D 6.8
Final Plan for Exploitation and Dissemination of Results: PEDR

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[1] PU: Public, CO: Confidential, only for members of the consortium (including the Commission Services)
[2] RE: Report, OT: Other; ORDP: Open Research Data Pilot

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

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Abbreviations and acronyms

TERMS, ABBREVIATIONS AND ACRONYMS	
ADRA	Artificial Intelligence, Data and Robotics Association
CF2	ConnectedFactories 2
CSA	Coordination and Support Action
BDVA	Big Data Value Association
DEI	Digitizing European Industry
DIH	Digital Innovation Hub
DMP	Digital Manufacturing Platform
DoA	Description of Action
EC	European Commission
ECSEL	Electronic Components and Systems for European Leadership
EU	European Union
EFFRA	European Factories of the Future Research Association
FoF	Factories of the Future
HE	Horizon Europe
IA	Innovation Action
I4MS	ICT Innovation for Manufacturing SMEs
KDT	Key Digital Technologies
MiE	Made in Europe
PEDR	Plan for Exploitation and Dissemination of Results
SAE	Smart Anything Everywhere
SME	Small and Medium Sized Enterprise
SPARC	Partnership for robotics
WP	Work package
ORDP	Open Research Data Pilot

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Executive Summary

The ConnectedFactories2 (CF2) '**Plan for Exploitation and Dissemination of Results**' (PEDR) is a document of strategic nature. It was used to plan, implement, and monitor the project's communication, dissemination, and exploitation activities. The preliminary plan outlined in the Description of Action (DoA) was continuously updated. The 'Intermediate PEDR' represented the status of project dissemination and exploitation in month 18 (May 2021) and was further expanded throughout the project lifetime towards the document at hand, the final PEDR at month 36 (November 2022), representing the end of the project.

The CF2 final PEDR details activities performed within the second half of the project and presents activities and exploitation plans beyond the project's end. During the second half of the project, the covid-19 pandemic situation still led to the challenge of keeping the planning as flexible as possible and the need to shift the focus towards digital tools and activities. In person events became possible again towards the project end.

The key objective of the project was to enhance smart manufacturing through digital platforms, cross-cutting features, and skilled workforce. Key aims were to attract relevant stakeholders to the CF2 ecosystem, stimulate knowledge exchange and technology transfer, and ultimately support European manufacturing companies in their digital transformation. CF2 Dissemination and Exploitation activities had the twofold goal to collect project relevant information from the community (**input side**) as well as to disseminate and discuss the project's results (**output side**). Both sides benefited vastly from the large consortium (19 partners in 16 countries) leveraging from their wide networks as well as the close connection to the European Factories of the Future Research Association (EFFRA) as a multiplier.

To make sure the project's **input side** is well covered and the **integration of new stakeholders** across Europe effective, a whole work package (WP5) was dedicated to conduct **2 European** and **20 national and regional workshops** engaging over 500 stakeholders from over 15 EU countries. As reported in the related Deliverables, the project has even exceeded these numbers. Moreover, a close link to the DT-ICT-07 sister projects and related initiatives has been established from the very beginning of the project and mailings lists, working groups and regular focused thematic events have been set up and used intensively.

Regarding the **output side,** the consortium constantly analysed the respective dissemination means and channels to make sure to address the right recipients. These included the manufacturing industry, especially SMEs, EU/national/regional initiatives, the ecosystems established by the IA sister projects (DMP Cluster), the DEI Initiative and focus area, other related H2020 FoF/ HE Made in Europe, ICT-projects, the ECSEL and I4MS community, DIHs across Europe, policy makers, as well as the general public.

The results generated within CF2, its sister projects and related initiatives were broadly **communicated and disseminated** through WP6 via the project website and EFFRA Innovation Portal (including social media), newsletters, videos, events and partner networks providing open access to CF2 documents, workshop reports and project deliverables. In addition to the participation in conferences and fairs, the CF2 workshops involve a large number of stakeholders to inform and attract new stakeholders, as well as to discuss and disseminate CF2 findings and successful use cases. The project results and key deliverables will be maintained in a structured way in the EFFRA Innovation Portal. Moreover, key exploitable outputs like the CF2 pathways, use cases, training catalogues, structured wiki will be further used by the partners after the project end.

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1 Introduction and Context

The CF2 CSA communication, dissemination and exploitation efforts were designed to maximise the reach and impact of the outcomes of the CSA. This included providing a structured overview of available and upcoming technological developments and best practices to the European manufacturing industry, academia and policy making to enhance the European competitiveness and opening new business opportunities.

These objectives of communication, dissemination, and exploitation activities included:

- Communication activities aimed at giving visibility of the project to a wider, more general audience that might not have technical expertise in the topics addressed in the CF2 CSA
- Dissemination activities aimed at sharing CF2 CSA results to a specialised audience with experience and deep knowledge on the topics of digitalisation of the manufacturing industry
- Exploitation activities aimed at promoting and enforcing knowledge transfer and fostering the adoption of the results produced by the CF2 CSA, its sister projects, and the community

This way, the PEDR structured and guided the communication, dissemination, and exploitation efforts coherently in the desired direction according to the overall project objectives. More importantly, the PEDR defined the expected exploitable results of CF2 as well as an exploitation strategy that specified how to translate these results, on the one hand into recommendations for relevant political, manufacturing stakeholders, and on the other hand into concrete success cases for researchers developing and refining these pathways as well as potential users and early adopters of these technologies.

The project's Communication, Dissemination, and Exploitation approach was structured into two work packages (WPs) taking up activities and results from all other WPs.

The objectives of WP5 were to engage with the actors in both European and local manufacturing fora, including manufacturing companies, suppliers and users of digital technologies and platforms. This work package had a key role in giving directions to the enhancement of the ConnectedFactories2 pathways and the associated set of cases, establishing cross-fertilisation with national/regional actors and initiatives as well as between academia and industry and in disseminating results, experiences, and knowledge out of the CSA.

WP5 concentrated on holding European, national and regional workshops on digital manufacturing to collect information as well as to disseminate and discuss CF2 results. It included the following activities, which partly have individual Deliverables this document refers to:

- Develop a strategy and information package for digital manufacturing workshops (D5.1)
- Organise 20 national/regional workshops and publish associated reports (D5.3 and D5.4)
- Organise two European workshops and publish associated reports (D5.2 and D5.5)

The overall objective of WP6 was to effectively: 1) disseminate key project information, activities and results, 2) support cross-fertilisation and increase synergies between related activities projects and communities and 3) enhance the exploitation and uptake of innovative technologies.

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WP6 focused on the development of communication and dissemination materials and performing broad outreach, dissemination and exploitation activities. It included the following activities, which partly have individual Deliverables this document refers to:

- Develop a corporate identity, website incl. social media and dissemination material (D6.1, D6.2)
- Produce newsletters, articles and publications
- Organise/ co-organise dissemination and collaboration events and thematic workshops (D6.3, D6.7)
- Develop 'animated pictures' illustrating digitalisation in manufacturing (D6.4, D6.6)

2 Target groups

CF2 activities involved close collaboration with the DT-ICT-07 sister projects (DMP Cluster Innovation Actions), other related projects funded under the Factories of the Future (FoF) / Made in Europe Partnership and the European Factories of the Future Research Association (EFFRA). Moreover, CF2 aimed at reinforcing links to other European activities, such as ECSEL/ KDT, BDVA and ADRA, SPARC/euRobotics, Cybersecurity, I4MS, SAE and relevant standardisation groups, as well as to initiatives at transnational, national and regional level.

In December 2019, the CF2 project kicked off together with the Innovation Actions (IA) of the DT-ICT-07-2018-2019 call 'Digital Manufacturing Platforms for Connected Smart Factories' (DMP Cluster). Being the CSA in this call, CF2 fostered a structured exchange between these projects, enhanced close collaboration with and between them and communicated and disseminated the outcomes and results broadly. The following IAs were running within this 'Digital Manufacturing Platforms' (DMP) Cluster (see DT-ICT-07-2018, DT-ICT-07-2019):

- **ZDMP** - Zero Defect Manufacturing Platform (https://www.zdmp.eu/)
- **QU4LITY** - Digital Reality in Zero Defect Manufacturing (https://qu4lity-project.eu/)
- **EFPF**- European Connected Factory Platform for Agile Manufacturing (https://www.efpf.org/)
- SHOP4CF - Smart Human Oriented Platform for Connected Factories (https://shop4cf.eu/)
- **DigiPrime** - Digital Platform for Circular Economy in Cross-sectorial Sustainable Value Networks (https://www.digiprime.eu/)
- **KYKLOS 4.0** - Advanced Circular and Agile Manufacturing Ecosystem based on rapid reconfigurable manufacturing process and individualised consumer preferences (https://kyklos40project.eu/)

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Figure 1. CF2 sister projects from DT-ICT-07-2018 and 2019 calls (the DMP cluster)

Moreover, the CF2 CSA addressed a broad range of stakeholders within the European manufacturing landscape, specifically the research community, industry, regional SMEs, DIHs, potential end-users, and technology integrators (with special focus on SMEs) as well as the general public. CF2 partners engaged with their local environment as well as with actors at a European level that are relevant to their specific topic of expertise, e.g., standardisation, cybersecurity, human-machine interaction, etc.

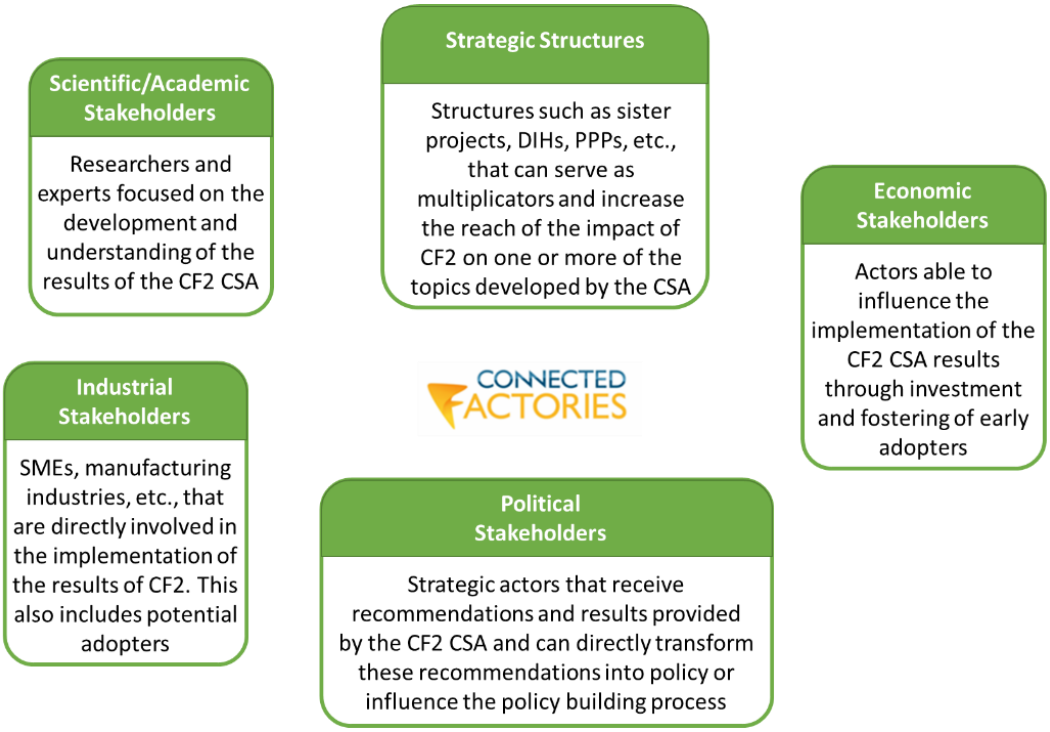

Figure 2. Target groups of CF2 CSA

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The main target audience can be segmented into five groups: research, economical, industrial, political, strategic structures (Figure). CF2 brought these players together and fostered collaboration among them. This was achieved by organisation of and participation in common activities and events, as well as by establishing working groups to systematically develop and refine the concepts and results produced by CF2.

3 Roadmap and Timeline of the CF2 PEDR

Figure shows the adapted CF2 Communication and Dissemination Plan according to the activities performed until M36. Details of these events are presented in the following chapters and Annex of this deliverable.

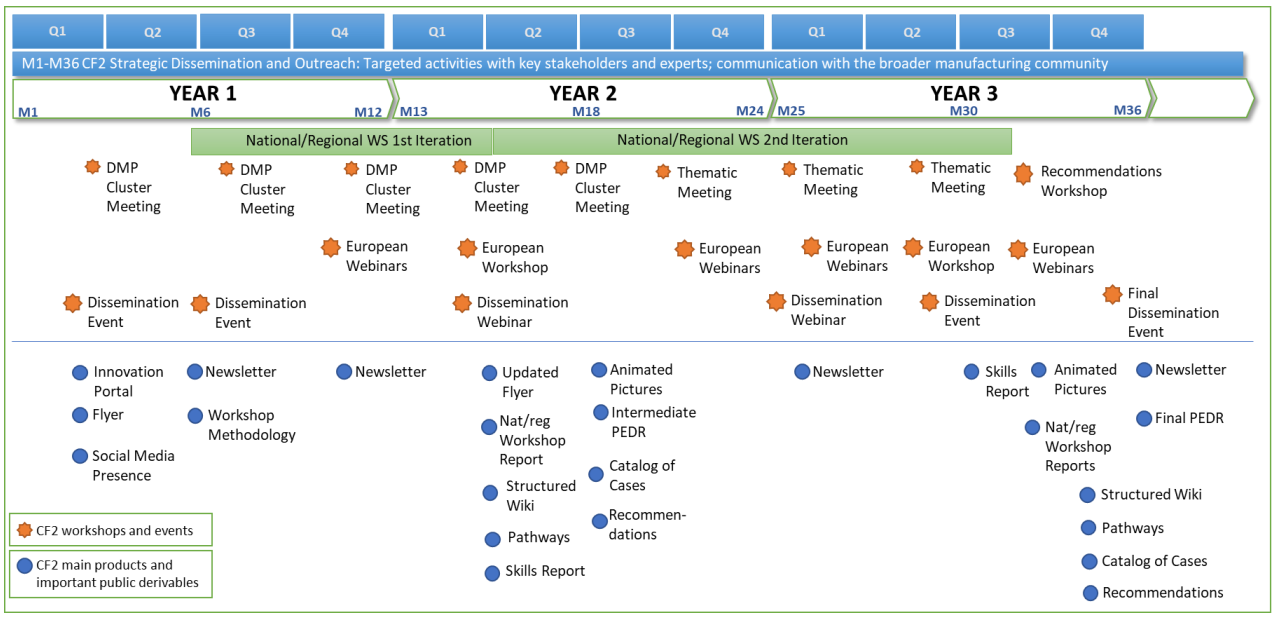

Figure 3. Organised and planned dissemination and communication activities for the CF2 CSA

4 Covid-19 Related Risks and Measures of Mitigation

During the second period, face-to-face interactions were still limited due to the pandemic of covid-19. Towards the end of the project in person meetings became possible again and CF2 held the respective meeting face-to-face whenever possible, with the second European Workshop and the Final Dissemination Event being among the largest ones.

The CF2 CSA consortium had taken measures and adapted its activities to achieve its proposed objectives. Events and workshops when held online used suitable digital tools, white boards and voting possibilities to enable interaction between the participants. Break out rooms served for more focussed discussions between participants and events were recorded to serve a larger audience. Online meeting also reduced traveling and made participation possible for people who would otherwise not have been able to attend. Networking opportunities could nevertheless only be covered to a minor extend and going back to face-to-face meetings was recognised as a much better format to build trust and collaboration opportunities.

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5 Communication Strategy of CF2

Communication activities add a public value to the achievements of the project by presenting the sometimes-complex results into accessible and understandable formats prioritising the impacts and relevance for end-users and society.

The CF2 communication approach focused on giving visibility and positioning the CSA to a broader audience in the European industrial landscape. The specific communication channels for each target group varied according to the expected interest and expertise of stakeholders within these groups. Specifically, communication activities fully exploited the broadcasting capabilities of several state-of-the-art social media tools and the CF2 network and ecosystem.

5.1 Means of Communication

Several channels were being utilised by CF2 as a whole and by its partners to the communication objectives of the CSA and reach the target audience identified. Table 1 and table 2 give an overview of the communication channels and activities that were used during the project. It also lists the Key Performance Indicators (KPIs) for each activity and shows the progress towards them.

Type	Communication channels and activities	Key performance indicator	Progress by M36
Corporate Identity	The CF2 **website**	Operational, active by M3, and under permanent update	Achieved (D6.1) 340 visitors/ months
	CF2 **social media channels**, particularly its Twitter channel, to broadcast information to the wider public	Operational and active at the start of the project	Achieved (D6.1) 234 followers

Table 1. CF2-corporate identity tasks within the Communication Activities

Type	Communication channels and activities	Key performance indicator	Progress by M36
Reach out to Broader Community	CF2 produced **3 electronic newsletters** containing the main information about the project and related FoF PPP activities. Moreover, CF2 content was regularly published in EFFRA newsletters	4 newsletters	3 Newsletter 12 EFFRA newsletter contributions
	Brochures, **flyers**, and other communication material	1st Flyer Updated Flyer	Achieved (D6.1)
	CF2 produced a set of informative videos or **Animated Pictures** to explain CF2 and its outputs to the wider audience, and on the other hand, engage experts with targeted information.	First iteration M18 Second iteration M33 Additional videos	Achieved (D6.4) Achieved (D6.6) 2 more in M36
	EFFRA communication channels, including e-mail list, website, newsletter, and social media channels were actively exploited	Channels active M03	Achieved and extensively used

Table 2. Tasks to extend the CF2-community within the Communication Activities

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5.2 Detailed Communication Activities by M36

5.2.1.1 Corporate Identity: CF2-Website and Twitter Account

The CF2 website is the main entrance of CF2 CSA to learn about the pathways to digitalisation and cross-cutting factors, showcase success cases, discover specialised activities, and obtain overall information on the project. From this perspective, the CF2 website is considered part of communication activities to bring information to the overall community and landscape of stakeholders with additional access to specialised technical information. The CF2 website is a standalone dedicated website strongly synchronised with the EFFRA communication channels and under permanent update. Similarly, the CF2 Twitter account solidifies the presence of the project in social media and facilitates the broadcasting of relevant information to the general public as a means to engage with wider community.

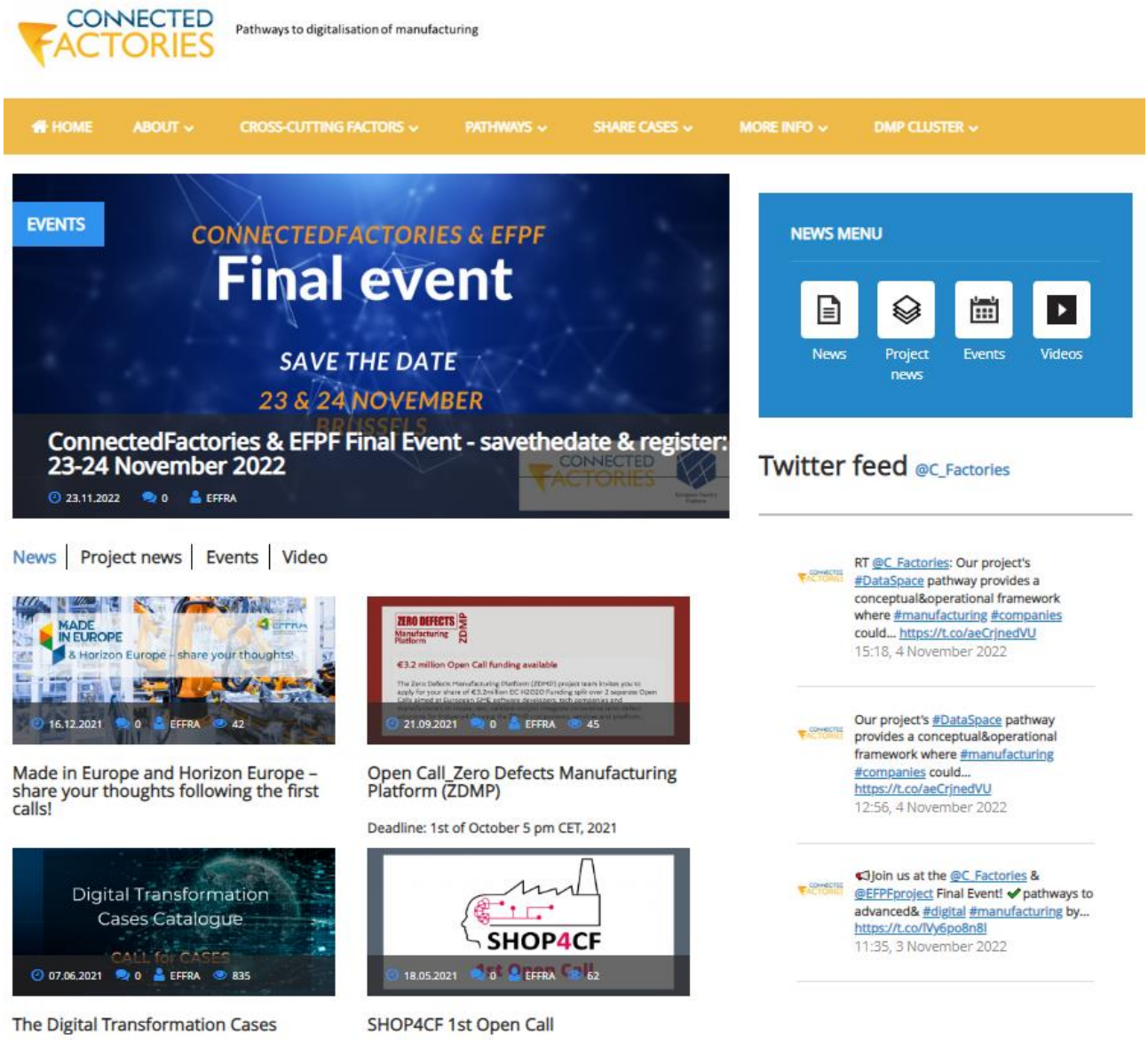

Figure 4. Screenshots of the CF-Website and Twitter account

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5.2.2 Reach out to Broader Community

5.2.2.1 Electronic Newsletters

CF2 produced three electronic newsletters containing the main information about the project and related projects' activities. Newsletters are distributed and published through the EFFRA networks including CF2 community networks and website and additional platforms associated with ICT/CPS in manufacturing as well as through and social networks. The newsletter and further news are shared on the ConnectedFactories website: News | Connected factories

5.2.2.2 Physical and Digital Communication Material

Printed brochures, **flyers** and similar material were originally planned to be produced for distribution at events, workshops and through physical mail. These plans were adapted due to the restrictions imposed by covid-19, and consequentially, **e-brochures**, **e-flyers** and other **digital material** specifically designed to exploit the digital environment were prioritised. Such material was also heavily utilised for online distribution and information purposes. The focus on such 'greener ways' to disseminate even allowed the reach of a wider audience. Moreover, CF2 shares all open Deliverables on its website: WPs & Deliverables | Connected factories. Moreover, a PowerPoint template has been designed (in alignment with the CF2 videos) to present the CF2 pathways in a homogeneous way.

Figure 5. PowerPoint Template for Pathways

5.2.2.3 Audio-visual Communication Material

Following the experience from CF1, CF2 has and has produced a set of informative videos, or 'Animated Pictures'. Key messages concerning digitisation of manufacturing and the core points of the project were selected. A clear narrative for different pathways has been developed. The videos were targeted to wider

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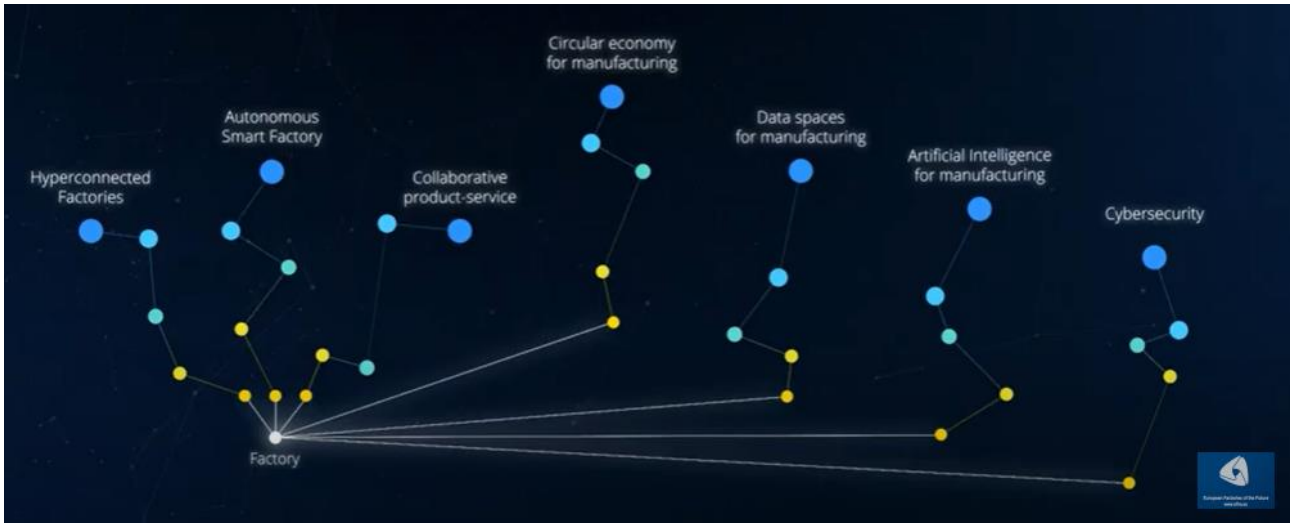
audiences as well as the manufacturing, digital and related communities. The first iteration of 'Animated Pictures' provides a concise and engaging overview of the pathways to digitalisation of the manufacturing industry proposed by CF2 Use cases and demonstrators on the pathways to digital manufacturing by ConnectedFactories - YouTube. The second iteration goes more into depth and describes the Data Spaces Pathway in more detail ConnectedFactories Data Space Pathway - YouTube with an associated cases video Digital platforms for Manufacturing - a Step Stone towards Data Spaces for Manufacturing - YouTube. Another video depicts the Circular Economy pathway in more detail The Circular Economy and Manufacturing pathway - YouTube. 3 of the videos were produced in the second reporting period, as results became available. The first 2 videos are described in more detail in the related Deliverables, while the last 2 videos were produced in addition, due to the very good feedback and many view on the website (1st video was watched over 400 times and shared widely). The videos include animations produced exclusively for them, suitable film footage and the last 2 videos event filming to provide a more human touch. The sister projects use-cases were featured along the different CF2 pathways.



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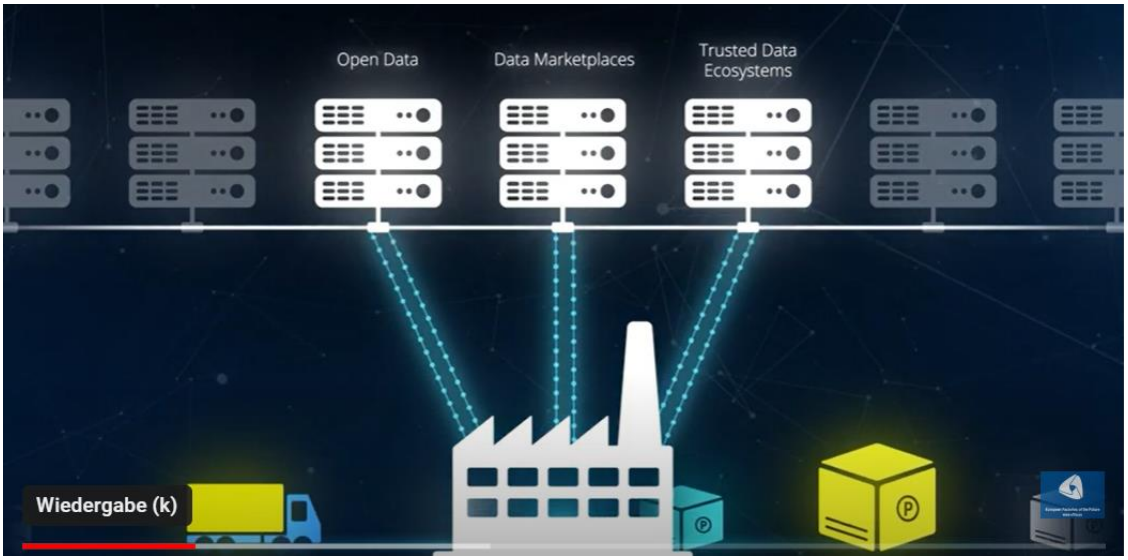

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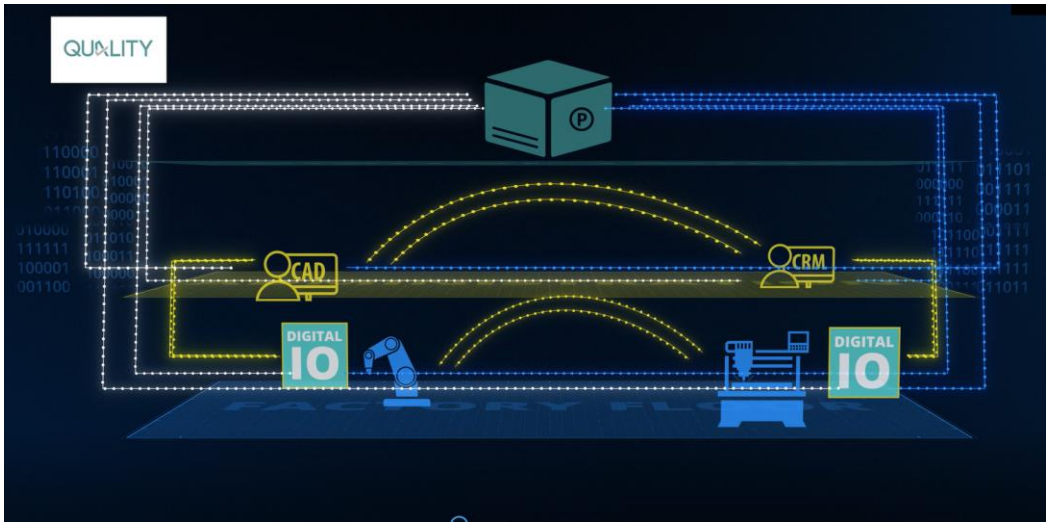

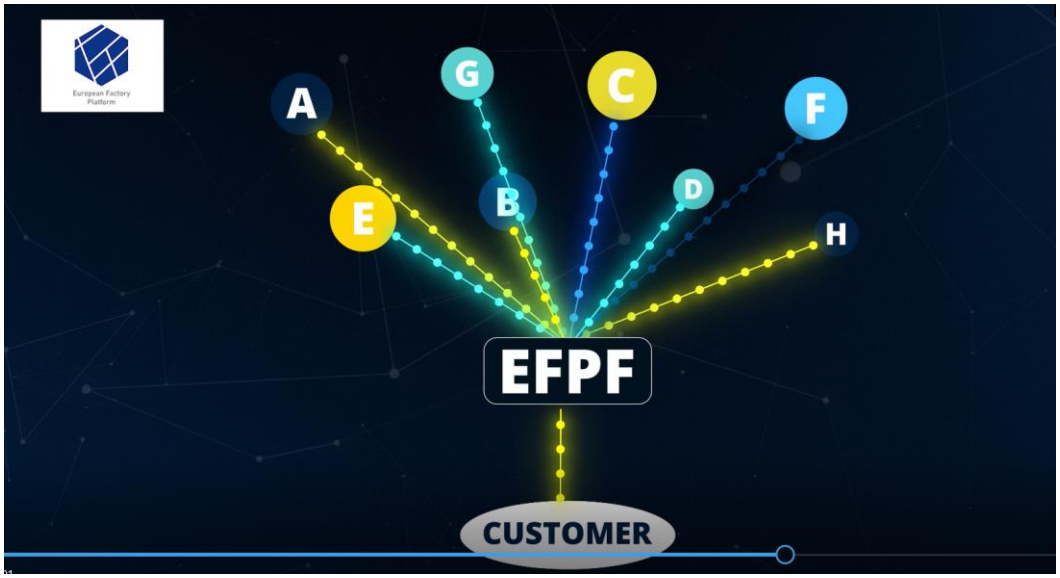

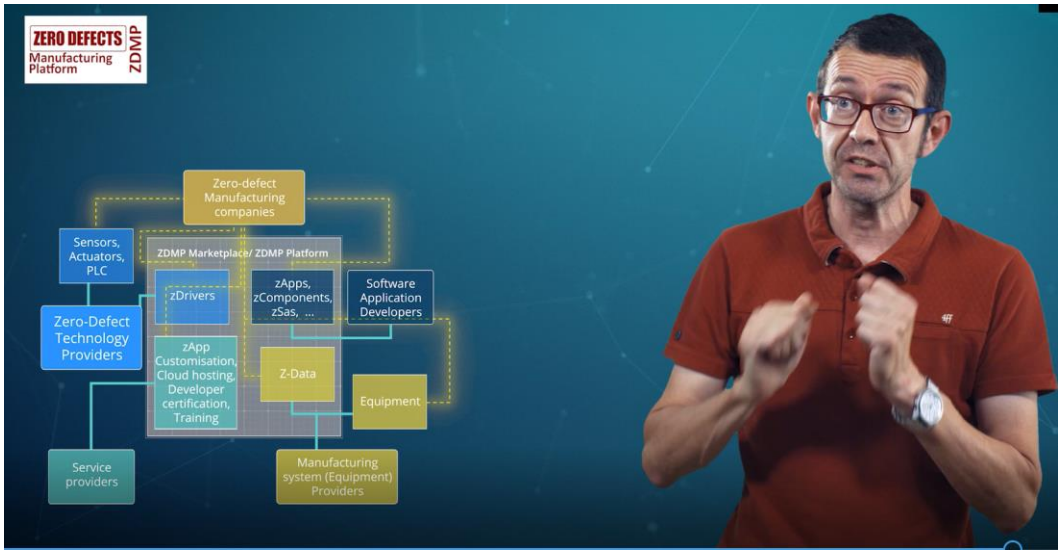

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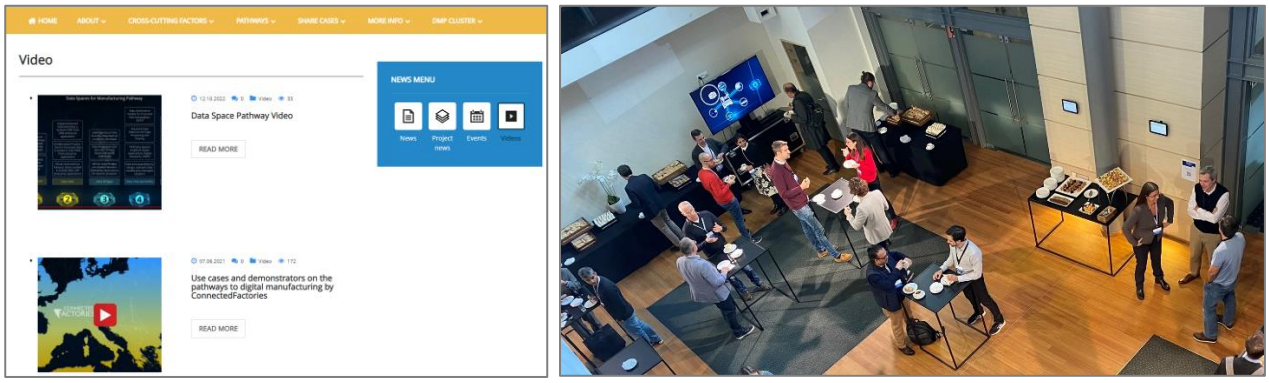

Figure 6. Screenshots from CF2 Videos and their presentation on the CF2 website

All videos are stored on the ConnectedFactories Website and were shown on screens e.g. at the final event.

5.2.2.4 EFFRA communication channels

The EFFRA communication channels, including e-mail list, website, newsletter, and social media channels, i.e. Twitter and LinkedIn (Figure 7), are actively utilised as a multiplicator to reach both specialised, and a wider community within the European manufacturing landscape, including political and economic stakeholders as well as strategic structures focused on the digitalisation of manufacturing, e.g. DIHs

EFFRA Portal as an efficient multiplier of CF2

- EFFRA web-site – Average (monthly) views: 6221, 5 CF2 news promoted
- EFFRA Twitter Channel: Followers: 3474, Average (monthly) tweet impressions: 4683, Average (monthly) profile visits: 3226, Average (monthly) mentions: 23 – CF2 Tweets: 16 – CF2 re-tweets: 27
- EFFRA LinkedIn - Followers: 1754, Average (monthly) visits: 151 CF News: 12
- EFFRA newsletter – Subscribers: 1093, 8 CF2 articles

(a) EFFRA-LinkedIn account (b) EFFRA-Twitter account

Figure 7. EFFRA channels increasing the reach of CF2 activities

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6 Dissemination Strategy of CF2

Dissemination activities under CF2 aimed at sharing the results and progress of the CSA to a specialised audience, to the purpose of refining and improving the knowledge on the digitalisation pathways, cross-cutting factors, success cases, trends and challenges, etc., related to digitalisation of the manufacturing industry. These activities were designed to produce a strong impact on the corresponding target audience regarding the importance and priority of these topics for the competitiveness of the European industry. Moreover, the dissemination strategy set the foundation for later exploitation of the results of CF2. Hence, through these activities, the CF2 CSA expects that the dissemination materials, workshops, publications and training materials, will also contribute and guide the experts in the target audience, such as researchers, SMEs, regulatory bodies, etc., to the implementation or adoption of the proposed developments, helping the further exploitation of the project's results.

6.1 Means of Dissemination

To achieve the position and consolidation of CF2 in the specialised community, achieving the targeted impact, the CF2 partners and the CSA as a whole performed a series of dissemination actions making use of several dissemination channels. Table provides an overview of these activities, including KPI and progress by M36.

Type	Dissemination channels and activities (plan)	Key performance indicator	Progress by M36
Strengthening the Community and Knowledge Transfer	**Joint publication** of cross-thematic peer-reviewed scientific/industrial articles **in international journals**	No KPI set as CF2 is a CSA	1 Joint publication
	CF2-partners will organise 20 **national and regional workshops** where researchers, developers, solution providers and end-users share experiences and challenges regarding the development and deployment of digital manufacturing platforms for connected smart factories.	20 workshops by M32	24 workshops by M32
	A key process in the organisation of the **workshops** is the development of a strategy and an **information package** for their proper execution and documentation.	Info package in M06	Achieved (D5.1) (continuously updated)
	Organising two big CF2 **Dissemination Events**	2 big Events 1st event by M18 2nd event by M32	4 big Events Achieved (D6.3) Achieved (D6.7)
	Participation in info-days, brokerage events, trade-fairs, national events, collaboration meetings with other communities, participation with IA meetings	Participate in 20 events	Over 20 in M36
	Collaboration with other DT-ICT-07-2018-2019 projects: Organise **DMP cluster events**	6 cluster events	12 by M36
	Organise two **European workshops**	2 EU Workshops 1st WS by M18 2nd WS by M32	Over 5 EU WS Achieved (D5.2) Achieved (D5.5)
	The most direct means to inform and access the target audience in CF2 and DMP **e-mail list**. In this case, CF2 builds upon the database developed during CF1 and is updated in concordance with the new results, project news and latest progress on the pathways, cross-cutting factors, and success cases being developed in CF2.	Cluster and thematic mailing lists: All cluster projects reached	Achieved 120 subscribers All cluster projects covered

Table 3. Dissemination channels, activities, KPI and progress by M36

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6.2 Detailed Dissemination Activities and Highlights by M36

6.2.1 Main publications

A joint publication was accepted: Towards Sustainable Manufacturing through Collaborative Circular Economy Strategies, https://hal-emse.ccsd.cnrs.fr/emse-03339428

6.2.2 Organisation of events and workshops

The main instrument to access the dissemination target audience is through the participation, organisation, and co-organisation of thematic activities to discuss the results of CF2 and obtain feedback to refine these results. In this context, the organisation of European workshops and topic-specific workshops have been essential to engage with specialists from the academic and industrial landscape. In the following, the key activities organised by CF2 are highlighted. Additional events were CF2 partners actively contributed are presented in the annex of this document. CF2 dissemination, especially workshop/events had the twofold goal to collect project relevant information from the community (**input side**) as well as to disseminate and discuss the project's results (**output side**). Moreover, they served to create and expand the ecosystem.

6.2.2.1 Connected Factories Big Dissemination Events (WP6)

Two 'Big Dissemination Events' were originally planned in CF2 in WP6. As they could not all be held in person, the consortium decided to extend the number. Three big Dissemination events were held online and a final event as an in-person event. Two of them have already been held and described in detail in the first project period (see interim PEDR and D6.3). Two 'Big Dissemination Events' were held in the second period which are described below and detailed in D6.7.

A third 'Big ConnectedFactories2 Dissemination Event' was organised on 18 February 2022. It was titled '*ConnectedFactories - Use cases and demonstrators of Digitalisation of manufacturing'* and held as an on-line event (still impacted by Covid-19 constraints). The promotion gained broad visibility with 584 views.

289 participants registered to the event of which 183 participated. The audience included representatives from the EC, academia, industry, SMEs as well as policy making. The level of newcomers was estimated to be around 50% as the event was interesting for a diversified pool of organisations and given that the event was promoted through the EFFRA and Connected Factories websites, newsletters, newsflashes, and social media. The event focused on key results, use cases and demonstrators from projects that show the path towards the digital transformation of manufacturing. Presentations can be found here:

- Agenda
- Presentations
- Recordings

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Main outcomes and impacts included raising visibility of the ConnectedFactories 2 project, its aims approach and results. Moreover, it provided a platform to showcase the sister projects results, use-cases and demonstrators to share and discuss the advances and knowledge between them and with a broader audience. In addition, national/regional projects were invited, as well as projects from related initiatives (ECSEL) to support cross-fertilisation and take-up of results.

The **ConnectedFactories 2 Final Event** was organised on 23 and 24 November 2022 back-to-back to the EFPF project final event, one of the sister projects from the DT-ICT-07-2018 topic. It was an in-presence event organised in Brussels and is described in more detail in D6.7. The event gained broad visibility already during the registration phase (see picture below from November 11 representing 487 views).

23.11.2022 0 Events 487

ConnectedFactories & EFPF Final Event - savethedate & register: 23-24 November 2022

153 participants registered to the event of which 94 participated in person. The audience included representatives from the EC, related EU projects (including the DMP cluster), academia, industry, SMEs as well as policy making. The level of newcomers was estimated to be around 40% as the event was mainly interesting for research institutes and industry and given that it was promoted through EFFRA's and through the Connected Factories' websites, newsletters, newsflashes, and social media.

During the event, an overview of the pathways to advanced and digital manufacturing by the ConnectedFactories 1 and 2 projects was presented, with a particular focus on the data space pathway and the circular manufacturing pathway. The state of play of the exploitable results and demonstrators from the six sister Innovation Actions (DMP cluster) was presented. In addition, main take-aways and key observations were shared regarding cross-cutting aspects such as interoperability, standardisation, cybersecurity, business as well as information on cases catalogue and outcomes of the national/ regional workshops.

Main outcomes and impacts included the sharing of knowledge and cross-fertilisation between related projects, information on advances, challenges and recommendations of the future focus of R&D in the area of digital platforms in manufacturing, discussions on cross-cutting factors like standardisation and business models, as well as raising awareness of use cases to the catalogue and digital manufacturing pathways. For more details, please check Deliverable D6.7.

The recordings of the sessions are available on this YouTube playlist. The respective presentations are also available via this link.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

Figure 8. Pictures of the CF2 CSA Final Event

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

6.2.2.2 Connected Factories European Workshops (WP5)

Two 'European Workshops' were originally planned in CF2 in WP5. They served to collect inputs from an expert audience across Europe and discuss the CF2 approach, pathways and outputs. One of them was held online in the first project period and is described in the interim PEDR D6.5 and D5.2. The second European workshop was as an in-person event on 13th of June 2022 and is described in more detail in D5.5 and below.

The 1st European workshop organised the 24th of March titled "***Pathways to digitalisation of manufacturing and associated use cases***" brought together experts from the industry and researchers to discuss the current progress and developments of CF2. The execution of the workshop was properly documented, and the obtained feedback will be utilised to refine the pathways and cross-cutting factors. These results are presented in D5.2. The whole event was recorded and can be accessed through the EFFRA YouTube channel, and the presentations can be accessed in the EFFRA cloud service.

The 2nd European Workshop was organised as a face-to-face event on June 13th titled " ***AI for manufacturing Pathway*** " and brought together 34 experts from the industry and researchers to discuss the current progress and developments of CF2 AI Pathway and the obtained feedback was utilised to refine the pathway.

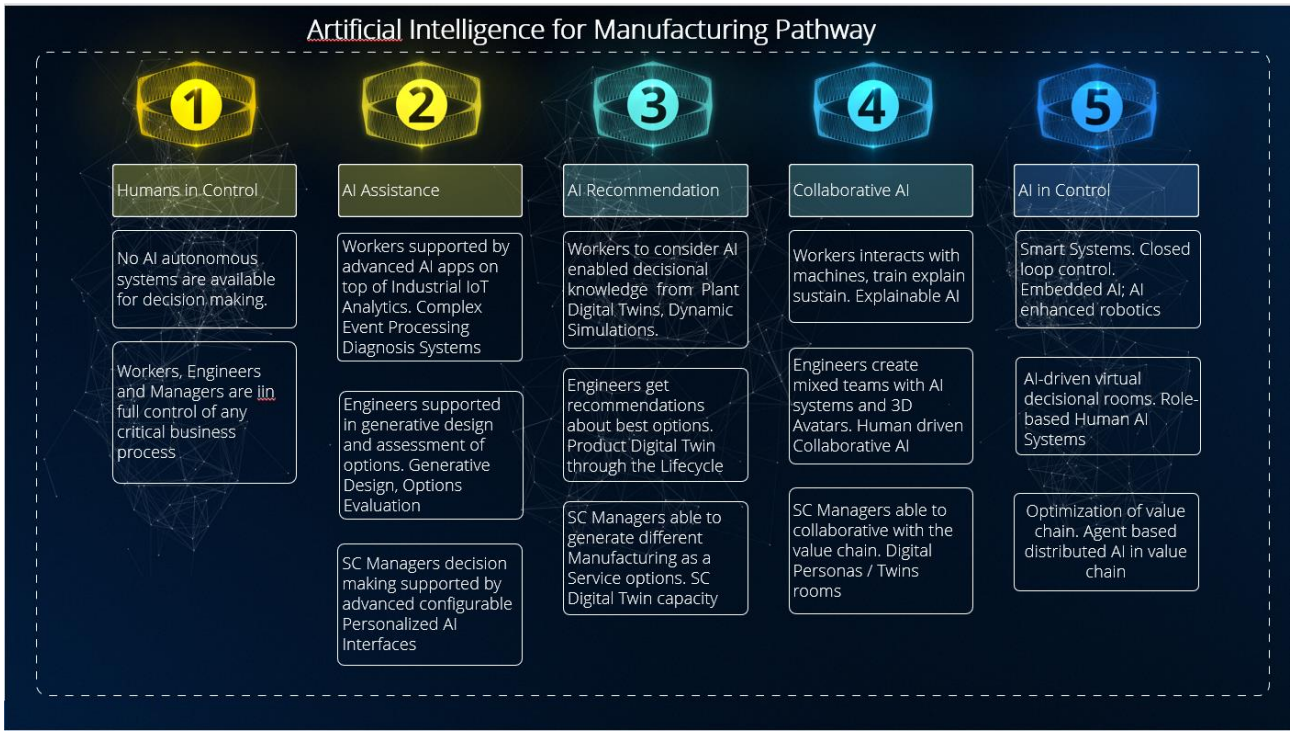


Figure 9. Status of the AI for Manufacturing Pathway at the day of the EU Workshop

It was an invitation-only workshop, where project representatives have been invited from the following calls: ICT-38-2020, DT-ICT-07-2018-2019, DT-ICT-03-2020 and the ConnectedFactories 2 CSA consortium. The agenda includes eight slots for projects to summarise their objectives and pilots/demonstrators and to situate the demonstrators within the AI Pathway. The workshop was organised by EFFRA and FPM. More details can be found in the associated Deliverable D5.5, where also further European Workshops are described in more detail. The event was promoted widely and the agenda is shown below.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

European workshop on the AI Pathway

13 June 2022 - 13:30 - 17:30

Brussels

CONNECTED FACTORIES

12:00 -13:30	Welcome Lunch
13:30 - 13:45	CF2 Introduction and its pathways: **Chris Decubber**, EFFRA
13:45 - 14:00	The AI for Manufacturing pathway: **Sergio Gusmeroli**, POLIMI
14:00 - 14:50	Series of cases from projects:

- AI REGIO: positioning AI REGIO experiments in the AI for Manufacturing pathway - **Sergio Gusmeroli**, POLIMI e **Fabiana Pirola**, UNIBG
- KYKLOS 4.0: using AI to leverage Circular Economy: The KYKLOS 4.0 Approach - **Jason Mansell**, Tecnalia
- SHERLOCK: AI seamless enabled Human-robot collaboration - **Sotiris Makris**, University of Patras
- KITT4SME: making AI affordably usable for SMEs - **Andrea Bettoni**, SUPSI

14:50 - 15:15	Coffee break
15:15 - 16:15	Series of cases from projects:

- TEAMING.AI: Dynamic knowledge graph approach for human-centred manufacturing in I5.0 - **Mario Pichler**, SCCH
- MAS4AI: optimization agents coordination in a bearing production line - **Luis Usatorre**, Tecnalia
- MAS4AI: agents for planning activities in the bicycle industry - **Kosmas Alexopoulos**, University of Patras
- ASSISTANT: data-driven production management - **Simon Thevenin**, IMT-Atlantique
- knowIEdge: understanding the AI roadmap in the knowledge project - **Stefan Walter**, VTT

16:15 - 17:30	Interactive session
17:30	Farewell drink

CONNECTED FACTORIES This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements No 723777 (ConnectedFactories1) and 873086 (ConnectedFactories2) under the Factories of the Future PPP.

Figure 10. Pictures from the 2nd European Workshop.

6.2.2.3 Further European Workshop and Dissemination Webinars

Online ConnectedFactories CyberSecurity for Digital Manufacturing Pathway webinar - 1 April 2022

01.04.2022 0 Events 188

ConnectedFactories CyberSecurity for Digital Manufacturing Pathway webinar

In 2021 the Manufacturing industry sector was the number one target for CyberSecurity attacks, replacing the financial services industry and representing nearly one out of four attacks, one out of four being ransomware. This trend is continuing in 2022. With emerging digital manufacturing platforms, the Connected Factories 2 project (CF2) aimed to inform manufacturing companies and digital manufacturing platform developers on best practices, methodologies and technologies to improve the CyberSecurity by developing the CyberSecurity pathway. The pathway will continue to guide technologies linked to various industry standards. During the CF2 CyberSecurity for Digital Manufacturing Pathway webinar, we will follow-up on the webinar of the 20th of January 2021, and it will focus entirely on best practices and experiences sharing from top leading experts from European and international research projects (QU4LITY, SECOIIA, COLLABS, InfraStress, TRINITY,), industrial partners, policymakers and international CyberSecurity Manufacturing experts.

Business and legal aspects of digital platforms in manufacturing - online workshop - 24 May 2022

24.05.2022 0 Events 113

Business and legal aspects of digital platforms in manufacturing - online workshop

Digitalisation and servitisation have already changed and will continue to shape the operating environment of manufacturing and the ways in which cooperation towards sustainability/green transition occurs. Digital solutions and the data flows collected by platforms enable novel ways of value co-creation within manufacturing and up-scaling on these business models as we are able to make a shift from data sharing to joint processing of information. At the same time, servitisation increases the need for combined interfaces so that end users can have access to a seamless service package in a multi-channel operating environment of manufacturing companies. The workshop built a shared understanding of how digital platforms are changing the value networks of manufacturing and enabling customer-driven, sustainable, as well as agile/resilient manufacturing.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

Foresight & Recommendations workshop - online workshop – 19 October 2022

An online workshop of the ConnectedFactories CSA on **'Foresights and Recommendations'** was facilitated by Politecnico di Milano and EFFRA on 19 October from 14:00 to 16:30. The workshop included interventions from projects **on recommendations for future R&D and remaining challenges** followed by a Q&A with discussion. There were 55 registrations – out of those, there were 36 attendees. The results have feed into D3.5 'Foresights and Recommendations of Digital Manufacturing Platforms for a Digital Europe'.

ConnectedFactories Foresight & Recommendations workshop
19 October 2022, 14:00 – 16:30 CET
Online

Agenda

14:00 Welcome by EFFRA and Politecnico di Milano

14:10 Interventions on current outcomes and future requirements/challenges (10' minutes each)

- QU4LITY - Jorge Rodriguez, ATOS
- SHOP4CF - Sladjana Martens, TUM
- DIMOFAC - Kunal Suri, Cécile Girardot, CEA
- 4ZDM Cluster - Juanan Arrieta, IDEKO
- Foresee Cluster – Nikolaos Nikolakis, LMS
- XMANAI - Michele Sesana, TXT
- AI PROFICIENT - George Triantafyllou, ATC
- CAPRI – Cristina Vega, CARTIF
- DIGIPRIME - Marcello Colledani, Polimi
- KYKLOS4.0 - Jason Mansell, Tecnalia
- AI-REGIO - Sergio Gusmeroli, Polimi

16:00 Q&A and discussion

16:30 Conclusion of the workshop

Figure 11. Agenda of the Recommendations Workshop.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873086.

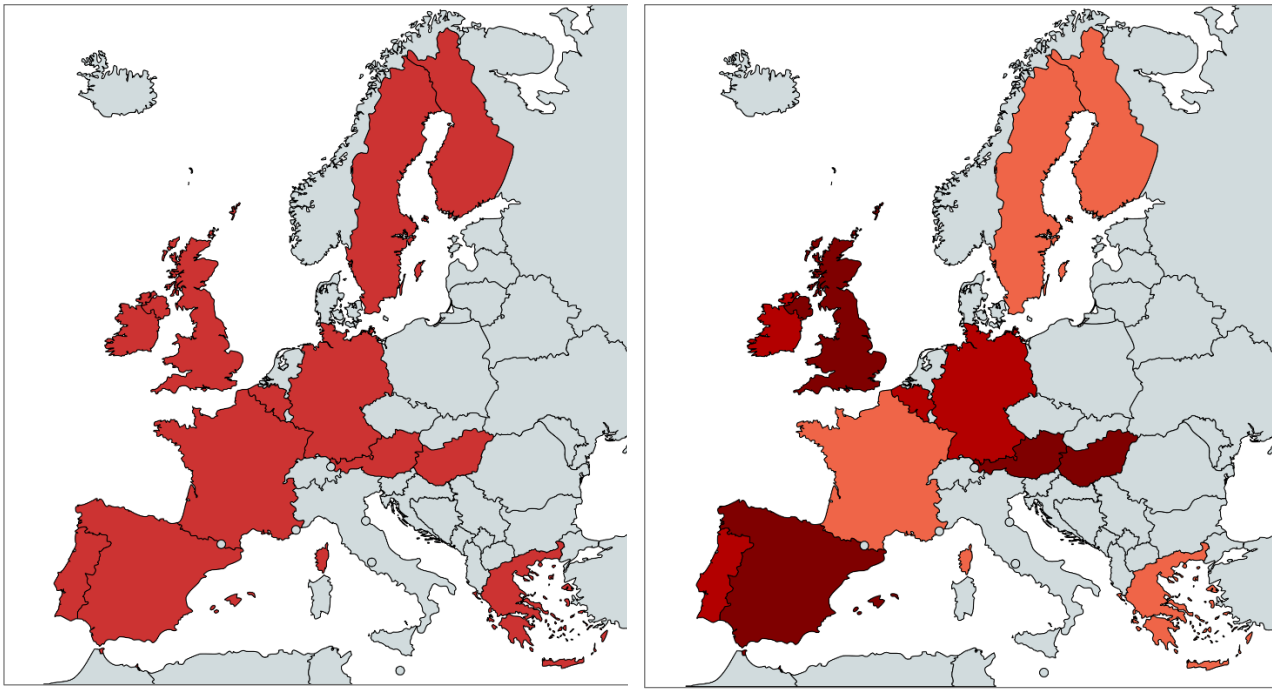
6.2.2.4 Connected Factories National/Regional Workshops (WP5)

A total of 24 workshops organised by the different CF2 partners, whereof 13 with over 500 participants in sum took place in the 2nd reporting project period. They were held to discuss and refine the digitalisation pathways and cross-cutting factors further as well as to demonstrate and collect real-world use-cases.

The workshops served as platforms to:

- foster open and mutual sharing of knowledge and experiences,
- identify industrial needs and requirements, trends, existing practices, and obstacles,
- present the most relevant developments and outcomes of related EU projects, to facilitate and foster the uptake of results,
- evaluate the implementation of current solutions, validate the CF 2 results (such as the pathways) and present further use cases, and
- involve developers, suppliers and users of digital technologies and digital platforms for manufacturing in the CF2 workflow.

Thanks to the large CF2 consortium, the national / regional workshops gained a widespread across Europe. The following picture shows the spread of all workshops conduced (lighter colour) whereof the ones of the second reporting period are presented in xxx (darker colour). Overall workshops were held in 12 countries and the participants nearly covered over 2/3 of all EU countries.



(a) Coverage of workshops *(b) 1-3 workshops held (darker colour more WS)*

Figure 12. EU coverage of national/regional Workshops.

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Figure 13 shows the workshops held throughout the CF2 projects and the associated partners and focus themes. The partners in darker blue held 13 workshops in the second reporting period (and additional ones in the first reporting period).

NATIONAL/REGIONAL WORKSHOPS															
Partner	IPA/S2i	INN	MTC	UNO	IVF	SIR	EIL	I4A	IMR	VTT	TEC	LSEC	CEA	LMS	INS
Number of WSs	2	2	2	1	1	1	3	3	2	1	1	1	1	1	2
Digitalisation Pathways															
Autonomous F.				1					2					1	
Hyperconnected F.				1				1							
Collaborative F.					1			1							
Circular Economy					1					1	1				
Human Factors			1				1	2							
Data Spaces		2					1	1		1					
Cross-cutting Factors															
Business Models		2			1			1							1
Standardisation	2	2						1			1		1		
Cybersecurity						1			2			1			
Legal Aspects								1							
Humans in Manuf.							2	2							
Skills		2	2				1	1	2					1	1
Trends, needs, barriers and challenges															
	2	2	1		1	1	2	3					1		2
Successful use-cases															
	2	2		1		1	2	2	1				1	1	2

Figure 13. Summary of the partners and topics of the workshops of the CF2 CSA.

Figure 14 shows the total number of participants of the workshops grouped according to the type of institution each participant represented. Here it can be observed that European SMEs from the manufacturing landscape were the main group of participants of these workshops, which was the main target group. Moreover, it is relevant to highlight the high participation of larger companies, which also shows the

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transversal interest of the topics and outputs proposed by CF2. The participants were mainly newcomers, and the workshops were partly held in the regional language, giving access to the related ecosystems.

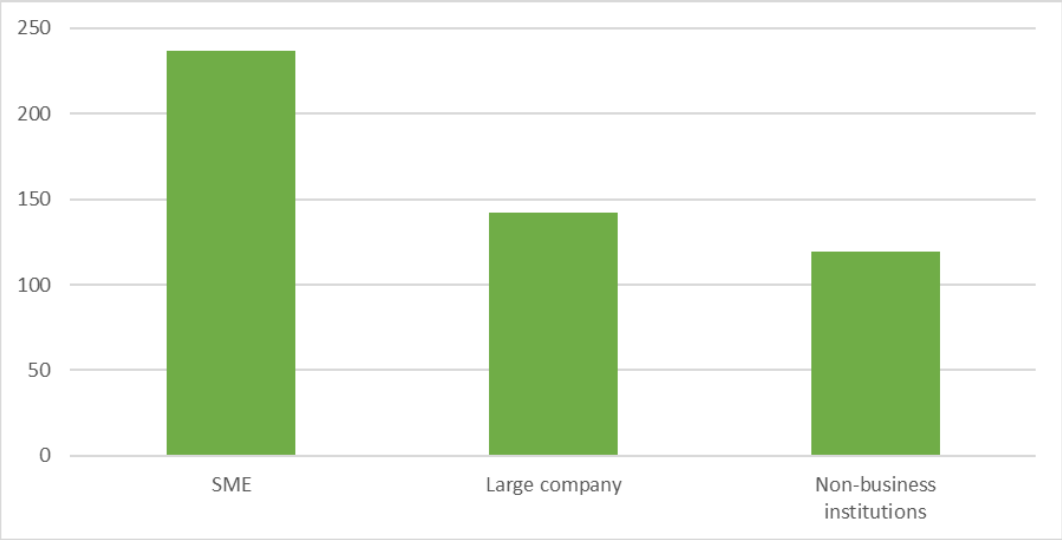

Figure 14. Profile of the participants of the National/Regional workshops[3][4]

The objective of these workshops was two folded: Collecting input from the CF2 network, its stakeholders, and the manufacturing community in general, and disseminating and discussing the findings and outcomes of CF2 and its sister projects to the European manufacturing community. Thus, strong emphasis was given to the inputs of participants and analysis of the results of the workshops as a mean to refine the proposed pathways and cross-cutting factors to digitalization proposed by CF2. The results of the workshops of the second reporting period are presented in D5.4. A table showing the individual workshops is below.

These workshops attracted many newcomers (to the European manufacturing ecosystem), as they were held on regional level and in regional language to lower the barriers for participation. The workshop leaders assume that well over 50% of the participants are not members of EU projects in digital manufacturing and no frequent visitors of EU-project organised events.

[3] The information of the workshop organized by CEA is not considered.
[4] The category *Non-business institutions* considers public and policy organizations as well as RTOs, universities, chambers of commerce, and public/private associations.

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Date	Lead	Name/ link	Description Scope (incl input/ output/ ecosystem)	Results / Impacts	Type: CF Organised Event	Place	Type of audience (%) SME	Size
CF2 Organised Workshops and Events in Reporting Period 2								
National /Regional Workshops (serving as inputs to and disseminating the outputs of CF2)								
11.11.21	I4.0	Data Sharing: Best Practice Netherlands	Best practices on Data Spaces serving as **input** for WP2, Data Spaces Pathway, Discussing CF2 **outputs**	The lessons learned can be transferred other European companies that are interested in setting up a Data Space.	Workshop	Online (AT)	3% SMEs 27% large company 70% non-business organization	30
11.11.21	MTC	The MTC Digitising Manufacturing Conference 2021	Promote CF2 project **outputs** to attendees for future use. Support the findings of and giving **input** to Work Packages 1-4, esp. skills and human factors pathway	Trends/barriers identified. Discussion on digital skills from different perspectives. Highlighted the need for action regarding fractured nature of skills frameworks and infrastructure.	Workshop	Hybrid, MTC (UK)	46% SMEs 25% large company 29% non-business organization	178
12.02.22	UNOTT	Digitalisation for SMEs	Dissemination of CF2 **output**/ pathways to regional SMEs within the UK midlands. Showcase successful digitalisation cases. Get SME **input** to needs and pathways.	Understanding SME needs. Cases were inspiring for SMEs. SME feedback to pathways. CF pathways help understand next step along digitalisation journey. Providing further support for SMEs.	Workshop	Online (UK)	85% SMEs 15% non-business organization	14
09.02.22	IVF	Circular Economy Pathway related to co-creating sustainable offerings in new value-networks	The workshop and interviews aimed to collect feedback **(inputs)** to the CE pathways.	Feedback on pathways. CE is not created by or in an individual company, it requires collaboration in ecosystem, value-creating networks. Participating organisations learned about challenges, barriers business models and examples from other actors in the context of circular economy.	Workshop	Online (SE)	47% SMEs 27% large company 26% non-business organization	15
22.02.22	I4.0	Safety and Health at Work	**Inputs** to human centred pathway, and cross-cutting factors. Following	Feedback to human centred pathway, trends, barriers, skills. Human-	Workshop	Online (AT)		

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			the concept of Industry 5.0 there is an increasing focus on human-centered aspects of digitalisation.	centricity is a very important factor. Focus on digital assistance systems. Continuous training recommended.				
22.02.22	INNO	Connect to the Data Economy	Introduce the concept of the Data Spaces. Discuss DS pathway, related skills and business models. **Input** on needs and challenges.	Identification of huge need for information on data spaces, how an organization can benefit. The legal aspect is a big concern for companies. It is crucial to define new job profiles, specifying the required skills to implement and maintain data spaces. Training is also needed.	Workshop	Online (ES)	3% SMEs 20% large company 77% non-business organization	30
23.02.22	INNO	Connect to the Data Economy – GAIA Cluster	Introduce the concept of the Data Spaces. Discuss DS pathway, related skills and business models. **Input** on needs and challenges.		Workshop	Online (ES)	75% SMEs 20% large company 5% non-business organization	63
12.21 03.22	IMR	Industrial Internet of Things	Discuss topics on cybersecurity, autonomous smart factory and skills. Presentation of CF2 **outputs**.	Awareness raising on IIoT, skills needed and riskt regarding cybersecurity as well as relevant tools.	Workshop	Online (IR)	51% SMEs 49% large company	47
12.04.22	EIL	Industrial Digitalization Technical Day	Discuss digital twin in relation to CF2 results. Digital Twin showcases.	Identification of trends an barriers regarding digital twins, skills needed.	Workshop	Online (HU)	55% SMEs 15% large company 30% non-business organization	107
25.05.22	SIRRIS	Cybersecurity, essential in your path to the digital factory	Promote the CF2 and its **outputs** and lessons learned Discussion among all participants on developing a Risk Based Cybersecurity strategy (**input for WP1 and WP2** Cybersecurity Pathway and cross-cutting factors)	Provide the participants a first guideline on how to secure manufacturing processes. Inputs to the Cybersecurity pathway.	Workshop	Online (BE)	23% SMEs 15% large company 62% non-business organization	13
10.06.22	IPA/S2i	Digital twin: Expert panel on interoperability, standards, and challenges	Disseminate CF2 **outputs**. Compare national approaches regarding Digital Twins. **Input** for WP1 (Interoperability and standardization)	Digital Twins and especially the 'asset administration shell' to increase interoperability. Project opportunities, tools and trainings are available.	Workshop	Online (DE)	SME, industry and RTOs, mainly newcomers	40
28.06.22	IMR	5G and Industry 4.0 Applications –	Disseminate CF2 **outputs**. Gathering opinions and feedbacks on skills, cybersecurity. **Ecosystem** building.	Empowering participants with what to consider in terms of scaling 5G	Workshop	Online (IR)		

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				deployment models and how the eco-system can facilitate this.				
European Workshop (serving as inputs to and disseminating the outputs of CF2)								
13.06.22	EFFRA / POLIMI	AI for manufacturing Pathway Workshop	Input to AI Pathway, Ecosystem around AI and Discussion on Pathway outputs	Enrichment and refinement of AI Pathway	Workshop	Brussels	Academia, industry, SMEs, policy making	34
19.10.22	EFFRA / POLIMI	Foresight & Recommendations workshop	Input to Policy Recommendations	Creation of D3.5 Policy Recommen-dations	Workshop	Online	Academia, industry, SMEs	36
CF2 Big Dissemination Events / Conferences (serving to disseminate and discuss the CF2 outputs)								
18.02.22	EFFRA	Use cases and demonstrators of Digitalisation of manufacturing	Dissemination (output) and discussion of use-case and demonstrator results	Cross-fertilisation among sister projects as well as related initiatives on EU and national/regional level	Con-ference	Online	Academia, industry, SMEs, EC, policy making	183
23.11.22	EFFRA	Final Event	Dissemination (output) and discussion of CF2 and sister project results	Cross-fertilisation amongst players of the ecosystem, networking amongst participants, formation of new collaborations	Con-ference	Brussels	33% research institutes/centers 10% universities 19% industry 7% SMEs 8% associations 3% EC	94

Table 4. List of key workshops and events organised by the CF2 consortium.

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6.2.2.5 Digital Manufacturing Platforms Thematic Meetings and Cluster Meetings (WP1/WP6)

CF2 regularly engaged the Digital Manufacturing Platforms (DMP) for Connected Smart Factories projects (DT-ICT-07-2018-2019) through the organisation of DMP Cluster Meetings and joint dissemination events where synergies were exploited. The DMP Cluster meetings aim at refining both pathways and cross-cutting factors, as well as collecting information and stimulating collaboration between projects in the cluster. In particular, the DMP Cluster Working Groups regularly met to refine, discuss, and obtain feedback from involved participants on the corresponding projects.

DMP Cluster Plenary Meetings were organised to discuss cluster interactions. DMP Cluster Plenary meeting took place during the CF2 Dissemination Events, and more focussed DMP Cluster working group meetings took place regularly. To support and efficiently exploit the results obtained at each meeting, a dedicated mailing list has also been created for the DMP Cluster and its working groups and a cloud service for presentations, minutes, and recordings whenever they take place.

The following Collaboration Meetings have taken place in the second Reporting Period and are described in more detail in WP1 Deliverables and Reporting.

Date	Agenda	References

09.08.21	• General update on actions (CF2)
	• New WG 1 member DAT4.ZERO
	• Update of the projects' activities
	  ○ EFPF
	  ○ ZDMP
	  ○ QU4LITY
	  ○ KYKLOS 4.0
	  ○ Change2Twin
	  ○ DAIS and DRYADS
	  ○ DAT4.ZERO
	• Common standards (CF2)
		• Meeting minutes
		• Excel "Status update"
		• Excel "Standards matrix"

08. 11.21	• General update on actions (CF2)
	• Update of the projects' activities
	  ○ EFPF
	  ○ ZDMP
	  ○ QU4LITY
	  ○ digiPRIME
	  ○ SHOP4CF
	  ○ DAT4.ZERO
	• Common standards (CF2)
		• Meeting minutes
		• Excel "Status update"
		• Excel "Standards matrix"
		• Deliverable "D1.2 First report on standardization for digital twins"
		• Presentation "ForeSee roadmap to the predictive maintenance technologies production systems"
		• Presentation "InterOpera project"

07. 02.22	• General update on actions (CF2)
	• Update of the projects' activities
	  ○ EFPF
	  ○ ZDMP
	  ○ QU4LITY
	  ○ KYKLOS 4.0
	  ○ digiPRIME
		• Meeting minutes
		• Excel "Status update"
		• Excel "Standards matrix"
		• Presentation "SHOP4CF standardization activities"
		• Deliverable "D2.8 QU4LITY"

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	○ SHOP4CF ○ Change2Twin ○ DAIS and DRYADS ○ DAT4.ZERO • Common standards (CF2)	
01.08. 22	• General update on actions (CF2) • Update of the projects' activities ○ EFPF ○ ZDMP ○ QU4LITY ○ KYKLOS 4.0 ○ digiPRIME ○ SHOP4CF • Events / joint dissemination activities (CF2)	• Meeting minutes • Excel "Standards matrix" • Deliverable "QU4LITY D9.6 Contributions to SDOs and Clusters" (final)

Table 5. List of DMP Cluster Meetings organised by CF2.

Next to meetings dedicated to the cluster and working groups additional 'thematic workshops' have been held:

- AI for Manufacturing – 30 September 2021
- AAS (Asset Administration Shell – IDS and IDS Connector -12 October 2021
- Circularity – Interoperability – 16 November 2021

6.2.3 Training and skilling

The WP elaborated on trainings and skills available as well as future skills and job profiles needed. Identification of emerging skills and job requirements (V.0.9) (connectedfactories.eu) . Next to sharing Training and reskilling opportunities on the CF2 website the partners themselves are actively giving trainings or lectures in universities as well as for academia (see annex for details). Some of the webinars also had a focus on skills or tackled the topic.

Presentations and recordings are available here.

While in the first period two national/regional Workshops addressed skills, this raised to eight workshops held during the second period (see D5.4). Example Nottingham Workshop below.

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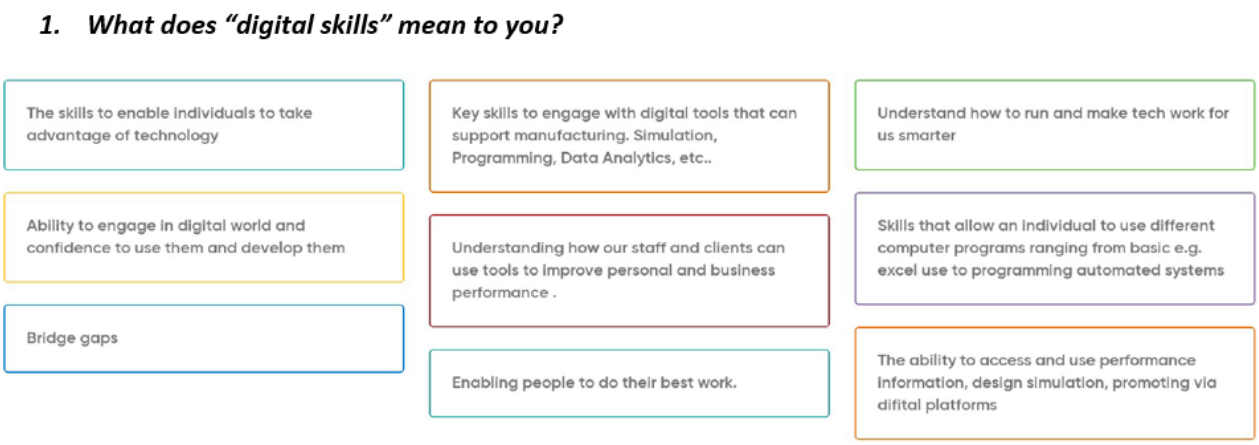

Figure 15. Mentimeter questions at 'Skills workshop'

6.2.4 Consortium participation in events and networking activities

The CF2 participants were actively involved in relevant additional activities from the European manufacturing landscape. In such events, CF2 partners participated as keynote speakers but also further engaging with specialised counterparts and stakeholders, providing a platform to CF2 in those instances. The details are presented in the annex of this document.

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7 Exploitation Strategy

7.1 Exploitable results and alignment with strategy

The CF2 project and its offered services provide a source of great value for European manufacturing companies with an interest in digitisation. The services presented on the website and EFFRA Innovation Portal, be it the unique digitisation pathways, the project wiki, the use cases and tools, the skill profiles and training courses, aim at supporting European companies and other stakeholders to adapt to the challenge of digitisation. Crucial aspects are to provide information on developments in the digital platform area, enhance technology transfer and ultimately get access to innovative digital tools and services to tackle the challenge of digitisation. Additionally, being informed on and taking cross-cutting factors like advances in skills demand, standardisation, cybersecurity and evolving business models into account can reduce risk and uncertainty when implementing new digital technologies and applications.

The network of partners aligned to the CF2 project will foster the exploitation of new digital technologies. Thus, the CSA's mission is to promote as best as possible these products, opportunities, and services offered and make them available to a large group of stakeholders. This will in turn grow and strengthen the digital platform ecosystem and support the digital transformation of the European manufacturing industry.
The key exploitable results, the target groups and means of exploitation are outlined below.

Exploitable Result	Description and means of exploitation	Target groups / Users
CF2 Digitization Pathways	The CF1 and CF2 **pathways** represent a unique means to give an overview on digitisation routes with dedicated steps and milestones towards digital and circular. These pathways can guide individual companies step-by-step through the digitisation process until reaching the targeted more mature digital state. Project partners can exploit this methodology to provide consultancies and digital transformation services to their customers. Moreover, other stakeholders can include this methodology to assess their customer needs and accompany them during their digital maturation. The pathways also serve as a valuable instrument to give an overview of the current state-of-the-art tools and services to policy makers and identify gaps and hurdles in the overall picture to be overcome (e.g. by future research and innovation efforts).	SMEs, mid-caps, LE, DIH, policy making
Implementation of Pathways via DIHs	The Pathways facilitate the migration from legacy situation to next levels in a structure way. This objective is aligned with the purpose of DIHs that support the digitalisation of manufacturing SMEs. Thus, Pathways can facilitate and stimulate the companies involved in the DIH networks to have internal discussions and help them identify the main areas of development: where they can evolve, how to approach the digitalisation process, where to invest, what are the tools and technologies and key enablers needed to reach the desired level within the Pathways. On the other hand, Pathways can help the DIH itself to analyse its portfolio of services, experiments and use cases and to identify gaps. This can be used to develop the DIH's service portfolio.	SMEs via DIHs

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	At the same time, by mapping SME use cases on Pathways, the DIHs can gain a wider visibility for the hub and for the use case owner, as the EFFRA Innovation Portal is an open access site with significant coverage.	
CF2 Cross-Cutting Factors	The cross-cutting factors assessed in CF2 include business models, legal aspects, skills, cybersecurity and standardisation. All these factors play a key role in a company's safe and successful digitisation journey. Profound knowledge about advances and risks as well as tools and methods available will help European Industries to overcome hurdles in the digital transformation. Knowledge of these factors and engagement with the respective communities will give project partners the means to consult their customers about cross-cutting issues and to further focus their own development activities and services correctly.	SMEs, mid-caps, LE, DIH, policy making, RTOs, academia
CF2 website, Structured wiki, Mapping framework, EFFRA Innovation Portal	The **CF2 wiki, website and EFFRA Innovation Portal** gather and present a rich portfolio of the CF2 and other projects' research and development results, use cases, new products, tools and methodologies, knowledge on cross-cutting factors and CF pathways. As the CF2 results are presented and embedded in the open EFFRA Innovation Portal, they are searchable and exploitable by the very broad community. As the EFFRA Innovation Portal is not restricted to the project duration, it ensures technology transfer and sustainability of project results after the projects end. The results can be accessed and assessed by industry and academia and used to get an overview of recent R&I efforts, to align future developments and to find partner. In summary, the Innovation Portal represents a living repository with up-to-date information on key aspects for the overall digital manufacturing community. This leads to a much broader and more sustainable dissemination as well as multiplication of the project's impacts through enhanced exploitation possibilities.	RTO, academia, industry, policy making
Workshops, Thematic groups	CF2 results are widely discussed in **open workshops and thematic groups**. CF2 acted as a platform to bring key stakeholders together to share advances and/or find consensus regarding specific. Moreover, CF2's interactive approach gathers knowledge, experiences and perspective of sister projects, related initiatives and other interested audiences. By enhancing knowledge exchange, cross-fertilisation and technology transfer from academia to industry, CF2 contributed to the exploitation of project and program results already during the project lifetime. Moreover, with the structured wiki and thematic groups, it contributed to the standardisation efforts in Europe which will continue after project end.	RTO, academia, industry, policy makers, standardisation groups
Event outcomes, research results	Dissemination events ensured a broad communication and dissemination of project and program outcomes to collect end-user feedback, enhance technology transfer, and facilitate early uptake of project results.	End-users, industry, policy makers, RTO
CF2 list of new skills and job requirements **Training catalogue**	Digital platforms and the application of novel technologies in manufacturing create a demand for new skills. Aspects such as life-long learning and new teaching paradigms have become increasingly important. CF2 created a **list of emerging, new skills and job requirements** and identified associated **training, courses and online offerings** for industrial workers/managers. Next to this, CF2 assessed novel **delivery mechanisms** and analysed academic and professional curricula to understand **gaps** and provide directions.	SMEs, industry, policy makers, academia, EIT Manufacturing

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	The CF2 skills and training catalogue and work on future job profiles will prepare SMEs and industries for upcoming needs and human resources strategies. It will also inform academia and industry on emerging education and training needs. The results are crucial to aligning the upcoming skills need with the education and training programs.	
Digital Transformation Cases Catalogue **CF2 Use Cases, Demonstrators, Infrastructures**	The CF2 **use cases** and **demonstrators** illustrate how specific products, project developments, methodologies, or services can contribute to digitisation in manufacturing, e.g., by enabling the next level of digitisation within a pathway. CF2 collected, catalogued and disseminated key practical results of sister projects and related initiatives. This provides Large Industry and SMEs with practical examples of commercial and community lead digital manufacturing platforms to find 'tested' cases to **inspire and encourage them to invest** in digital platform deployment, smart connected services and application projects. Innovation being well ahead of real market deployment, often seem very distant for industries, especially SMEs. Through cases from industrial state-of-the-art to demonstrators and pilot lines, CF2 gave innovations broad visibility to the early adopters of new technologies, with the aim of mobilising the industry in general, and SMEs in particular, to benefit from technological developments for digital and circular transformation.	Early adopters, SMEs, industry
Policy Recommendations for Digital Europe	CF2 provided a document on 'Foresights and Recommendations of Digital Manufacturing Platforms for a Digital Europe', which gives an outlook on key challenges for the EU industry and provide key recommendations to motivate future lines of research. The document analysed the digital platforms, use cases and demonstrations to detect the areas in which the implementation of the new technologies is more widespread and to identify the challenges that will have to be addressed with future initiatives. It summarised the evolution of digital platforms towards increased levels of intelligence, autonomy and circularity. With this, the document will be of great value for regional, national as well as European policy makers to support decisions and structure future research.	Policy makers

Table 6. List of CF2 Key Exploitable Results.

7.2 Leveraging CF2 Results

The following chapter details how ConnectedFactories results are leveraged using the synergies with EFFRA processes for project/programme monitoring and community building and information sharing. The CF2 CSA has a very close connection to the FoF and MiE Partnerships, with EFFRA being a project partner and the coordinator as well as other partners being an EFFRA (board) members. This ensures that project results (such as the collection of demonstrators and use cases) are feeding directly into the EFFRA Innovation Portal and contribute to the overall KPIs and strategy development, where results are used and sustained.

In more detail, one of the main exploitation routes is making sure that the content generated is used and integrated in ongoing or new process that are operated by EFFRA, particularly in synergy with the management and monitoring of the Made in Europe Partnership.

a. Making sure that all public information about **demonstrators, pilots, test-beds** are collected, shared and promoted (associated to WP3 and the focus on use cases/pilots).

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EFFRA maintains a contact with ongoing Factories of the Future Partnership projects and has now started to engage with the starting Made in Europe Partnership projects. Collecting and sharing information about pilots and demonstrators is a key action item with respect to the Made in Europa period monitoring reports that EFFRA will (and has to) generate. Many of the operational KPIs are associated directly to the demonstrators/pilots that are generated by the projects.

	Objective	KPI #	KPI definition	Proposed Target
Ensuring manufacturing excellence and circularity	Advance technologies for green, flexible and resilient manufacturing in all sectors	KPI 1	num. of demonstrators targeting zero defect and zero downtime manufacturing	50 demonstrators, with scrap rate reduction of up to 20%; reduction by 10% on the amount of labour on defect identification and finishing
		KPI 2	num. actions for production of smart and complex products	10 demonstrators and actions
		KPI 3	num. demonstrators and actions targeting green and resilient manufacturing (either factory level or entry supply chain)	80 demonstrators covering at least one the sub-items 50 demonstrators, with 10-25% less material use 50 demonstrators, with 10-25% less energy use 50 demonstrators, with 15-30% less water use 50 demonstrators, with 20-30% less industrial waste 50 demonstrators, with 35% of renewable energy
		KPI 4	num. high TRL demonstrators per sectors	30 demonstrators; each project or demonstrator addresses at least three end-user sectors
		KPI 5	num. demonstrators targeting De-manufacturing, re-manufacturing and recycling technologies for more efficient manufacturing	50 demonstrators
	Build flexible and resilient supply chains	KPI 6	num. demonstrators targeting supply chain innovations	50 demonstrators
		KPI 7	num. demonstrators targeting improvement of response-time	50 demonstrators

Figure 16. Excerpt of KPIs under General and Specific Objectives, Made in Europe Partnership

This means that EFFRA will enhance its interaction with all projects in order to make sure that all demonstrators are included as separate resources on the EFFRA Innovation portal. This is already the case for the demonstrators that are included in the ConnectedFactories Digital Transformation catalogue, which has been embedded within the EFFRA Innovation Portal from the start. Pointers to all public deliverables of all projects are already included on the EFFRA innovation portal on a continuous basis. Similar to what is now already happening with use cases that associated to the DMP Cluster projects (DT-ICT-07-2018-2019), the demonstrators will be associated to public deliverables or public documents (whitepapers, web resources, etc...) that provide more information about the demonstrators (see the example https://portal.effra.eu/result/show/11531, taken from the Qu4lity project).

Hence the processes of collecting information for compiling period progress reports on the Made in Europe Partnership level are and will be running in full synergy with the process of promoting the outcome of the projects, in particular with respect to the demonstrators or pilots that are generated by the projects. This process will leverage on the outcome of the ConnectedFactories project and the associated 'Digital transformation Use Case catalogue'.

In particular towards the end of the projects, the shared 'lessons learned' is of big value to the overall Partnership programme management, as well as for the consortia that develop new projects. The Foresight & Recommendations Deliverable of ConnectedFactories is also feeding into the MiE Partnership management. The above described processes are also relevant for the use cases generated by the Digital Innovation Hubs. Synergies with the mapping of the (E)DIH Use Cases portfolio will be sought. This also draws the link with the ConnectedFactories activities on National and Regional level.

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b. Regarding **cross-cutting aspects and key enablers** (associated to WP1 and WP4): Interoperability, Standards and Standardisation, Human aspects and skills, Business aspects and legal aspects and Cybersecurity

Besides making available the final ConnectedFactories deliverables, the pointers to key resources that are referred to in these final deliverables will be included on the EFFRA innovation Portal. This includes the recordings of presentations given by task leads at the final conference or webinars.

In its daily operation, EFFRA comes across key documents. On a continuous basis, pointers to key resources will be added on the EFFRA portal and will be promoted via EFFRA's communication channels. Particular filters in order to lead interested stakeholders directly to these resources will be made available.

As described under point a., EFFRA is interacting with the FoF and MiE Partnership projects and this interaction is currently enhanced in view of generating the periodic progress reports on Partnership level. The interaction with these projects will also aim at identifying how these projects are addressing key cross-cutting aspects and will therefore provide a continuous process of monitoring and sharing of developments in these areas. The other way around, the projects and the wider European Manufacturing research and innovation community will benefit by obtaining information about key developments in the respective areas.

The collection of this information on key cross-cutting aspects and how projects are addressing these, is also of importance for the identification of future research and innovation priorities for the Made in Europe Programme or even beyond.

In particular, the mapping of the use of standards (which actually span the entire set of cross-cutting aspects) and also the contribution to standardisation processes by projects will be continued in the future. Synergies will be established with ongoing activities, such as the Stand4EU Coordination and Support Action (see presentation by Olga Meyer at the ConnectedFactories final event) . This also associated to a pathway that was suggested at a ConnectedFactories National / Regional workshops on the topic of Standards / Standardisation (see also point c. for more exploitation aspects associated to the pathways).

c. Continue the **validation of the pathways** and using pathways for obtaining insight in the coverage and evolution of the Made in Europe Partnership (associated to WP2).

Pathways are of interest to identify how projects and their demonstrators are progressing towards advanced manufacturing (digitalised, climate-neutral, resilient and competitive, etc). This provides insight that is required for the development of future research priorities.

This covers existing pathways and potential or already suggested enhancements of the pathways within ConnectedFactories, but also pathways that are proposed/developed outside ConnectedFactories. For instance, the project https://denim-fof.eu/ developed a pathway on energy efficiency in manufacturing. These initiatives need to be valued and integrated.

The interrelation among the pathways themselves is also an action item for the future, in order to make sure that mapping of projects and projects cases can be done coherently and effectively with minimum effort.

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7.3 Exploitation Plans

The CF2 partners have vastly benefitted from the developments and outcomes of the project, the exchange with the partners, sister projects and the broader ecosystem as well as the lessons learnt relevant for the individual entities. The individual partners will exploit the results of the project in manifold ways, whereof various organisation types have shown similarities in their exploitation routes, as presented in the summary table below (exploitation routes per organisation type). More detailed examples are given in table 9 (individual exploitation plans) in the annex of this document.

Organisation Type	Exploitation Plans
RTOs	▪ Expanding the network, establishing new collaborations within the digital and circular manufacturing ecosystems, starting new projects in the area ▪ Using the CF2 Pathways, Use-Cases, wiki and EFFRA Innovation Portal as a structured source of information for the organisation as well to disseminate to partners and customers ▪ Integrating learnings about industrial developments (supply side) and customer needs (demand side) into future activities ▪ Engaging and using learnings from CF2 in strategy documents/ discussions (Made in Europe and beyond) and roadmaps ▪ Using CF2 results and learnings for own R&I and improve products and services ▪ Integrate learnings on trends, barriers, customer needs into future activities
Academic Partners	▪ Publication of peer reviewed papers ▪ Exchange on scientific topics in digital manufacturing for future research ▪ Getting in touch with new collaboration partners from academia and industry (from research to end-users)
Partners active in Education	▪ Exchange on education, skills development ▪ Exchanging perspectives on learning content needed ▪ Implementing learnings on education needs and formats
Clusters / Associations	▪ Providing a pool of structured information ▪ Practical use cases to explain technologies ▪ Basis for workshops and exchanges
Technology Transfer Organisations	▪ Using the CF2 results esp. pathways and associated workshop methodologies in consulting their customers ▪ Adapting pathways to the individual company level ▪ Use CF2 cases and demonstrators to enrich dissemination of the CF2 results with practical examples ▪ Use structured information (EFFRA Innovation Portal and in CF2 Deliverables) to inform and consult customers, clusters and policy making ▪ Expanding the network and getting even more rooted in the EU digital ecosystem, getting in touch with new collaboration partners.
Partners of the DIHs and EDIHs ecosystem	▪ Use Pathways and structures information on cross-cutting factors and use cases to consult SMEs ▪ Involving the DIHs ensures that the Pathways are used to promote the digitalisation even after the CSA. ▪ EDIH4Manu invited the CF2 consortium to hold a Train the Trainer Workshop in January 23 to present the Pathways to digitalisation of manufacturing and to involve them to continue the work of collecting use cases into the EFFRA Innovation Portal.

Table 7. CF2 exploitation routes per organisation type.

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8 Conclusion

The ultimate success of the ConnectedFactories2 project is, by its nature, vitally dependent on intensive exchange with various stakeholders external to the consortium (manufacturing industry/SMEs, platform end-users, policy makers, researchers, standardisation groups, related projects and national/regional initiatives). For this, an up-to date communication, dissemination and outreach strategy was an essential factor. As described in this document, all communication, dissemination and exploitation activities in CF2 were directly aimed to support the digital manufacturing platforms community, either on its input side (attracting stakeholders and collecting important information) or on its output side (disseminate and discuss the CF2 and sister projects results).

In summary, the numerous activities related to dissemination and exploitation focussed on:

- Increasing awareness of the development of the digital manufacturing platforms with wide coverage across Europe
- Disseminating the CF2 project and sister projects results and stimulate knowledge exchange
- Attracting relevant stakeholders to the ecosystem and engaging them in project activities
- Influencing on the future development directions

This was achieved by:

- Providing platforms and tools for efficient communication, dissemination and exploitation of the CF2 project (CF2 website, mailing lists, social media, newsletters, working groups, events)
- Exploiting EFFRA as a multiplier (EFFRA open portal, social media, newsletter, sessions at events) of the dissemination activities
- Reinforcing collaboration between the DT-ICT-07 sister projects (e.g. by DMP Plenary and Cluster Meetings and thematic working groups and associated email lists)
- Creating linkages between the digital manufacturing ecosystem and EU, national as well as regional initiatives and attracting SMEs from regional ecosystems
- Maximising the impact of CF2 and its sister projects by reinforcing links to related activities such as relevant European partnerships and other initiatives like I4MS, SAE and standardisation groups
- Developing and adapting the CF2 pathways to digitisation together with key stakeholders
- Advancing and promoting the EFFRA catalogue of 'digital manufacturing platform' use-cases to enable technology transfer and early uptake of results

The activities engaged a large number of stakeholder and had a wide reach, good coverage across Europe and were very well received by the community. Despite the careful planning of dissemination activities, the pandemic situation has posed some challenges to the dissemination and exploitation activities. Nevertheless, the consortium has adapted quite quickly to the situation and adapted its methods, tools and strategy in a flexible way. Activities had been turned back into face-to-face activities as soon as they became possible. Exploitation after the project end will be performed on an individual basis but also through the EFFRA community and Innovation Portal providing further visibility and sustaining the project results.

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9 Annex

Next to the vast amount of communication and dissemination activities organised by the CF2 consortium, the following table shows additional key activities in which the CF2-consortium participated during the second reporting period (**June 2021 – November 22**).

Date/ Period	Name of event/ activity	Lead/ Participant	Type of Activity	Description	Place	Type of audience	Size of audience
11.06.2021	SIRI	IMR	Other	Webinar	Online	General Public	67
22.06.2021	Digital Twins	LCM	Organisation of a Workshop	A workshop organised by the Mechatronics Cluster Upper Austria, Austria	Linz, AU	Industry	49
23.06.2021	Manusquare project final event,	EFFRA	Participation to a workshop	Presentation - Industrial Platforms supporting Manufacturing Value Chains Impact: Awareness making about other projects on digital platforms and CF Pathways and past CF workshops material	Online	Scientific Community (Higher Education, Research)	60
06.07.2021	Digital Tech Talk - Predictive Maintenance for Optimized Manufacturing Solutions in Industry 4.0	EFFRA	Participation to a workshop	Presentation - Predictive maintenance within Made in Europe digital transformation pathways; Impact: Awareness making about projects on digital platforms and CF Pathways and past CF workshops material	Online	Scientific Community (Higher Education, Research)	70
08.07.2021	European Zero-Defect Manufacturing (ZDM) Landscape: State of Play	EFFRA	Participation to a workshop	Presentation - Zero-Defect, projects and Pathways Impact: Awareness making about projects on digital platforms and CF Pathways and past CF workshops material	Online	Scientific Community (Higher Education, Research)	60
13.07.2021	https://cloudsecurityalliance.org/events/emea/	Cloud Sec	Participation to a workshop	cloud security industry	Online	Other	160
19.07.2021	SME Digital manufacturing training courses launched[5]	MTC	Training courses	The three-part certificate - Practical Steps to Digitalising Your Manufacturing Business - is aimed at helping UK manufacturers embrace the latest digital technologies to improve their businesses.	Online	Industry	
29.07.2021	Training your CNC Staff & The Future of CNC Training	IMR	Other	Webinar	Online	General Public	31
20.08.2021	https://www.cbcommerce.eu/events/cbcommercenext/scale-ups/	LSEC	Organisation of a Workshop	industry and retail challenges	Online	Other	1000
01.09.2021	IOT WEEK	TECNALIA	Non-scientific and non-peer-reviewed publication (popularised publication)	Trustworthy AI: Components to provide trust on AI technology	Online	Industry	51

[5] https://the-amtc.co.uk/training/digitalising-your-manufacturing-business/

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01.09.2021	Steps to define and delivera successful Automation Project	IMR	Other	Webinar	Online	General Public	43
01.09.2021	Discover the Intralogistics Assessment Tool	IMR	Other	Webinar	Online	General Public	36
06.09.2021	https://www.youtube.com/watch?v=BN-ve3APvjo	LSEC	Organisation of a Conference	industrial cybersec	Chemnitz, GER	Other	200
07.09.2021	https://www.cybersecuritycoalition.be/about/focus-groups/	LSEC	Organisation of a Workshop	crypto industrial cybersec	Online	Other	160
10.09.2021	https://globalepic.org/	LSEC	Participation to a conference	industrial cybersec	Online	Other	200
14.09.2021	https://securit-project.eu/	LSEC	Participation to a conference	industrial cybersec	Marseille, FR	Other	200
22.09.2021	3if.eu	LSEC	Participation to a conference	industrial cybersec	Ghent, BE	Other	350
28.09.2021	Textile ETP Annual Conference	EFFRA	Participation to a workshop	EFFRA Update @ Textile ETP Annual Conference Impact: Awareness making about projects on digital platforms and CF Pathways, in particular Data Space pathway	Online	Industry	70
30.09.2021	Connected Factories thematic meeting on Pathway to AI in Manufacturing	CF2 Consortium		Initial concepts for a Pathway to AI in Manufacturing + relation to Data Space pathway	Online	Scientific Community (Higher Education, Research)	20
01.10.2021	DDMS - Data Driven Maintenance Service	IMR	Other	Webinar	Online	General Public	51
08.10.2021	https://emo-milano.com/en/homepage-4/	LSEC	Participation to a conference	industrial cybersec	Milano IT	Other	200
12.10.2021	Connected Factories thematic meeting on AAS and IDS/Gaia-X	CF2 Consortium	Participation to an event other than a conference or workshop	General introduction - AI current projects and projects that are in the pipeline – need for framework/pathway	Online	Scientific Community (Higher Education, Research)	15
14.10.2021	MMP Symposium	Profactor	Organisation of a Conference	The main event in Austria for Human-Machine Interaction	Online	Industry	120
21.10.2021	EUSALP World Manufacturing Week workshop: Case studies on policy to support the implementation of ICT technologies for circular economy - Circular4.0, Digital for Eco-Industry	EFFRA	Participation to a workshop	Presentation - focusing on Circular Economy Pathway Impact: Awareness making about projects on digital platforms and CF Pathways, in particular CE pathway	Online	Policy Makers	50
01.11.2021	DIGITbrain - Digital twin development for validation of multi-site additive manufacturing production.	IMR	Other	Webinar	Online	General Public	15

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01.11.2021	Additive manufacturing surface finishing approaches and development for the medical industry	IMR	Other	Webinar	Online	General Public	51
09.11.2021	Manufacturing focus the journey towards a smart factored of the future with the MTC[6]	MTC	Webinar	Discussion around where SME's find issues with beginning their digital journey & explaining where they should start. Plus audience questions,	Online	Industry	
09.11.2021	Swedishproductionacademy internal meeting	EFFRA	Participation to a workshop	Presentation - EFFRA and The MADE IN EUROPE Partnership - Update of ongoing work Impact: Awareness making about digital platforms and CF Pathways	Online	Scientific Community (Higher Education, Research)	20
15.11.2021	JRC experts workshop	EFFRA	Participation to a workshop	Presentation - EFFRA and The MADE IN EUROPE Partnership - examples of digital-green projects and CF pathways Impact: Awareness making about digital-green manufacturing projects and CF Pathways	Online	Scientific Community (Higher Education, Research)	15
16.11.2021	Interoperability for circular economy ,	TECNALIA	Non-scientific and non-peer-reviewed publication	Interoperability and circularity in Digiprime and Kyklos4.0	Online	Industry	50
16.11.2021	Connected Factories thematic meeting on Interoperability for circularity	CF2 Consortium	Participation to an event other than a conference or workshop	Examples of ongoing work, focussing on best practices, challenges and open issues	Online	Scientific Community (Higher Education, Research)	21
16.11.2021	https://cybersecurityconvention.be/program	LSEC	Organisation of a Conference	cybersec	Online	Other	600
24.11.2021	National Manufacturing and Supply Chain Exhibition and Conference 2021	IMR	Organisation of a Conference	The annual Manufacturing and Supply Chain Exhibition and Conference was held recently in the RDS Simmonscourt, Dublin. The annual conference provides a national forum for manufacturers and operators to gather and discuss topics and trends for Irish industry. This was the 8th annual Manufacturing & Supply Chain event, that involved strategic planning and implementation of government guidelines to enable a physical exhibition with some virtual interaction. There were over 3,000 people at the event over the two days.	Dublin IR	Industry	150
01.12.2021	European Big Data Value Forum 2021 - Session: A precursor network of AI Testing and Experimental Facilities in Manufacturing: the AI REGIO Didactic Factories	EFFRA	Participation to a workshop	Presentation - Introductory statements from EFFRA Impact: Awareness making about AI projects and AI within the CF Pathways	Online	Scientific Community (Higher Education, Research)	40

[6] https://www.circle2success.com/manufacturing-focus-the-journey-towards-a-smart-factory-of-the-future-with-the-mtc/

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01.12.2021	European Big Data Value Forum 2021 - AI and Data Technologies for Industry 5.0: opportunities and future scenarios	EFFRA	Participation to a workshop	Presentation - Introductory statements from EFFRA Impact: Awareness making about AI and Human aspects and AI within the CF Pathways	online	Scientific Community (Higher Education, Research)	40
03.12.2021	EBDVF 2021	FPM	Participation to a conference	The 2021 edition took place from the 29th of November to the 3rd of December. This year we had a "hybrid": the event was held both, in person and online. EBDVF 2021 was an associated event of Slovenian EU Presidency. EBDVF 2021 theme was "Digital Transformation powered by Data and AI".	online	Scientific Community (Higher Education, Research)	300
03.12.2021	Reflective Picking	IMR	Other	Webinar	Online	General Public	15
03.12.2021	MAAS	IMR	Other	Webinar	Online	General Public	15
06.12.2021	Fireside Chat with Tom Szaky	IMR	Other	Webinar	Online	General Public	88
08.12.2021	https://www.iiotsbom.com/event/iiotsbom-kick-off-event/	LSEC	Organisation of a Conference	manufacturing, industrial cybersec	Online	Other	250
14.12.2021	Workshops on Industrial Internet of Things	IMR	Organisation of a Workshop	Two IIoT courses were completed in December 2021 and March 2022 with 47 participants from both SME and multinational backgrounds. The attendee's included both technical staff and senior management.	Mullingar / Ireland	Industry	47
16.12.2021	Manufuture DTI WG meeting	EFFRA	Participation to a workshop	Presentation about relevance of CF pathways to Decentralised intelligence Impact: Presentation about relevance of CF pathways to Decentralised intelligence and the work of the DTI WG	Online	Scientific Community (Higher Education, Research)	20
20.12.2021	https://securit-project.eu/	LSEC	Organisation of a Conference	manufacturing, industrial cybersec	Online	Other	200

Date/ Period	Name of event/ activity	Lead/ Participation by	Type of Activity	Description	Place	Type of audience	Size of audience
22.01.2022	Smart Factory Innovation Hub launch[7]	MTC	Pilot for an innovation hub	A hub for businesses to test quick-fire projects & early-stage technologies at one of 16 testbeds, aimed at supporting the increasing digital technologies in industry.	UK wide	Industry	
25.01.2022	https://csglobal2022.cybersecforum.eu/	LSEC	Participation to a conference	high level debate	Online	Other	650
25.01.2022	https://www.smartagrihubs.eu/latest-events/EU-US-Trade-and-Technology-Council-	LSEC	Participation to a conference	high level debate	Online	Other	450

[7] https://hvm.catapult.org.uk/case-study/5g-factory-of-the-future-the-smart-factory-of-tomorrow-starts-today/

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	Cybersecurity-Webinar-for-SMEs						
01.02.2022	Overview of an Advanced Manufacturing Pilot Factory	IMR	Other	Webinar	Online	General Public	45
01.02.2022	How Industry can Access IMR's Advanced Manufacturing Pilot Factory	IMR	Other	Webinar	Online	General Public	45
03.02.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the QUALITY H2020 consortium	Online	Other	4
12.02.2022	Institute for Advanced Manufacturing - Breakfast Event #3 - Digitalisation for SMEs[8]	UNOTT	Organisation of a Workshop	Workshop on Connected Factories 2 digitalisation pathways and gathering feedback	Nottingham, UK Hybrid	Civil Society: 14%; Industry: 86%	14
18.02.2022	Use cases and demonstrators of Digitalisation of manufacturing	CF2 Consortium	Participation to an event other than a conference or workshop	Focus on key results, use cases and demonstrations of running projects.	Online	Scientific Community (Higher Education, Research)	25
18.02.2022	https://www.effra.eu/events/connectedfactories-use-cases-and-demonstrators-digitalisation-manufacturing-presentations	LSEC	Organisation of a Conference	industrial cybersec	Online	other	200
22.02.2022	Security and Health	PIA	Organisation of a Workshop	Workshop with presentations and discussions about security issues and health	Online	Other	45
24.02.2022	First Open Dialogue on Industrialisation of Explainability for AI in Manufacturing Digital Factory Alliance	EFFRA	Participation to a workshop	Presentation on explainable AI including the relevance of the CF use cases catalogue and the pathways	Online	Scientific Community (Higher Education, Research)	40
28.02.2022	DiManD Training School #5 - Digital Manufacturing and Design ITN[9]	UNOTT	Participation to a workshop	Dissemination of CF2 results as part of a larger Digital Manufacturing training event organised by UNOTT.	Nottingham, UK Hybrid	Scientific Community (Higher Education, Research)	14
01.03.2022	Applications of 360° Imagery in Manufacturing	IMR	Other	Webinar	Online	General Public	40
01.03.2022	Ready for Virtually Anything - IMR's XR Lab & Recording Studio	IMR	Other	Webinar	Online	General Public	40
02.03.2022	Workshops on Industrial Internet of Things	IMR	Organisation of a Workshop	Two IIoT courses were completed in December 2021 and March 2022 with 47 participants from both SME and	Mullingar / IR	Industry	47

[8] https://www.aerospaceup.com/
[9] https://dimanditn.eu/es/home

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				multinational backgrounds. The attendee's included both technical staff and senior management.			
18.03.2022	Webinar - Opportunities and services provided by CSAs to support DIHs and EDIH (I4MS CSA)	VTT	Participation to a conference	Presentation - ConnectedFactories 2 - to cross-fertilise the Industrial Platform communities, allowing for easier take-up of digital technologies, and supporting the transfer of skills and know-how, relevance of the CF use cases catalogue	Online	Online Industry 350	350
20.03.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the ZDMP H2020 consortium	Online	Other	5
01.04.2022	"Digital Transformation – the journey to a smart factory" at o TÜSİAD SD2 Program	MTC	Digital outreach	TÜSİAD SD2 Program, which aims to bring technology producers and technology users together in order to strengthen the innovation ecosystem in Turkey. This one day event consisted of panels and keynote speeches in diverse themes, such as trending technologies, digital transformation journey in the Turkish manufacturing sector, commercial and legal affairs for tech producers.	Hybrid with remote speakers	Industry	
01.04.2022	ConnectedFactories2 - CyberSecurity for Digital Manufacturing Pathway	CF2 Consortium	Participation to an event other than a conference or workshop	The webinar focuses on best practices and experiences shared from leading experts from international research projects (e.g. QU4LITY, SECOIIA) industrial partners and international CyberSecurity Manufacturing experts.	Online	Scientific Community (Higher Education, Research)	21
01.04.2022	https://www.effra.eu/events/connectedfactories-cybersecurity-digital-manufacturing-pathway-webinar	LSEC	Organisation of a Conference	industrial cybersec	Online	other	
12.04.2022	Industrial Digitalization Day - INDIGO	EIL	Organisation of a Workshop	Solutions of industrial digitalization - the "efficiency" was the keyword.	Live	Experts from industry, developers, government officials	150
20.04.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the EFPF H2020 consortium	Online	Other	4
20.04.2022	4ZDM Webinar Digital Technologies for Zero-Defect Manufacturing	EFFRA	Participation to a workshop	Presentation - Update from EFFRA Presentation including the relevance of the CF pathways to the 4ZDM cluster	Online	Scientific Community (Higher Education, Research)	30
25.04.2022	ERA-NET - MiE collaboration meeting	EFFRA	Organisation of a Workshop	Presentation including the relevance of the CF pathways to the programme management	Online	Policy Makers	20
09.05.2022	"Made in Europe: What challenges for the manufacturing industry in Europe?" CIMES -	EFFRA	Participation to a workshop	Presentation including the relevance of the CF use cases catalogue	Online	Industry	30

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	French pôle de compétitivité dedicated to Manufacturing and Production Performance						
11.05.2022	https://www.cyberseceurope.com/	LSEC	Organisation of a Workshop	industrial cybersec	Brussels, BE	Other	4500
12.05.2022	https://www.cyberseceurope.com/	LSEC	Organisation of a Workshop	industrial cybersec	Brussels, BE	Other	4200
19.05.2022	DIGITALEUROPE members meeting Digital Europe	EFFRA	Participation to a workshop	Presentation - Made in Europe and EFFRA Presentation including the relevance of the CF use cases catalogue	Online	Industry	20
22.05.2022	https://www.cpdpconferences.org/	LSEC	Organisation of a Workshop	high level debate	Brussels, BE	Other	1300
23.05.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the SHOP4CF H2020 consortium	Online	Other	4
25.05.2022	Cybersecurity, essentieel in uw weg naar de digitale fabriek	Sirris	Organisation of a Workshop	Guidelines to secure manufacturing processes	Online	Industry	5
25.05.2022	Cybersecurity, essentieel in uw weg naar de digitale fabriek	Sirris	Organisation of a Workshop	Guidelines to secure manufacturing processes	Online	Scientific Community (Higher Education, Research)	5
25.05.2022	Cybersecurity, essentieel in uw weg naar de digitale fabriek	Sirris	Organisation of a Workshop	Guidelines to secure manufacturing processes	Online	General Public	3
30.05.2022	Summit Industrie 4.0	PIA	Organisation of a Conference	Annual Conference of PIA	Vienna, AU	Industry: 48%; Scientific Community (Higher Education, Research): 38%; Policy Makers: 7%; Media: 7%	150
02.06.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the KYKLOS4.0 H2020 consortium	Online	Other	5
05.06.2022	https://www.youtube.com/watch?v=4vJADL-J0W8	LSEC	Organisation of a Workshop	high level debate	San Francisco, USA	Other	250
08.06.2022	DATA WEEK 2022	FPM	Participation to a conference	Data Week 2022 opening event will kick-start the activities on the 24th of May. The three hours of online sessions are opened with a view to the French EU Presidency, followed by a speech by the European Commission representative. A round of	Naples, IT	Scientific Community (Higher Education, Research)	250

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				keynotes from industry, research, Hub and SME perspectives will pave the way to the panel discussion: "Towards an innovative, trusted and fair European data economy: Role of the Federation of Data-driven innovation hubs". The event will conclude with an overview of the Data Week's agenda for the following weeks, and a closing keynote by the Italian event hosts			
10.06.2022	Digitaler Zwilling: Expertenpanel zu Interoperabilität, Standards und Herausforderungen	IPA; S2i	Organisation of a Workshop	Practical discussion on the implementation of standards in an industrial context	Online	Scientific Community (Higher Education, Research): 27%; Industry: 24%; Policy Makers: 4%; Customers: 45%	55
13.06.2022	European worksho on the AI pathway	TECNALIA	Non-scientific and non-peer-reviewed publication	Optimization agents interaction in a bearing production line	Brussels, BE	Scientific Community (Higher Education, Research)	LARGE
15.06.2022	EPIC InnoLabs presented about AI to AUDI	SZTAKI, EPIC InnoLabs, Audi Hungary	Presentation	The goal was for employees to understand the basic concepts of AI and see its most important areas of application.		Employees of AUDI Hungária from different levels.	45
15.06.2022	CyberSecurity deep dive for agile manufacturing, iot & robotics - IIoTSBOM[10]	LSEC	Organisation of a Workshop	industrial cybersec	Leuven, BE, online	Other	95
21.06.2022	IOT WEEK	TECNALIA	Non-scientific and non-peer-reviewed publication	Innovating in the era of Trustworthy AI	DUBLIN, IR	Scientific Community (Higher Education, Research)	LARGE
22.06.2022	Aerospace Wales	MTC	Meeting	Presentation on digital adoption and its importance	Wales, UK	Industry	
23.06.2022	Confindustria Bergamo meeting	EFFRA	Participation to a workshop	Presentation - Made in Europe and EFFRA Presentation including the relevance of the CF use cases catalogue	Brussels, BE	Industry	10
27.09.2022	European Manufacturing Conference 2022	EFFRA/ FPM	Participation to a conference	Presentation on Data Spaces and Manufacturing - including the CF pathways as an overall framework	Brussels, BE	Industry	150
28.06.2022	Digitisation and 5G	IMR	Organisation of a Workshop	IMR completed the "5G Networking"event on June 28th 2022 on 'Digitisation and 5G'. The event was attended by over 80 individuals from over 30 companies.	Mullingar / IR	Industry	80
29.06.2022	https://erf2022.eu/programme/#erf2022-programme	LSEC	Organisation of a Workshop	industrial cybersec	Rotterdam, NL	Other	140

[10] https://www.leadersinsecurity.org/events-old/icalrepeat.detail/2022/06/15/334/-/cybersecurity-deep-dive-for-agile-manufacturing-iot-robotics-iiotsbom-june-15th.html?filter_reset=1

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30.06.2022	West Midlands Aerospace Round Table	MTC	Meeting	facilitated an SME roundtable with several local manufacturers to discuss progress in digitalisation, share experience and examples of what has and hasn't worked.	Coventry, UK	Industry	<20
07.07.2022	National Manufacturing Day - https://www.nationalmanufacturingday.org/	UNOTT	Exhibition	Dissemination of CF2 project and concept during UNOTT's open day as part of the UK's National Manufacturing Day.	Nottingham, UK	Other: 85%; General Public: 8%; Policy Makers: 2%; Industry: 5%	110
20.07.2022	Aerospace Growth Partnership (AGP)	MTC	Conference	Presentation at the Farnborough Airshow to launch the AGP Digital Support pack, a document produced to support Aerospace supply chain adoption of digital technologies	Farnborough, UK	Industry	
25.07.2022	Manufacturing revival panel (participant)	MTC	Participation on a panel	Industry expert discussion on manufacturing in the UK and surviving the current market fluctuations. With a digital and automation leaning.	Wakefield, UK	Industry	
25.07.2022	Skills and human aspects	LMS	Participation in activities organised jointly with other H2020 project(s)	Presentation of CF2 skills and human factor aspects to the DIGIPRIME H2020 consortium	Online	Other	4
28.07.2022	IndTech 2022 https://indtech2022.eu/	VTT	Participation to a conference	Presentation 'Digital Industrial Platforms' highlighting CF2 results	Grenoble, FR	Scientific Community (Higher Education, Research)	50 (estimate)
09.09.2022	Irish Precision Engineering Networking Event	IMR	Organisation of a Workshop	Irish Manufacturing Research (IMR), in association with Precision Turning Manufacturing Association (PTMA), are hosting a precision engineering event at its Mullingar site. The event will showcase live cutting demonstrations and technology overviews provided by IMR's industry partners and a summary of IMR's CNC training offering.	Mullingar / IR	Industry	60
15.09.2022	CyberSecurity AI & AI for CyberSecurity - CSAI 2022[11]	LSEC	Organisation of a Conference	cybersec	Leuven, BE, online	Other	140
16.09.2022	Made Smarter West Midlands Case study	MTC/ WMG	Case study (Use case) publication	For over a year now, the MTC has worked alongside sister Catapult, WMG, and the Coventry and Warwickshire Growth Hub to deliver Made Smarter in the West Midlands. During the pilot phase last year MTC were proud to have delivered forty, 6 to 8 day support projects to local businesses through Made Smarter. They all received MTC focussed engineering support from our Digital or Automation Transformation teams – who helped local small businesses progress against an agreed technology readiness roadmap. The program has delivered meaningful support to our local SMEs, preparing them and supporting them in technology adoption journeys	Midlands region, UK	industry	

[11] https://www.leadersinsecurity.org/events-old/icalrepeat.detail/2022/09/15/326/-/cybersecurity-ai-ai-for-cybersecurity.html?filter_reset=1

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22.09.2022	Industrial Digitalizaton Day – Powered by Fraunhofer	EIL + German-Hungarian Chamber of Industry and Commerce	Organisation of a Workshop	Presentations were given on the topics of industrial digitalization, the use of artificial intelligence, and the sustainability of production systems	Live	Researchers of EIL and four Fraunhofer institutes, industrial executives.	70
27.09.2022	European Manufacturing Conference	EFFRA, FPM, VTT, S2i	Participation to a conference	Discussions and panels on the future of manufacturing	Brussels, BE	Scientific community, industry, policy	250
Sept. 2022	Symspace Webinars	LCM	Organisation of a Workshop	Electro-Magnetic Simulation using FEMM42	Online	Industry	50
01.10.2022	Manufacturer Magazine article	MTC	Article	Short article on the basics of ERP. Vol 25, Issue 6, Oct 2022, Pages 44 & 45.	In print/online	Industry	
12.10.2022	COED Industry Day[12]	LSEC	Organisation of a Conference	cybersec	Leuven, BE, online	Other	100
19.10.2022	ConnectedFactories Foresight & Recommendations workshop	EFFRA and FPM	Participation to an event other than a conference or workshop	Discussion on present status of topics and slight brain drain on possible challenges.	Online	Scientific Community (Higher Education, Research)	24
26.10.2022	AGP: Chair of Factory of the Future Working Group	MTC	Events & presentations	Attended Manufacturing and Supply Chain workshop event and presented progress on Supply Chain digitalisation and Factory of the Future framework development.	UK	Industry	
28.10.2022	Confindustria Bergamo. Digital Manufacturing.	FPM	Participation to a workshop	Digital Manufacturing. Trend tecnologici e prospettive di adozione	Online	Industry	40
07.11.2022	Leicester Business Festival	MTC	Panel Session	Participated in a Panel session (in-person & on-line) on Digital Transformation with Microsoft CTO, DeMontfort Uni CTO and Local Enterprise Scaling and Growth lead. Aimed at SME businesses in Leicester and East Midlands.	in person & online; Leicester, UK	Industry and local governmetn	
10.11.2022	https://www.iiotsbom.com/iiotsbom-annual-update-10-11-22/	LSEC	Organisation of a Conference	cybersec	Antwerp, BE, online	Other	96
15.11.2022	EU Partnerships Stakeholder Forum	VTT	Participation to an event other than a conference or workshop	Keynote about Digital Transition and AI, Data an Robotics in Manufacturing and Made In Europe partnership; panel discussion	Brussels, BE	Policy Makers	30 plus online
16.11.2022	Made in Europe Confindustria Emilia	FPM	Participation to a workshop	I finanziamenti europei 2023-2024 Made in Europe per la transizione green e digitale della manifattura	Bologna, IT	Industry	100
16.11.2022	Confindustria Emilia-Romagna meeting	EFFRA	Organisation of a Workshop	Presentation - Made in Europe and EFFRA, Presentation on Data Spaces and Manufacturing, Circular Economy - including the CF pathways as an overall framework	Bologna, IT	Industry	60
14-17.11.22	Smart Factory Expo	MTC	Conference & business award.	Industry event promoting increased use of digital technologies within factories across the UK.	Liverpool, UK	Industry	

[12] https://www.esat.kuleuven.be/cosic/projects/coed/2022/06/13/coed-industry-day-oct-12th/

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23.11.2022	CIRCULÉIRE Virtual Conference 2022	IMR	Organisation of a Conference	On Wednesday November 23rd 2022, IMR's flagship circular economy initiative, CIRCULÉIRE – The National Platform for Circular Manufacturing, will host a virtual conference titled: Demonstrating Irish Circular Economy Innovation. The conference showcased the impacts, insights and learnings from the cross-sectoral Innovation Pilots funded by CIRCULÉIRE in the construction, furniture, and medical devices, plastics, and textiles sectors.	Virtual	Industry	150
23.11.2022	International members Day	IMR	Organisation of a Workshop	Through our international research network, we will be offering our members a unique annual opportunity to experience the latest trends and technology being developed by manufacturers and research organisations in Eindhoven, Brainport's beating heart. Eindhoven, is more than an epicenter of innovation in high tech and design. It is an exceptional blend of multinational trailblazing entrepreneurs, progressive ecosystem which never sleeps but invents, and an engine of creativity, and this makes it an indispensable factor why the Netherlands is "the new Silicon Valley."	Amsterdam / Eindhoven, NL	Industry	20
23.11.2022	International members Day	IMR	Organisation of a Workshop	Through our international research network, we will be offering our members a unique annual opportunity to experience the latest trends and technology being developed by manufacturers and research organisations in Eindhoven, Brainport's beating heart. Eindhoven, is more than an epicenter of innovation in high tech and design. It is an exceptional blend of multinational trailblazing entrepreneurs, progressive ecosystem which never sleeps but invents, and an engine of creativity, and this makes it an indispensable factor why the Netherlands is "the new Silicon Valley."	Amsterdam / Eindhoven, NL	Industry	20
23.11.2022	CYBER SECURITY CONVENTION 2022[13]	LSEC	Organisation of a Conference	cybersec	Online	Other	200
30.11.2022	Industry Network Day	IMR	Organisation of a Workshop	IMR's Industry Network Day is a members only event, enabling industry members to speak openly with peers on diverse topics and technologies. IMR members network includes over 100 industry partners, both SMEs and MNCs from diverse sectors, sharing their stories on their transformation journeys.	Mullingar / IR	Industry	150
30.11.2022	Industry Network Day	IMR	Organisation of a Workshop	IMR's Industry Network Day is a members only event, enabling industry members to speak openly with peers on diverse topics and technologies. IMR members network includes over 100 industry partners, both SMEs and MNCs from diverse sectors, sharing their stories on their transformation journeys.	Mullingar / IR	Industry	150

Table 8. Dissemination Activities – CF2 Partners have participated in.

[13] https://insightz.io/content/278/Cyber-Security-Convention-2022?triggerWebinarSignup=true

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The table below shows detailed examples of the individual exploitation plans of CF2 partners.

Partner short name	Exploitation Plan
VTT	VTT will exploit the CF2 results through four main channels. First, we will continue **spreading the results**, in particular the **CF2 pathways**, in the communication with our **customers**. The main target customer groups are the Sustainable Industry X Manufacturing cluster and the Open Smart Manufacturing Ecosystem ecosystem, that have already been active in contributing to CF2. Secondly, VTT will continue spread the results using the existing **European networks** like the **DIH projects** BetterFactory, DIH^2 and L4MS on robotics and manufacturing that we coordinate. Thirdly, VTT will look for opportunities to use and cultivate the results in the EIT Manufacturing partnership in order to reach more companies. Lastly and most importantly, VTT exploits the **great community** and network of leading European research parties in the future projects and activities to **strengthen the twin transition of industry**. This will be done through the EFFRA activities (including the **innovation portal**) as well as through individual projects under Made in Europe PPP and other programs. The insights gained during the CF2 will also help us contribute to the **European strategies** (such as Made In Europe SRIA up-date, EFFRA road-maps and working groups, EIT Manufacturing call focuses, Industrial Forum TF5, BDVA **white paper** on data spaces in manufacturing) and to national **roadmaps** and their implementation where VTT is involved. We also continue to use the **structured wiki** advanced in CF2 to make national and European **use cases** visible in the innovation portal.
Tecnalia	TECNALIA will exploit the CF2 results through in the following ways: 1. Spreading the results, in particular the CF2 interoperability CCF, in the communication with our customers. 2. **Consulting customers**, where they place themselves within their individual digital evolution, and what projects, tools, opportunities and challenges exist in the surrounding landscape. 3. Helping our customers to understand Interoperability challenges. Presenting **Use cases and demonstrators** showcased by CF2. 4. Presenting our customers the **wiki/EFFRA Innovation Portal**, as an ideal information base to cross-fertilise with and for targeted information to clients and **DIH/EDIH** beneficiaries This strategy and approach have been developed and tested successfully within CF2 (national/ regional workshops) and can be applied to customers directly. Other actions are 5. Exploit the great **community and network** of leading European research parties in the future projects and activities to strengthen the twin transition of industry. 6. Contribute to the **European strategies** (such as Made In Europe SRIA up-date, EFFRA road-maps and working groups, EIT Manufacturing call focuses, etc) and to national roadmaps and their implementation where TECNALIA is involved. 7. Use the **structured wiki** advanced in CF2 to make national and European use cases visible in the innovation portal benefit from the partners network, the ecosystem built with the sister projects, the contacts to the extended ecosystem of the many attendees of the divers CF2 events and workshops, getting even more rooted in the digital manufacturing universe, to get in touch with new **collaboration partners**.
S2i	S2i will use the CF2 results in **consulting their customers**, in the context of being a partner in the regional EDIH as well as in future projects. The CF2 pathways have revealed a very useful tool in showing SMEs, where they place themselves within their individual digital evolution, and what projects, tools, opportunities and challenges exist in the surrounding landscape. Such pathways can then be adapted to the **individual company level**. Use cases and demonstrators showcased by CF2 present very **practical** and comprehensive information making sometimes complex information more understandable. The strategy and approach have been developed and tested successfully within CF2 (national/ regional workshops) and can be applied to customers directly. The use cases and other results like the cross-cutting factors (especially business models, cybersecurity and interoperability), job profiles and training opportunities being presented in a structured way in the **wiki/EFFRA Innovation Portal**, serve as an ideal information base to cross-fertilise with related projects and for

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	targeted information to clients and **DIH/EDIH** beneficiaries. Apart from this S2i will vastly benefit from the partners network, the ecosystem built with the sister projects, the contacts to the extended ecosystem of the many attendees of the divers CF2 events and workshops, getting even more rooted in the digital manufacturing universe, which enabled S2i to get in touch with new **collaboration partners**.
FPM	FPM (Fondazione Politecnico di Milano) *contributes towards innovating and developing Italy's economic and productive landscape, operating to improve the efficiency of relationships between Politecnico di Milano and companies, institutions and public authorities, by providing professional support, including on an international scale, to research, education and the University's third mission*. In the domain of Digital Manufacturing Platforms for Industry 4.0, FPM has a twofold aim: to **disseminate knowledge and innovation** in the Italian territory and especially in Lombardy and to **contribute to the digital awareness** and **digital transformation** of manufacturing companies and SMEs. For the former aim, FPM is actively linked with the **(E)DIH** for Manufacturing network as well as Confindustria DIHs and Industria 4.0 Competence Centers. Exploiting the knowledge gained by CF2 Working Groups about **Standardisation, Use Cases, Success stories** will create a **region-to-Europe win-win** virtuous circle for innovation and allow Lombardy SMEs to be aligned with the most recent and advanced technological achievements. Webinars, workshops, interactive sessions have been organized and will be organized for this purpose. The second aim is to exploit **WP2 pathways** in the Lombardy and Italian territory, especially those related to **Circular Economy, Data Spaces and AI**. This is mostly done in combination with **Digital Maturity Assessment** methods and tools (DREAMY 4.0, Test Industria 4.0) and Digital Transformation pathways such as the 6Ps method, addressing Product, Process, Platform, People, Partnership and Performance dimensions. In close collaboration with DIH Lombardia, FPM will promote the identification of **industrial cases** to be assessed through CF2 pathways' grids.
LMS	The experience and knowledge acquired during the Connected factories 2 project will be incorporated in **educational courses**, both at undergraduate and post-graduate levels and it will also enhance the R&D consultation capabilities of LMS, to several national and European industrial partners. The channel of **EIT Manufacturing**, of which LMS is a member, will be used to exploit knowledge gained for example by developing projects in the pillar of educations (e.g. by exploiting know how related to skills development) or in the pillar of innovation (e.g. by building on top of the pathways for digital manufacturing). Moreover, the knowledge gained in relation to the skills for advanced and digital manufacturing will help setup and adjust the learning and training program of the **Teaching Factory Competence Center** of which LMS is a founding member.
CEA	CEA will exploit the results of CF2 by actively disseminating the **CF2 pathways** along with the **showcased demonstrators and use-cases** through different channels. Firstly, CEA will promote CF2 pathways in national initiatives in which CEA is strongly involved, in particular in the working groups of the AIF (Alliance Industry of the Future), leading reflections on digitalisation and the deployment of digital twins, which will cascade to national roadmaps. Secondly, CEA will exploit CF2 results in its discussions with industrial partners, in the context of direct partnerships, consortia such as the FactoryLab initiative, which is led by CEA, and future and running European projects such as DIMOFAC. A focus will be given to the **Circular economy** for manufacturing pathway. The partners **network** built through the CF2 ecosystem is highly valuable for CEA and has already allowed mutually enriching interactions, for instance linked to CSA CIRPASS.
MTC	MTC will exploit the CF2 results through a number of opportunities: • Internal exploitation through the **upskilling** of existing engineers in the new pathways & cross-cutting factors created and expanded on in CF1 & CF2. To better support industry, especially SMEs, in undertaking the transition to a digital facility. • Use as supporting material and learning within the Digital Manufacturing Accelerator (DMA) Initiative based out of the Liverpool MTC office & supported by the Liverpool City Region Council. The Virtual factories and cybersecurity cross-cutting factors are directly linked to on-going activities in the DMA, so examples in the CF2 portal and all outputs will be used to increase the support offered.

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	• Exploitation of the **community and network** of European projects collated in the structured wiki (hosted by EFFRA), to use as examples of past projects by organisations moving to or increasing use of digital technologies. These examples will highlight the art of the possible to UK manufacturers, in particular SMEs. • Linked to the above, MTC will endeavor to promote and use the **structured wiki build** on in CF2. Including providing **additional cases**. • Further support in the transition to digital targeting **SMEs** within the UK, through talks, panels, working groups and conferences, in addition to targeted support programs like Made Smarter. Highlighting the **use cases** collected throughout connected factories 1 & 2 and the **pathways/cross-cutting factors**.
UNOTT	The University of Nottingham has and will continue to use the results of the Connected Factories 2 (CF2) project in two primary ways: in informing companies of the resources developed in CF2 to enable them to better understand and develop digitalisation in manufacturing; and by using the CF2 developed resources in informing directions for current and future research at the University and with our research partners. With regards to the former point, the University has a long and successful track record of working with industrial companies to ensure our research is industrially applicable and successful. Historically, this has primarily focused on three categories of company: • Local Small to Medium Enterprises (SMEs) within the Derby, Derbyshire, Nottingham, Nottinghamshire (D2N2) Local Enterprise Partnership (LEP). • Large multinational original equipment manufacturers (OEMs) or tier 1 suppliers, with a particular focus on the aerospace domain. • Large manufacturing automation and digitalisation technology providers. The CF2 resources, including the **pathways**, **cases catalogue**, and **structured wiki** has been of particular interest to **regional SMEs** looking to take their first step into, or continue initial progress within manufacturing digitalisation. The Autonomous Smart Factories pathways has been (and is expected to remain) the most successful outcome for our SME partners, as well as the cross-cutting factors descriptions to aid in understanding the high-level factors which must be considered. For large companies (both manufacturers and technology providers) the complete gamut of pathways have proven popular, both as guidance for complex or emerging areas such as Data Spaces, but also understanding ways in which the future of manufacturing may evolve, allowing technology providers to be prepared for future developments. Due to the forward-looking nature of the pathways (particularly those new for CF2) these will continue to be highly applicable in discussions with companies for the foreseeable future, and UNOTT will continue to disseminate and discuss these. UNOTT continues to be an active participant in **European-funded projects** and proposals, and access to the CF2 results such as cross-cutting themes, **job roles, training, and case catalogues** allows for a more joined-up and consistent approach to current and future research in Europe, preventing repetition of work and promoting alignment with key EU priorities such as the twin transition and green new deal. The structured wiki and the cases catalogue will continue to be used to disseminate the results and learnings from UNOTT's and it's partners digital manufacturing demonstration platforms, ensuring wide visibility.
SIRRIS	Sirris will use the CF2 results to further **support manufacturing companies** in their improvement **roadmap**. To do this Sirris has several tools. First Sirris will continue to organise **workshops** and **master classes** around the topics of Cybersecurity and smart manufacturing where experts transfer their knowledge and experiences to the participants but also where there is room to have interaction between the participants. (Example – Example2) These events are a combination of presentations and hands-on exercises in one of our labs. To strengthen this hands-on aspect Sirris is busy deploying an **experience center** with focus on operator support in assembly, cybersecurity and lean manufacturing. Sirris also participates in external events to promote its services to companies (Example). Via the digital newsletters and the extensive Sirris website companies get access to a large information and **inspiration resource**. As a collective centre for the Belgian technology sector Sirris provides one-on-

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	one advice and support on the subject of cybersecurity, smart manufacturing and digitalisation to support production processes. But also via participation in collective research projects companies can extend their knowledge. Partners from the CF2 consortium are interesting to know for setting up future projects. Sirris, together with the sector federation Agoria, assess manufacturing companies that strive to become a Factory of the Future and has therefore the Made Different programme in place. Since the beginning of the programme almost 50 companies obtained the Factory of the future label. Government provides financial aids for SMEs that want to setup an cybersecurity action plan. Sirris is one of the **expertise centres** companies can rely upon for setting up such a plan.
EIL	EIL intends to use CF2 results in projects for digitalization of industry. The CF2 **pathways give directions**, guidelines for both theoretical and practical activities. EIL plans to **exploit up-to-date technologies** as digital twins, simulation of factory operations, data analysis (BigData) and artificial intelligence in different levels and for different industrial sectors by organizing **national/international workshops** and focused **national trainings** for industrial executives in cooperation with e.g. SZTAKI, Fraunhofer Institutions and German-Hungarian Chamber of Industry and Commerce. **Consultation** project activities both on national and international level will have outstanding importance too, as the industrial applications of new technologies need strong theoretical background and tight cooperation with industry. This co-working is essential to produce quick and effective practical solutions. These knowledge and experiences can be used when **participating in EU projects** as well. The INDIGO Industrial Digitalization Day has been organized 4th time in 2022, and as this is always a successful event with over 100 participants it is planned to issue a call for 2023 and beyond establishing a traditional event for industry executives, developers and government officials in CF2 topics. The **trainings on simulation and DT** are also in the exploitation plan for the next years as well as focused presentations in challenging new themes for potential customers taking into consideration the relevant CF2 pathways. EIL plans to include topics based on the opinions of the participants of previous workshops, trainings e.g. in different AI fields. A special and suggestive part of trainings is when professional EIL experts partially solve on site, real time a fraction of a real problem of an industrial participant submitted before the event with e.g. a very simplified simulation model. A more detailed solution can be forwarded for the questioner later.
I4.0 Austria (PIA)	Platform Industry 4.0 Austria will use the results in all **activities of their work**, e.g. the results are fed into the various activities of PIA. On the one hand into all the **expert groups** that PIA runs. These include the expert groups on Research, Technology and Innovation, the expert group on New Business Models (especially on the topic Gaia-X), the Expert Group on "**The Human in the Digital Factory**", where PIA has organised workshops as this is perceived to be a very important topic, the expert group on **Circular Production** and the Expert Group "**Regional Strategies**", where business support agencies of all nine federal provinces regularly meet. Moreover, as PIA is also involved in a variety of **international projects** (HORIZON EUROPE, DIGITAL EUROPE and INTERREG), the results of CF2 will be used there as well.
IMR	IMR shall utilises digital marketing channels to provide information on CF2 technologies and opportunities for **SME's to engage** with. One of the areas of digitisation where IMR focuses is the application of the Industrial Internet of Things in the context of Industry 4.0. IMR shall provide leadership across 3 key themes within this digitisation theme; 1. **Technology understanding** and identification. 2. **Skills needed** to support digitisation strategies. 3. **Organisational capabilities** and structures. IMR cooperates closely with EU Actions transferring research & innovative solutions into the wider manufacturing community. This will continue and CF2 results will form a strong part of that messaging. Such initiatives include, CSA-Industry4.E, CIRCULÉIRE – The National Platform for Circular Manufacturing, ADMA TranS4MErs: ADMA TranS4MErs is re-energizing the European Advanced Manufacturing (ADMA), MIDIH I4MS phase 3, DIH² and FactoryxChange (European Digital Innovation Hub), a consortium led by Irish Manufacturing Research (IMR) in Mullingar.

Table 9. Examples for partners' individual exploitation plans

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