – Asset Administration Shell (AAS) with Industrial Digital Twin Association (IDTA) 38	
8.4.1	Goal of the standard	38
8.4.2	History of the standard	38
8.5	DTC – Digital Twin Consortium.....	39
8.5.1	Goal of the standard	39
8.5.2	History of the standard	39
	ISO SC42 AI and CEN JTC21 AI	40
8.5.3	Goal of the standards.....	40
8.5.4	History of the standards.....	40
8.6	Ontology Standards.....	40
8.6.1	Goal of the standards.....	40
8.6.2	History of the standards.....	41
8.7	ISO/TC 299 – Robotics.....	41
8.7.1	Goal of the standard	41
8.7.2	History of the standard	42
8.8	Other common and pilot-specific standards.....	43
8.8.1	Overview of other standards	43
9	Exploitation Activity Strategy	45
9.1	Source of Exploitation	45
9.2	Clarity of Pilot Context	46
9.3	Design and development strategies.....	46
9.4	Exploitation Plan	47
9.5	Envisaged Exploitation Activities.....	48
10	Conclusions	49



List of figures

Figure 1 – AIDA model..... 12

Figure 2 – COGNIMAN brand book 18

Figure 3 – Deliverable (left) and Powerpoint (right) template 19

Figure 4 – COGNIMAN LinkedIn profile 22

Figure 5 – COGNIMAN event portfolio 23

Figure 6 – Preview of partner's action plan 34

Figure 7 – Overview of standards under development 42



List of tables

Table 1 – Consortium members	2
Table 2 – List of abbreviations	7
Table 3 – Engagement actions and activities for COGNIMAN target groups	14
Table 4 – Differentiation of media ownership	20
Table 5 – Potential events and conferences	23
Table 6 – Examples of target media	25
Table 7 – Potential scientific journals to publish in	25
Table 8 – Projects funded under the same topic as COGNIMAN	26
Table 9 – Amplification through related projects	27
Table 10 – Mapping target audiences with appropriate channels to reach them.....	29
Table 11 – Communication channels, tools and actions	29
Table 12 – Communication and dissemination key metrics and KPIs.....	32
Table 13 – Factory of the future projects	43
Table 14 – Made in Europe projects.....	43
Table 15 – Exploitation tasks and guidelines for the project activities.....	47
Table 16 – Activities for the definition of the exploitation strategy	48



List of abbreviations

Table 2 – List of abbreviations

s	Explanation
AAS	Asset Administration Shell
ADRA	AI, Data and Robotics Association
AI	Artificial Intelligence
AIDA	Attention, Interest, Desire and Action
DTC	Digital Twin Consortium
EC	European Commission
EFFRA	European Factories of the Future Research Association
EU	European Union
FoF	Factory of the Future
GA	Grant agreement
HaDEA	European Health and Digital Executive Agency
IDTA	Industrial Digital Twin Association
IEC	International Electrotechnical Commission
IoT	Internet of Things
ISO	International Organisation for Standardisation
JTC	Joint Technical Committee
KPI	Key performance indicator
MiE	Made in Europe
OMG	Object Management Group
PR	Public Relations
R&I	Research and Innovation
SDO	Standards Developing Organisations
SME	Small and medium-sized enterprise
TC	Technical Committee
WG	Working Groups
WP	Work package
WPL	Work package leader
W3C	World Wide Web Consortium



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Executive summary

In manufacturing sectors such as glass fibre production, precision machining of large parts, additive manufacturing of medical implants and high-temperature metal production, automation has proven to be a daunting challenge. The complexity of these processes, coupled with a lack of understanding and control over individual manufacturing steps, has led to labour-intensive efforts and significant inefficiencies. This hampers sustainable growth, productivity, efficiency and flexibility, resulting in excessive waste and unpredictable production times.

To address these pressing issues, COGNIMAN aims to develop and demonstrate the concept of “digital cognitive smart manufacturing.” This visionary initiative aims to shape the future of manufacturing processes, enabling autonomy, predictability and improved flexibility, safety and efficiency. By integrating key technologies such as simulations, digital twins, advanced sensors, machine learning and cognitive robotics, COGNIMAN will create human-centric modular toolboxes that supports the operators in performing the tedious tasks.

Collaborative robotics and the responsible use of artificial intelligence have an ethical dimension to them, which the partners of COGNIMAN are very much aware of. Thus, monitoring and evaluating the developments of the project, asking: “What does this mean to the people involved?” plays an important role in the project and in the communication activities as well. Contributing to the currently very active debate, which has been sparked by the emergence of ChatGPT, is an opportunity to convey the opportunities of the project to a broader audience.



The COGNIMAN dissemination and communication plan supports achieving the objectives of the project by creating awareness and generating interest among a wide range of stakeholders. Once the solution has been developed, the activities encourage its further replication and utilisation. It is designed to ensure that technologies, outcomes, tangible results and the project overall is shared beyond the consortium members.

The plan includes an overview of objectives, stakeholders and target audiences, a messaging framework, the project branding, communication and dissemination channels as well as activities and impact monitoring, standards monitoring and exploitation. Some activities will require further development during the project.

The COGNIMAN plan supports the analysis of COGNIMAN technology and pilots with respect to identification of standards for further focus during the project – related to the most obvious standards and standardisation organisations related to AI, Data and Robotics and the domains of the various pilots. During the first year of the project, it is an aim to identify the standards of highest importance for the COGNIMAN project in order to focus efforts related to these.



1 Introduction

The primary goal of COGNIMAN is to enable flexible, resilient, reconfigurable, safe, sustainable and efficient smart manufacturing. Through the integration of simulation, models, digital twins, sensors, artificial intelligence in the form of machine learning, data processing and analytics, robotics and autonomous systems, COGNIMAN's modular toolbox can be adapted to new manufacturing processes and environments. This approach not only aims to enhance the competitiveness of the European technology and manufacturing sectors in global markets but also to minimise the environmental footprint of manufacturing activities.

With its transformative vision and cutting-edge technological solutions, COGNIMAN is poised to catapult European manufacturing into a position of industrial leadership. By revolutionising the way manufacturing processes are designed and executed, COGNIMAN paves the way for a more sustainable, efficient and globally competitive manufacturing industry.

Effective communication is essential for project success. The project consortium plays a crucial role in this regard. Therefore, the project partners will receive information about communication activities and will be encouraged to amplify them.

Communication and dissemination are interconnected components. Dissemination aims to promote project results and outcomes, whilst communication focuses on spreading information about the project from the outset, ensuring that diverse audiences are informed about its purpose and potential benefits for businesses and society.

Communication and dissemination share similarities, such as target audiences and communication channels. The term “communications” encompasses both communication and dissemination, with a distinction made when only one area is involved, to avoid repetition.

A communication and dissemination plan serves as the foundation for all related activities. It outlines the objectives of COGNIMAN communications, identifies target audiences and describes the strategies and tactics to be employed. Tactics determine the messages conveyed to the audience, the channels used for communication and dissemination and the methods for measuring effectiveness. Each aspect of the strategy and its role in the project will be briefly introduced in their respective sections.

The plan will evolve throughout the project, gaining more detail as work packages progress and adjusting as necessary based on activities and results.

1.1 COGNIMAN project goals

Eight key objectives are defined for the COGNIMAN project:

- Define a flexible and controllable virtual/simulation platform for digital cognitive manufacturing, with models, simulation mechanisms and Digital Twins for optimisation before deployment in real settings.



- Develop next-gen sensing systems for online monitoring and robotic control in selected manufacturing scenarios.
- Establish robust and explainable lifelong Machine Learning methods and tools for real-time visibility and control, prediction mechanisms and adaptiveness to changing conditions.
- Develop safe, collaborative robotics with ergonomic, intuitive and context-aware human-machine-autonomous agents and AGVs interaction for advanced smart manufacturing.
- Apply a human-centric design approach to define human-machine teaming models, including Social Sciences and Humanities aspects such as experience analysis, acceptance, awareness, trust, skills, liability and safety improvement.
- Integrate models, simulation, Digital Twins, sensors, actuators, AI mechanisms into a human-centric modular toolbox.
- Test and validate the integrated system in field trials for four concrete pilots.
- Develop a network of open access pilots supported by Digital Innovation Hubs and other multiplier organisations to enable data and knowledge sharing and facilitate involvement of targeted and new stakeholders.

Objectives for communications are aligned with the project objectives.

1.2 COGNIMAN project target groups

A target group is a group of people that an activity, product or service is intended to reach. The following target groups were identified:

- Manufacturing companies: SMEs, midcaps and large,
- Engineering and technology providers: SMEs, midcaps, large, RTOs,
- Academia,
- Manufacturing and technology start-ups,
- Policy, regulation and standards organisms related to the manufacturing sector,
- Associations like euRobotics aisbl, Big Data Value Association, EPIC, EURAL, EFFRA, CLAIRE.AI, etc.,
- Partnerships: AI, Data and Robotics; Made in Europe,
- EU-Japan Centre for Industrial Cooperation

1.3 Targeting each audience

Each target group assumes various roles within or outside of the project. Communication and dissemination seek to tailor their activities to make sure they are best informed and involved accordingly.



2 Communication and dissemination strategy

The communications strategy is aligned with COGNIMAN objectives and target groups. The project goals are translated into communications objectives and broken down into specific tactics, such as the creation of a website, the use of social media, organisation of or participation in events or publication of papers. Project goals are being further developed into dissemination objectives, influencing the choice of communications channels.

Strategy and tactics determine how the message will be delivered to the target groups, whether through a one-to-one or one-to-many approach and which communications method will be used. These methods may include face-to-face interactions, traditional media like newspapers, web-based platforms or newsletters.

The dissemination of results is expected to include different elements and to take place at a few levels:

- The COGNIMAN developments and periodic results – solutions to the challenges faced by the pilots.
- The final toolbox developed by COGNIMAN available for use and replication by other market players.

Dissemination activities and channels will leverage and build upon the communications channels and tactics, however, the content for dissemination will be dedicated to results. Channels and activities may vary depending on the variety and type of results becoming available throughout the project. Disseminating results may still be relevant outside the project timeframe and after completion.

2.1 Communication and dissemination objectives

At the start of a project, there is limited public knowledge about it. Therefore, the primary objective is to generate awareness so that target audiences begin to follow the project's progress and engage with it.

The communications approach for COGNIMAN will adhere to the AIDA model, which was originally developed to describe the customer journey from initial awareness of a product or service to its acquisition. AIDA stands for Attention, Interest, Desire and Action. The model identifies the stages individuals go through during the purchasing process for a product or service:

Attention: Creating awareness among the defined target audiences.

Interest: Stimulating interest in the project by providing additional information.

Desire: Converting interest into a desire to be part of the project through further information and addressing inquiries.

Action: Offering clear calls to action, making it easy for individuals to connect or interact.



Figure 1 – AIDA model



The AIDA model also highlights that communications require different messages at different stages, as time progresses from creating awareness to encouraging action.

All communications activities can be attributed to a specific stage and must be coordinated to guide individuals towards the desired action.

Different target audiences may be at different stages at different times. While one target audience may have received messages to prompt action, another may still be in the awareness phase.

At this early stage of the project, the following communications objectives have been identified to support the overarching goals of the project:

- Raise awareness and ensure visibility of COGNIMAN, its objectives and activities,
- Announce and promote the COGNIMAN events and activities, contributing to maximising the attendance and engagement potential,
- Generate interest and convert a set of audiences to follow the project progress and attend/subscribe to news and events,
- Develop a content strategy and create relevant, compelling content for the different defined target audiences.

In addition to this, the following dissemination objectives are closely connected to the objectives above:

- Raise awareness for COGNIMAN achievements and results,
- Make the results of the project available and thereby enable their replication,
- Use results to promote and nurture scientific discussions on the research topics addressed by COGNIMAN.

These objectives will be achieved by employing a variety of channels to convey the messages, such as the COGNIMAN website, social media, media relations and events and through channels of the project partners.

Communication and dissemination objectives are expected to be refined in Q2 2024 and then further specified and adjusted during the 48-month project.

2.2 Target groups and audiences

To achieve the COGNIMAN goals, the project activities and its results will be communicated and disseminated to communities in the field, scientific groups and financial actors to secure the future commercialisation of the solution. These target groups and audiences will be targeted with appropriate messages through a variety of channels.

COGNIMAN has several aspects of communicating and disseminating, e.g., the project itself, the solutions for the challenges faced by each pilot and the toolbox. Accordingly, every communications activity needs to be tailored to a dedicated audience.



Since communication and dissemination are very closely intertwined, the audiences for activities in both realms largely overlap. The following audiences will be reached via the activities:

- **End users:** Engage manufacturing and industrial associations, federations, media and the general public through publications like magazines and newspapers.
- **Policy makers:** Establish dialogue and promote engagement by actively communicating and cooperating through regular campaigns to transfer project experience and results into policy actions.
- **Communities:** Connect with communities surrounding EC-funded projects, EIT KICs, specialised RTOs and application centres.
- **Manufacturing specialists:** Promote the project and its outcomes by participating in relevant European or international events, such as workshops, conferences and exhibitions within the EU.
- **Engineering and technology providers:** Support providers looking to expand their market segment and reach new organisations by offering COGNIMAN's modules to enrich their product and service offerings.

As the project progresses, more concrete mapping of the target groups and audiences will ensue. Typically, the targeted personas are experts in the field of artificial intelligence and robotics as important influencers in their respective organisations and communities, decision makers and influencers of decisions. For the COGNIMAN project, the decision makers can be Managing Directors of SMEs as well as Chief Technical Officers (CTO), plant managers and Heads of R&D in large manufacturing corporates.

Error! Reference source not found. gives an overview of the main actions and activities that will be used to engage with COGNIMAN's audience. All the actions and activities listed below will be tailored according to the needs of each group and main interests.

Table 3 – Engagement actions and activities for COGNIMAN target groups

COGNIMAN target groups	Engagement actions and activities
All stakeholders	<ul style="list-style-type: none"> • Sharing of website updates (blog articles on news, events, results, videos, brochures, posters, flyers) via social media channels or via personal interaction
Research and innovation communities, other related projects	<ul style="list-style-type: none"> • Distribution of newsletters, invitation to social media channels • Sharing of public deliverables, relevant project findings and results • Invitations to attend events (workshops, training sessions)
Policy makers	<ul style="list-style-type: none"> • Invitations to attend events and dedicated dialogue
Media	<ul style="list-style-type: none"> • Press releases, offers of interview partners, event invitations
Partners	<ul style="list-style-type: none"> • Invitations to share projects communications • Provision of materials to share



Messaging framework

A messaging framework defines messages that are supposed to be used in communication activities to specific target audiences. It serves as a guideline for communications from the project and all sixteen partners, so that all partners convey the same messages. As an integral part of designing and implementing a communication strategy and tactics, it is essential for consistency of communications and overall recognisability of the project.

Messages need to be relevant for the target audiences in any of the AIDA phases. At present, the creation of awareness is paramount.

COGNIMAN General key message:

Manufacturing processes like glass fibre production, precision machining, additive manufacturing and high-temperature metal production are difficult to automate: Tasks are complex, and cannot be fully controlled. The EU project COGNIMAN aims at solving this and making manufacturers more productive, efficient, flexible as well as sustainable. 16 partners from six countries develop a novel concept of “digital cognitive smart manufacturing”. COGNIMAN stands for “COGNitive Industries for smart MANufacturing”.

Solving four concrete use cases on the way, the outcome of the project will be human-centric modular toolboxes that can be adapted to substitute a range of manual manufacturing processes. The toolboxes will integrate key technologies such as simulations, digital twins, advanced sensors, machine learning toolbox and cognitive robotics.

The ultimate objective is to boost competitiveness of the European technology and manufacturing sectors towards industrial leadership in global markets, while reducing the environmental footprint of manufacturing activities.

Moreover, there are dedicated messages for the work packages and pilots:

Pilot 1 – Defect detection in fibreglass production

Glass fibres are produced from molten glass. Breaks in the fibre disrupt the production process and are currently difficult to predict, as the reason why the fibres break is not entirely clear. This means operators have to intervene and there is significant waste. The EU project, COGNIMAN aims to automate break detection in glass fibre production using sensors and machine learning. This will improve operator response, reduce waste and enable efficient recycling of glass waste.

Pilot 2 – Precision machining – deburring of large metal parts

A burr is an excess material that remains on the edge of a part after manufacturing or modification. Deburring is the process that removes this. For a use case for manufacturing of large parts, the EU project, COGNIMAN aims to develop a robotic solution to automate the



process of deburring using Machine Learning and sensors. This will improve the quality of the finished parts, increase efficiency and relieve operators of physically straining labour, allowing them to focus on other tasks.

Pilot 3 – Additive Manufacturing of medical implants

Medical implants made with Additive Manufacturing require highly sophisticated post-processing to make sure no sharp edges remain which could potentially damage tissue during implantation. Complexity increases with patient-specific implants since every person has a unique geometry. The EU project COGNIMAN aims to develop algorithms to guide robots to automate this process while maintaining high-quality finishes. The end result would be a safe, flexible robot system that collaborates seamlessly with the operators.

Pilot 4 – Flexible manufacturing – digital library for batches

How to operate and maintain a large library of finished and semi-finished products in batches or large variety, size and dimension in steel manufacturing? This is the challenge the EU-project COGNIMAN seeks to solve. COGNIMAN aims to establish a digital library that provides a real-time overview and will thus allow full visibility of stock and internal logistics processes alike.

WP1 – Cognitive manufacturing pilots

COGNIMAN is an EU project aiming to improve manufacturing through key technologies like collaborative robotics, machine learning and artificial intelligence. It works with four pilot scenarios. These four pilots serve as a starting point for defining a toolbox that will enable streamlining processes for the pilot partners and others in the industry. One taskforce of the project team is dedicated to overseeing and supporting the implementation of the four pilots. They will also analyse the results and collect feedback.

WP2 – Modelling, sensing, Digital Twins and Machine Learning

COGNIMAN is an EU project aiming to improve manufacturing through key technologies like collaborative robotics, machine learning and artificial intelligence. It will employ simulations, digital twins, advanced sensors, machine learning toolbox and cognitive robotics integrated in human-centric modular toolboxes that can be easily adapted to solve other challenges in the manufacturing sector. One task force within the project is dedicated to characterising the general COGNIMAN system architecture by defining and developing the overall simulation framework, robotics and the sensors required for each of the four use cases. Additionally, this taskforce will work towards developing the toolbox where the COGNIMAN learnings will be made available for other stakeholders to tackle their manufacturing issues.



WP3 – Robotics for smart manufacturing

COGNIMAN is an EU project aiming to improve manufacturing through key technologies like collaborative robotics, machine learning and artificial intelligence. One task force of the project is dedicated to robotics, from developing robot and guidance mechanisms to integrating the robots into the four use cases which the project seeks to solve.

WP4 – Human centric analysis, improvement and skills development

Human-AI teaming comes in various forms. In some cases, AI will speed up human performance, while in others, it will transform current tasks and change processes. One task force in the EU project COGNIMAN aims to ensure that responsible use of AI leads to human-AI collaboration which benefits people as much as the company balance sheet.

WP7 – Ethics requirements

Ethical implementation of Artificial Intelligence and robotics ensures that the fundamental rights of the workforce are respected. One task force of the EU-project COGNIMAN is dedicated to ensuring the compliance of the project with ethical requirements. This will be done through surveys and interviews and the feedback collected will be used to conduct future developments in the project.

Developing a comprehensive messaging framework involves gaining a deeper understanding of the specific pain points and talking points of the target audiences. By exploring the professional pain points, challenges and opportunities that the audience faces, it becomes possible to create pertinent messages that effectively resonate with them and maximise the impact of communications.

Defining the pain points and talking points will be a collaborative effort involving the project partners. The objective is to have an actionable framework in place by the end of Q3 2023 tailored to suit the diverse target audiences. As the project progresses and produces results, the messaging framework will be refined and expanded to reflect the evolving circumstances and insights gained from the project.



3 Communication and dissemination tactics

Communication and dissemination tactics comprise actions taken to implement a strategy. Therefore, a basic branding is needed, on which all actions are built. Appropriate channels are important to play these actions out.

3.1 Branding

Branding involves establishing a compelling and consistent perception of a company, product, service, or similar entity. In the case of COGNIMAN and its associated project activities, it pertains to shaping the perception of the project as a whole. This encompasses various elements such as logos, fonts and colours. Through this distinctive combination, a unique identity is formed, with the logo serving as the primary and most apparent form of branding. Successful branding facilitates recognition among the target audiences and sets the project apart from others.

It is imperative to adhere to the project's branding guidelines to ensure a uniform visual appearance across all project-related activities.

3.1.1 Brand book

A brand book contains the branding and visual identity information and is essential to a communications strategy. It lets everyone know how to correctly use distinctive branding elements like logo, fonts and colours to ensure a visually coherent appearance. Using a coherent visual appearance enhances brand awareness, recognition and trust in the brand.

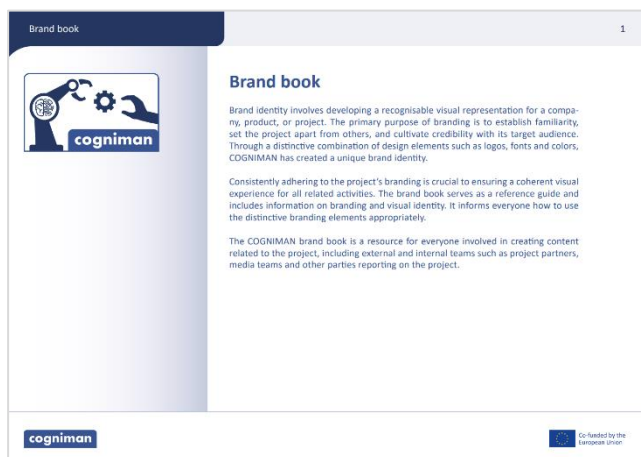


Figure 2 – COGNIMAN brand book

The COGNIMAN brand book serves everyone who creates content related to the COGNIMAN project – external and internal: project partners, media teams and other parties reporting on the project. It can be found on NORCE



SharePoint in the shared folder for WP5. As the project evolves, it will be extended, since layouts and templates will be included in the brand book as well.

3.1.2 Templates

There are templates for communications materials to ensure a coherent external and internal visual communication. These templates include Word templates for deliverables, letterheads and project reports and a PowerPoint template. All templates can be found on NORCE SharePoint in a dedicated shared folder.

Moreover, there are guidelines for properly recording and reporting all activities.

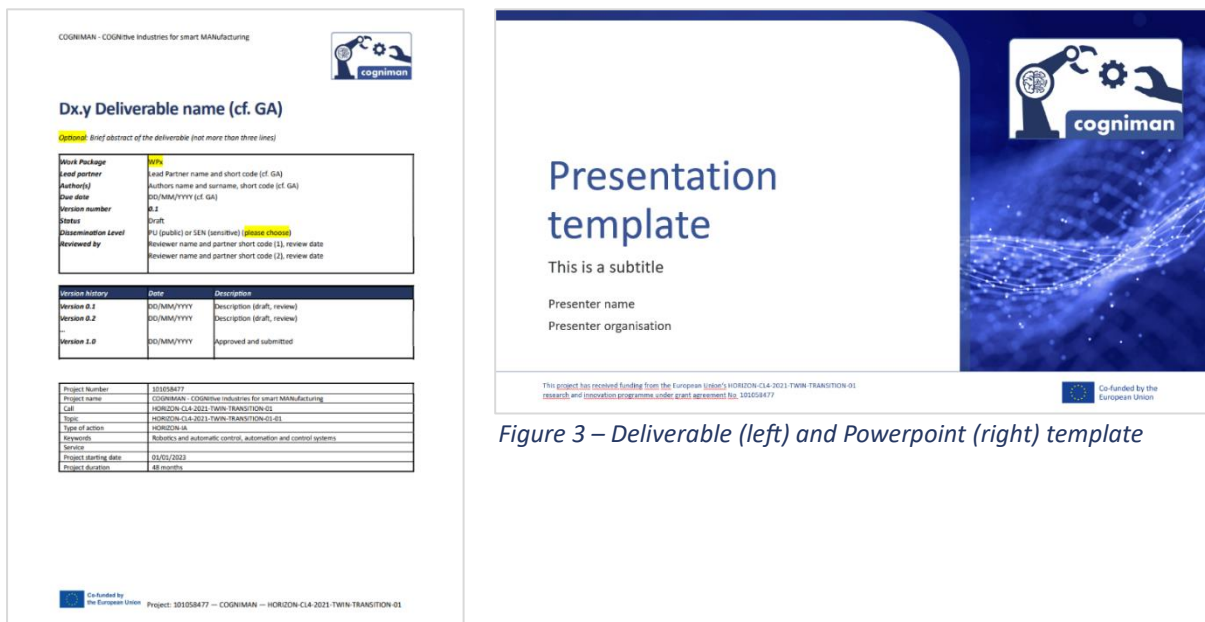


Figure 3 – Deliverable (left) and Powerpoint (right) template

3.2 Tools and channels

Communication encompasses various forms, including written, verbal and non-verbal, in both formal and informal settings, with the aim of conveying a message from a sender to one or more recipient(s). To effectively transmit a message, an appropriate communication channel must be utilised, such as a website, social media platforms, videos, newsletters or events.

Typically, a combination of owned, paid and earned media is employed for communication, depending on the objectives and the available budget.

Owned media refers to channels that the information sender possesses and can control. Paid media channels are owned by third parties, such as publishers, for which the sender pays to utilise them and must tailor the content



to meet the requirements of the media owner. Earned media encompasses channels where the sender's messages are shared and disseminated to the media owner's audience without payment.

Table 4 – Differentiation of media ownership

Owned media	Paid media	Earned media
<ul style="list-style-type: none"> • Project website • LinkedIn profile • Newsletter • Own events 	<ul style="list-style-type: none"> • Sponsored events • Speaking opportunities • Advertising • Social media sponsored posts and ads • Search engine advertising 	<ul style="list-style-type: none"> • Trade magazines • Newspapers • Word-of-mouth • Speaking opportunities

In the course of the project, different media will be involved. Specifically in the awareness creation phase, messages will be built via the own media, occasionally supported by paid media. Experience shows that earned media uptake comes into play at a later stage of the project, since COGNIMAN competes against a multitude of other news that flood editors and journalists every day. Therefore, a certain threshold in awareness needs to be overcome.

For the communications activities during the COGNIMAN project, specific communications channels are defined to spread the word about the project and its results. Here, communication and dissemination can use the same channels.

3.2.1 COGNIMAN website

A website contains one or more web pages sharing a single domain name. It serves various purposes, like enhancing awareness and providing information or generating leads. As a website is fully under the owner's control, it is a powerful tool to provide information, publish news, generate leads and, to be more general, to be the first place to go to for interested people.

The website will be created under the domain cogniman.eu and will be online at M6.

The website content will be organised in five main sections:

- Home page: Presenting the general information about the project,
- About: This page describes the main objectives of the project, the conceptual framework and the project consortium and the ethical implementation of AI and robotics,
- Pilots: This section explains the pilots in detail giving insights into the challenge and the solution,
- News: This section will be constantly updated with all the latest news about the project and the events where the members of the COGNIMAN project will be involved,
- Resources: This section contains all the relevant documents and public deliverables which can be downloaded.
- Glossary: This section is dedicated to defining the technical terms related to COGNIMAN.



This preliminary structure will be further refined during the project.

The pages layout will be composed by three main sections:

- Header, which includes the project logo and the main menu
- Content area, which varies from page to page
- Footer with project contacts and EU disclaimer

The website usage and accesses will be monitored which allows to record various information, such as visitors, traffic sources, most viewed contents, etc. This is a helpful means to identify opportunities for improvement, increase the communication efficiency and evaluate the website impact and effectiveness.

3.2.2 Social media

Social media platforms are digital and interactive technologies that facilitate the creation, sharing and connection of individuals. They give rise to virtual networks and communities where people can engage with one another. Some well-known social media platforms include Facebook, Twitter, TikTok and Instagram. Among them, LinkedIn holds significant importance as a professional social network.

The purpose of social media is to foster a community where information can be shared, individuals can learn from each other, interact and promote ideas, events and products/services. It serves as a potent tool for communications, engaging audiences and interacting with interested parties.

Social media tactics will primarily be employed to communicate news about the COGNIMAN project and reach a wide-ranging audience. Events, press releases and other noteworthy updates will be published on the COGNIMAN website and promoted through social media platforms. It is expected that the social media posts will drive audiences to visit the project website.

At the beginning of the project, a LinkedIn account has been established. The LinkedIn Profile is accessible here: <https://www.linkedin.com/company/cogniman/>. News and insights will be published throughout the project. All partners are invited to like and share the posts, create their own posts and tag the COGNIMAN profiles.

There is a social media plan, which can be found in the shared folder for WP5 on NORCE SharePoint. The plan will be filled continuously during the project to keep the information flow going.



Figure 4 – COGNIMAN LinkedIn profile

3.2.3 Events and conferences

In communications, an event is an organised, interactive and timed event that a group can join online or in person. They can increase awareness, inform about a specific topic and engage audiences. Examples of an event are webinars, trade shows and conferences. Events are work-intensive and costly, but they are a powerful tool to interact with and involve people. They serve to spread news and information for instance also with speaking opportunities, intensify the collaboration with existing customers and to strengthen the overall reach.

Events can be co-organised or owned. Furthermore, speaking opportunities at externally organised events can be used to spread information to a large audience for a comparatively small effort and often small budget.

The overall events strategy and planning of individual events for the COGNIMAN project will be looking at various factors and the interdependencies of those factors. The decision on the type of event and choice of event enables COGNIMAN to get a clear message across to the right audience. It will be based on project objectives and project maturity in terms of progress and achievements. In the project's initial phase, while awareness generation is the key objective, speaking opportunities at external industry conferences are a good way of reaching a broad audience.

The right mix of event types in the overall COGNIMAN portfolio will allow the consortium to optimise usage of the event budget and improve audience outreach. The COGNIMAN conceptual approach to events is illustrated in 6.

During the whole project there will be seven events and workshops to inform and attract relevant experts and future end-users. The expected duration will vary based on the type of event. These events will be organised by EITM in cooperation with the project partners.

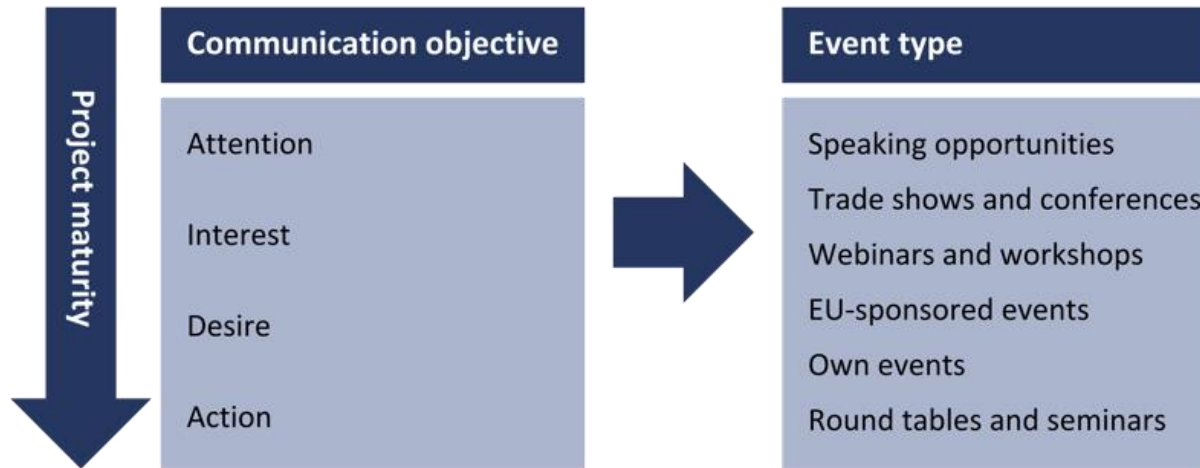


Figure 5 – COGNIMAN event portfolio

Events are mainly planned as webinars, seminars and workshops and can happen online and in-person. While in-person events allow for more networking and dynamic dialogue opportunities, targeted interactions, more powerful relationships and deeper engagements, online events contribute to positioning COGNIMAN and allow a broad audience to take part, as no travel is involved and thus the required resources in time and money are considerably less than for in-person events.

External events and conference attendance is a key mechanism for the COGNIMAN consortium to interact with the scientific and manufacturing community. The participation in external events is a relevant channel to engage and network with target groups and to disseminate the project, its activities, results and main findings. A preliminary non-exhaustive list of external events and conferences, in which COGNIMAN results can be presented, is listed in the table below.

All events and conferences will be identified and integrated into the COGNIMAN event calendar, which can be found in the shared folder for WP5 on the NORCE SharePoint. The exact list of events for 2023 is to be finalised by Q3 2023 and for 2024 by Q1 2024.

Table 5 – Potential events and conferences

Type E / C	Name of the event / conference	When	Where
E	EMO Hannover 2023	18 – 23 September, 2023	Hannover, DE
C	ACM/IEEE Conference on Human-Robotics Interaction 2024 - hybrid	11-14 March, 2024	CO, USA
C	IEEE Sensors 2025	26-29 October 2025	Vancouver, CA
E	ERF 2024 European Robotics Forum	13-15 March 2024	Remini, Italy
C	Embedded Vision Workshop 2023	19 June 2023	Vancouver, Canada



Type E / C	Name of the event / conference	When	Where
C	IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR)	18-22 June 2023	Vancouver, Canada
C	International Conference on Computer Vision	2-6 October 2023	Paris, France
C	IEEE International Conference on Robotics and Automation	13-17 May 2024	Yokohama, Japan
C	IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	1-5 October 2023	Detroit, Michigan, USA
C	IEEE International Conference on Cloud Computing and Artificial Intelligence	21-23 November 2023	Marrakesh, Morocco
C	AAMAS (International Conference on Autonomous Agents and Multiagent Systems)	6 – 10 MAY 2024	Auckland, New Zealand
C	AAAI 2024: National Conference on Artificial Intelligence	Feb 22-25, 2024	Vancouver, BC
C	IJCAI 2024 International Joint Conference on Artificial Intelligence	TBA	TBA
C	IHIET Human Interaction & Emerging Technologies Conference Series	TBA	TBA
C	ALIFE Conference on Artificial Life	TBA	TBA
E	The Orthopaedic Manufacturing & Technology Exposition and Conference	June 11-13, 2024	Chicago, USA
E	Limerick for Engineering	March 2024	Shannon, Ireland
C	72nd CIRP General Assembly (TBC)	20-26 August 2023	Dublin, Ireland

3.2.4 Media relations

Media relations describe the relationship between a company or organisation with journalists, bloggers and influencers. They are the gatekeepers that a piece of information needs to pass through before it reaches the public through third-party channels such as trade magazines, newspapers or social media.

The aim of going through these third parties is to diversify the employed communication channels and, ideally, endorsement by these third parties. This way, the public learns of activities and/or specific topics through a source which is perceived as opinion leader or neutral source of information. Thus, activities gain publicity, as these people spread the word and news in the mass media on behalf of the company/organisation. Good media relations are powerful, maximising the media-coverage without advertising costs.

In the COGNIMAN project, media relations will, e.g., be used to distribute press releases for project updates to reach the broadest possible audiences. All press releases will also be published on the COGNIMAN website and promoted via social media channels and the partner's media network, provided the partners have them. Example media are given in the list below.



Regarding media relations, COGNIMAN visibility is expected to benefit from the international presence of eleven consortium partners to achieve maximum coverage. All partners will receive the tools to engage with their media audiences in addition to the activities coordinated by EITM.

Table 6 – Examples of target media

Magazine / newspaper / online medium	Language
Produktion https://www.produktion.de/	DE
VDI-Z Nachrichten https://www.ingenieur.de/fachmedien/vdi-z/	DE
Wired Italia https://www.wired.it/	IT
Horizon Results Booster https://www.horizonresultsbooster.eu/	EN
Horizon Magazine https://ec.europa.eu/research-and-innovation/en/horizon-magazine	EN
CORDIS website https://cordis.europa.eu/	EN

3.2.5 Papers and scientific publications

With scientific papers, research work and results can be shared with an academic audience. They are published in dedicated journals which are peer reviewed, which means that papers have been evaluated by one or more people with similar competencies.

At least four papers in international peer-reviewed journals with open-access schemes are expected to be published during the COGNIMAN project, to reach a scientific target audience. Open Access journals will be preferred whenever possible. Additionally, there will be some publications of key results and explanatory articles on EC channels such as Cordis, H2020 The EU R&I magazine and research EU focus.

A preliminary list of potential scientific journals can be found in Table 7.

Table 7 – Potential scientific journals to publish in

Journal	ISSN	Publisher
International Journal of Artificial Intelligence (IJAI) http://ceser.in/ceserp/index.php/ijai/	0974-0635	online resource
IEEE Industrial Electronics Society https://www.ieee-ies.org/	1540-7993	IEEE
Human Behavior and Emerging Technologies https://onlinelibrary.wiley.com/journal/25781863	2578-1863	Wiley Online Library



Journal	ISSN	Publisher
ACM Transactions on Human-Robot Interaction https://dl.acm.org/journal/thri	2573-9522	ACM Digital Library
Sensors https://www.mdpi.com/journal/sensors	1424-8220	MDPI
Optics Express https://opg.optica.org/oe/home.cfm	1094-4087	The Optical Society (OSA)
Applied spectroscopy https://journals.sagepub.com/home/aspc	1943-3530	Sage Journals
Open Engineering https://www.degruyter.com/journal/key/eng/html?lang=en	2391-5439	De Gruyter
International Journal of Computer Vision https://www.springer.com/journal/11263/	0920-5691	Springer

3.2.6 Channels from other EU-funded projects

COGNIMAN will build synergies with existing initiatives. Over the course of the project, the project partners will explore opportunities and forms of collaboration, among them also communications activities. The table below lists relevant EU past and ongoing projects and initiatives in the robotics and Artificial Intelligence sector.

Table 8 – Projects funded under the same topic as COGNIMAN

Acronym	Title	Project ID
CONVERGING	Social industrial collaborative environments integrating AI, Big Data and Robotics for smart manufacturing	101058521
AI-PRISM	AI Powered human-centred Robot Interactions for Smart Manufacturing	101058589
Fluently	Fluently - the essence of human-robot interaction	101058680
COALA	COgnitive Assisted agile manufacturing for a LABor force supported by trustworthy Artificial Intelligence	957296
CISC	Collaborative Intelligence for Safety Critical systems	955901
COGNITWIN	COGNITIVE PLANTS THROUGH PROACTIVE SELF-LEARNING HYBRID DIGITAL TWINS	870130
HARTU	Handling with AI-enhanced Robotic Technologies for flexible manufactUring	101092100
BRIDGES 5.0	EU Horizon project focused on building synergies between digital potential and human potential to achieve better outcomes for businesses, workers, society and the planet	101069651

Networking and coordinating activities with related research projects will be a key activity to foster synergies and align outputs and networks. Exploring complementarities with these projects and initiatives can lead to the generation of new ideas, exchange of good practices and will expand the network of involved stakeholders.



Specifically in communications, related projects and their consortia can amplify the reach of communications activities. The following table lists some preliminary ideas to amplify communications.

Table 9 – Amplification through related projects

High level objective	Activities to foster synergies
Create awareness; amplify communications impact and broaden reach	<ul style="list-style-type: none"> • Sharing relevant posts on social media • Share and promote relevant news on the project website • Invite other projects to write a blog post on COGNIMAN website • Invite other projects to participate in COGNIMAN events and initiatives • Participate in events organised by related projects • Organise joint events

3.3 Communications material

Communications material is textual, visual, audio and video content, which is published and conveys news and information about a specific topic, addressed to a defined target audience. It can be both printed and digital items, such as brochures, fact sheets, newsletters or presentations.

The design of communications material is always based on branding. Consistent and high-quality communications material delivers the information readers want, fostering trust in the brand.

To support COGNIMAN project's goals, brochures, leaflets, roll-ups and newsletters will be produced on a need basis. All the materials will be offered in English and digital formats ready to be uploaded/downloaded to/from websites and for printing/production, which will be the responsibility of each partner. The English language version will enable translations/national versions.

3.3.1 One-pager fact sheet for each pilot

These are informative or promotional documents about each pilot in the COGNIMAN project. They are used in digital or printed format to spread information.

In the COGNIMAN project, brochures and product leaflets will be distributed online via the COGNIMAN website, LinkedIn accounts and the partner's websites as PDFs. This enables partners to send information about the project to other interested parties. These one-pagers can also be printed and distributed in trade shows and other networking events. This will be made available around M7.

3.3.2 Newsletters

A newsletter is an email sent to an audience periodically to inform them about specific topics like the latest news about the development of the project, events or further content. They contain teaser texts, images and usually



lead to a website via links. Newsletters contribute to brand reputation and ensure the brand remains in the audience's minds.

Regarding the COGNIMAN project, newsletters will be issued periodically to summarise shortly and attractively the progress and main achievement of the project as well as AI and robotics-related content and events. During the COGNIMAN project, quarterly newsletters will be sent to interested people. Those newsletters will contain information about the project and its results and invite recipients to join upcoming events.



4 Mapping tools and target audiences

The different tools listed in the previous sections will be used to reach the different target audiences with different messages. Please note that the channel of media relations can reach all target audiences but is directed at journalists and editors who then create information formats in their media which will reach the aforementioned target audiences.

Table 10 – Mapping target audiences with appropriate channels to reach them

Target audience	Channels			
	Project website	Social media	Events	Media relations
End users	x	x	x	x
Policy makers	x		x	x
Communities	x	x	x	x
Manufacturing specialists	x	x	x	x
Engineering and technology providers	x	x	x	x
Journalists	x			x

Starting from the different channels and activities identified, a preliminary plan of all planned communications actions is available. The timing and frequency of communications activities – especially via the website and social media – is crucially dependent on the project progress. Only if there is news to communicate or results to disseminate, an update will be generated. Please see an overview in 11.

Table 11 – Communication channels, tools and actions

Channel/tool	Action	Responsible partner	Timing/frequency
COGNIMAN website	Design and development of the project website	EITM	set up by M6
	Continuous updates with blog articles on news, events, results, videos, brochures, posters, flyers	Coordinated by EITM, all partners will contribute	on average monthly
Social media	LinkedIn: posts on on-going activities, findings and results, relevant topics for the project, events	EITM, all partners will contribute	on average weekly
	Sharing of and interacting with partner communications, content by other projects etc.	EITM, all partners will contribute	depends upon availability



Channel/tool	Action	Responsible partner	Timing/frequency
Newsletters	Summarise in a short and attractive way the progress and main achievements of the project and send them to the contact list	EITM, all partners will contribute	Every three months starting from M7
Conference papers and publications	Summarise key results and insights from the project work for a more specific target audience	Scientific partners	5 per year on average
Events and conferences	Presenting COGNIMAN and its results at national events	All partners	Whenever there are relevant events
	Presenting COGNIMAN and its results with speaking opportunities at external events	All partners	
	Presenting COGNIMAN and its results at international events and conferences	All partners	
Networking activities and synergies with other projects	Building up synergies with existing initiatives and EU projects	All partners	Continuous process
Marketing material	One-page fact sheet presenting the pilots and the challenges	EITM	M7
	Roll ups explaining the project in a few keywords to disseminate the project in fairs, seminars and other public events	EITM	Need basis
	Promotional video presenting and explaining the project in detail	EITM	1 every year



5 Monitoring

In order to maximise impact and truly make a difference, all communications activities will be evaluated for efficacy, which requires proper and timely recording. The communication and dissemination strategy evolves as the project progresses, which will be reflected in the reporting.

The WPL depends upon all consortium partners to achieve a comprehensive monitoring by keeping track of each communications activity as they take place as well as the audience reached whenever possible. It is important to keep track also of the feedback gathered from the target audience(s).

The task of monitoring COGNIMAN communications activities was allocated to EITM as part of WP5. This task will be accomplished with the help of a monitoring management spreadsheet which will facilitate collating all relevant data, both in terms of events and the audience reached through the project's outputs.

The monitoring sheet will be saved in the COGNIMAN shared project repository on NORCE SharePoint. It is the duty of every partner to regularly update it with the relevant information recording the type of communications activities and their achieved impact, in terms of estimated reached audience.

EITM will regularly check the status of the monitoring record with the partners involved in communications activities and send monthly reminders to partners to update the spreadsheet. The regular use of the monitoring tool will provide the WPL with live updates on achieving impact and reaching our targets (Key Performance Indicators – KPIs) which are shown in the next section.

5.1 Communication and dissemination metrics and KPIs

Ambitious goals drive COGNIMAN communications objectives and are expected to fulfil SMART criteria (Specific, Measurable, Achievable, Relevant and Timely). COGNIMAN communications activities are being called upon to demonstrate the value and contribution to the project's success. Therefore, determining some key metrics and measurements is essential.

The metrics are directly linked to all communications activities. The main tactics to employ are website, social media, events, PR and newsletters.

Based on the above preliminary split of communications activities, Table 12 shows the success metrics that represent measurements against the communications objectives, which have been identified.

Moreover, a set of KPIs defined hereafter will be analysed periodically in order to assess the performances of the Dissemination and Communication actions undertaken to achieve these goals. Based on this performance assessment, the KPIs will be reviewed and adapted periodically. The constant monitoring of the KPIs will allow pointing out strengths and weaknesses of the strategy pursued and to identify suitable mitigation strategies when needed.



Table 12 – Communication and dissemination key metrics and KPIs

Channels/ tools	Metric/ indicator	M1-12	M13-24	M25-36	M37-48	Total
Website	Unique page visits	800	1200	1600	2000	5600
	News and event section updates	10	20	30	30	90
Social Media	Followers on LinkedIn	200	250	300	350	1100
	Posts on LinkedIn (own posts and reposts)	40	80	100	120	340
Events and conferences	Participants in the events and workshops	50	80	120	150	300
	Number of events and workshops	1	1	2	3	7
Media relations	Press releases delivered to traditional media	4	4	4	4	16
Publications	Conference papers and journal articles	1	2	7	10	20
Newsletters	Newsletter published	3	3	3	3	12
Promotional material	Brochures					Need basis
	Roll-ups					Need basis
	Pilot one-pager	4	Need basis	Need basis	Need basis	4
	Video	1	1	1	1	4

The list of metrics can be further extended and updated. Measuring the performance of each campaign and each tactic provides a good basis for determining what works well and what how all project partners can best leverage the COGNIMAN project.



6 Communication and dissemination management policies

Making the project and its results visible for all relevant stakeholders is a legal obligation under the grant agreement. In addition to that, specific rules apply.

6.1 Partners roles and responsibilities

Within WP5 “Communication, Dissemination and Exploitation”, all COGNIMAN partners will actively participate in and contribute to communications in their respective networks and focus areas and support dissemination of the project results. Some key tasks and corresponding partners are listed as follows:

- EITM as WP leader is responsible for the coordination and monitoring of the overall communication and dissemination activities.
- EITM is also responsible for the development of the communication and dissemination materials and channels (project website, newsletters, project flyer, videos etc.).
- EITM as leader of T5.2 is responsible for the design and development of the project website.
- MI as leader of T5.3 is responsible for the COGNIMAN exploitation plan.
- SINTEF as leader of T5.4 is responsible for COGNIMAN standards monitoring, impact and compliance.
- EYDE as leader of T5.5 is responsible for COGNIMAN network of open-access pilots.

6.2 Acknowledgement of EU funding

All communication activities of the partners related to the action (including media relations, conferences, seminars, information material, such as brochures, leaflets, posters, presentations, etc., in electronic form, via traditional or social media, etc.), dissemination activities and any infrastructure, equipment, vehicles, supplies or major result funded by the grant must acknowledge EU support and display the European flag (emblem) and funding statement (translated into local languages, where appropriate), as can be found in the Brand book.

Any communication or dissemination activity related to the action must use factually accurate information. Moreover, it must indicate the following disclaimer (translated into local languages where appropriate): “Co-Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.”



7 Partner engagement

Integrating the project partners into the communications activities is crucial to increasing their impact. The partners themselves and the communications of their companies or institutions will support communications at all stages of the project.

7.1 Partners' action plan

In the shared folder for WP5 on NORCE SharePoint, there will be a list of the communications activities planned by partners as to enable each partner to amplify all others' activities. These activities will also be reflected in the reporting. This plan is a living document and will be flexibly adjusted throughout the project.

Tactic or activity	Communication or dissemination	Partner	Timing, date, location	Target audience	Communication objectives	Communication channels to be used	KPI/ Metrics					
							Digital marketing	Social media	PR/Media	Events/conferences	Other	COGNIMAN website
Example 1: Present COGNIMAN at XX Conference	Communication		25 June 2021, online	Manufacturing companies	Raise awareness about COGNIMAN achievements	Event and social media	n/a	Number of posts, number of impressions, number of engagements	Number of mentions in the media, number of press interviews at the conference	Number of attendees, number of opt-ins/leads for more information about the project		# of unique visits
Example 2: Leverage XXX newsletter for promoting the project achievements	Communication		Q3, 2023	Healthcare communities	Get share of voice, position COGNIMAN solutions/results	Email	CTR, open rate	n/a	n/a	n/a		Drive # unique visitors
Example 3: Testimonial about company A contribution to the project results	Communication		Q4, 2023	Policy makers	Create awareness and generate interest for solution A	Promote testimonial via social media, reach out to publications X and Y, direct marketing	e-nurture, email campaign to existing customers of company A	Number of posts, impressions, engagements	2 articles	n/a		# unique visits
Example 1: Present first results at XX Workshop	Dissemination		5 June 2021, Brussels	Policy makers, certification bodies	Create awareness and generate interest for solution A	Event and social media (LinkedIn)	n/a	impressions, number of engagements	media, number of press interviews at the conference	of opt-ins/leads for more information about the project		# of unique visits

Figure 6 – Preview of partner's action plan



8 Standards monitoring, impact and compliance

The COGNIMAN project will identify and monitor relevant standards related to the COGNIMAN Toolbox and the pilots of the projects. There will be a focus on using suitable standards where they are available to ensure the best possible interoperability and future evolution and portability of systems. It will be a goal to have relevant compliance with standards as to impact future evolutions of standards wherever this is appropriate.

The standards identification and monitoring will take advantage of ongoing European joint standardisation activities with related European projects. In particular, as this emerges among MiE (Made in Europe) projects and within the standards activities of the European Adra – AI, Data and Robotics Association.

8.1 Standards and Standards supporting organisations

MiE – Made in Europe is the manufacturing partnership with the European Commission under the Framework Programme Horizon 2021-2027. The Made in Europe partnership will be the voice and driver for sustainable manufacturing in Europe based on joint expertise and resources. It will boost European manufacturing ecosystems towards global leadership in technology, towards circular industries and flexibility. The partnership will contribute to a competitive, green, digital, resilient and human-centric manufacturing industry in Europe. It will be at the centre of a twin ecological and digital transition, being both a driver and subject to these changes. Collaboration in standards activities will be considered together with other MiE projects.

Adra and Adra-e – in May 2021, BDVA, CLAIRE, ELLIS, EurAI and euRobotics founded Adra (AI, Data and Robotics Association, asbl) joining forces and integrating a wide range of stakeholders into the activities of the partnership. Adra is the private side of the AI, Data and Robotics Partnership in Horizon Europe. The Adra-e support/CSA project will actively support the Artificial intelligence, data and robotics (ADR) partnership in order to engage in a dialogue including all actors involved in the ADR ecosystem, mobilising cross-border and cross-sector collaboration in order to create the conditions for a sustainable, effective, multi-layered, comprehensive, and coherent European AI, Data and Robotics ecosystem. ADR Observatory of standards: online observatory of standards and standardisation activities, developed with a group of experts in the field.

StandICT 2026 – the StandICT.eu 2026 support project builds on the previous two editions, namely 2020-23 & 2018-19 StandICT.eu initiatives, obtaining the recognition of the “go-to” project on ICT Standards in Europe. StandICT.eu 2026’s principal goal is to strengthen its global reach in the European ICT Standardisation Ecosystem, by:

1. Launching & managing a robust and efficient facility supporting the Fellowship Programme with € 2,925,000 funding earmarked over 36 months with nine open calls;
2. EUOS (EU Observatory for ICT Standardisation) and Technical Working Groups (TWGs) empowering contributions from ICT standardisation experts;
3. Training the next generation of ICT standardisation experts, engaging with National Standardisation Bodies & PPPs through the Standards Education Group (EUOS-SEG);



4. ensuring high-level steering of StandICT.eu 2026 by means of an authoritative Expert Group (the EAG) who tap directly into the Working Groups (WGs) & Technical Committees (TCs) of Standards Developing Organisations (SDOs), tackling EU priorities, challenges & gaps;
5. Creating an engaging & influential Forum on EU Strategy for ICT standards to address policy (FOREST), to keep momentum in policy discussions, in-synch with the MSP and subsequent high-level forum to be rolled-out in 2022.

The following Landscape of Standards report are available by mid-2023 – and is being consulted by the COGNIMAN project:

- Landscape of digital twins standards
- Landscape of artificial intelligence standards
- Landscape of ontologies standards
- Landscape of edge computing standards
- Landscape of Internet of Things (IoT) standards
- Landscape of digital product passport standards

European Commission Supporting Standards in EU Funded RTDI Projects

HSBooster.eu – HSbooster.eu is a 24-month European Commission initiative until 2024 that will provide the European Standardisation Booster. The booster provides expert services to European projects to help them to increase and valorise project results by contributing to the creation or revision of standards.

HSbooster.eu facilitates and streamlines the dialogue between Horizon 2020 and Horizon Europe Research & Innovation projects with the Standardisation landscape and its main actors, namely corresponding SDOs to increase the European impact on (international) standardisation and strengthen the European competitiveness.

Contributing to standards is often an objective of many R&I projects. However, the actual process to engage with standardisation working groups, technical committees, focus groups can be complex to comprehend. This is where HSbooster.eu steps in.

HSbooster.eu will provide consultancy services to guide and support beneficiaries and consortia of R&I projects to make sure they take the right strategic approach and contribute efficiently to the standardisation process and to make them active players in the development of Standards in the corresponding area or domain.

The HSbooster.eu Standardisation Training Academy is addressing the educational dimension of standardisation, in response to the Code of Practice on Standardisation by providing an efficient mechanism and accessible hub for training knowledge, expertise and skills in the field of standardisation.



8.2 Standardisation roadmap and action plan – project plan and standards application

The following provides an overview of relevant ISO standards and industry consortium standards considered for the initial analysis of suitable standards to consider by COGNIMAN. Each standard is described with the goal and history of the standard.

8.3 ISO SC41 IoT and Digital Twins

8.3.1 Goal of the standard

The objective of the ISO SC41 Suite of standards is to establish standardisation in the area of Internet of Things (IoT) and related technologies. SC41 acts as the primary driving force within JTC 1's standardisation initiative for IoT and Digital Twin, encompassing their corresponding technologies. It also aims to provide guidance to Joint Technical Committee 1 (JTC 1), International Electrotechnical Commissions (IEC), International Organisation for Standardisation (ISO) and other entities developing IoT and Digital Twin related applications.

8.3.2 History of the standard

The ISO SC41, dedicated to IoT and related technologies, was established in 2017. In 2019, it was decided that this committee would also take charge of standardising Digital Twin within ISO, leading to the name change to ISO/IEC JTC 1/SC 41 Internet of Things and Digital Twin. The committee comprises various working groups, including:

- ISO/IEC JTC 1/SC 41/WG 3 – IoT Architecture
- ISO/IEC JTC 1/SC 41/WG 4 – IoT Interoperability
- ISO/IEC JTC 1/SC 41/WG 5 – IoT Applications
- ISO/IEC JTC 1/SC 41/WG 6 – Digital twin
- ISO/IEC JTC 1/SC 41/WG 7 – Maritime, underwater IoT and digital twin applications

Among the ISO SC41 working groups, WG6 Digital Twin holds a prominent position and is related to Digital Twin areas in the COGNIMAN project in particular. The WG6 is currently developing three key standards related to Digital Twin, including:

- ISO/IEC AWI 30173 – Digital twin — Concepts and terminology
- ISO/IEC AWI 30172 – Digital Twin — Use cases
- ISO/IEC 30186 – Digital Twin - Maturity model and guidance for a maturity assessment
- ISO/IEC 30188 – Digital Twin – Reference Architecture



8.4 Digital Twin standard – Asset Administration Shell (AAS) with Industrial Digital Twin Association (IDTA)

8.4.1 Goal of the standard

There are many standards for digital twins. Many European MiE projects and European industries are using AAS. The main reason for this is that this is the only standard for digital twins that has a clear reference to industry operational systems, e.g., the typical protocols, such as OPC UA, are explicitly mentioned in the standard.

The AAS is the implementation of the digital twin in Industry 4.0¹. The goal is to bridge the gap between the real and digital worlds via “standardised connectors” by representing an asset of the real world in the information world through the AAS containing structures, properties and services.

The AAS has been included in the IEC series of standards. Standardisation is led by IEC TC65 WG24 in the area of industrial applications and smart manufacturing in particular. The IEC 63278-1 ED1 project “Asset administration shell for industrial applications - Part 1: Administration shell structure”² was already published on 31/05/2022.

Two parts of this standard are still under development:

- IEC 63278-2 ED1 “Asset Administration Shell for Industrial Applications – Part 2: Information meta model”³
- IEC 63278-3 ED1 “Asset Administration Shell for Industrial Applications – Part 3: Security provisions for Asset Administration Shells”⁴.

The work on PNW 65-994 ED1 “Asset Administration Shell for Industrial Applications Part 4: Use Cases and Modelling Examples”⁵.

8.4.2 History of the standard

The AAS specification was initially developed by the Platform Industrie 4.0, which is a network of companies, associations, trade unions, science and politics in Germany.

The AAS specification is currently structured into five parts:

- Part I is about the AAS metamodel and serialisation formats (JSON, XML and RDF)
- Part II specifies the APIs for reactive AASs, which are executable AAS that can be communicated with via APIs
- Part III specifies data specification templates conformant to IEC 61360 which defines the semantics of single properties or values
- Part IV covers the AAS security metamodel

¹ [Plattform Industrie 4.0 - Working Group “Reference Architectures, Standards and Norms” \(plattform-i40.de\)](#)

² [IEC 63278-1 “Asset Administration Shell for Industrial Applications – Part 1: Asset administration shell structure”](#)

³ [IEC 63278-2 “Asset Administration Shell for Industrial Applications – Part 2: Information meta model”](#)

⁴ [IEC 63278-3 “Asset Administration Shell for Industrial Applications – Part 3: Security provisions for Asset Administration Shells”](#)

⁵ [PNW 65-994 ED1 “Asset Administration Shell for Industrial Applications Part 4: Use Cases and Modelling Examples”](#)



- Part V defines the AASX Package Exchange Format (AASX) to be used as the exchange file format for the transport of information from one partner in the value chain to the next.

All parts of the AAS specification except part IV are already available for download⁶.

There are various open implementations of the AAS specification (for instance FA³ST⁷ and NOVAAS⁸) that can be considered in the project.

8.5 DTC – Digital Twin Consortium

8.5.1 Goal of the standard

The Digital Twin Consortium⁹ (DTC) operates as a program under the Object Management Group (OMG) and comprises members from industry, academia, and government. The DTC's primary objective is to promote the adoption of digital twins across various sectors. This is achieved through the development of shared terminology, related technologies, best practice guidelines, and open-source reference implementations.

The working groups within the DTC focus on sectors such as Aerospace & Defense, Agriculture, Food & Beverage, FinTech, Healthcare & Life Sciences, Manufacturing, Mobility & Transportation and Natural Resources. By addressing these sectors, the DTC aims to facilitate the widespread application of digital twins and foster collaboration among stakeholders.

8.5.2 History of the standard

The DTC was established in 2020 and is a program of OMG with the aim to create technology standards. DTC has many working groups including the DTC Manufacturing Working Group which focuses on the applicability of digital twins to the manufacturing process in various industries. The group is exploring the use of digital twins to:

- Accelerate product development
- Reduce defects
- Troubleshoot equipment
- Increase uptime
- And decrease manufacturing costs.

⁶ <https://industrialdigitaltwin.org/en/content-hub/downloads>

⁷ <https://www.iosb.fraunhofer.de/en/projects-and-products/faaast-tools-digital-twins-asset-administration-shell-industrie40.html>

⁸ <https://gitlab.com/novaas/catalog/nova-school-of-science-and-technology/novaas>

⁹ <https://www.digitaltwinconsortium.org/>



ISO SC42 AI and CEN JTC21 AI

8.5.3 Goal of the standards

SC42 operates as a joint committee of ISO and IEC, serving as a central entity for standardisation efforts in the field of Artificial Intelligence (AI) and the entirety of the AI ecosystem. Moreover, SC 42 is scoped to provide guidance to ISO and IEC committees involved in the development of AI applications. SC42 will services as the focus and proponent for JTC 1's standardization program on AI.

8.5.4 History of the standards

ISO SC42 AI was established in 2017, involving the previous activities of the Big Data group as an included WG2 Data Working group – which established the first ISO Big Data standards. Additionally, SC42 comprises several other Working Groups, namely:

- ISO/IEC JTC 1/SC 42/WG 1 – Foundational standards Working Group
- ISO/IEC JTC 1/SC 42/WG 2 – Data Working Group
- ISO/IEC JTC 1/SC 42/WG 3 – Trustworthiness Working Group
- ISO/IEC JTC 1/SC 42/WG 4 – Use cases and applications Working Group
- ISO/IEC JTC 1/SC 42/WG 5 – Computational approaches and computational characteristics of AI systems Working Group

8.6 Ontology Standards

8.6.1 Goal of the standards

The Semantic Web¹⁰ represents an expansion of the World Wide Web facilitated by standards established by the World Wide Web Consortium (W3C). Its primary objective is to enhance the machine-readability of Internet data. The term “Semantic Web” refers to W3C’s vision of the Web of linked data. Semantic Web technologies enable people to create data stores on the Web, build vocabularies, and write rules for handling data. Linked data are empowered by standards such as RDF¹¹, SPARQL¹², OWL¹³, and SKOS¹⁴.

Link Data. The Semantic Web is a Web of Data — of dates and titles and part numbers and chemical properties and any other data one might conceive of. The Semantic Web technologies, including RDF, OWL, SKOS, SPARQL, and more, create an environment where applications can effectively query this data, derive meaningful insights, and leverage specialised vocabularies for enhanced understanding and inference capabilities.

¹⁰ <https://www.w3.org/standards/semanticweb/>

¹¹ <https://www.w3.org/2001/sw/wiki/RDF>

¹² <https://www.w3.org/2001/sw/wiki/SPARQL>

¹³ <https://www.w3.org/2001/sw/wiki/OWL>

¹⁴ <https://www.w3.org/2001/sw/wiki/SKOS>



Vocabularies. In certain contexts, organising data can be crucial or advantageous. By utilising OWL to construct vocabularies, also known as ontologies, and employing SKOS for designing knowledge organisation systems, it becomes feasible to enhance data with additional meaning. This enrichment allows more people (and more machines) to do more with the data.

Query. Query languages and databases are closely intertwined. When considering the Semantic Web as a global database, the necessity for a query language becomes apparent. SPARQL serves as the designated query language for the Semantic Web, allowing users to efficiently retrieve and manipulate data within this expansive information ecosystem.

Inference. Towards the uppermost level of the Semantic Web stack, inference plays a prominent role by enabling logical reasoning over data based on predefined rules. The W3C's efforts in the realm of rules, particularly through RIF (Rule Interchange Format) and OWL, concentrate on tasks such as facilitating translation between rule languages and promoting the exchange of rules across diverse systems.

Vertical Application. W3C is working with different industries — for example in Health Care and Life Sciences, eGovernment, Manufacturing and Energy — to improve collaboration, research and development, as well as innovation adoption through Semantic Web technology.

8.6.2 History of the standards

The World Wide Consortium (W3C)¹⁵, founded in 1994 and lead by Tim Berners-Lee, is responsible for the development of several relevant standards (known as W3C recommendations) for the World Wide Web (or Web). Berners-Lee had envisioned the Semantic Web by at least 1994, only a few years after he began developing the WWW in 1989. He unveiled his idea for the Semantic Web at the First International WWW Conference, held in 1994, which resulted in the formation of the W3C.

As of today, the W3C Semantic Web has published many standards including RDF, OWL, SPARQL, RDFa, JSON-LD, SKOS, RDFS, GRDDL, POWDER, PROV, RIF, SAWSDL, RDB2RDF, SHACL.

8.7 ISO/TC 299 – Robotics

8.7.1 Goal of the standard

ISO/TC 299 has the goal to develop high quality standards for the safety of industrial robots and service robots to enable innovative robotic product to be brought onto the market. In addition, ISO/TC 299 has the goal to foster the growth of the robotic market by introducing standards in fields like terminology, performance measurement and modularity. The scope of ISO/TC 299 reads “Standardization in the field of robotics, excluding toys and military applications.”

¹⁵ <https://www.w3.org/>



The standards provide global organisations and individuals with guidance on how to implement robots in best possible way. Value is added to the robot investments by providing clear best practices on how to ensure proper safe installations, as well as providing standardised interfaces and performance criteria.

8.7.2 History of the standard

In 1983 the committee started as subcommittee SC 2 “Robots for manufacturing environment” under the Technical Committee ISO/TC 184 “Industrial automation”. The initial efforts were primarily related to industrial safety with some activity in vocabulary and performance. As a result, the title was updated as “Robots for industrial environments”. The title was again updated to “Robots and robotic devices” to include not only industrial robots but also non-industrial robots, which were defined as service robots in 2006. With increased robotic activity, greater visibility was needed for better coordination. This resulted in ISO/TC 184/SC 2 being upgraded to be ISO/TC 299 with the title of “Robotics” in 2016. These changes over the years have reflected the increasing and broadening standardisation activities in the field of robotics. Here is an overview of standards under development:

Standard and/or project under the direct responsibility of ISO/TC 299 Secretariat ⁽¹¹⁾ ↑
<p>Ⓞ ISO/DIS 5363 Robotics — Test methods for exoskeleton-type walking RACA robot</p>
<p>Ⓞ ISO/DPAS 5672 Robotics — Collaborative applications — Test methods for measuring forces and pressures in human-robot contacts</p>
<p>Ⓞ ISO/FDIS 10218-1 Robotics — Safety requirements — Part 1: Industrial robots</p>
<p>Ⓞ ISO/FDIS 10218-2 Robotics — Safety requirements — Part 2: Industrial robot systems, robot applications and robot cells</p>
<p>Ⓞ ISO/AWI 13482 Robotics — Safety requirements for service robots</p>
<p>Ⓞ ISO/DIS 18646-2 Robotics — Performance criteria and related test methods for service robots — Part 2: Navigation</p>
<p>Ⓞ ISO/DIS 22166-201 Robotics — Modularity for service robots — Part 201: Common information model for modules</p>
<p>Ⓞ ISO/CD 22166-202 Robotics — Modularity for service robots — Part 202: Information model for software modules</p>
<p>Ⓞ ISO/FDIS 31101 Robotics — Application services provided by service robots — Safety management systems requirements</p>
<p>Ⓞ IEC 80601-2-77:2019/DAmD 1 Medical electrical equipment — Part 2-77: Particular requirements for the basic safety and essential performance of robotically assisted surgical equipment — Amendment 1</p>
<p>Ⓞ IEC 80601-2-78:2019/DAmD 1 Medical electrical equipment — Part 2-78: Particular requirements for basic safety and essential performance of medical robots for rehabilitation, assessment, compensation or alleviation — Amendment 1</p>

Figure 7 – Overview of standards under development



8.8 Other common and pilot-specific standards

8.8.1 Overview of other standards

The pilot specifications and requirements will be analysed with respect to the identification of potential other and common specific standards that will be relevant to use, such as OPC UA as a common standard or any standards that are related to the domains of the various pilots.

Table 13 – Factory of the future projects

FoF – Factory of the Future projects	
Connected Factories 2	Digital Manufacturing Platforms for Connected Smart Factories (CSA)
EFPP	Digital Manufacturing Platforms for Connected Smart Factories (IA)
AI REGIO	I4MS (phase 4) - uptake of digital game changers (IA)
COLLABS	Security and resilience for collaborative manufacturing environments (RIA)
XMANAI	Artificial intelligence for manufacturing (RIA)
SHERLOCK	Effective Industrial Human-Robot Collaboration (RIA)
DIY4U	Open Innovation for collaborative production engineering (IA)
LEVEL-UP	Refurbishment and re-manufacturing of large industrial equipment (IA)
DIMOFAC	Pilot lines for modular factories (IA)
REMODEL	Handling systems for flexible materials (RIA)
EnerMan	Energy-efficient manufacturing system management (IA)
PENELOPE	Pilot lines for large-part high-precision manufacturing (IA)
InterQ	Quality control in smart manufacturing (IA)

The lead entity for the Made in Europe (MiE) Partnership is the European Factories of the Future Research Association (EFFRA; www.effra.eu). EFFRA brings together companies from the entire manufacturing supply chain, including production technology providers and users of such machinery and equipment. On the academic and research side, all leading European research institutes, technical universities and other organisations are part of the community.

Table 14 – Made in Europe projects

MiE – Made in Europe projects	
ENGINE	Zero-defect manufacturing towards zero-waste (IA)
BIO-UPTAKE	Manufacturing technologies for bio-based materials (RIA)
R3GROUP	Rapid reconfigurable production process chains (IA)
MODULAR	Excellence in distributed control and modular manufacturing (RIA)
AGILEHAND	Intelligent work piece handling in a full production line (RIA)
COGNIMAN	AI enhanced robotics systems – Cognitive Industries for smart MANufacturing (IA)



MiE – Made in Europe projects	
METAMORPHA	Laser-based technologies for green manufacturing (RIA)
Circular TwAIIn	Artificial Intelligence for sustainable, agile manufacturing (IA)
RE4DY	Data-driven Distributed Industrial Environments (IA)
AI REDGIO 5.0	ICT Innovation for Manufacturing Sustainability in SMEs (IA)
DiCiM	Digital tools to support the engineering of a Circular Economy (RIA)



9 Exploitation Activity Strategy

Following a strategy for exploitation makes the COGNIMAN project a key point in the realisation of cognitive solutions in manufacturing. This activity must be able to guarantee clear results and easily reusable assets. Everything should then be easily publicly available, so that the results can be disseminated as widely as possible.

The strategy for the exploitation will focus on making the result produced by the project replicable and meaningful also by external parties. This strategy will therefore influence:

- The comprehensibility and clarity of the contexts of the four pilots, from which significant results will be reported
- The entire design and development process of the COGNIMAN toolbox.

The following will describe the sources from which the project will be exploited and the application of exploitation strategies and plans.

9.1 Source of Exploitation

It is important to be able to define the sources for exploitation. These, in fact, form the basis for the realisation of a reusable and at the same time innovative system.

In the context of Industry 4.0, the exploitation of artificial intelligence (AI) models used for analysis plays a crucial role. Industry 4.0 is based on the integration of advanced technologies to improve the efficiency and productivity of industrial processes. AI models, such as machine learning and natural language processing, offer significant potential for analysing large amounts of data and extracting valuable information. The exploitation of such models implies the strategic use of analysis results to optimise industrial operations, identify inefficiencies, predict machine failures or anomalies, optimise the supply chain and improve product quality. The exploitation of AI models in Industry 4.0 can lead to numerous benefits, such as increased productivity, reduced production costs, better product lifecycle management and increased customer satisfaction. However, it is important to ensure proper implementation and management of AI models, including data protection, algorithm transparency and mitigation of risks associated with the use of such advanced technologies.

COGNIMAN aims to maximise the exploitation of the digital twins integrated by the partners in the project solution. Digital twins are detailed digital representations of physical systems or processes, allowing us to simulate and monitor their operation in real time. By exploiting the solutions provided by the partners, it is possible to obtain a complete and accurate view of the different components involved in the project, enabling to analyse and optimise performance more effectively. However, it is important to emphasise that successful exploitation requires agreement and close cooperation between all project partners. Clear guidelines and protocols must be established for the integration and use of solutions, defining common objectives, intellectual property rights, data sharing and shared responsibilities.



9.2 Clarity of Pilot Context

The project involves the application of the developed solution on four different pilots, which in turn describe four different manufacturing areas. A clear description of the application context for the four pilots can facilitate the integration of this solution into other manufacturing environments. A transparent description of the fields of application facilitates the adoption and dissemination of the project, providing an immediate understanding of the benefits and possibilities offered.

This can generate greater interest from potential partners, customers or financiers, increasing opportunities for collaboration and investment. In addition, a clear definition of application areas helps to target resources, concentrating on areas where the project can make the greatest impact. This promotes efficient use of resources and greater focus on key project objectives. Besides, a clear description of scopes of application allows solutions to be adapted and customised to the specific needs of different contexts, increasing their relevance and effectiveness.

Furthermore, it is interesting to be able to provide an overview that can address the limitations of manufacturing activities in as general a manner as possible. In this way, the COGNIMAN toolbox can be presented as a suitable solution for any type of problem in this sphere. Starting with the general solution, it is then possible to go on to explore the specific action contexts individually, detailing the actions taken to modify the solution, making it suitable for the project pilots.

The above directly relates to the results obtained from the use of the COGNIMAN toolbox in the four contexts of use. Making the results publicly accessible, highlighting what the real improvements are, is an operation that can highlight the goodness of the solution. The detailed description of the results also illustrates how the solutions can be adapted and applied in different contexts, thus enabling greater customisation and adoption. Furthermore, the presentation and description of results foster transparency, building trust and providing a solid basis for future collaboration or development.

9.3 Design and development strategies

The design and development phases of the COGNIMAN toolbox will be strongly influenced by several factors and planning choices. COGNIMAN's approach to system implementation will be based on the choice of open-source technologies. The decision to adopt open-source technologies in the project is crucial to facilitate the exploitation of the results obtained. Open-source technologies offer numerous advantages in terms of accessibility, flexibility and collaboration.

Due to the open nature of the source code, open-source solutions allow a wide community of developers to contribute, improve and customise technologies according to the specific needs of the project. This promotes greater adoption and dissemination of solutions, increasing opportunities for collaboration and exploitation of results.



The use of open-source technologies also facilitates integration with other systems and platforms, enabling greater interoperability and a smoother flow of data. This facilitates the exploitation of project results, allowing open-source technologies to be combined with other existing solutions and creating synergies that maximise the value of the results obtained.

In addition, the adoption of open-source technologies can reduce licensing costs and foster the accessibility of solutions to a wider audience, stimulating the adoption and dissemination of project results nationally and internationally. Overall, the choice of open-source technologies promotes a collaborative mindset and an open innovation ecosystem, thus contributing to the project's exploitation and long-term impact.

Another aspect to be taken into account in order to increase the exploitability of the results concerns the compatibility of the technologies used. High compatibility between the different modules and easy deployment on the various operating systems are key properties to make the COGNIMAN solution highly reusable. The compatibility of technologies reduces barriers to adoption and use, enabling easier implementation and dissemination of the developed solutions. It also promotes collaboration between different partners and actors involved in the project, facilitating the exchange of knowledge, alignment of objectives and optimisation of resources. The compatibility of technologies also facilitates the updating and evolution of the system over time, allowing new solutions to be integrated and adapted to changing needs and emerging challenges.

The development of the toolbox must be conducted considering the minimum system execution requirements. Getting a system executable on low-performance systems can increase the solution's adoption surface. In this sense, software optimisation plays a key role in facilitating the exploitation of a project by reducing the minimum execution requirements. Lowering the minimum execution requirements encourages greater adoption and dissemination of the project, allowing a wider audience to access the solutions offered. In addition, optimising the software can help reduce implementation and maintenance costs, making the project more affordable. The exploitation of the project thus benefits from greater scalability and a wider user base, potentially generating a more significant impact and sustainability in the long term.

9.4 Exploitation Plan

Taking into account what has been said so far, it is clear that exploitation is composed of several activities to be carried out at different stages of the project. In order to have a clearer view of all the tasks and guidelines to be followed for this purpose, a table summarising the main activities is proposed below.

Table 15 – Exploitation tasks and guidelines for the project activities

Project Activity	Exploitation Task / Guideline
Design and Development of COGNIMAN Toolbox	The Design must be conducted schematically and concisely, detailing the system architecture. Development must be carried out by considering open-source solutions and all changes and additions made must be documented



Project Activity	Exploitation Task / Guideline
System Availability	The system must be easily accessible from external parties. The presence of an installation guide could facilitate the adoption of this solution
System Optimisation	The system must go under optimisation phase, in order to improve his performance and lower the minimum requirements to get the product working
Pilot Synthesis	The pilot context and the use of the COGNIMAN toolbox must be described and explained in synthetic form.
Overview of Results	The results obtained within the project must be publicly available, facilitating the understanding of the benefits obtained from the system's application

9.5 Envisaged Exploitation Activities

The Following Table summarises the main activities that are envisaged to be performed during the project together with their outcome and the scheduled timeline. Also, the consortium is currently analysing the possibility to request supporting services such as the Horizon Result Booster to get additional support for the exploitation strategy definition and go to market approach.

Table 16 – Activities for the definition of the exploitation strategy

Activity	Outcome	Timeline
Market watch	Market status and trends	Continuous, starting in Q4 2023
Key Results identification	List of key results of the project	Q1 2024
Key Exploitable Results identification	Preliminary list of Key Exploitable Results	Q4 2024
Key Exploitable Results analysis	Deep understanding on the exploitation potential of the selected KERS	Q2 2025
Key Exploitable Results assessment	Final list of selected KERS	Q4 2025



10 Conclusions

The communication and dissemination plan outlines the strategic and tactical aspects of COGNIMAN communication and dissemination planning, including target audiences, messaging framework and metrics for measuring and evaluating success. Moreover, it contains practical recommendations for a communications mix.

With sixteen partners from six countries, the project has a truly European character and international scope. In addition to the centralised communication and dissemination effort, partners' active involvement in spreading the word about COGNIMAN locally and nationally is expected to boost the results of media relations and social media communications.

While the strategy provides an approach for communication and dissemination planning, it will evolve over the 48-month project. Planning will become more detailed and individual campaigns and activities will evolve from the results the project generates.

The standardisation plan has a foundation in an analysis of COGNIMAN technology and pilot analysis with respect to identification of standards for further focus during the project – related to the most obvious standards and standardisation organisations related to AI, Data and Robotics and the domains of the various pilots. During the first year of the project, it is an aim to identify the standards of highest importance for the COGNIMAN project in order to focus efforts related to these.

The main steps for the definition of the exploitation strategy of the project results is also included and will be further elaborated as the project progresses and starts producing results.

This deliverable is written at an early stage of the project. Therefore, it primarily lays the foundation for further developments of the planned activities. Moreover, it includes concrete communication channels and activities. These activities are expected to evolve as results become available. The communication and dissemination approaches will be tweaked throughout the project for greatest possible impact.