D6.2. Engagement and ecosystem establishment review - report 2

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Abstract	This updated report outlines the concept, methodology, main steps and actions that underpinned the iPRODUCE work towards stakeholder engagement and ecosystem establishment in the pilot areas (cMDFs) of Spain, Germany, France, Italy, Greece and Denmark[1]. Based on the scope of each cMDF at the local level, tailor-made engagement strategies were developed to address the needs and interests of different stakeholder actors groups. Employed strategies - supported by a suite of communication channels – and mobilisation events, organised at the cMDF level, are reported herein. Remarks and observations on the experiences gained while shaping the cMDF ecosystems are also integrated.

DELIVERABLE HISTORY			
Date	**Version**	**Author/ Contributor/ Reviewer**	**Summary of main changes**
07/06/2023	V0.1	WR	First version of deliverable
13/06/2023	V0.2	All cMDF partners	Internal review
13/06/2023	V0.3	WR	Final version of deliverable sent to Project Coordinator
14/06/2023	V1.0	AIDIMME	Final submission of deliverable

DISSEMINATION LEVEL		
PU	Public	x
PP	Restricted to other programme participants (including the EC services)	
RE	Restricted to a group specified by the consortium (including the EC services)	
CO	Confidential, only for the members of the consortium (including the EC)	

[1] After BetaFactory bankruptcy, only 5 cMDF remained fully active. No CMDF developments in Denmark after Oct 2021. In this regard, the report summarises the Danish cMDF progress made within 2020-21.

DISCLAIMER

iPRODUCE ● Grant Agreement: 870037 ● Innovation Action ● 2020 – 2022 | Duration: 36 months

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Executive Summary

This report constitutes a revised version of *D6.1 Engagement and ecosystem establishment review report*. It outlines the concept, methodology and provides an updated overview of the main steps followed towards the iPRODUCE stakeholder engagement and ecosystem establishment activities in the project's pilot areas (cMDFs)[2].

D6.2 defines the scope and objectives of each cMDF and provides an updated analysis of the identified stakeholders at the pilot level, along with their interests, characteristics and interrelationships. The report further elaborates on the respective stakeholder engagement strategy applied over the project's lifecycle, describing the suite of techniques, actions and events deployed at each regional case while also reflecting on the experiences gained while shaping the cMDF ecosystems.

Setting a cMDF-level stakeholders' engagement strategy, while also reporting the applied procedures to effectively engage the local communities, was a cornerstone for iPRODUCE as it paved the way for the development of the manufacturers, makers and consumers (MMC) ecosystems at the pilot level. The iPRODUCE engagement efforts educated and informed the targeted stakeholders about the purpose of the project by highlighting local issues, technical considerations, best practices, implementation methods, and potential impacts of the social manufacturing concept.

The engagement efforts further yielded a better understanding of our targeted stakeholders' interests, preferences and needs and, in turn, enabled us to fine-tune and streamline our methodology and tailored project actions in each of the pilot areas. In this regard, tailored cMDF-level strategies were proactively adjusted or enhanced to account for any unforeseen developments such as the identification of new and important key stakeholders, low effectiveness of selected channels, etc.

Employed approaches, tailored to local specificities, contexts and stakeholders, as thoroughly described herein, were closely monitored throughout the project and have indeed facilitated and further empowered active participation in social manufacturing processes within and beyond the iPRODUCE framework.

[2] After BetaFactory bankruptcy, only 5 cMDF remained fully active. No CMDF developments in Denmark after Oct 2021. In this regard, the report summarises the Danish cMDF progress made within 2020-21.

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Abbreviations

B2B	Business-to-Business
B2C	Business-to-Consumer
cMDF	Collaborative Manufacturing Demonstration Facilities
DIY	Do It Yourself
IPR	Intellectual Property Rights
MMC	Manufacturers, Makers and Consumers
OpIS	Open Innovation Space
STEM	Science, Technology, Engineering and Mathematics

1. Introduction

1.1. Purpose and structure of the deliverable

D6.2 presents an updated and final status of the employed strategies and respective actions to mobilise the multi-stakeholder communities in the target pilot areas around the cMDFs, based on their specific needs and motivations. To do so, it builds upon knowledge gained through project activities, as well as the partners' knowledge and information on engagement approaches and local stakeholders.

This report is structured in 5 chapters as follows:

- **Chapter 2** describes the background and objectives of the deliverable
- **Chapter 3** presents the methodology followed for stakeholder identification and classification
- **Chapter 4** formulates the stakeholder engagement strategies employed per cMDF
- **Chapter 5** briefly summarises the main conclusions

1.2. Connection with other deliverables

The content of this deliverable is linked to the outcomes of several project activities which are:

- Market insights about user perceptions, motivations and other factors shaping their participation in collaborative manufacturing (T2.1 Users and stakeholders Requirements, Perspectives and Motivation)
- cMDF scope and description of use case scenarios (T2.4 Defining the Local Collaborative MDFs, Use-Cases, Innovation Challenges and KPIs)
- Composition and purpose of the cMDF (T3.2 Mapping and Reinforcing the Manufacturing Capacity of the cMDFs)
- Target audiences and key messages of iPRODUCE (T10.1 Target-Driven Dissemination Strategy, Plan and Review)

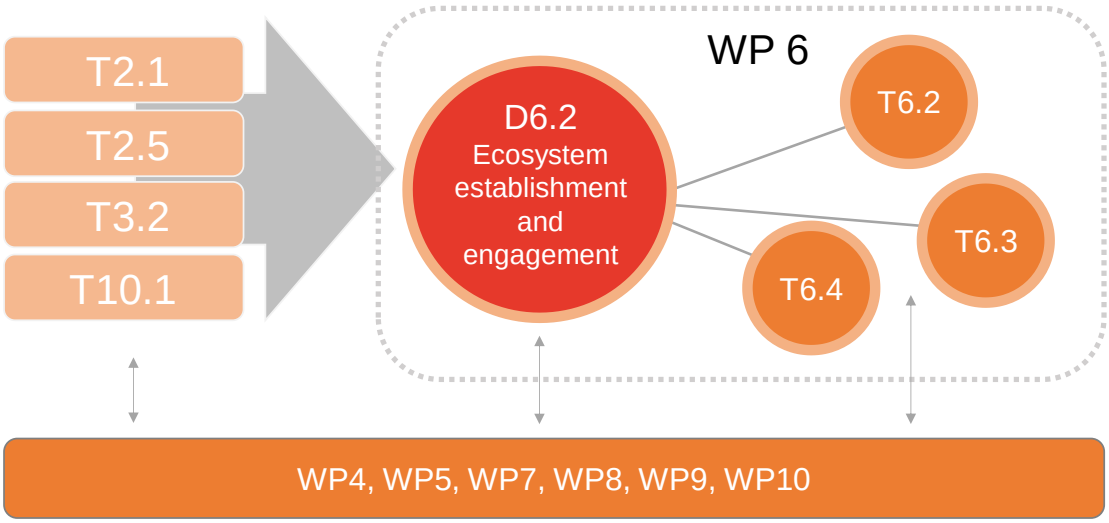

Figure 1. Links between iPRODUCE T6.1 and the rest of the project's workplan

These tasks act complementary for the identification of stakeholders and their respective needs and motivations. At the same time, as a strategy document, this is directly linked with all the activities of WP6, as they altogether target the engagement of makers and consumers in open innovation and collaborative manufacturing activities.

2. Background and objectives

The maker movement is becoming increasingly popular and is considered to be a key driver for collaborative manufacturing. Over the last decade, it has been attracting attention while an immense growth of communities engaged in DIY activities has been observed (Rosa et al., 2018, 2017). Nevertheless, the manufacturing industry at large lacks a deeper understanding of the potential of the maker movement in the production of consumer goods.

In iPRODUCE, we have been working on **encouraging collaboration between manufacturers and makers, while at the same time, on facilitating the transition of consumers into prosumers and of makers into co-innovators of SMEs.** At the same time, the participation of manufacturers, makers and consumers in the social manufacturing approach of iPRODUCE is considered one of the main challenges of the project. Not all consumers want to be makers, not all makers want to innovate for SMEs or scale up, not all SMEs are favourable to open innovation. To this end, **we have to first understand the needs and perceptions of the different communities, in order to successfully engage them**. In the context of iPRODUCE, special focus has been given to better understand the consumers, makers and stakeholders in the pilot level of the cMDFs along with their perceptions, preferences and motivations with respect to the collaborative manufacturing and the maker movement.

In particular, D2.1 and D2.2 shed light on the main drivers and barriers shaping stakeholders' willingness to actively participate in collaborative manufacturing through a large-scale survey which targeted both pilot countries and the EU level. These reports confirm that there is an overall positive attitude towards citizen engagement in all pilot countries. As expected, higher levels of familiarity with terms related to social manufacturing, as well as previous experience in collaborative projects, constitute significant parameters positively affecting both overall perceptions and willingness to join the maker movement. Stakeholders' main motivation for cMDF participation is to gain access to digital tools, exchange ideas and participate in collaborative projects for digital modelling and fabrication.

Our analysis also indicates that consumer empowerment, provision of higher quality services and the training character of makerspaces consist key factors for joining a collaborative manufacturing project. On the contrary, barriers related to health and environmental sustainability, as well as lack of makerspaces, information, and funding opportunities, affect almost all stakeholder groups' perceptions. Demographic aspects are also important factors for the engagement of different stakeholder groups. In particular, D2.1 and D2.2 reports show that the level of education and age are the factors that can strongly affect attitude towards collaborative manufacturing.

2.1. Ecosystem establishment and engagement

Multi-stakeholder engagement processes together with co-creation activities are among the key pillars of iPRODUCE and provide significant advantages in the context of social manufacturing. On the one hand, they contribute to developing products and services that are better adapted to the real needs of people and communities and thus allow more sustainable changes. On the other hand, involving stakeholders to develop innovative products through advanced digital technologies is even more relevant as digital collaboration is possible at a global level, while manufacturing is contextualized through local production and makerspaces.

In this context, it is crucial to have a clear understanding of the needs and motivations of local communities, in order to successfully engage them. **This report leverages the findings of D2.1 and**

D2.2, as well as knowledge gained through other activities of the project, in order to define specific engagement strategies per cMDF and per targeted stakeholder group.

To this end, a set of strategic objectives have been defined under a context of mutual collaboration, information exchange and constant reporting.

The objectives of the iPRODUCE stakeholder engagement approach are:

- **Define the stakeholder groups** to be engaged and integrated to the strategy;
- Provide **timely and appropriate information** in order to secure equal, informed and open participation in the project by stakeholder groups;
- Outline and construct a robust set of **action plans** to be coherently followed by each cMDF;
- **Consult and interact** with impacted stakeholder groups;
- Develop a set of **measurable, ambitious and realistic targets** that have to be met, in order the consortium to be able to measure the success of the action plans;
- **Disclose and disseminate** the anticipated impacts of the project and related mitigation measures in case of need;
- Continuously **provide information** about the project implementation process to the public and government agencies;
- Offer a robust **reporting framework** that all partners are expected to follow;
- Provide a relevant **timetable**, which will guide the consortium partners with regard to the timely and unhindered implementation of the stakeholder engagement action plans;
- Facilitate **open and continuous communication and consultation** between various groups including construction contractors, stakeholders, and the general public;

These objectives are met through the implementation of the pilot-based strategies that are presented in detail in Section 4.

3. Methodology

3.1. Stakeholders identification

The first and most important step in the stakeholder engagement process was to identify the key stakeholders with whom the iPRODUCE consortium partners could establish channels of communication and collaboration. To do so, a template for stakeholder mapping has been circulated to the consortium (*see D6.1, Annex 1*) and each cMDF has been asked to provide information about their local ecosystem of stakeholders. An initial list was jointly formulated which was then regularly updated based on partners' input. The stakeholder identification process was periodically reassessed throughout the project in order to ensure that no relevant groups or individual stakeholders have been excluded. The up to date and final list of stakeholder groups comprising the iPRODUCE ecosystem is presented in Table 1.

Table 1. The iPRODUCE Stakeholders Ecosystem

Manufacturers & Industrial Stakeholders	Consumer-goods manufacturers
	Manufacturing Startups
	Software companies
	Service providers
	Equipment / Material suppliers
Makers and Maker Communities	FabLabs
	DIY communities and maker groups
	Co-working spaces
	Artists and designers
	Engineers, inventors and relevant experts
	Individual makers
Consumers	Individuals
	Targeted market audience
Scientific Community	Research organizations
	R&D units in private companies
	Experts and individual researchers
Facilitators	Associations of engineers and manufacturers
	Funding agencies / Business incubators
	Policy making institutions
Enablers	Local /Regional authorities
	National authorities
	EU networks and initiatives
Civil Society	General public / Citizens
	Civil, social organizations / NGOs
	Public infrastructure (e.g. health, education)

Stakeholders were initially selected following the **ex-ante approach**, according to which stakeholders are identified in advance, in relation to likely stakeholder categories, taking into consideration particular

sectors or groups of relevance and specific roles or functions of different actors (e.g. manufacturers, policy makers, local communities). Other methods used for identifying key stakeholders included:

- Brainstorming and consulting with project partners
- Initiating self-selection by promoting the engagement process and encouraging individuals with an interest to come forward
- Using 'snowball sampling' techniques, whereby one stakeholder identifies further stakeholders until no additional new stakeholders are identified

Next, for each stakeholder, the following information has been provided (*see D6.1, Annex 1*):

- **CMDF involved**: The cMDF in which the stakeholder is involved
- **Stakeholder name**: The stakeholder's organisation name or personal name
- **Stakeholder group**: The broader stakeholder group where the identified stakeholder belongs
- **Stakeholder subgroup:** The stakeholder subgroup where the identified stakeholder can be clustered
- **Potentially related expertise:** Further details on the (potentially related) expertise of the identified stakeholder (e.g. what kind of manufacturer? what kind of maker community? materials being used etc.)
- **Influence:** the capacity of each stakeholder group to affect the achievement of our project's results. A rating score has noted here ranging from low to very high.
- **Impact** the effect the project has on each specific group of stakeholders. A rating score has noted here ranging from low to very high.
- **Current level of engagement:** The current level of engagement with the specific stakeholder. A rating score has noted here ranging from "unaware" to "leading".
- **Desired level of engagement:** The desired level of engagement with the specific stakeholder. A rating score has noted here ranging from "unaware" to "leading".
- **Channel of communication:** e.g. social media, email, face-to-face meetings, etc.
- **Incentives**: The potential incentives for the stakeholder to join iPRODUCE (e.g. participation in an iPRODUCE event, access to certain features of the digital platform, etc.)
- **Contribution**: What the stakeholder could most likely contribute to? What does iPRODUCE need from this stakeholder?

In total, over the stakeholders' identification and mapping exercise and throughout the project's lifecycle, **more than 130 actors and individuals** with diverse roles and level of engagement were identified, stemming from **7 main types and 25 subtypes of stakeholders** (Table 1).

3.2. Stakeholders classification

In order to further determine the type of engagement activities that is most appropriate to integrate each stakeholder category and individual, a Stakeholder Classification Model was LAO used. The latter classifies stakeholders in four quadrants (Q1 Consult, Q2 Collaborate, Q3 Inform, Q4 Involve) based on the relationship of two variables, namely, influence and impact.

- **Influence** refers to the capacity of a stakeholder to affect the achievement of the project results
- **Impact** refers to the effect the project has on each specific group of stakeholders

Stakeholder engagement efforts are more geared towards stakeholders on the upper left/right quadrants (involve, collaborate). This is due to the fact these stakeholder groups are immediately relevant to the project either in terms of directly influencing its implementation or in terms of being more immediately

affected by it. In this sense, the stakeholder groups with higher influence and impact in the project consist of the Manufacturers, Makers and Consumers (MMC) communities that are created in iPRODUCE. On the contrary, stakeholder engagement efforts are less geared towards stakeholders on the low left/right quadrants (inform, consult). The latter can have an important multiplier or complementary role, but they exercise less influence over the project and are also less affected by it. Of course, this does not lower the significance or necessity of engaging these groups to the project.

Based on this model, the identified stakeholder groups relevant to the iPRODUCE Stakeholder engagement process were classified as illustrated in Figure 2. It should be noted that the position of stakeholders in the quadrants is not fixed in stone; the position is rather fluid and stakeholders may jump quadrant.

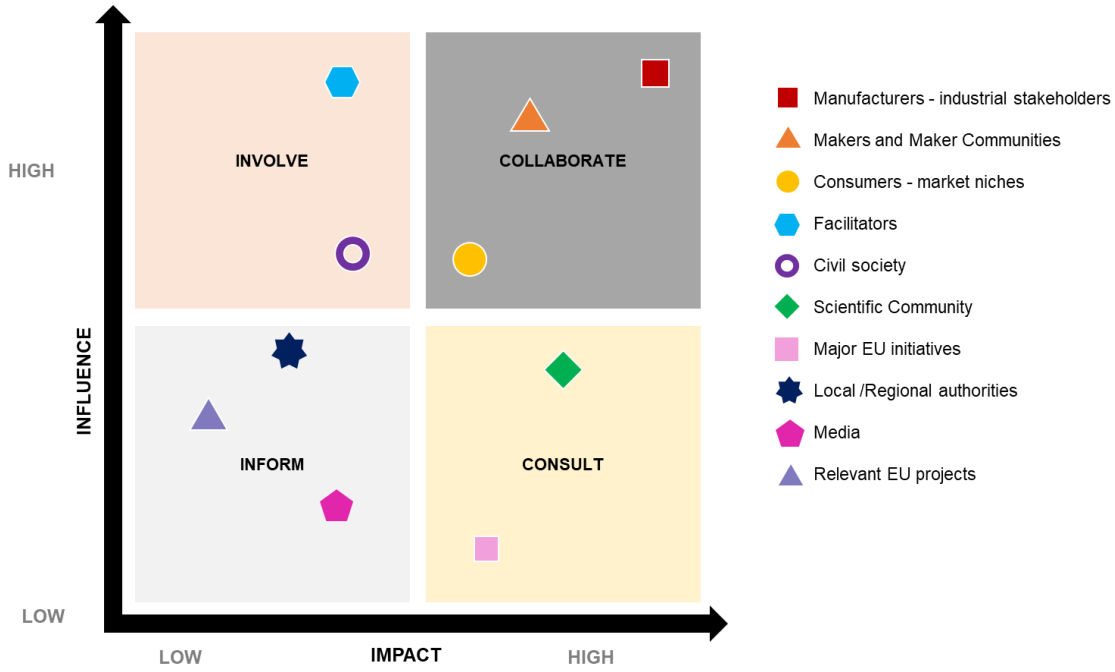

Figure 2. iPRODUCE Stakeholder groups classification

3.3. Strategies definition and events reporting

Building upon the aforementioned identification and classification methodologies, pilot-based strategies for stakeholder engagement and ecosystem development have been defined, updated and presented at their final shape in Chapter 4, focusing on the specific context and needs of each cMDF.

The iPRODUCE engagement strategies are specifically tailored to address the unique scopes and challenges of each cMDF at a pilot level. These strategies are informed by insights from iPRODUCE research and the knowledge and experience of the iPRODUCE partners, particularly the cMDF partners, within their local ecosystems.

While **each cMDF has its own unique focus** in terms of industrial sector, composition, and maturity, the engagement strategies also share **common goals**. These goals include:

- **raising awareness about collaborative production in the consumer goods sector,**
- **fostering information exchange and collaboration among different stakeholder groups, and**
- **increasing stakeholders' willingness to actively participate in co-creation activities.**

Local feedback provided by the iPRODUCE partners has played a significant role in shaping and updating these engagement strategies to align with local specificities and stakeholders. To provide a comprehensive overview of the engagement efforts, each stakeholder mobilisation event (e.g., warm-up events) was reported by the respective activity-conducting team. Activity-specific reports captured the objectives, audience, and key outcomes of each event, were drafted by cMDF partners, following a template circulated by WR (*see D6.1, Annex 2*). Event reports' findings are fused and summarized in chapter below.

4. Pilot-based strategies applied for stakeholder engagement

The following section outlines the tailored engagement strategies developed for each cMDF, providing details about their scope, targeted stakeholder groups and ecosystem composition. It highlights the specific engagement channels employed and provides an overview of activities and events conducted in each cMDF. Remarks, identified challenges and observations on the developed ecosystems are also incorporated.

The report itself focuses on the cMDF-level engagement strategies and provides an overview of actions, such as conducted warm up and promotion events that have successfully taken place.

It is important to mention that, besides the mobilisation and warm up activities foreseen within T6.1, there are **several additional events** at the project level (e.g., consultation workshops as part of T6.3, hackathons as part of T6.4, demo shows as part of T10.4 as well as interactions with stakeholders taking place in WP9) which have **significantly contributed to the establishment of the iPRODUCE ecosystem.**

Results of the remaining pool of pilot- and project-level events (with a wider engagement potential) are further presented in dedicated deliverables. For example:

- a thorough description of the consultation workshops with early project adopters and identified ambassadors (T6.3) is offered in ***D6.5. Ambassador Programme for Early Adopters***
- the project-dedicated "iPRODUCE hackathon" with participants across all cMDFs is presented in ***D6.6 Open Competitions on Consumer Products Innovation Challenges***
- a detailed analysis of all cooperation, promotion and project dissemination activities is provided in ***D10.6 Report on the Cooperation Activities 3***

4.1. Spanish cMDF

4.1.1. Scope

The main scope of the Spanish cMDF is to **develop customer-driven products through collaborative engineering between furniture manufacturing companies and maker communities**. In particular, through the collaboration between manufacturers, FabLabs and the communities of makers, the Spanish iPRODUCE cMDF aims at developing complex specifications for customized products that producers could not develop on their own. The cMDF introduces co-production and co-design of physical products in the furniture sector addressing specific needs for new products, like new materials, or tailor-made shapes and functionalities. Custom furniture design will be tested through prototyping with digital manufacturing technologies and will then lead to the development of appropriate industrial processes for the documentation of the product elements. The Spanish cMDF is composed of three partners:

Table 2. Composition of Spanish cMDF

Partner	Stakeholder group	Role in the project
AIDIMME (cMDF representative)	Technology Institute (metal processing, wood, furniture, and packaging)	○ Research Partner ○ Facility Party ○ Product Engineering activities ○ Contact to manufacturing SMEs (mainly associated members) ○ Support for dissemination actions
Lagrama	Furniture manufacturer	○ Representing the manufacturing companies who can approach to a cMDF ○ Product requirements definition
Océano Naranja	Fab Lab	○ Facility Party ○ Product Design activities ○ Contact to Fablabs, Makers, Consumers ○ Support for dissemination actions

Besides the common goals of all engagement strategies across iPRODUCE, the specific goals of the engagement strategy for the Spanish cMDF are:

- **Familiarise the furniture sector with the methods and tools of collaborative production**
- **Facilitate collaborative engineering in customer-driven home furnishing products**

4.1.2. Identified Ecosystem of Stakeholders

Based on existing knowledge as well as information and findings from the iPRODUCE activities, the Spanish cMDF ecosystem appears to be comprised of a series of relevant actors as showcased in Table 3. These stakeholder groups, as also described below, have indeed been identified as the most relevant local actors who constitute the Spanish MMC community.

Table 3. Overview of Spanish cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers & Industrial Stakeholders	Furniture manufacturers
	Manufacturing Startups

Main Stakeholder Type*	Stakeholder Subtype
Makers And Maker Communities	FabLabs
	DIY communities and maker groups
	Engineers, inventors and relevant experts
Scientific Community	Research organisations
Facilitators	Associations of engineers and manufacturers
Enablers	Local /Regional authorities
Civil Society	Consumers, citizens, social organizations / NGOs

Furniture Manufacturers and Industrial Stakeholders

Manufacturers and industrial stakeholders relevant to the furniture sector are among the most important stakeholder groups of the Spanish MMC community. In fact, Spain is one of the largest European furniture manufacturing countries with exports in several EU countries. The key factors considered to be driving the growth of the Spanish furniture market are the developments in manufacturing technologies together with the **increasing demand for customizable furniture**[3] which are both addressed through the approach of iPRODUCE.

This stakeholder group refers to manufacturing SMEs and start-ups that are directly or indirectly linked with the production of furniture, such as companies with expertise on additive manufacturing. Clearly, engaging these stakeholders plays a crucial role for the collaborative manufacturing processes of the Spanish MMC community. They have a **very good knowledge of the industrial processes and the manufacturing technologies and they can provide substantial feedback on different stages of the collaborative design and manufacturing of products**. In turn, they can benefit from gaining access to the digital platform of iPRODUCE to further improve their products by extending their features and functionalities through prototyping and testing.

An identified challenge in their engagement process is the familiarisation of these actors with the concept of open innovation and the collaborative approach to manufacturing, and the differences to the traditional closed processes of manufacturing. Therefore, it is important that they get informed on the IPR management strategies for preserving and managing IPR issues in the collaborative production scenarios that will be also supported through the smart contracts of the digital platform.

FabLabs and Maker Communities

FabLabs, DIY and maker communities also constitute an important stakeholder group of the Spanish MMC community. This stakeholder group includes **makerspaces, FabLabs, hackerspaces and formal or informal maker communities that are working with technologies of digital fabrication, electronics and programming.**

The motivation behind engaging this group in the Spanish cMDF is **their experience with hands-on activities, including prototyping, through the use of digitally innovative technologies.** Moreover, they are familiar with processes of co-creation and co-design which will make it easier for them to understand the iPRODUCE approach. Overall, they are expected to support the collaborative manufacturing of furniture with creative ideas on how to design and develop customised features and, therefore, contribute to the improvement of the final products. Individual makers can also act as project ambassadors and consumer champions in order to accelerate the development of the collaborative manufacturing processes of the cMDF.

[3] Spain Furniture Market - Growth, Trends and Forecasts (2020 - 2025), Source: *https://www.researchandmarkets.com/reports/5176721/spain-furniture-market-growth-trends-and*

The main challenge for engaging this stakeholder group can be their commitment to the iPRODUCE activities. Since making is usually seen as a hobby or a leisure activity, there can often be difficulties in retaining the participants' interest and motivation throughout the project activities. In this regard, a targeted incentivisation – aligned to the stakeholders' needs - (e.g., free access to software resources, hackathons) appears to be a solid way of addressing potential hurdles.

Associations of Engineers and Manufacturers

Another stakeholder group that has been identified to have a very high influence and impact to the Spanish cMDF includes engineers' and/or manufacturers' associations. The purpose of these associations is to serve as **an advocate and partner for manufacturing** and their related businesses and companies, defending their collective and individual interests to the public administration and other institutions. Furthermore, they also provide their associated companies with different services that seek to **promote, develop and constantly improve their business activities through trainings, networking events and other activities**. This stakeholder group includes associations of engineers, sectorial business federations (e.g. furniture, metal, wood, etc.) as well as startup associations. These organisations usually act at a regional or even national level, and thus, their targeted engagement supports, at the same time, the wider promotion and dissemination of the scope and approach of the Spanish cMDF. Through their extensive networks of associated companies, **these actors play a key role in promoting social manufacturing and utterly contribute to engaging more companies** in the collaborative activities of the Spanish pilot case.

Public Authorities (local and national)

Public authorities are also considered as a key stakeholder group of the Spanish cMDF ecosystem. This group includes relevant **ministries and local authorities that can promote co-creation and social innovation as a way to contribute to more efficient processes of manufacturing.** Considering the role of public authorities in the Spanish cMDF, it becomes obvious that engaging this type of stakeholders will probably speed up the process of the other stakeholders' engagement and will, thus, help us to make fast progress in implementing collaborative manufacturing processes. In addition, public authorities have a significant role in fostering education and training through STEM methodologies and in this way contribute to familiarising the general public with the potential and benefits of social manufacturing.

Consumers and General Public

Finally, consumers and the general public are among the main stakeholder groups to be involved in the cMDF activities. After all, promoting new collaboration processes that will ease consumers' participation in the co-production of products will result in the creation of local added value in the local communities. Moreover, engaging consumers and the general public, fully corresponds to the core of the iPRODUCE vision, concept and approach that is to involve consumers in the collaborative manufacturing of consumer goods. We can include inventors, start-ups, researchers, and even students (mainly from university) addressing Open Innovation as Consumers. Since there are specific use cases for each cMDF, consumers were directly linked with the developed products.

4.1.3. Tailored Strategy for Stakeholder Engagement

Stakeholder groups are very different in knowledge, scale and focus. Furthermore, they have different motivations for participating in collaborative manufacturing as well as different incentives and ways of contribution. Therefore, tailor-made strategies were developed and are presented below, in order to better address the specific needs and motivations of different stakeholder groups.

Engagement of Furniture Manufacturers and Industrial Stakeholders

The motivation of furniture manufacturers and industrial stakeholders for joining the Spanish cMDF can be triggered through economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of consumer goods.** This type of communication serves a two-fold aim: (i) offer information about social manufacturing and the iPRODUCE approach and (ii) invite them to join the Spanish cMDF.
- **cMDF visits, personal phone calls and warm-up events** help us to communicate with the furniture manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **participation in user-driven innovation workshops and their involvement in co-creation activities**, for the collaborative design and manufacturing of furniture. The goal is to engage them in developing customized furniture while taking into account the views of consumers and makers.

Such steps were coordinated by **AIDIMME** who serves as the representative of the Spanish cMDF and has extensive knowledge of the local furniture manufacturing landscape as well as of furniture and metal processing companies in the area of Valencia and all over Spain.

Key messages for reaching furniture manufacturers and industrial stakeholders

It is important to underline that social manufacturing offers a variety of benefits that could have direct impact on their product design and development, by offering positive future perspectives for the collaborative production activities integrating makers' and consumers' feedback. For instance:

- Identified consumer needs in home furnishing
- Development of complex specifications for customized furniture products
- New business models for manufacturing developed within the scope of iPRODUCE.
- Processes through which manufacturers can involve makers and consumers in the manufacturing process through open innovation.
- Intellectual property protection in collaborative environments for open innovation.

Engagement of FabLabs and Maker Communities

The motivation of FabLabs and maker communities for participating in the Spanish cMDF can be sparked through practically indicating what can be offered to them. On one hand, they have the chance to **participate in the design and manufacturing of actual products collaborating with industrial stakeholders of the furniture sector, putting in practice their skills and knowledge.** On the other hand, they also gain knowledge on methods and tools for industrial product development which can support the further development of their ideas as well as understand how to create new cMDFs and expand or upscale existing makerspaces. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the Spanish cMDF while also broadcasting the project's promotional material. It is also handy to circulate emails asking for targeted feedback on developed tools (e.g. alpha or beta versions)
- **Face-to-face activities and workshops** bringing together stakeholders relevant to furniture design and manufacturing. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Such steps were coordinated by AIDIMME together with VLC. **Being a FabLab with connections to other FabLabs and maker communities in the local area, VLC served as a catalyst to ease communication processes** while also fostering a wider and active engagement in the Spanish cMDF.

Key messages for reaching FabLabs and maker communities

Specific messages for attracting makers' interest in the iPRODUCE approach can be used. Through sharp lines, light should be shed on how maker communities can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in home furnishing
- How to create new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Engineers, Designers and Manufacturers

Associations of engineers, designers and manufacturers can play a significant role in supporting the engagement of industrial manufacturers in the Spanish cMDF through their extensive networks of associated companies. AIDIMME established good contact with sectorial federations, so communication and information exchange through face-to-face or online meetings further ensured their engagement in disseminating the project's ambition.

Key messages for reaching Associations of engineers, designers and manufacturers

In our communication with Associations of engineers, designers and manufacturers, we explain how social manufacturing through the iPRODUCE platform can steer the growth of the Spanish furniture market in the area. More specifically we focus on:

- New methods, strategies and tools to foster co-creation and open innovation, while also reducing development costs of new and existing customized furnishing products.
- Methods and tools that can be considered for standardization.
- New products that are open for external investment.

Engagement of Public Authorities

Engaged authorities can provide a twofold contribution for iPRODUCE. First, they can promote co-creation and social innovation as as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of social manufacturing. Communication took place either through **email** or **phone** and further interaction was achieved through their **participation to project events**.

Key messages for reaching Public Authorities

In our communication with Public Authorities, we focus on the impact of the cMDF, explaining:

- The role of the cMDF at a local level and opportunities for replication.
- Good practices learned from the project that promotes greener manufacturing processes.

Engagement of Consumers and the General Public

As digital technologies evolve, novel ways of collecting consumer feedback and integrating it in the design and development stages are developed. In the context of iPRODUCE, **the mobile app developed under T6.2** enables interaction among users and feedback collection about specific products through polls. Special attention is paid to engaging and connecting consumers in areas of high social interest, such as vulnerable communities, female groups, migrants, etc.

Key messages for reaching consumers and general public

In our communication with consumers and the general public, we use clear and direct messages to explain the benefits of social manufacturing, including:

- New customized furniture to meet consumers' needs
- Novel ways to share experience and provide feedback for a specific product
- Consumers can contribute to the design and development of better products.

General remark: *To achieve broad dissemination of the cMDF scope and activities,* ***social media campaigns*** *through both the project and partners' accounts took place. For these campaigns, local language is used together with relevant hashtags that can easily convey key messages.*

4.1.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the Spanish cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 4. Spanish cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
information letters and email invitations	Furniture manufacturers, designers and relevant industrial stakeholders	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Communicate with furniture manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes to be followed.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF.

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
		A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	Furniture manufacturers, designers and industrial stakeholders, FabLabs and maker communities, consumers and general public	Bring together relevant stakeholders and involve them in co-creation activities around the topic of collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early adopters/ambassadors, as part of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	Furniture manufacturers, designers and industrial stakeholders, FabLabs and maker communities, consumers and general public	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore engagement among the local MMC communities of the cMDFs.
Press releases and articles about iPRODUCE and the Spanish cMDF	Associations of engineers, designers and manufacturers, Public Authorities	inform about the vision of the iPRODUCE project as well as the scope of the Spanish cMDF.

4.1.5. Conducted Engagement Events

This section provides a brief analysis of conducted engagement activities of the Spanish cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the Spanish pilot level, please refer to D10.6.**

Table 5. Spanish cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
1st Warm-Up Event Co-Creating With Manufacturers, Makerspaces And Consumers	03 Feb 22	**warm-up event** (physical)	11

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
2nd Warm-Up Event Walkthrough Of The IPRODUCE Platform & Integrated Tools Through a User Case Scenario	21 Feb 22	**warm-up event** (physical)	5
3rd Warm-Up Event With Escola d'Art i Superior de Disseny de València (EASD)	19 May 22	**warm-up event** (physical)	12
Consultation Workshop, Spanish cMDF + Ambassadors	22 Jun 22	Consultation workshop*	7
Eurobrico Fair and Habitat Fair - AIDIMME´s booth on iPRODUCE and dedicated workshops	Sept, Oct 22	**Promotional/ warm up events** (physical)	105
Consultation Workshop Spanish cMDF + Ambassadors + Core Group	21 Feb 23	Consultation workshop*	16
Consultation Workshop Spanish cMDF + Ambassadors	14 Mar 23	Consultation workshop*	3
		Total Engaged Stakeholders	***159***

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

Through the Spanish cMDF's engagement activities more than 150 stakeholders were engaged, representing sectors such as research, industry and makers. The section below briefly analyses the outcomes of Spanish warm up events.

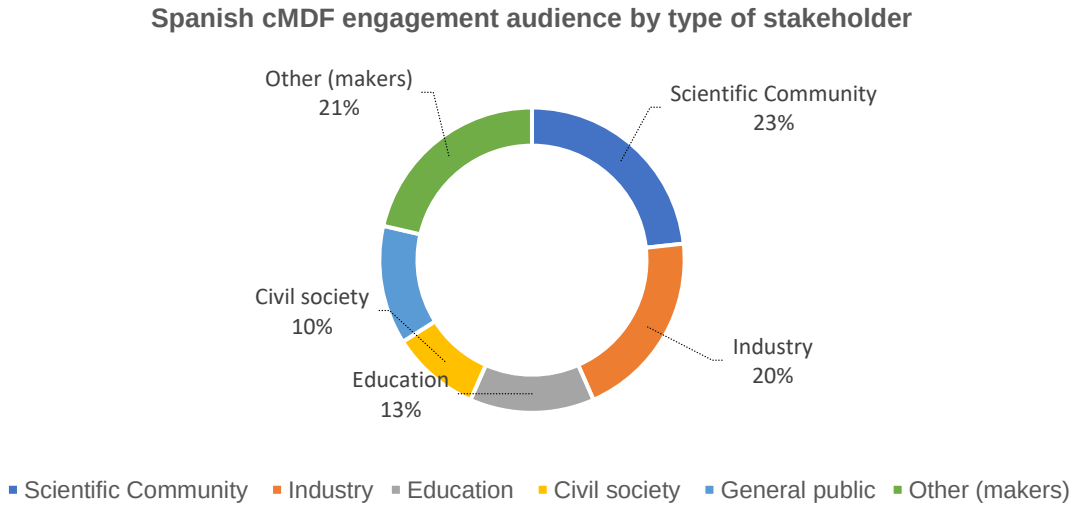

Figure 3. Spanish cMDF-engaged audience by stakeholder type

The warm up events where physically hosted by the Spanish cMDF partners within the period of 2022-2023. These events focused on presenting the iPRODUCE project and showcasing the concept of social and collaborative manufacturing.

In the **1st and 2nd warm up events** (Feb 22, n=16), the audience consisted of professionals from the product design and furniture sectors, including individuals with a maker profile, entrepreneurs, and self-employed individuals. The main objective was to demonstrate how iPRODUCE tools can facilitate the creation of collaborative teams and the development of products. Participants were guided through the use of various project tools, including the Marketplace, Matchmaking, IPR contracts, VR and AR toolkits, and Agile Data Analytics & Visualization Suite. They **actively engaged with the iPRODUCE tools, creating user profiles, forming collaborative teams,** negotiating contracts using blockchain technology, and testing and editing 3D files in VR and AR tools. In both of these sessions, participants got acquainted with the iPRODUCE ambition and recognised the value of the developed platform as a collaboration tool for team/product creation. Engaged stakeholders provided positive feedback on project-platform aspects that could be improved or enhanced. For example, some of the suggestions included improving notifications, refining the Marketplace's functionality, addressing issues with IPR contracts, and enhancing the AR/VR toolkit. Participants feedback at that time was well considered by the project's consortium. The events overall facilitated stakeholder engagement, with participants expressing interest in using iPRODUCE assets as well as broadcasting them among their networks. It also helped identify areas for improvement and generated new ideas for enhancing the project platform.

The **3rd warm up event** (19 May 2022, n=12) gathered feedback from participants who were unfamiliar with iPRODUCE, focusing on their perspective and ideas for new functionalities. The event targeted students, researchers and professors from the master's degree in Creativity and Product Development of Escola d'Art i Superior de Disseny in València (EASD), aiming to demonstrate the iPRODUCE tools through live demos, and showcase videos of other tools in development. Representatives from AIDIMME and Oceano Naranja, along with two teachers from the Master, delivered presentations and engaged the audience. Participants followed guidelines and offered theoretical remarks on the iPRODUCE tools and features. Students provided positive feedback but also identified a series of tools' characteristics that – by the time of event organisation and according to their personal opinion – could be improved. Captured feedback was compiled into a report and then shared with the consortium's technical developers for consideration.

On top of the aforementioned events, **Habitat Fair (Sep 2022) and Eurobrico Fair (Oct 2022)** were both important events for the Spanish pilot team to showcase the iPRODUCE project and engaging with stakeholders. Participation in these events, as also presented in D10.6, helped to create interest, generate awareness, and foster potential collaborations with manufacturers, designers, and other relevant stakeholders. The Habitat Fair provided an opportunity to showcase iPRODUCE tools to furniture manufacturers and product designers in a face-to-face setting. The Eurobrico fair brought together national and international agents in the DIY, hardware, garden, and decoration sectors. Both fairs provided a platform for engaging interested actors, promoting the project, and demonstrating the capabilities of iPRODUCE tools and the Spanish cMDF.

The Spanish cMDF stakeholders' mobilisation activities overall provided a great basis for effectively engaging local actors. The employed engagement strategy brought together the industrial expertise of furniture producers and manufacturers with the creative and innovative ideas of the maker communities and the actual needs of the consumers. The hosted sessions mobilised people under the banner of social manufacturing and engaged them in the collaborative manufacturing processes of the Spanish cMDF. At the same time, valuable insights were extracted into the strengths of the project's tools and functionalities. The outcomes included identifying areas for improvement, generating new ideas, and creating reports with feedback and suggestions for the project's technical experts to take into consideration.

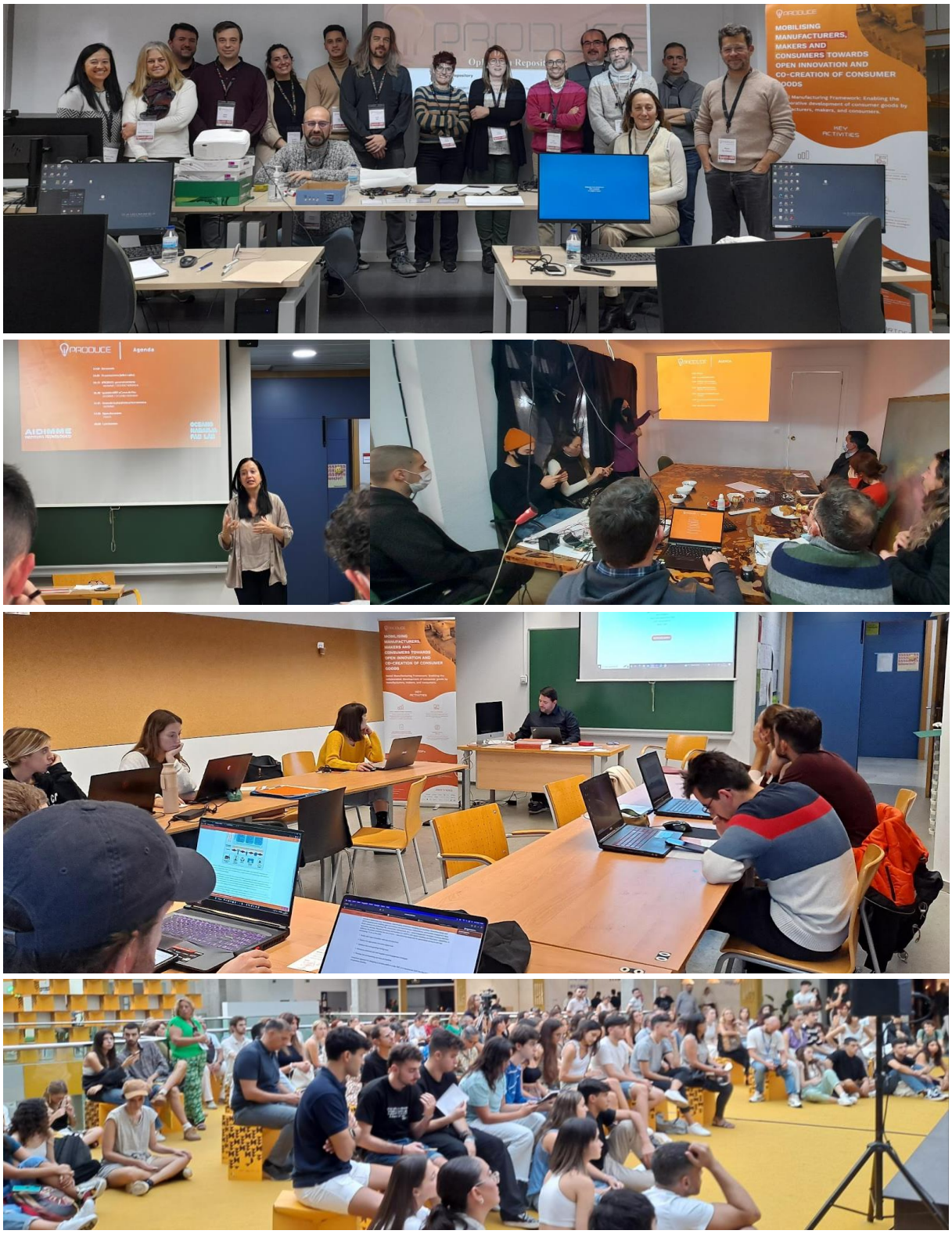

Figure 4. Snapshots from the Spanish cMDF engagement events

Another key outcome of these events was the identification of potential early adopters of the project-generated resources, who can act as ambassadors to mobilise and inform local communities on social manufacturing. This pool of identified "lead users" was approached and engaged within the **consultation workshops that are thoroughly described and presented under *D6.5 Ambassador Programme for Early Adopters*.** Ambassadors and other engaged actors also took part in the

iPRODUCE hackathon, as described in detail under ***D6.6 Open Competitions on Consumer Products Innovation Challenges.***

4.1.6. Additional Remarks on the Spanish cMDF Ecosystem

The - easiest to reach and involve – stakeholder:
Students from the School of Art focusing in product design
Most impactful communication channels employed: e-mail and face-to-face meetings

Students at the School of Art, with a major in product design and particularly in the furniture domain, have a strong desire to enhance their visibility and establish an online presence on various platforms to showcase their designs. They actively engage with different networks and platforms to explore opportunities for collaborations and partnerships. This eagerness and openness made it rather easy, in the framework of iPRODUCE, to involve them in initiatives aimed at connecting with potential partners who can fulfil their requirements, or alternatively, where they can contribute their skills and expertise. By actively participating in platforms such as the infrastructure provided by our project, these students can leverage the vast possibilities available to connect with like-minded individuals and organisations. They can easily seek out suitable partners who can meet their specific needs or collaborate with them on their design projects. Simultaneously, they provide an attractive proposition to potential partners by offering their unique talents and creative abilities. They increase their chances of discovering new opportunities, expanding their professional network, and staying up to date with the latest trends and developments in their field.

The - hardest to reach and engage – stakeholder:
Furniture Manufacturers
Most impactful communication channels employed: e-mail and face-to-face meetings

The stakeholder type showing the highest level of active engagement:
Makers
Most impactful communication channels employed: e-mail and face-to-face meetings

The stakeholder type with the most impactful contribution:
the Vocational Training Centre in wood and furniture
Most impactful communication channels employed: e-mail and face-to-face meetings

The most challenging stakeholder to engage with, in the Spanish pilot region, was the furniture manufacturers. They appear to often be hesitant to embrace platforms like the one developed by iPRODUCE, as they believe that working with their own designers and development team is sufficient. They often conceive the maker community as an unattractive concept and do not always acknowledge the value in collaborative co-design through a platform. There is a reluctance and fear of idea copying, making it difficult to convince them to join the project's mission. To effectively engage furniture manufacturers, the Spanish cMDF focused on addressing their concerns with solid arguments. It is crucial to emphasise the benefits of an open innovation approach and alleviate fears about idea theft. Collaborating with them more closely and establishing trust helped (to a certain extend) to overcome their apprehension while highlighting success stories and showcasing the advantages of co-creation.

4.2. German cMDF

4.2.1. Scope

The main scope of the German cMDF is to **enhance the co-creation capacity of manufacturing SMEs for consumer product innovation**. By introducing the maker movement to the manufacturing sector, it aims to capitalize on the FabLab mentality and the respective working processes. The first step for that is to understand and determine the relationships between SMEs and makerspaces. Next, it establishes a concise list of services that are of interest and could be beneficial for SMEs and FabLabs alike. In this way, the German cMDF develops the mechanisms to facilitate initial equipment usage for new machine users and the corresponding processes and tools to support iterative prototyping with electronics. The cMDF is composed of three partners, as presented below.

Table 6. Composition of German cMDF

Partner	Stakeholder group	Role in the project
Fraunhofer FIT	Research Institute	○ Research Partner ○ Responsible for methodology
Zenit GmbH	Public Private Partnership	○ Networking Partner ○ Provides Contact to SMEs ○ Organizational support for organizing events
MakerSpace Bonn	FabLab	○ Facility Partner ○ Production capacity ○ Hosting workshop and machinery ○ Support for dissemination actions

Besides the common goals of stakeholder engagement, the strategy for the German cMDF aims to:

- **Encourage open consultation about methods and tools used in makerspaces**
- **Facilitate collaborative product development between different stakeholder groups**
- **Promote innovative methods and tools for collaborative learning**

4.2.2. Identified Ecosystem of Stakeholders

Based on existing knowledge as well as information and findings from the iPRODUCE activities, the German cMDF ecosystem appears to be comprised of a series of relevant actors as showcased in Table 7. These stakeholder groups, as also described below, have been identified as the most relevant local actors who constitute the German MMC community.

Table 7. Overview of German cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers & Industrial Stakeholders	Consumer-goods manufacturers
	Equipment / Material suppliers
Makers And Maker Communities	FabLabs
	Co-working spaces

Main Stakeholder Type*	Stakeholder Subtype
Scientific Community	Research organizations
	R&D units in private companies
Enablers	Local /Regional authorities

Industrial Manufacturers

Industrial manufacturers are among the most important stakeholder groups of the German MMC community. **This group includes manufacturing SMEs and start-ups as well as industrial companies that are working on electronic devices and focus on emerging IoT applications for both industrial environments and smart cities.**

The **main motivation** for their engagement in the German cMDF is to expand their manufacturing capabilities, experimenting and testing new methods and tools that are used in makerspaces. In other words, they have the chance to use rapid prototyping tools as well as co-creation methods that will make their working processes more efficient and will enable them to easier integrate user feedback and needs.

FabLabs and Maker Communities

This stakeholder group includes **makerspaces, FabLabs, co-working spaces, hackerspaces and maker communities working with technologies of digital fabrication, electronics and programming**. The motivation behind engaging this group in the German cMDF is their experience with prototyping and their familiarity with processes of co-creation and co-design. Individual makers can also act as project ambassadors and consumer champions in order to accelerate the development of the collaborative manufacturing processes of the cMDF.

The main challenge for engaging this stakeholder group can be their commitment to the iPRODUCE activities. Since making is usually seen as a hobby or a leisure activity, there can often be difficulties in retaining the participants' interest and motivation throughout the project activities. To tackle this challenge, the engagement strategy for this group will provide a set of incentives that could further motivate their participation throughout the project activities.

Consumers and General Public

Based on the outcomes of our survey performed in T2.1, the familiarity of the German sample with the maker movement is moderate compared to other pilot countries of iPRODUCE. At the same time, the results have shown that there is limited experience in working in collaborative projects. Both insights indicate that the engagement strategy targeting the general public should start from paying special attention on **familiarising people with the key concepts of the project.**

Local Administration

This group includes local authorities as well as local organisations providing support to SMEs. Through a wide range of initiatives, they foster the diffusion of STEM topics in society, focusing either on the general public or specific target groups, such as kids, elder people, etc. Therefore, the engagement of local administration plays a crucial role in raising awareness on collaborative manufacturing across society and accelerate the social acceptance of digital fabrication. After being engaged, they may significantly contribute to the promotion of the iPRODUCE approach.

4.2.3. Tailored Strategy for Stakeholder Engagement

A multi-stakeholder strategy has been developed for the engagement in the German cMDF in order to address the needs and motivation of different stakeholder groups. Interactions and interconnections between manufacturers and maker communities are strongly encouraged. At the same time, raising awareness on social manufacturing and digital fabrication is essential for all stakeholder groups. The tailor-made strategies that have been developed for the targeted stakeholder groups are presented below, addressing their specific needs and motivation.

Engagement of Industrial Manufacturers

The motivation of industrial stakeholders for joining the German cMDF can be triggered through economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of consumer goods.** This type of communication serves a two-fold aim: (i) offer information about open innovation, co-creation and the iPRODUCE approach and (ii) invite them to join the German cMDF.
- **cMDF visits, calls, meetings and warm-up events** help us to better interact with priority stakeholders and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **Active involvement in user-driven innovation workshops and co-creation activities** together with makers and consumers. In these events, stakeholders have the chance to experiment on using methods and tools for open innovation and co-creation, in order to enhance their manufacturing capacity and their innovation potential

To do so, the **extensive contact network of local SMEs of ZENIT, as well as the professional network of FIT were exploited**. Based on stakeholders' interest and participation, priority actors, relevant to electronic devices, IoT and smart city applications, were identified.

Key messages for reaching industrial manufacturers

It is important to underline that co-creation and open innovation could further improve processes of product design and development better aligned to consumers' needs and expectations. For instance:

- Identified consumer needs in electronic devices and IoT and smart city applications
- New business models for manufacturing developed within the scope of iPRODUCE.
- Processes through which manufacturers can involve makers and consumers in the manufacturing process through open innovation.

Engagement of FabLabs and Maker Communities

The motivation of FabLabs and maker communities for participating in the German cMDF can be sparked through practically indicating what can be offered to them. First, they will have the opportunity to **collaborate with industrial stakeholders and exchange knowledge on methods, tools and practices for collaborative design and manufacturing**. Second, they will have the chance to present their work and mission in a wide range of stakeholders and find support in their ideas. Third, they will learn how cMDFs are built and operating in order to either create new or expand and upscale existing makerspaces. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the German cMDF while also broadcasting the project's promotional material. It is also handy to circulate emails asking for targeted feedback on developed tools (e.g. alpha or beta versions)
- **Face-to-face activities, interaction and workshops** bringing together stakeholders relevant to IoT and smart city domains. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Being a FabLab with connections to other FabLabs and maker communities in the local area, **Makerspace Bonn (MSB) served as a catalyst to ease communication processes** while also fostering a wider and active engagement in the German cMDF.

Key messages for reaching FabLabs and maker communities

Specific messages for attracting makers' interest in the iPRODUCE approach can be used. Through sharp lines, light should be shed on how maker communities can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in electronic devices and IoT and smart city applications
- How to create new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Local Administration

The engagement of local administration is seen as a crucial element of this strategy and brings a twofold contribution. Engaged authorities can in turn promote co-creation and open innovation as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of social manufacturing.

Communication with local administration took place either through **email** or **phone** and further interaction was achieved through their **participation to project events**.

Key messages for reaching Local Administration

In our communications with Public Authorities, we focus on the impact of the German cMDF, explaining:

- The role of the cMDF at a local level and opportunities for replication.
- Good practices learned from the project that promote greener manufacturing processes.

Engagement of Consumers and General Public

As discussed above, previous findings from project activities indicate low to moderate familiarity of the German population with the concepts of collaborative production and the maker movement. Therefore, the first step for their engagement focused on raising awareness and familiarising people with the key concepts of the German cMDF. The use of clear and direct messages with which people can relate and identify their individual or collective needs is very important. In the context of iPRODUCE, **the mobile app developed under T6.2** also enabled am interaction among users and feedback collection about specific products through polls. Special attention was paid to engaging and connecting consumers in areas of high social interest, such as vulnerable communities and migrants.

Key messages for reaching consumers and general public

In our communication with consumers and the general public, we use clear and direct messages to explain the benefits of co-creation and open innovation, including:

- Opportunities for learning and developing new skills and capabilities
- New or existing products designed to meet consumers' needs
- Novel ways to share experience and provide feedback for a specific product
- Consumers can contribute to the design and development of better products.

General remark: *To achieve broad dissemination of the cMDF scope and activities,* ***social media campaigns*** *through both the project and partners' accounts took place. For these campaigns, local language is used together with relevant hashtags that can easily convey key messages.*

4.2.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the German cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 8. German cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
information letters and email invitations	Industrial manufacturers	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Engage in personal interactions between industrial manufacturers and the German cMDF to better understand their needs and expectations. cMDF visits, personal phone calls and emails help to communicate with the industrial manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF. A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	All identified stakeholders	Bring together relevant stakeholders and involve them in co-creation activities around the topic of collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early adopters/ambassadors, as part

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
		of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	Industrial stakeholders, FabLabs and maker communities, consumers and general public	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore engagement among the local MMC communities of the cMDFs.
Press releases and articles about iPRODUCE and the German cMDF	Local administration	inform about the vision of the iPRODUCE project as well as the scope of the German cMDF.

4.2.5. Conducted Engagement Events

This section provides a brief analysis of conducted engagement activities of the German cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the German pilot level, please refer to D10.6.**

Table 9. German cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
1st Warm-Up Event Methods and Digital Tools from the Maker-Community	21 April 20	**warm-up event** (online)	21
2nd Warm-Up Event Innovation from Home: Discussing Advantages and Disadvantages of Collaborative Online Tools	19 May 20	**warm-up event** (online)	35
3rd Warm-Up Event Rapid-Innovation, Production and -Distribution & Funding Opportunities In Germany	16 June 20	**warm-up event** (online)	10
4th Warm-Up Event Design Thinking To Foster	18 Aug 20	**warm-up event** (online)	12

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
Innovation & Interactive Production Design			
Christmas Special Event Creating Innovations From The Home Office: 3d Printing For Giveaways	28 Oct 20	**warm-up event** (online)	5
Engagement Event How Companies Can Use The Make Movement For Product Development	12 April 21	**warm-up event** (online)	8
German Cmdf Ambassador Workshop #1	18 Jan 22	Consultation workshop*	3
Greener Manufacturing Show	10 Nov 22	**Promotional/ warm-up event** (physical)	179
German Cmdf Ambassador Workshop #2	08 March 23	Consultation workshop*	5
		Total Engaged Stakeholders	***278***

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

Through the German cMDF's engagement activities more than 270 stakeholders were engaged, representing sectors such as industry, research and makers. The section below briefly analyses the outcomes of German warm up events.

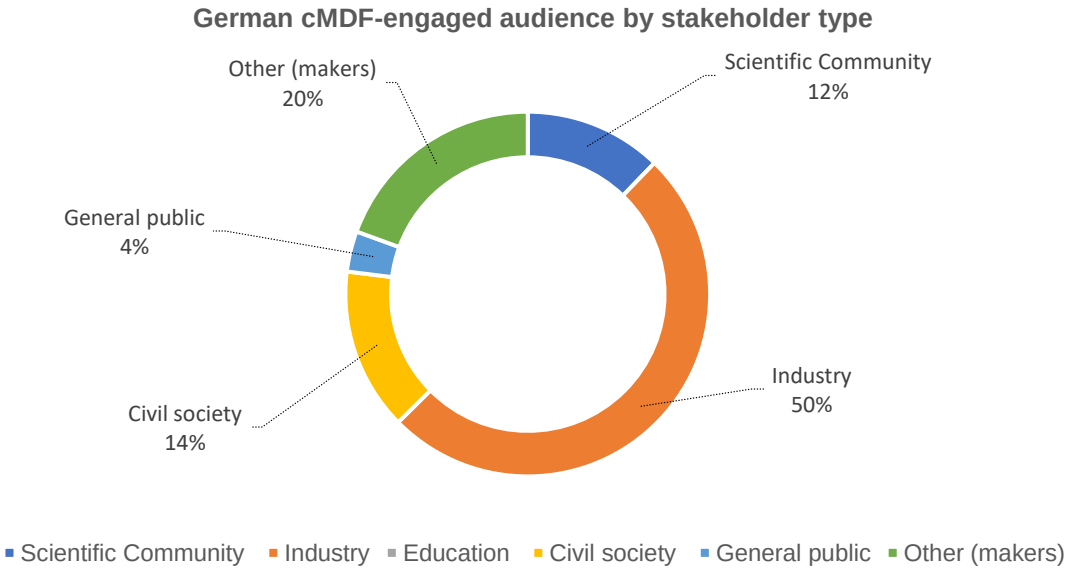

Figure 5. German cMDF-engaged audience by stakeholder type

The warm up events, briefly presented below, were hosted by the German cMDF partners and virtually took place over the Covid pandemic within 2020-2021.

The **1st warm up event** (21 April 2020, n=21) focused on informing participants about collaboration opportunities with Maker Space Bonn and gathering insights for tailored follow-up workshops. Legal aspects of online collaboration tools were also discussed. New ideas emerged, such as individual participant-focused sessions and workshops on collaborative remote working. The event attracted participants interested in further engagement. Participants provided positive feedback and expressed interest in continuing discussions.

The objective of the **2nd warm up event** (19 May 2020, n=35) was to respond to participants' needs in communication and collaboration tools. It aimed to establish a basis for future online collaboration, gather feedback on available or desired tools, and identify suitable interview partners for other iPRODUCE activities. The event included presentations on communication tools and company challenges. The outcomes included gaining knowledge about manufacturing SMEs needs, requirements and generating new ideas for collaboration platforms. Peer-to-peer exchange and shared experiences were highlighted as important. No challenges were faced, and participants provided positive feedback, expressing interest in learning more about the tools and the German cMDF.

The **3rd warm up event** (16 June 2020, n=10) focused on sharing ideas and activities related to medical supplies during the pandemic and presenting funding opportunities. The target audience was industry and applied research units. The outcomes revealed a lack of awareness among SMEs regarding maker community activities and funding opportunities. Stakeholders showed greater interest in pandemic-related topics, online tools, and digitisation. Positive feedback was received regarding MakerSpace Bonn activities and the objectives and ambition of iPRODUCE.

The **4th warm up event** (18 Aug 2020, n=12) of the German cMDF introduced the concept of design thinking. Over this meeting the *Tinkercad* software was presented, and attending SMES were encouraged and motivated to utilise the makerspace Bonn facilities. Meeting outcomes included increased visibility and interest in iPRODUCE within the Fraunhofer Institute community and establishing relationships with the Fraunhofer network. The main takeaways highlighted the suitability of online formats for this type of workshop, the challenge of engaging industrial SMEs, and the need to emphasize interactivity and address current topics of interest in future iterations.

The **5th warm up event** (28 Oct 2020, Christmas special, n=5) aimed to involve participants in a tangible activity related to 3D printing. Participants created personalized name tags using step-by-step instructions. The outcomes included acquainting participants with the need for 3D printing products and the potential for fast prototyping services. Participants provided positive feedback on the interactive format and felt more familiarised with the objectives and assets of iPRODUCE.

The **6th warm up event** (12 April 2021, n=8) focused on promoting iPRODUCE, raising awareness of design thinking and Maker Space Bonn, and disseminating the activities of the German cMDF and the iPRODUCE project. It was organized as a virtual booth at an industrial exhibition and targeted participants from the exhibition, manufacturing SMEs, and innovation networks. The event resulted in contacts with valuable stakeholders, re-establishing links with previous workshop participants, and identifying interested SMEs for cMDF services (e.g., live prototyping). A genuine interest in the iPRODUCE activities was expressed, particularly from the manufacturing sector and positive feedback was captured.

The German cMDF further exhibited iPRODUCE and pursued the engagement of potentially interested stakeholders at the **Greener Manufacturing show** in Cologne (10 Nov 2022, n=100+), where ZENIT

was present with a matchmaking stand. Start-ups and SMEs where informed about the opportunities offered by iPRODUCE on a local but also cross-border level to realise their product ideas.

In summary, the engagement strategy for the German cMDF brought together industrial expertise with creative and innovative ideas of the maker communities. The employed process helped to better understand the needs of manufacturing SMEs as well as the work processes of makerspaces. Multiple virtual warm-up events **facilitated knowledge sharing, identified needs, established collaborations, and successfully raised awareness around the iPRODUCE mission.** Participants expressed interest in further engagement and provided positive feedback on the project's methodological approaches. Overall, these events had a positive impact on promoting collaboration and engaging stakeholders during challenging times. Challenges included time limitations, engaging industrial SMEs, and clarifying terminology. Recommendations for future events included exploring new interactive formats, incorporating shared experiences, and relating topics to SMEs' specific needs.

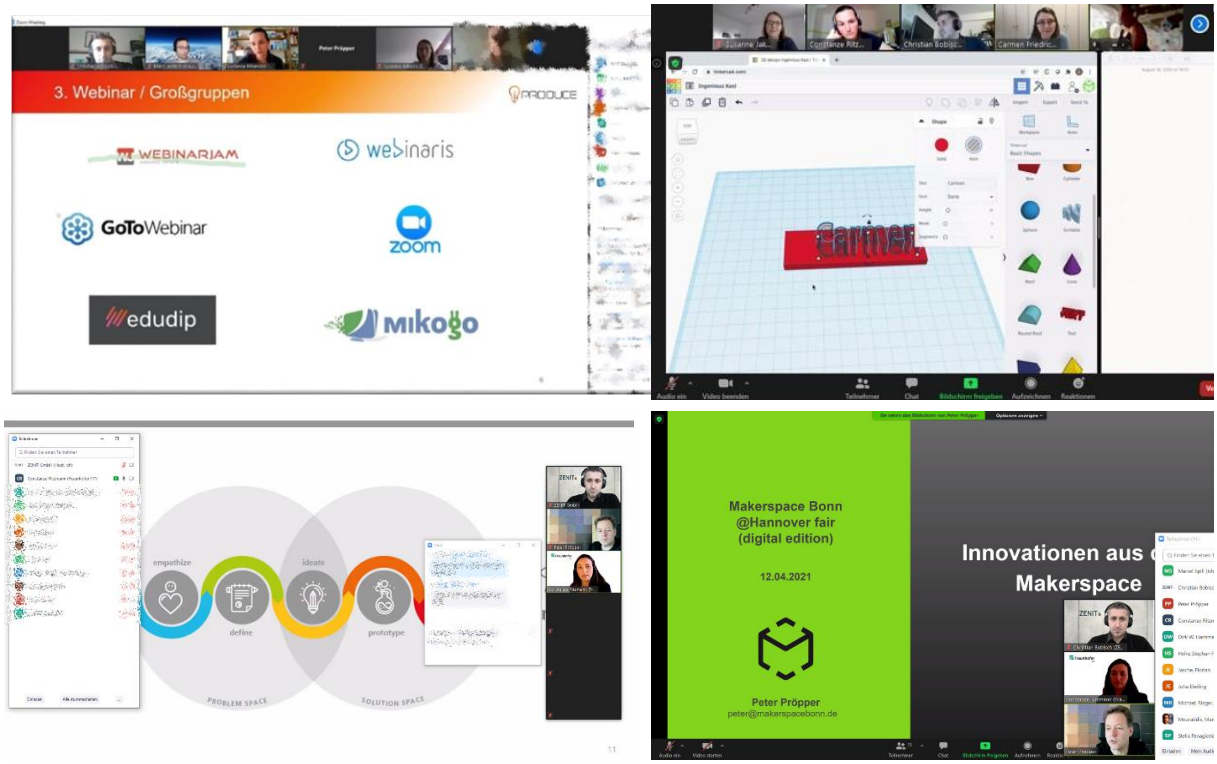

Figure 6. Snapshots from the German cMDF engagement events

A valuable outcome of these events was the identification of potential early adopters of the project-generated resources, who can act as ambassadors to mobilise and inform local communities on social manufacturing. This process is thoroughly described under ***D6.5 Ambassador Programme for Early Adopters.*** Ambassadors and other engaged actors also took part in the iPRODUCE hackathon, as described in detail under ***D6.6 Open Competitions on Consumer Products Innovation Challenges.***

4.2.6. Additional Remarks on the German cMDF Ecosystem

The - easiest to reach and involve – stakeholder:
Stakeholders and project managers working on different projects within the German cMDF host organisations; Start-up companies
Most impactful communication channels employed: personal contacts, social media

The - hardest to reach and engage – stakeholder:
SME managers
Most impactful communication channels employed: personal contacts, Newsletters, presence at exhibitions, webinars

The stakeholder type showing the highest level of active engagement:
Start-ups and makers who participated in product forge workshops and the hackathon
Most impactful communication channels employed: personal contacts

The stakeholder type with the most impactful contribution:
Start-ups, makers, stakeholders from the German cMDF host organisations
Most impactful communication channels employed: personal contacts

4.3. French cMDF

4.3.1. Scope

The main scope of the French cMDF is to **demonstrate the use of co-creation and co-design mainly in the mobility, automotive and robotics sectors**. To do so, the respective team is working on making the FabLabs equipment, tools and machines more accessible to potential users or product developers by creating virtual and digital trainings, tutorials and courses. At the same time, the French cMDF aims at supporting entrepreneurs' and SMEs' projects, especially in the mobility and electro-mobility sectors, by introducing and encouraging them to involve social and collaborative manufacturing in their product design and development processes. The cMDF is composed of three partners:

Table 10. Composition of French cMDF

Partner	Stakeholder group	Role in the project
Excelcar	Accelerator for industrial innovation	○ Detection of entrepreneurial projects related to micro-mobilities ○ Provision of prototyping equipment for cMDF projects ○ Organisation of open innovation challenges ○ Experimentation of training modules dedicated to the use of prototyping equipment
FabLab Vosges	FabLab	○ Running and organizing product design, co-creation and prototyping workshops. ○ Disseminating the local production and making capabilities through the participation in a set of local projects as well as organizing trainings related to the available equipment ○ Providing prototyping machines and equipment for user project purposes.
Materalia	Competitiveness cluster in materials and processes	○ Identification of new project opportunities ○ Elaboration of a financing strategy ○ Organisation of co-creation and open innovation workshops ○ Detection of partners or end users.

A diverse set of communication channels has been employed to successfully engage local communities in the activities of the French cMDF.

4.3.2. Identified Ecosystem of Stakeholders

The French cMDF ecosystem is comprised of a series of relevant actors as showcased in Table 11. These stakeholder groups, as also described below, have been identified as the most relevant local actors who constitute the French MMC community.

Table 11. Overview of French cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers & Industrial Stakeholders	Manufacturing Startups
	Service providers

Main Stakeholder Type*	Stakeholder Subtype
Makers and Maker Communities	FabLabs
	Co-working spaces
Scientific Community	Research organisations
	Technical centres, R&D units in private companies
Facilitators	Funding agencies / Business incubators
	Policy making institutions
Civil Society	Public infrastructure (e.g. health, education)

Manufacturers and Industrial Stakeholders

Manufacturers and industrial stakeholders relevant to the automotive sector are among the most important stakeholder groups of the French MMC community. **This group includes consumer-goods manufacturers and manufacturing start-ups with expertise in sensors, IoT devices, microcontrollers but also companies working on prototyping and additive manufacturing with plastics and metal.** The engagement of manufacturers and industrial stakeholders in the French cMDF plays a crucial role for the success deployment of collaborative manufacturing activities. Based on their expertise and skills, they can provide substantial support in the design of the products, the development of IoT solutions and the prototyping needs.

One of the main identified challenges in terms of this group's engagement is their familiarisation with the concept of open innovation and the collaborative approach to manufacturing, compared to the traditional closed processes of manufacturing. It is important that they get informed on the IPR management strategies for preserving and managing IPR issues in the collaborative production scenarios are also supported through the smart contracts of the iPRODUCE digital platform.

FabLabs and Maker Communities

FabLabs and maker communities are also among the most important stakeholder groups of the French MMC community. Based on the results of the large scale survey performed in T2.1, the French sample shows a high familiarity with the terms "*FabLabs*" and "*DIY manufacturing*" despite their lack of experience with the maker movement. These outcomes indicate that although makerspaces are relatively popular and people know about maker practices, the access and use of these facilities is still low.

This group consist of makerspaces, **FabLabs, hackerspaces, co-working spaces and formal or informal maker communities that are working with technologies of digital fabrication, electronics and programming**. The motivation for engaging this group in the French cMDF is to reach a wider audience, facilitating access to machinery of the makerspaces. At the same time, it also stems from their motivation to move from being a maker to being an entrepreneur. In the context of iPRODUCE, individual makers can also act as project ambassadors and consumer champions in order to accelerate the development of the collaborative manufacturing processes of the cMDF.

Consumers and General Public

Consumers and the general public are among the main stakeholder groups to be involved in the cMDF activities. As discussed above, it is likely that the general public is familiar with some of the concepts of iPRODUCE, but there is little experience with the maker culture. **The main motivation for consumers and general public to join the French cMDF is to gain access to machinery as well as skills and knowledge on how to prototype their ideas through innovative methods and digital tools.** Furthermore, based on the specific scope of the French cMDF, their personal interest on soft mobility

or their need for mobility devices adapted to their specific needs can also motivate their participation in collaborative manufacturing.

Business Incubators and Accelerators

Based on the overall approach of the French cMDF, **business incubators and accelerators can play a key role in maximizing the impact of collaborative manufacturing.** As digital fabrication moves from local hobbyists and informal communities to the entrepreneurial realm, business development and accelerator programmes become more relevant. At the same time, the maker culture integrates current and upcoming technologies to address new market opportunities, indicating the cooperation between makers and incubators/accelerators is essential.

The main motivation for incubators and accelerators to join the cMDF activities can be triggered through networking benefits. Through both iPRODUCE marketplace and matchmaking tools, they can have access to different prototyping facilities, especially for the automotive sector, and identify which one better match their specific needs.

Scientific Community

Finally, Another important stakeholder group to be considered for the engagement strategy of the French cMDF is the scientific community. This group includes **universities, higher education institutions, schools, technical centres and other educational organisations, aiming to support the development of digital and engineering skills and targeting different age groups**. As mentioned above, collaborative learning is one of the core concepts of the French cMDF and is promoted through supporting and training material for a wide range of users, such as makers, consumers and industrial companies.

In this context, the engagement of this stakeholder group is driven in two ways. On the one hand, sharing their knowledge and specific on and technologies for digital fabrication methods, like 3D printing and welding can improve the quality of the training material and approach. In turn, they are motivated to join by gaining access to the iPRODUCE marketplace and other digital tools, which allow them to identify and support new innovative projects relevant to their interests. On the other hand, they can experiment and evaluate the teaching modules for prototyping equipment, through gaining access to training tools of the digital FabLab kit.

4.3.3. Tailored Strategy for Stakeholder Engagement

To address the diverse needs of the stakeholder groups, a multi-stakeholder strategy has been developed for the French cMDF. This strategy aims to increase the interest of different stakeholder groups to the make use of the makerspaces and its machinery to improve their manufacturing capacity. It further aims to foster collaborative design and manufacturing in the automotive sector, bringing together different stakeholder groups

These stakeholder groups of the French cMDF ecosystem are very different in knowledge, scale and focus. Furthermore, they have different motivations for participating in collaborative manufacturing as well as different incentives and ways of contribution. Therefore, tailor-made strategies are developed and presented below, in order to better address the specific needs and motivations of different stakeholder groups.

Engagement of Manufacturers and Industrial Stakeholders

The motivation of industrial stakeholders for joining the French cMDF can be triggered through both economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of consumer goods.** This type of communication serves a two-fold aim: (i) offer information about open innovation, co-creation and the iPRODUCE approach and (ii) invite them to join the French cMDF.
- **cMDF visits, calls, meetings and warm-up events** help us to better interact with priority stakeholders and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **Active involvement in user-driven innovation workshops and co-creation activities** together with makers and consumers. In these events, stakeholders have the chance to experiment on using methods and tools for open innovation and co-creation, in order to enhance their manufacturing capacity and their innovation potential.

To do so, the **extensive contact network of both Excelcar**, **as well as the professional network of Materalia were exploited**. Based on stakeholders' interest and participation, priority actors, relevant to urban mobility, automotive and robotics sectors, were identified.

Key messages for reaching industrial manufacturers

It is important to underline that co-creation and open innovation could further improve processes of product design and development better aligned to consumers' needs and expectations. For instance:

- Identified consumer needs in urban mobility as well as the automotive and robotics sectors
- New business models for manufacturing developed within the scope of iPRODUCE.
- Technical support from FabLabs, makers and manufacturers
- Limited investment in production equipment and high flexibility in production capacity
- New skills in design and prototyping

Engagement of FabLabs and Maker Communities

The primary motivation of FabLabs and maker communities for joining in the French cMDF is to broaden their scope and impact in society. **They have the chance to share their knowledge and skills in the context of a specific project collaborating with industrial stakeholders from the mobility and robotics sector.** At the same time, the iPRODUCE platform facilitates access to their machines and technologies, enabling them to identify alternative sources of revenue for machines and/or personnel that might be underutilized. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the French cMDF while also broadcasting the project's promotional material.
- **Face-to-face activities, interaction and workshops** bringing together stakeholders relevant to mobility and electro-mobility domains. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Being a FabLab with connections to other FabLabs and maker communities in the local area, **FabLab Vosges** served as a catalyst to ease communication processes while also fostering a wider and active engagement in the French cMDF.

Key messages for reaching FabLabs and maker communities

Specific messages for attracting makers' interest in the iPRODUCE approach can be used. Through sharp lines, light should be shed on how maker communities can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in urban mobility as well as the automotive and robotics sectors
- How to create new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Consumers and General Public

Next, consumers and the general public have a substantial role on the societal impact of the cMDF at a local level. The first step of their engagement lies on raising awareness and motivating citizens to participate in the French cMDF activities through personal of collective interests that will be explained through a direct and clear way. Moreover, the mobile app developed under T6.2 enables interaction among users and feedback collection about specific products through polls. Special attention is paid to engaging and connecting consumers in areas of high social interest, such as vulnerable communities, female groups, migrants, etc.

Key messages for reaching consumers and general public

In our communication with consumers and the general public, we use clear and direct messages to explain the benefits of social manufacturing, including:

- Opportunities for learning and developing new skills and capabilities to prototype their ideas
- Participate in an innovative project on the concepts of soft mobility
- Be provided with mobility devices adapted to their specific needs.
- Novel ways to share experience and provide feedback for a specific product
- Consumers can contribute to the design and development of better products.

General remark: *To achieve broad dissemination of the cMDF scope and activities,* ***social media campaigns*** *through both the project and partners' accounts took place. For these campaigns, local language is used together with relevant hashtags that can easily convey key messages.*

Engagement of Business Incubators

As mentioned above, **business incubators** can play a significant role in supporting the business development of user-driven mobility devices and other projects from the automotive sector. EXCELCAR has already established good contact with an accelerator focused on the mobility sector, so communication and information exchange through face-to-face or online meetings encouraged their engagement in the cMDF, while contacts with other incubators and accelerators were also planned.

Key messages for reaching business incubators

We explain how the iPRODUCE platform can strengthen the entrepreneurial activity in the automotive and robotics sector. More specifically we focus on:

- New methods, strategies and tools to foster co-creation and open innovation, while also reducing development costs of new and existing customized furnishing products.
- Access to different prototyping facilities to match specific needs.
- Methods and tools that can be considered for standardization.
- New products that are open for external investment.

Engagement of Scientific Community

The engagement of the **scientific community** is also seen as a vital part of this strategy and their contribution is twofold. Engaged researchers can in turn promote co-creation and social innovation as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of social manufacturing. Communication with academics took place either through **email** or **phone** and further interaction was achieved through their **participation in project events**.

Key messages for reaching scientific community

In our communication with scientific community, we focus on the impact of the cMDF, explaining:

- New innovative projects relevant to urban mobility and user-driven mobility devices.
- New methods, strategies and tools to foster co-creation and open innovation
- Participative and open models and implications for IPR.
- New methods and tools to reinforce learning and training in digital fabrication.

4.3.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the French cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 12. French cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
Information letters and email invitations	Manufacturers and industrial stakeholders	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Engage in personal interactions between industrial manufacturers and the French cMDF to better understand their needs and expectations. cMDF visits, personal phone calls and emails help to communicate with the industrial manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF. A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	All identified stakeholders	Bring together relevant stakeholders and involve them in co-creation activities around the topic of

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
		collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early adopters/ambassadors, as part of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	Manufacturers and industrial stakeholders, FabLabs and maker communities, consumers and general public	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore engagement among the local MMC communities of the cMDFs.

4.3.5. Conducted Engagement Activities

This section provides a brief analysis of conducted engagement activities of the French cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, conferences, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the French pilot level, please refer to D10.6.**

Table 13. French cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
Webinar To Introduce iPRODUCE cMDF Use-Cases and Setup The French Community [French cMDF]	19 Jan 21	**Promotional/ warm up event** (online)	19
Warm Up Event	2 Nov 21	**warm-up event** (online)	15
Warm Up Event	23 Nov 21	**warm-up event** (online)	36
1st Consultation Workshop	18 Mar 22	Consultation workshop*	9
Promotional Session at the International Association for Management of Technology (IAMOT) conference in Nancy	22 June 22	**Promotional/ warm up event** (physical)	80
2nd Consultation Workshop	6 Feb 23	Consultation workshop*	9
		Total Engaged Stakeholders	***168***

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

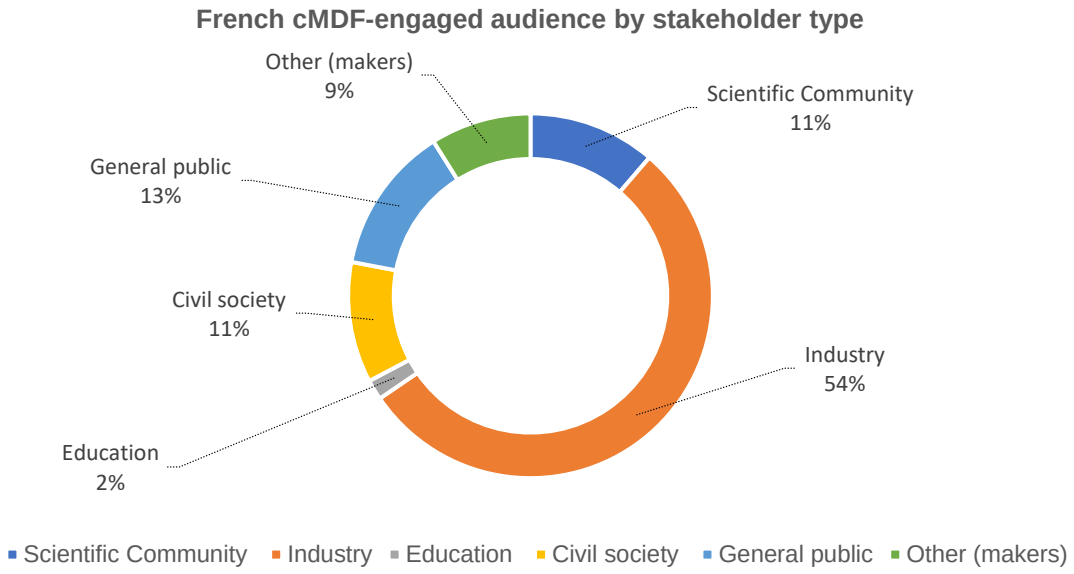

Figure 7. French cMDF-engaged audience by stakeholder type

An **intro webinar** (19 Jan 21, n=19), and a first **virtual warm-up event** (2 Nov 2021, n=15) aimed to introduce the project's goals and promote the concept of social manufacturing, fostering collaboration with fablabs and makerspaces. These events showcased the service offer developed by the French cMDF partners, providing start-ups in the mobility sector with a comprehensive solution from idea to final product. In both cases, a multi-channel approach was adopted, including email, social media, and a 30-second iPRODUCE video shared by multiple organizations. The outcome of the events was twofold. Firstly, potential collaborators for the French use case were identified, expanding the project's network and potential partnerships. Secondly, the attendees expressed interest in participating in project activities, indicating a positive reception of the iPRODUCE ambition. As a follow-up, a subsequent event was planned to present case studies of successful collaborations between fablabs and start-ups, aiming to further engage participants and deepen their involvement.

The **follow-up virtual warm up event** took place on the 23rd of November 2021 (n=36). Its goal was to, once again, present the iPRODUCE project and emphasize the significance of collaboration between start-ups and fablabs in enhancing product development. The event structure included a project introduction, case studies highlighting collaboration between the Fablab and mobility start-up, a Q&A session, and a discussion on future actions. More than 30 participants, including several start-ups, attended the event while also expressed a positive attitude about the project, with previous participants expressing continued interest and enthusiasm.

The French cMDF team also made a significant impact at the **International Association for Management of Technology (IAMOT) conference in Nancy**, France (22 June 22, n=80+). The event gathered experts in technology management, innovation, and entrepreneurship. The team's presence and presentation of a wooden bike, built within the framework of the cMDF-level explorations, effectively conveyed the project's goals and achievements, leaving a lasting impression and generating interest in further collaboration with iPRODUCE. Engaged stakeholders gained a deeper understanding of the project's objectives and were eager to follow up on its progress and updates.

Overall, the iPRODUCE engagement strategy for the French cMDF managed to increase public interest on the use of makerspaces while at the same time further boosted the notion of collaborative manufacturing in the automotive sector. The organised mobilisation events effectively

served their purpose of promoting the project, engaging stakeholders, and **fostering collaboration between start-ups, Fablabs and the general public.** The events facilitated the identification of potential collaborators, generated interest among participants, and introduced plans for future initiatives. Such events played a vital role in advancing the objectives of the iPRODUCE project and establishing a strong foundation for defining a wider ecosystem of interested and strongly engaged actors.

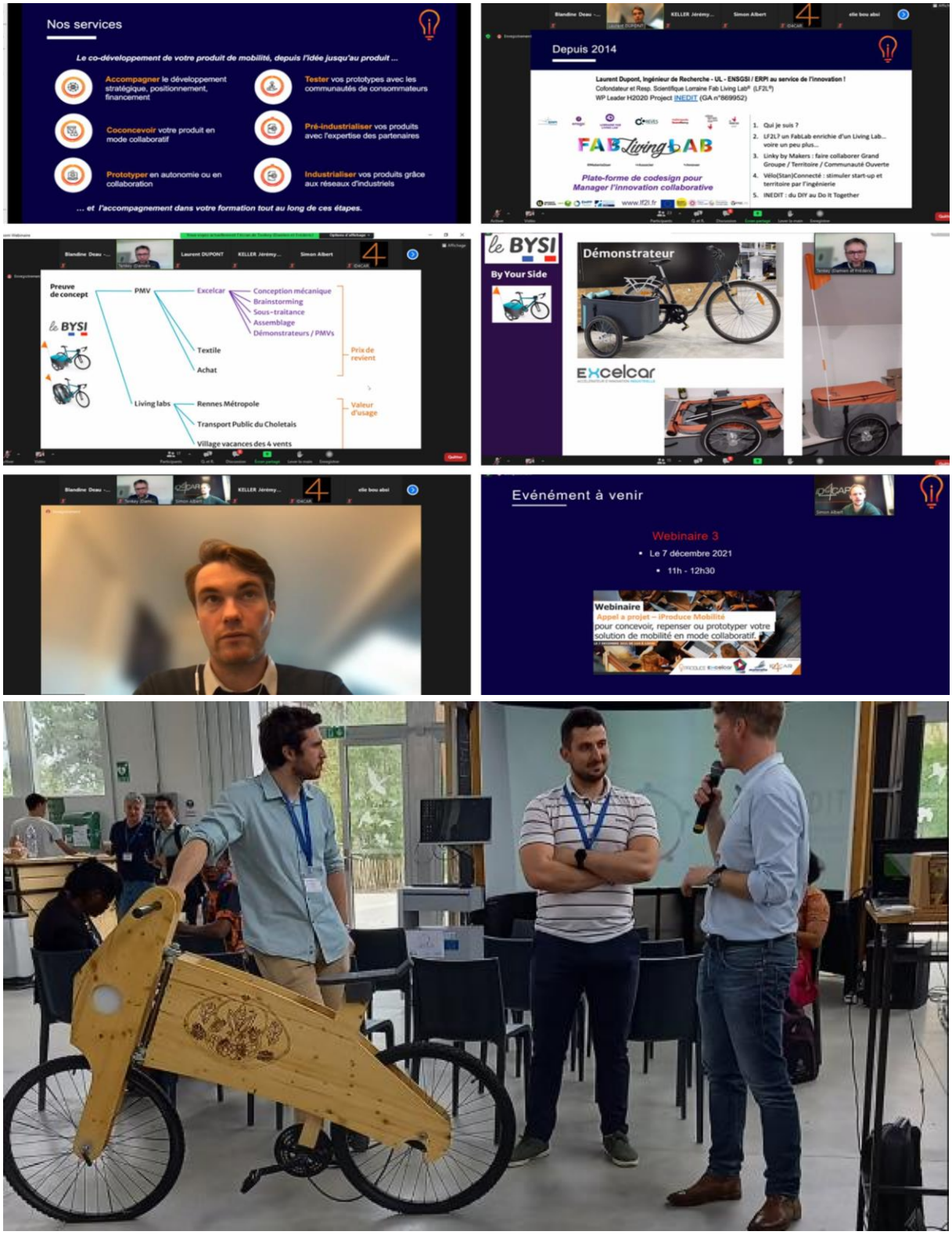

Figure 8. Snapshots from the French cMDF engagement events

Within the cMDF-organised event the identification of potential early adopters of the project-generated resources was also facilitated. A pool of identified "lead users" was approached and engaged within the **consultation workshops that are thoroughly described and presented under *D6.5 Ambassador Programme for Early Adopters.*** Ambassadors and other engaged actors also took part in the iPRODUCE hackathon, as described in detail under ***D6.6 Open Competitions on Consumer Products Innovation Challenges.***

4.3.6. Additional Remarks on the French cMDF Ecosystem

The - easiest to reach and involve – stakeholder:
Students, makers, people that are already close to the maker movement.
Most impactful communication channels employed: Face-to-face meeting via local network, Social medias

The - hardest to reach and engage – stakeholder:
Established Industries *
Most impactful communication channels employed: LinkedIn, email exchange

The pool of stakeholders that was easiest to reach and involve in the project was composed of students, makers, and individuals already connected to the maker movement. These individuals are readily accessible and can be effectively engaged through various communication channels. Face-to-face meetings within local networks and leveraging social media platforms have proven to be the most impactful means of communication in this regard.

On the other hand, engaging established industries has been more challenging. Mobilising companies in the Precision Manufacturing and Equipment domains (PMEs) and larger groups to participate in the project has proven difficult compared to younger start-ups and entrepreneurs. Traditional, established industries require more targeted and persuasive communication strategies. The most impactful channels for reaching and engaging them have been LinkedIn and email exchanges, which allow for more direct and professional interactions.

The stakeholder type showing the highest level of active engagement:
Incubators and Students
Most impactful communication channels employed: Online and face to face meetings

The stakeholder type with the most impactful contribution:
FabLabs and FabLabs' students
Most impactful communication channels employed: Online and face to face meetings

4.4. Italian cMDF

4.4.1. Scope

The main scope of the Italian cMDF is to **enable collaborative engineering between the mechanics/mechatronics manufacturing companies and the maker/Fablab communities, bringing together experts, makers, manufacturing facilities, local start-ups and SMEs**. It serves as a partner for companies and professionals, mainly, in the design and realization of mechatronics and microelectronics appliances. More specifically, it supports companies and professionals, especially SMEs, to design and build up components and devices with innovative technologies that are not easily accessible to them. The Italian cMDF is, at the due date of this deliverable, composed of three partners:

Table 14. Composition of Italian cMDF

Partner	Stakeholder group	Role in the project
ProM Facility FabLab of Trentino Sviluppo (cMDF representative)	Manufacturing Facility of Trentino Sviluppo, a local development and destination marketing agency	○ Facility and manufacturing partner ○ Support in electronics design
Energy@Work	SME on AI and IoT solutions for energy and manufacturing	○ Electronic design ○ Support in the cMDF management ○ Consulting and design support in the use cases
Noitech Makerspace	Makerspace of Noitech Technological and Scientifica Park in Bozen	○ 3D printing ○ Manufacturing of consumer goods

Until now, Noitech Makerspace represents the extension of the initial cMDF core (ProM, Energy@Work). Other industrial makerspaces/Fablab/Manufacturing Facilities are identified, both in the Northern and Southern geographical areas, such as MUSE Fablab in Trento and FabLab BITZ in Bozen.

4.4.2. Identified ecosystem of stakeholders

The Italian cMDF ecosystem is comprised of a series of relevant actors as showcased in Table 15. These stakeholder groups, as also described below, have been identified as the most relevant local actors who constitute the Italian MMC community.

Table 15. Overview of Italian cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers & Industrial Stakeholders	Consumer-goods manufacturers
	Equipment / Material suppliers, Service providers
Makers And Maker Communities	FabLabs, Co-working spaces
	Artists and designers
Consumers	Targeted market audience
Scientific Community	Research organisations
	R&D units in private companies

Main Stakeholder Type*	Stakeholder Subtype
	Experts and individual researchers
Facilitators	Associations of engineers and manufacturers
	Funding agencies / Business incubators
	Policy making institutions
Enablers	Local /Regional authorities
	EU networks and initiatives

Manufacturers and Industrial Stakeholders

Manufacturers and industrial stakeholders relevant to mechatronics and microelectronics appliances are among the most important stakeholder groups of the Italian MMC community. In this context, this stakeholder group includes manufacturing and engineering companies, machine providers, ICT partners and all other companies interested to use the cMDF services. They have a very good knowledge of the industrial processes and the manufacturing technologies and they can provide substantial feedback on different stages of the collaborative design and manufacturing of products. In turn, they can benefit from gaining access to the digital platform of iPRODUCE to further improve their products by extending their features and functionalities through prototyping and testing.

The biggest challenge in their engagement process is to familiarize them with the concept of open innovation and the collaborative approach to manufacturing, and the differences to the traditional closed processes of manufacturing. **It is important that they get informed on the IPR management strategies** for preserving and managing IPR issues in the collaborative production scenarios supported through the smart contracts of the project's platform.

FabLabs and Maker Communities

This group consist of **makerspaces, FabLabs, hackerspaces, designers, co-working spaces and formal or informal maker communities that are working with technologies of digital fabrication, electronics and programming**. Based on the results of the large scale survey performed in T2.1, the Italian sample shows a high familiarity with the terms "FabLabs" and "DIY manufacturing" and a moderate experience with the maker movement. These outcomes indicate that makerspaces are relatively popular, while additional efforts to facilitating the access and use of these facilities has to be made.

The motivation for engaging this group in the Italian cMDF is their willingness to improve their basic knowledge and skills about design and manufacturing, in order to create their own customized objects for personal use. Individual makers can also act as project ambassadors and consumer champions in order to accelerate the development of the collaborative manufacturing processes of the cMDF.

Manufacturers' Associations

This stakeholder group includes **associations of international associations of development agencies, incubators, lobbying organisations and networking institutions for SMEs and large companies**. These organisations usually act from a regional to an international level, and thus, their engagement in the Italian cMDF is expected to support the dissemination of the scope and approach of the cMDF. Through their extensive networks of associated companies, they play a key role in promoting social manufacturing and utterly contribute to engaging more companies in the collaborative activities of the Italian cMDF.

Research Organisations

This group includes **universities, higher education institutions, R&D units in private companies as well as experts and individual researchers**, aiming to advance research on a diverse range of scientific fields relevant to digital fabrication and manufacturing. Engagement of this stakeholder group is driven mainly by their research interests and their willingness to further enrich their expertise. Sharing their knowledge and specific on and technologies for digital fabrication methods, like 3D printing, can improve the quality of the mechatronics prototypes and the final products. At the same time, they may be motivated to join the project's mission by gaining access to the iPRODUCE marketplace and other digital tools, which allow them to create synergies for future possible collaborations.

Consumers and General Public

Promoting new collaboration processes that will ease consumers' participation in the co-production of products will result in the **creation of added value in the local communities**. Engaging consumers and the general public, fully corresponds to the core of the iPRODUCE vision, concept and approach that is to involve consumers in the collaborative manufacturing of consumer goods. Since there are specific use cases for each cMDF, the targeted consumers can be directly linked with the under development/exploration products.

Public Authorities and EU Initiatives

Finally, another stakeholder group that has an enabling role for the for the Italian cMDF includes public authorities and EU initiatives. More specifically, this group includes local governments, European institutions (e.g. EIT Climate-KIC, EIT Food, EIT RawMaterials, EIT Digital) and other institutions responsible for policy making and funding from the regional to the EU level. Such agents can play a crucial role in accelerating the uptake of collaborative engineering and manufacturing at the level of policy but also at the level of investment.

4.4.3. Tailored Strategy for Stakeholder Engagement

Italian cMDF stakeholder groups are very different in knowledge, scale and focus. Furthermore, they have different motivations for participating in collaborative manufacturing as well as different incentives and ways of contribution. Therefore, tailor-made strategies were developed and are presented below, in order to better address the specific needs and motivations of different stakeholder groups.

Engagement of Manufacturers and Industrial Stakeholders

The motivation of industrial stakeholders for joining the Italian cMDF can be triggered through both economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of consumer goods.** This type of communication serves a two-fold aim: (i) offer information about open innovation, co-creation and the iPRODUCE approach and (ii) invite them to join the Italian cMDF.
- **cMDF visits, calls, meetings and warm-up events** help us to better interact with priority stakeholders and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **Active involvement in user-driven innovation workshops and co-creation activities** for the collaborative design and manufacturing of mechatronics goods. The goal is to engage actors in developing customized products while considering their views and feedback.

To do so, **the extensive contact network of Trentino Svilluppo (TS) was exploited**. Based on stakeholders' interest and participation, priority actors were identified.

Key messages for reaching manufacturers and industrial stakeholders

It is important to underline that co-creation and open innovation could further improve processes of product design and development better aligned to consumers' needs and expectations. For instance:

- Identified consumer needs in microelectronics and mechatronics appliances.
- Development of complex specifications for customized products
- New business models for manufacturing developed within the scope of iPRODUCE.
- Processes through which manufacturers can involve makers and consumers in the manufacturing process through open innovation.
- Intellectual property protection in collaborative environments for open innovation.

Engagement of FabLabs and Maker Communities

The primary motivation of FabLabs and maker communities for joining in the Italian cMDF is to broaden their scope and impact in society. They have the chance to **participate in the design and manufacturing of actual products collaborating with industrial stakeholders of the mechatronic and mechanical sectors, putting in practice their skills and knowledge**. At the same time, they gain knowledge on methods and tools for industrial product development which can support the further development of their ideas as well as understand how to create new cMDFs and expand or upscale existing makerspaces.. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the Italian cMDF while also broadcasting the project's promotional material. It is also handy to circulate emails asking for targeted feedback on developed tools.
- **Face-to-face activities, interaction and workshops** bringing together stakeholders relevant to mechanics/mechatronics domains. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Key messages for reaching FabLabs and maker communities

Specific messages for attracting makers' interest in the iPRODUCE approach can be used. Through sharp lines, light should be shed on how maker communities can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in mechatronics based products
- How to create new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Manufacturers' Associations

Manufacturers associations can play a significant role in supporting the engagement of industrial manufacturers in the cMDF through their direct contact with associated companies. Communication and information exchange through face-to-face or online meetings may focus on presenting the overall scope of the cMDF and the scenario use cases that will be developed. Further involvement was pursued through their invitation in info days and project events, where opportunities for collaboration and synergies were presented.

Key messages for reaching manufacturers associations

We will explain how social manufacturing through the iPRODUCE platform can enrich the manufacturing capacity across industrial sectors. More specifically we focus on:

- New methods, strategies and tools to foster co-creation and open innovation, while also reducing development costs of new and existing customized products.
- Methods and tools that can be considered for standardization.
- New products that are open for external investment.

Engagement of Research Organisations

Academics and research organisations can promote co-creation and social innovation as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of social manufacturing. Communication in this context can take place either through email or phone and further interaction through invitations to project workshops and info days.

Key messages for reaching research organizations

We focus on the impact of the cMDF, explaining:

- New innovative projects relevant to mechatronics and mechanical devices for B2C and B2B.
- New methods, strategies and tools to foster co-creation and open innovation
- Participative and open models and implications for IPR.
- New methods and tools to reinforce learning and training in digital fabrication.

Engagement of Consumers and General Public

Even if they are not the primary clients of the Italian use cases, consumers and the general public can also play an important role on the way social manufacturing will be developed in the future. As digital technologies evolve, novel ways of collecting consumer feedback and integrating it in the design and development stages are developed. In the context of iPRODUCE, the mobile app developed under T6.2 enables interaction among users and feedback collection about specific products through polls.

Key messages for reaching consumers and general public

We use clear and direct messages to explain the benefits of social manufacturing, including:

- New customized IoT B2C products to meet consumers' needs
- Novel ways to share experience and provide feedback for a specific product
- Consumers can contribute to the design and development of better products.

General remark: *To achieve broad dissemination of the cMDF scope and activities,* ***social media campaigns*** *through both the project and partners' accounts took place. For these campaigns, local language is used together with relevant hashtags that can easily convey key messages.*

Engagement of Public Authorities and EU Initiatives

Local, regional and national authorities were informed about the cMDF scope and composition through face-to-face or online meetings and relevant promotional material was circulated. For engaging initiatives at the EU level, participation of cMDF partners in external events, like conferences, were planned to identify possible connection and synergies. Further communication through email or phone

focused on presenting the results of the co-creation activities, while invitations to the project events encouraged discussion about relevant policies and investments at local and EU level.

Key messages for reaching public authorities and EU initiatives

We focus on the impact of the cMDF, explaining:

- The role of the cMDF at a local level and opportunities for replication at the national and EU level
- The cMDF federation and collaborative engineering across sectors and countries
- Good practices learned from the project that promote greener manufacturing processes.
- Results of the co-creation activities established in the six cMDF.
- New products delivered in the different application areas.
- New role of consumers and makers in the open-innovation manufacturing process.

4.4.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the Italian cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 16. Italian cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
information letters and email invitations	Manufacturers and relevant industrial stakeholders	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Engage in personal interactions between industrial manufacturers and the Italian cMDF to better understand their needs and expectations. cMDF visits, personal phone calls and emails help to communicate with the industrial manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF. A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	All identified stakeholders	Bring together relevant stakeholders and involve them in co-creation activities around the topic of collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
		adopters/ambassadors, as part of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	manufacturers, designers and industrial stakeholders, FabLabs and maker communities, consumers and general public	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore engagement among the local MMC communities of the cMDFs.
Press releases and articles about iPRODUCE and the Italian cMDF	Associations of engineers, designers and manufacturers, Public Authorities	inform about the vision of the iPRODUCE project as well as the scope of the Italian cMDF.

4.4.5. Conducted Engagement Activities

This section provides a brief analysis of conducted engagement activities of the Italian cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the Italian pilot level, please refer to D10.6.**

Table 17. Italian cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
Collaborative Workshop – Kick-off with External Interested Partners	29 July 21	**warm-up event** (online)	15
follow up meeting with External Interested Partners	21 Oct 21	**warm-up event** (physical/hybrid)	12
Promotion Of iPRODUCE at Digital Automation Lab In Reggio Emilia	26 Nov 21	**External/ Promotional/ warm up event** (physical/hybrid)	60
Warm Up Event With Italian cMDF Partners and Potential New Partners	1 Feb 22	**warm-up event** (online)	15
Presentation Of The iPRODUCE Italian cMDF within Webinar on EU Projects	25 Feb 22	**Promotional/ warm up event** (hybrid)	35

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
Co-Creation Hackathon And Engagement Event	29 Nov 22	**Promotional/ warm up event** (physical)	43
1st Consultation Workshop	29 Nov 22	Consultation workshop*	12
Arduino Day Hackathon and Engagement Event	25 Mar 23	**Promotional/ warm up event** (physical)	39
2nd Consultation Workshop	25 Mar 23	Consultation workshop*	12
		Total Engaged Stakeholders	***243***

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

Through the Italian cMDF's engagement activities more than 240 stakeholders were engaged.

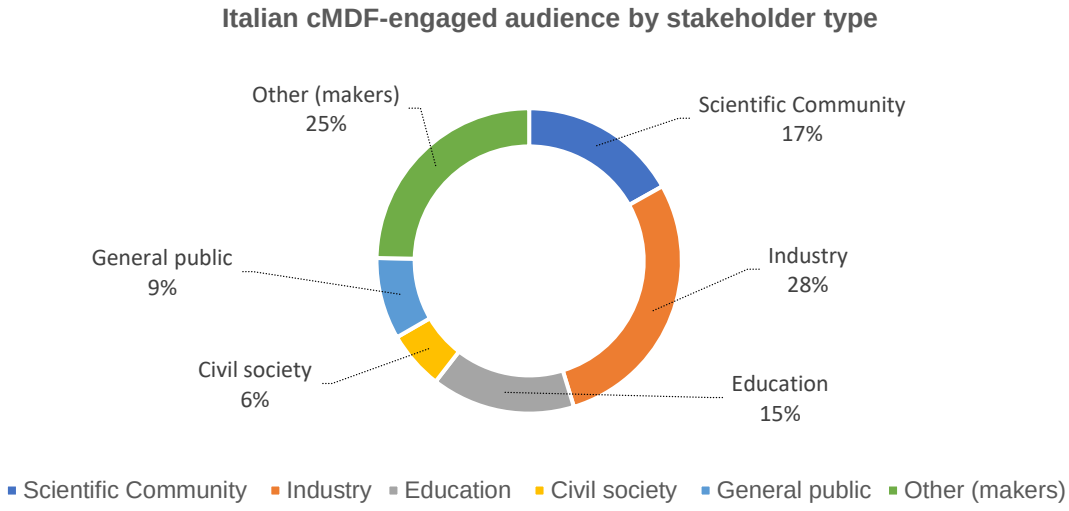

Figure 9. Italian cMDF-engaged audience by stakeholder type

The Italian cMDF mobilisation events, briefly presented below, were hosted as physical or hybrid sessions within 2021-2023. Apart from the warm up events, dedicated hackathon days[4] as well as promotional activities in external events (e.g., Promotion Of iPRODUCE at Digital Automation Lab In Reggio Emilia) reinforced the applied stakeholders' engagement and ecosystem establishment strategy.

A **warm-up event took place on the 29th of July 2021** (n=15) aimed to introduce iPRODUCE to external stakeholders. The event brought together representatives from the scientific community, industry, and technology parks and employed a mixed physical and digital participation mode due to pandemic restrictions. The outcome of the event was the creation of the first founding group for the Italian cMDF and the identification of additional stakeholders that would like to be involved. The minutes of the meeting were shared with participants and other organisations, spreading awareness and inviting

[4] Dedicated hackathons by the Italian cMDF – not to be confused with the iPRODUCE hackathon, reported in D6.6.

further engagement. Lessons learned included the need for a prompt follow-up event to maintain stakeholder interest.

A **follow-up warm up event** was organised on the **21st of October 2021** (n=12), aiming to expand the group of stakeholders involved in the under development Italian ecosystem. It was held as a hybrid session - both online and physically at the MUSE Science Museum in Trento, demonstrating openness to potential new partners. The event gathered participants from the scientific, industrial and technological communities of the region. Presentations were held from participants, highlighting their expertise and areas of activity. The event then focused on presenting the latest updates on the iPRODUCE platform and particularly emphasised on the use case implementation. Compared to the 1st warm up meeting, participants' enthusiasm was slightly cooled due to the, at that time, limitations to showcase a working version of the project's platform. The event evaluation indicated the importance of having a functional platform to increase engagement and interest from industry stakeholders. Despite this, the event successfully reinforced connections with existing stakeholders and identified new potential partners.

A **third warm up event was held online on the 1st of February 2021** (n=15), following the previous meetings, aiming to involve new stakeholders and ambassadors in the Italian cMDF. The event gathered an enlarged group of participants from the scientific community, industry, and technology parks, with identified ambassadors playing a crucial role. The event included presentations on participants' expertise, discussions on the latest platform updates, and the introduction of use cases for the Italian cMDF. The discussions focused on further collecting manifests of interest from participants regarding their potential roles and competences for the project. The meeting fostered further engagement and resulted in the identification of additional stakeholders and ambassadors.

The engagement strategy of the Italian cMDF was effectively complemented by the organisation of 2 hackathons[5] as briefly described below. The first one centred around the development of hardware and software solutions for servo-assisted cradle control (related to the Italian cMDF use case #1), while the second one focused on a watering system control (related to the Italian cMDF use case #2). These hackathons served as a valuable platform for the iPRODUCE team to better connect with students who possessed relevant competencies and provided them with a glimpse into the latest tools for idea creation and co-development. By showcasing the potential of the co-creation approach and its practical application in operational fields, both events presented attendants with exciting opportunities to enhance the value of their products through the utilization of mechanical and electrical boards, software advancements, and future strategies. Thus, these hackathons successfully engaged a wider range of stakeholders and fostered a deeper understanding and commitment to the mission of iPRODUCE.

- The **Co-Creation Hackathon**, organised by Trentino Sviluppo, Hub Innovazione Trentino, and Fablab - Università di Trento, took place on **November 29, 2022** (n=43), at BeFactory-Manifattura in Rovereto, Italy. The event aimed to achieve several objectives, including introducing the iPRODUCE project, developing hardware and software solutions for servo-assisted cradle control (Italian cMDF use-case #1), expanding the Italian co-creation community, engaging interested industries, training participants on Opis tools, testing the OpiS platform, and disseminating iPRODUCE project results. Various participant groups were targeted, including the scientific community, students, industry representatives, and technology parks/transfer agencies. Promotion efforts were carried out through various channels, such as the Università di Trento Fablab Telegram group, emails, phone calls, LinkedIn, press releases and website news. A warm-up session informed and familiarised attendees with iPRODUCE,

[5] Dedicated hackathons by the Italian cMDF – not to be confused with the iPRODUCE hackathon, reported in D6.6.

followed by presentations on the project's OpiS tools. Involved teams generated multiple ideas for servo-assisted cradle control and "smart" cradle functionalities. The event generated multiple ideas for servo-assisted cradle control, and stakeholders showed great interest in the co-creation approach and the potential value added to products they worked on during the hackathon event. Feedback from participants was positive overall, with scholars appreciating the initiative, and reporting remarks on points of improvement regarding the the OpiS tools. Industry representatives also found value in connecting with students possessing relevant competencies in product development and gaining insights into the latest tools for idea creation and co-development.

- The **Arduino Day Hackathon** took place on **March 25, 2023** (n=39), at MUSE - Trentino Museum of Science in Trento, Italy. The event aimed to further introduce the iPRODUCE project and develop hardware and software solutions for a watering system control (Italian cMDF use-case #2) using Arduino platforms and sensors. The event successfully engaged stakeholders groups within the scientific community, students, the general public, Fablab representatives, industrial actors, and technology transfer agencies. Promotion efforts were carried out through multiple online channels, and a warm-up session familiarized attendees with iPRODUCE. Stakeholders expressed strong interest in the methodology for generating new ideas and its application in their operational fields. The results achieved by the teams, along with the development of mechanical and electrical boards, software, and future strategies, have the potential to add value to their products. The teams faced challenges in working together due to differences in age and skills, but technical personnel present at the event provided guidance and assistance. Even though involved teams and engaged actors did not user the project's OpiS tools, as opposed to the first hackathon of the Italian cMDF, the event successfully acquainted them with the project and fostered interest in following project updates.

Overall, The iPRODUCE engagement strategy for the Italian cMDF overall **brough together the industrial expertise of engineers and manufacturers with the creative and innovative ideas of the maker communities and the actual needs of the consumers.** Mobilisation events played an important role in introducing the iPRODUCE project to external stakeholders, gathering fresh ideas, and identifying potential partnerships. Despite challenges related to the absence of a fully functional platform, at the time of these events, performed sessions successfully engaged a highly relevant audience. The involvement of preliminarily identified ambassadors contributed to the project's visibility and further stakeholder identification.

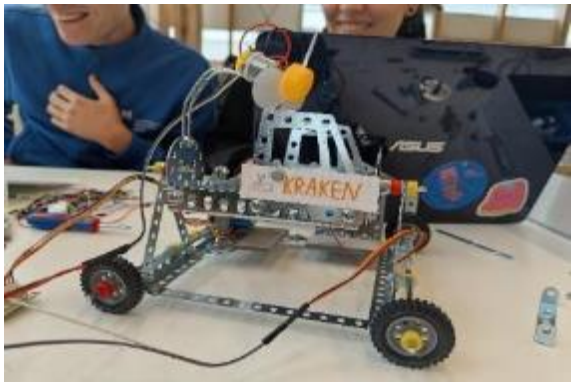

Figure 10. Snapshots from the Italian cMDF engagement events

Details on the iPRODUCE ambassadors' approach and the organisation of consultation workshops with early project adopters are thoroughly presented under ***D6.5 Ambassador Programme for Early Adopters.*** Ambassadors and other engaged actors also took part in the iPRODUCE hackathon, as described in detail under ***D6.6 Open Competitions on Consumer Products Innovation Challenges.***

4.4.6. Additional Remarks on the Italian cMDF Ecosystem

The - easiest to reach and involve – stakeholder:
University student
Most impactful communication channels employed: direct contacts with University professors in fields related to Engineering, email exchange, social media

The - hardest to reach and engage – stakeholder:
High school students*
Most impactful communication channels employed: direct contacts with high school professors of STEM courses

The Italian cMDF ecosystem involved various stakeholders, with different levels of ease in reaching and engaging them. University students were the easiest to reach and involve, with direct contacts with professors in engineering-related fields, email exchanges, and social media being the most impactful communication channels. On the other hand, high school students posed a greater challenge in terms of reaching and engaging them. Due to their strict school calendars and extracurricular activities, scheduling events requires careful planning well in advance and during specific school periods.

The stakeholder type showing the highest level of active engagement:
Industrial stakeholders
Most impactful communication channels employed: direct contacts, online and face to face meetings

The stakeholder type with the most impactful contribution:
University students
Most impactful communication channels employed: Social media

4.5. Greek cMDF

4.5.1. Scope

The main scope of the Greek cMDF is **to bridge the gap between SMEs and makerspaces, with a focus on medical equipment**. It aims to leverage expert opinion as well as experiential feedback to feed the design process supported by community makers. In this way, it seeks to produce innovative medical equipment that outperforms existing solutions in terms of comfort and efficiency, offering patients a chance to increase their quality of life. Apart from the medical equipment, **the Greek cMDF focuses also on micro-manufacturing and rapid prototyping for other sectors like robotics, agile tools, electronics and consumer lifestyle goods**. The Greek cMDF is composed of two partners:

Table 18 Composition of Greek cMDF

Partner	Stakeholder group	Role in the project
AidPlex (cMDF representative)	Health-tech start-up	○ Research and facility partner ○ Responsible for the methodology to be implemented in the pilots
CERTH	Research centre	○ Research and facility partner ○ Technical guidance and access to its equipment and machinery

In the context of the iPRODUCE pilots, the Greek cMDF examines the role of consumer engagement in the development of orthopedic back brace solutions of AidPlex with the aim of higher comfort levels. Through the use of IoT sensors and gamification, AidPlex brings together a diverse set of people (makers and designers, patients, physicians) to test and provide feedback for the proposed solution.

4.5.2. Identified ecosystem of stakeholders

The Greek cMDF ecosystem is comprised of a series of relevant actors as showcased in Table 19. These stakeholder groups, as also described below, have been identified as the most relevant local actors who constitute the Greek MMC community.

Table 19. Overview of Greek cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers & Industrial Stakeholders	Manufacturing Start-ups
	Service providers
Makers And Maker Communities	Engineers, inventors and relevant experts
	Individual makers
Scientific Community	Research organisations
Facilitators	Funding agencies / Business incubators
Enablers	Local /Regional authorities
	National authorities
Civil Society	Public infrastructure (e.g. health, education)

Industrial Manufacturers

Industrial manufacturers are among the most important stakeholder groups of the Greek MMC community. This group includes manufacturing SMEs and **start-ups as well as industrial companies that are working on 3D design and 3D printing, as well as on emerging IoT applications for health or other sectors**. The main motivation for their engagement in the Greek cMDF is to expand their manufacturing capabilities, experimenting and testing new methods and tools that are used in makerspaces. In other words, they have the chance to use rapid prototyping tools as well as co-creation methods that will make their working processes more efficient and will enable them to more easily integrate user feedback and needs into the design phase.

Maker Communities

This group consists of **makerspaces, FabLabs, hackerspaces, artists, designers, co-working spaces and formal or informal maker communities that are working with technologies of digital fabrication, electronics and programming**. The motivation for engaging this group in the Greek cMDF is supporting them to improve their basic knowledge and skills about design and manufacturing, in order to create their own customized objects. In the context of iPRODUCE, individual makers can also act as project ambassadors and consumer champions to accelerate the development of the collaborative manufacturing processes of the cMDF.

Doctors and Scientific Community

Another important stakeholder group of the Greek cMDF are doctors and scientists. This group includes **people with medical expertise, like doctors, physicians and veterinarians, as well as researchers working on innovative methods and materials for digital fabrication**. Their contribution mainly focuses on providing feedback on the design and development of the medical equipment that will be created, in order to ensure the overall quality of the final products. The engagement of this stakeholder group is driven mainly by their research interests and their willingness to share and further enrich their knowledge. They may be motivated to join for gaining access to the iPRODUCE marketplace and other digital tools, which will allow them to create synergies for future possible collaborations and identify other projects in which they could contribute.

Health Infrastructure

This group includes **public hospitals, veterinarian clinics, as well as orthopaedics clinics, well-being centres and other health structures** that serve patients with different health problems. Their main motivation for joining the cMDF activities is to have access to efficient medical equipment that is designed to meet specific needs of patients and medical staff. In turn, they can test and evaluate the developed prototypes, contributing to improving the quality and efficiency of the final products.

Public Authorities

This group includes relevant ministries and local authorities that can promote co-creation and social innovation as a way to contribute to more efficient processes of manufacturing. Moreover, public authorities have a significant role in fostering education and training through STEM methodologies and in this way contribute to familiarising the general public with the potential and benefits of social manufacturing.

4.5.3. Tailored Strategy for Stakeholder Engagement

A multi-stakeholder strategy has been developed for the engagement in the Greek cMDF in order to address the needs and motivation of different stakeholder groups. Interactions and interconnections

between manufacturers and maker communities are strongly encouraged. At the same time, raising awareness on social manufacturing and digital fabrication is essential for all stakeholder groups. The tailor-made strategies that have been developed for the targeted stakeholder groups are presented below, addressing their specific needs and motivation.

Engagement of Industrial Manufacturers

The motivation of industrial stakeholders for joining the Greek cMDF can be triggered through economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of medical equipment.** This type of communication serves a two-fold aim: (i) offer information about open innovation, co-creation and the iPRODUCE approach and (ii) invite them to join the Greek cMDF.
- **cMDF visits, calls, meetings and warm-up events** help us to better interact with priority stakeholders and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **Active involvement in user-driven innovation workshops and co-creation activities** together with makers and consumers, for the **collaborative design and manufacturing of medical equipment**. In these events, stakeholders will have the chance to experiment on using methods and tools for open innovation and co-creation, in order to enhance their manufacturing capacity and their innovation potential. The utter goal is to actors them in developing customised medical devices while also taking into account the views of doctors and makers.

To do so, the **AidPlex** and **CERTH**'s professional network of industrial companies was exploited. Based on stakeholders' interest and participation, priority actors, relevant to the Greek cMDF mission, were identified.

Key messages for reaching industrial manufacturers

It is important to underline that co-creation and open innovation could further improve processes of product design and development better aligned to consumers' needs and expectations. For instance:

- Identified consumer needs in medical equipment.
- Development of complex specifications for customized products
- New business models for manufacturing developed within the scope of iPRODUCE.
- Processes through which manufacturers can involve makers and consumers in the manufacturing process through open innovation.
- Intellectual property protection in collaborative environments for open innovation.

Engagement of Maker Communities

The motivation of FabLabs and maker communities for participating in the Greek cMDF can be sparked through practically indicating what can be offered to them. On one hand, they have the chance to **participate in the design and manufacturing of actual products collaborating with industrial stakeholders of the medical sector, putting in practice their skills and knowledge.** On the other hand, they also gain knowledge on methods and tools for industrial product development which can support the further development of their ideas as well as understand how to create new cMDFs and expand or upscale existing makerspaces. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the GreekcMDF while also broadcasting the project's promotional material. It is also handy to circulate emails asking for targeted feedback on developed tools and under exploration user cases.
- **Face-to-face activities and workshops** bringing together stakeholders relevant to design and manufacturing of medical products. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Key messages for reaching maker communities

We explain how they can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in medical equipment
- How to create a new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Doctors and Scientific Community

The engagement of the doctors and scientific community is also seen as a vital part of this strategy and their contribution is twofold. First, they can promote co-creation and social innovation as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can provide useful feedback based on their expertise to improve the overall quality of the medical equipment. Engagement was achieved through dedicated information channels providing insights on the iPRODUCE concept while also explaining how digital fabrication can support the development of tailormade medical devices. Such actors were also invited to take part in the project's workshops and co-creative activities. Proving a clear role for them in the co-creation process can further foster their participation in such a mission.

Key messages for reaching doctors and scientific community

In our communication with scientific community, we focus on the impact of the cMDF, explaining:

- New innovative projects relevant to customized medical equipment.
- New methods, strategies and tools to foster co-creation and open innovation.
- Participative and open models and implications for IPR.

Engagement of Health Infrastructure Agents and Public Authorities

The engagement of health infrastructure and public authorities is also seen as a crucial element of this strategy. On the one hand, they can raise awareness on how digital fabrication can lead to the design of more efficient medical equipment being aligned to specific needs of patients and medical staff. On the other hand, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of social manufacturing.

Communication with this stakeholder group took place either through **email** or **phone** and further interaction was achieved through their **participation in project events**. Policy events and info days specifically targeted representatives of health infrastructure, local administration and policy makers.

Key messages for reaching health infrastructure and public authorities

In our communication with health infrastructure and public authorities, we focus on the impact of the cMDF, explaining:

- The role of the cMDF at a local level and opportunities for replication.
- Good practices learned from the project that promote greener manufacturing processes.

4.5.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the Greek cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 20. Greek cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
information letters and email invitations	Industrial manufacturers	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Engage in personal interactions between industrial manufacturers and the Greek cMDF to better understand their needs and expectations. cMDF visits, personal phone calls and emails help to communicate with the industrial manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF. A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	All identified stakeholders	Bring together relevant stakeholders and involve them in co-creation activities around the topic of collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early adopters/ambassadors, as part of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	Industrial stakeholders, FabLabs and maker communities	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
		engagement among the local MMC communities of the cMDFs.
Press releases and articles about iPRODUCE and the Greek cMDF	Health infrastructure and public authorities	inform about the vision of the iPRODUCE project as well as the scope of the Greek cMDF.

4.5.5. Conducted Engagement Activities

This section provides a brief analysis of conducted engagement activities of the Greek cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the Greek pilot level, please refer to D10.6.**

Table 21. Greek cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	TYPE OF ACTIVITY	AUDIENCE
			Number of engaged stakeholders
Additive Manufacturing & 3D Printing Technologies under Greek Social Manufacturing" Workshop	18 Jan 21	**warm-up event** (online)	60
Digital Technologies in Education And Culture	4 June 21	**warm-up event** (online)	40
1821-2021: Through The Eyes Of The Children	25 Sep 21	**Promotional /warm-up event** (physical)	150
2nd Thessaloniki Design Week	13-17 Oct 21	**Promotional /warm-up event** (physical)	170
3D Collaborative Manufacturing in Education & Culture	26 May 22	**warm-up event** (physical)	40
1st Consultation Workshop	23 Nov 22	Consultation workshop*	3
2nd Consultation Workshop	6 Dec 22	Consultation workshop*	4
		Total Engaged Stakeholders	**467**

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

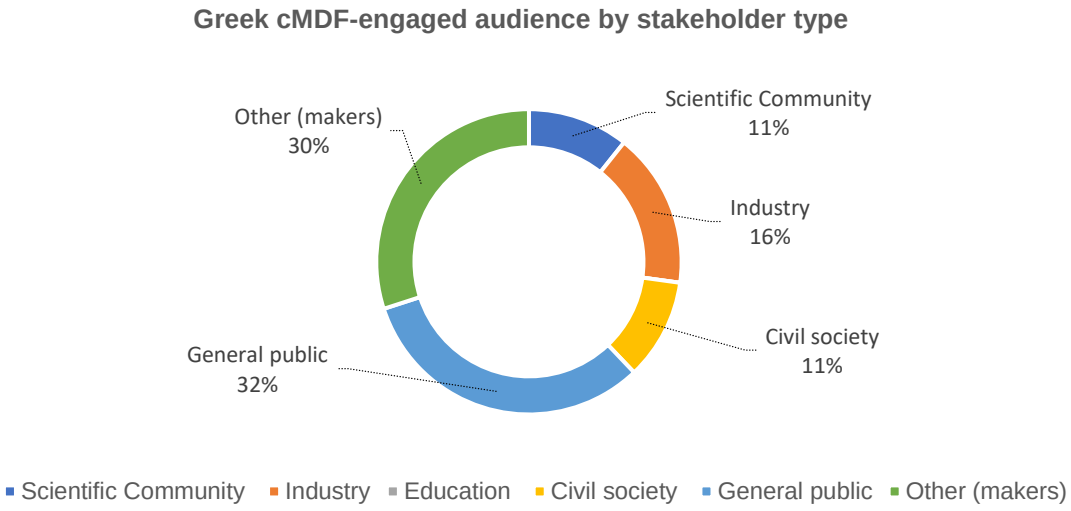

Figure 11. Greek cMDF-engaged audience by stakeholder type

5 warm up events where both virtually and physically hosted by the Greek cMDF partners within the period of 2021-2022. These events, briefly described below, focused on presenting the iPRODUCE project and showcasing the concept of social and collaborative manufacturing.

The **first warm up event** "*Additive Manufacturing & 3D Printing Technologies under Social Manufacturing*" was conducted online (18 Jan 2021, n=60) and aimed to highlight ongoing work and practices related to social manufacturing in Greece, with a focus on additive manufacturing and 3D printing. It sought to inform participants about the Greek cMDF and its operations, demonstrate co-creation activities, and showcase the capabilities of the Additive Manufacturing Unit (AMU) of CERTH/ITI. The event also aimed to present the systemic innovation of additive manufacturing within the iPRODUCE project, along with its integration with other digital technologies. The event involved collaboration with key Greek 3D printing manufacturers, makerspaces, researchers, and scientists. The promotion was done through email invitations and social media channels, utilising a dedicated leaflet/poster for promotion. The outcomes of the event included positive feedback on implemented use cases and the generation of new ideas for potential use case scenarios within the iPRODUCE project. Stakeholder engagement was evident through the interest expressed by participants. The event evaluation highlighted the need to explore new formats for interactive virtual tours and to focus on a single topic to optimize presentation time and material focus. Key takeaways from the event included raising stakeholder awareness of digital tools and digital manufacturing, promoting the concept of co-design, and seeking additional exploitation opportunities. Challenges faced during the event included the interactivity during virtual tours and the limited time available for detailed presentations. Participants at the end provided positive feedback, expressing interest in attending similar events.

The **second warm up event** "*Digital Technologies in Education & Culture*" was also held online due to the COVID-19 pandemic. (4 June 2021, n=40). It focused on the integration of digital technologies, such as 3D printing and augmented reality/virtual reality (AR/VR), in the fields of education and culture and targeted various groups, including students, teachers, parents, researchers, and local actors. Its objectives were to enhance stakeholders' familiarity with digital technologies, promote the use of digital tools for educational and cultural purposes, and increase awareness of the digital tools developed within the iPRODUCE project. The event' structure included presentations on 3D printing in education and culture, virtual visits to the Additive Manufacturing Unit (AMU) of CERTH/ITI, and discussions on augmented reality, virtual reality, and smart contracts. The meeting raised awareness, promoted the

use of digital tools for educational and cultural purposes, and increased stakeholders' understanding of the iPRODUCE project. It successfully engaged stakeholders and generated interest in following the project's updates and participating in future activities.

The **third warm up event** *"3D Collaborative Manufacturing in Education & Culture"* (26 May 2022, n=40) took place at the infrastructures of CERTH/ITI and focused on promoting co-design and co-creation activities using 3D printing and augmented/virtual reality (AR/VR) technologies within the framework of the iPRODUCE project. Its objectives were to familiarise young students and stakeholders with digital technologies, encourage their participation in the project, and increase awareness of the digital tools developed for the OpIS platform. The event mostly targeted students, teachers/educators, parents, guardians associations, and educational and cultural stakeholders. Promotion of the event was done through email invitations, social media, and the use of leaflets/posters and videos to showcase the achievements of the OpIS platform and the iPRODUCE project. The event's structure included demonstrations of 3D specimens, a guided tour of the Additive Manufacturing Unit (AMU), a training workshop on the manufacturing process, and demonstrations of the tools created for the OpIS platform and specific use case scenarios. Real-time demonstrations and videos were also used to enhance communication. The evaluation of the event highlighted the satisfactory attendance, familiarisation of participants with the goals and concepts of iPRODUCE, knowledge sharing, and the opportunity to test and train local communities in using the project's digital platform. Challenges were faced in engaging specific target groups, such as students of the 5th and 6th grade of Elementary Schools. However, the event received positive feedback, indicating a desire to conduct similar events and explore specific projects in more detail.

The Greek cMDF further exhibited iPRODUCE and pursued the engagement of potentially interested stakeholders in 2 wider-scale promotional events:

- **1821-2021:Through the eyes of the children** (25 Sep 21, n=150): This event focused on co-design and co-creation activities through 3D printing and AR/VR experiences for children to visualize history and culture. It primarily engaged the scientific community, civil society, and the general public and successfully raised awareness of digital tools and manufacturing and increased the impact of the iPRODUCE project.
- **2nd Thessaloniki Design Week** (13-17 Oct 21, n=170): This event aimed to familiarise stakeholders with digital technologies and encourage their participation in the project. It targeted the scientific community, industry professionals as well as the general public. Through tailored iPRODUCE videos, and use case scenarios demonstrations, including 3D printed smart luminous artifacts and 3D printed (bio) scaffolds, the event successfully raised awareness of digital social manufacturing tools and attracted stakeholders' interest who expressed willingness to follow up with the cMDF level events and activities.

Overall, the iPRODUCE engagement strategy for the Greek cMDF **effectively connected, among else, medical experts, educators, consumers, designers, and engineers, aligning their expertise and values.** Discussions related to Greek social manufacturing were stimulated, while some events were also centred around the utilisation of digital technologies in education and culture. The employed engagement strategy introduced participants to the objectives and concepts of iPRODUCE, fostering their familiarity with project's main goals. It further facilitated the sharing of knowledge acquired during project implementation and strongly encouraged discussion among mobilised actors. These efforts successfully **engaged participants and deepened their understanding and involvement in project activities.** In addition, the performed actions raised awareness, promoted co-design and co-creation, and **advanced the use of digital manufacturing in education and culture**. Conducted events received positive feedback with attendees willing to follow up with project updates and future activities.

Figure 12. Snapshots from the Greek cMDF engagement events

Another key outcome of the Greek cMDF mobilisation events was the identification of potential early adopters of the project-generated resources, who can act as ambassadors to mobilise and inform local communities on social manufacturing. This pool of identified "lead users" was approached and engaged within the **consultation workshops that are thoroughly described and presented under *D6.5 Ambassador Programme for Early Adopters.*** Ambassadors and other engaged actors also took part in the iPRODUCE hackathon, as described in detail under ***D6.6 Open Competitions on Consumer Products Innovation Challenges.***

4.5.6. Additional Remarks on the Greek cMDF Ecosystem

The - easiest to reach and involve – stakeholder:
Makers and Maker communities, Scientific community
Most impactful communication channels employed: social media, face to face meetings

The - hardest to reach and engage – stakeholder:
Facilitators, media
Most impactful communication channels employed: social media, face to face meetings

The stakeholder type showing the highest level of active engagement:
Makers and Maker communities; Civil society; Consumers –market niches; Scientific community
Most impactful communication channels employed: direct contacts, social media, face to face meetings

The stakeholder type with the most impactful contribution:
Makers and Maker communities; Civil society; Consumers –market niches; Scientific community
Most impactful communication channels employed: direct contacts, social media, face to face meetings

4.6. Danish cMDF

Disclaimer: After the bankruptcy of BetaFactory (BF) - the key member of the Danish cMDF - in October of 2021, (see amended GA), there were no additional cMDF developments in Denmark. This section presents the established ecosystem, applied engagement strategy and a brief overview of mobilisation activities solely performed withing the period of 2020-21.

4.6.1. Scope

The main scope of the Danish cMDF is to **democratise 'making' by expanding the knowledge and expertise about the potential of local production through partnerships with different groups of stakeholders, including educational institutions (schools and universities), SMEs and businesses.** Among the activities of the cMDF, a mobile lab unit containing a set of machines has been created and equipped to provide a mobile production facility that can be deployed to various locations, linked to specific on-site production workshops and activities. The Danish cMDF is composed of two partners:

Table 22 Composition of Danish cMDF

Partner	Stakeholder group	Role in the project
BetaFactory (BF) (cMDF representative)	Prototype and production facility	• Responsible for local production on site, equipment and development of the mobile unit • Running workshops • Disseminates local production capabilities through events and partnerships with potential partners from educational institutions (schools and universities) to SMEs and businesses
Copenhagen Business School (CBS)	University	• Supports and co-develops with BetaFactory workshops and project-related activities. • Identifies and develops sustainable business models, based on BF's vision and goals, aligned with market opportunities. • Helps BF to solidify and expand its business towards a healthy and sound development.

4.6.2. Identified ecosystem of stakeholders

The Danish cMDF ecosystem is comprised of a series of relevant actors as showcased in Table 23. These stakeholder groups, as also described below, have been identified as the most relevant local actors who constitute the Danish MMC community.

Table 23. Overview of Danish cMDF ecosystem of stakeholders

Main Stakeholder Type*	Stakeholder Subtype
Manufacturers - industrial stakeholders	Consumer-goods manufacturers
	Manufacturing Startups
	Engineers
Makers and Maker Communities	Artists and designers
Consumers - market niches	Service providers (e.g. generative design, logistics)

Main Stakeholder Type*	Stakeholder Subtype
	R&D units in private companies
SMEs	Software companies
	Consumer-goods manufacturers
	Individuals/entrepreneurs

Furniture Manufacturers and Industrial Stakeholders

This stakeholder group includes **manufacturing SMEs and start-ups as well as engineers that are directly or indirectly linked with the production of furniture, such as companies with expertise on interior design, metal works, or urban installations**. Based on their knowledge of the industrial processes and the manufacturing technologies, they can provide substantial feedback on different stages of the collaborative design and manufacturing of products. In turn, they can benefit from gaining access to the digital platform of iPRODUCE to further improve their products by extending their features and functionalities through prototyping and testing.

Creative Communities and Makerspaces

This stakeholder group includes **artists, designers as well as maker communities and individual makers that combine creative approaches with technologies of digital fabrication**. The motivation behind engaging this group in the Danish cMDF is their experience with hands-on activities, including prototyping, through the use of digitally innovative technologies. Moreover, they are familiar with processes of co-creation and co-design which makes it easier for them to understand the iPRODUCE approach. They are expected to support the collaborative manufacturing of furniture with creative ideas on how to design and develop customised features and, therefore, contribute to the improvement of the final products. Individual makers can also act as project ambassadors and consumer champions in order to accelerate the development of the collaborative manufacturing processes of the cMDF.

Educational Institutions

Based on the scope of the Danish cMDF, another important stakeholder group to be considered for the engagement strategy involves educational institutions. More specifically, **primary and secondary schools, universities and other educational organisations** may play a key role in the collaborative activities of the Danish cMDF. One of the use cases specifically targets primary and secondary students to be actively involved in the collaborative fabrication of school equipment. This was a solid motivation for schools to be involved in the cMDF activities, as collaborative learning through hands-on activities expands the students' skills and knowledge while teachers also evaluate the teaching modules for prototyping equipment, through gaining access to the training tools of the digital FabLab kit.

Consumers and General Public

Promoting new collaboration processes that will ease consumers' participation in the co-production of products results in the creation of local added value in the local communities.

4.6.3. Tailored Strategy for Stakeholder Engagement

Engagement of Furniture Manufacturers and Industrial Stakeholders

The motivation of furniture manufacturers and industrial stakeholders for joining the Danish cMDF can be triggered through economical aspects and social benefits. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **informative letters**, **pointing out the potential of social manufacturing as well as the collaborative design, engineering and manufacturing of consumer goods.** This type of communication serves a two-fold aim: (i) offer information about social manufacturing and the iPRODUCE approach and (ii) invite them to join the Danish cMDF.
- **cMDF visits, personal phone calls and warm-up events** help communicate with the furniture manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
- **participation in user-driven innovation workshops and their involvement in co-creation activities**, for the collaborative design and manufacturing of furniture. The goal is to engage them in developing customized furniture while taking into account the views of consumers and makers.

Such steps were facilitated by the **Copenhagen Business School** and coordinated by **BetaFactory**[6] who has expertise in digital fabrication technologies and an established network of collaborators in the furniture and design sector.

Key messages for reaching furniture manufacturers and industrial stakeholders

It is important to underline that social manufacturing offers a variety of benefits that could have direct impact on their product design and development, by offering positive future perspectives for the collaborative production activities integrating makers' and consumers' feedback. For instance:

- Identified consumer needs in home furnishing
- Development of complex specifications for customized furniture products
- New business models for manufacturing developed within the scope of iPRODUCE.
- Processes through which manufacturers can involve makers and consumers in the manufacturing process through open innovation.
- Intellectual property protection in collaborative environments for open innovation.

Engagement of Creative Communities and Makerspaces

The motivation of FabLabs and maker communities for participating in the Danish cMDF can be sparked through practically indicating what can be offered to them. On one hand, they have the chance to **participate in the design and manufacturing of actual products collaborating with industrial stakeholders of the furniture sector, putting in practice their skills and knowledge.** On the other hand, they also gain knowledge on methods and tools for industrial product development which can support the further development of their ideas as well as understand how to create new cMDFs and expand or upscale existing makerspaces. The consortium recommended that major steps for engaging such a group include but are not limited to:

- **Targeted emails**, communicating the iPRODUCE approach and tools, the scope of the Danish cMDF while also broadcasting the project's promotional material.
- **Face-to-face activities and workshops** bringing together stakeholders relevant to furniture design and manufacturing. Through these events, potential early adopters and local maker champions can be identified to be contacted for the ambassador programme that will be developed under Task 6.3. These workshops can also be used to collect feedback on the user experience of the iPRODUCE platform.

Being a makerspace with strong connections to maker communities in the local area, BetaFactory served as a catalyst to ease communication processes while also fostering a wider and active engagement in the Danish cMDF.

[6] Since BETAFACTORY bankruptcy in Oct 2021, no CMDF development in Denmark.

Key messages for reaching FabLabs and maker communities

Specific messages for attracting makers' interest in the iPRODUCE approach can be used. Through sharp lines, light should be shed on how maker communities can benefit from participating in collaborative production with industrial stakeholders and consumers. For instance:

- Identified consumer needs in home furnishing
- How to create new cMDF and expand existing or upscale makerspaces and infrastructures.
- New methods, strategies and tools to foster co-creation and open innovation, while simultaneously reducing development costs.

Engagement of Educational Institutions

The engagement of educational institutions is also seen as a vital part of this strategy and their contribution is twofold. Engaged educators can in turn promote co-creation and social innovation as a way to move towards more efficient processes of manufacturing, convincing people to participate in collaborative production activities. In addition, they can also foster education and training through STEM methodologies to familiarise the general public with the potential and benefits of digital fabrication. Communication with academics took place either through **email** or **phone** and further interaction was achieved through their **participation in project events**.

The first step was informing them about the learning benefits of digital fabrication through direct and clear messages. Further engagement emerged through the participation of students, teachers and educators in the collaborative manufacturing activities of the Danish cMDF.

Key messages for reaching educational institutions

We focus on the impact of the cMDF, explaining:

- New methods, strategies and tools to foster co-creation and open innovation
- New methods and tools to reinforce learning-by-doing and training in digital fabrication.

Engagement of Consumers and the General Public

As digital technologies evolve, novel ways of collecting consumer feedback and integrating it in the design and development stages are developed. In the context of iPRODUCE, **the mobile app developed under T6.2** enables interaction among users and feedback collection about specific products through polls. Special attention is paid to engaging and connecting consumers in areas of high social interest, such as vulnerable communities, female groups, migrants, etc.

Key messages for reaching consumers and general public

In our communication with consumers and the general public, we use clear and direct messages to explain the benefits of social manufacturing, including:

- New customized furniture to meet consumers' needs
- Novel ways to share experience and provide feedback for a specific product
- Consumers can contribute to the design and development of better products.

General remark: *To achieve broad dissemination of the cMDF scope and activities,* ***social media campaigns*** *through both the project and partners' accounts took place. For these campaigns, local language is used together with relevant hashtags that can easily convey key messages.*

4.6.4. Engagement Channels

This section summarises the main channels that were identified as most suitable for approaching and engaging with stakeholders of the Danish cMDF ecosystem. A more thorough presentation of employed channels can be found in D6.1.

Table 24. Danish cMDF – Engagement Channels

CHANNEL	TARGETED STAKEHOLDERS	REMARKS
information letters and email invitations	Furniture manufacturers and relevant industrial stakeholders	Highlighting benefits for those deciding to join the project and, namely, by presenting them the perspectives for collaboratively designing and developing products while also integrating makers' and consumers' feedback.
cMDF visits and personal interactions (e.g. emails, calls)		Engage in personal interactions between industrial manufacturers and the Danish cMDF to better understand their needs and expectations. cMDF visits, personal phone calls and emails help to communicate with the industrial manufacturers and receive information about their individual needs as well as their feedback on the collaborative manufacturing processes employed by the project.
Warm-up activities	All identified stakeholders	Mobilise people under the banner of social manufacturing and engage them in the collaborative manufacturing processes of the cMDF. A key outcome of these events is also to identify potential early adopters and local maker and consumer champions (lead users), who can act as ambassadors to mobilise and inform local communities on social manufacturing.
Workshops	All identified stakeholders	Bring together relevant stakeholders and involve them in co-creation activities around the topic of collaborative manufacturing. Project-foreseen workshops indicatively include: (a) **Maker workshops** as part of T5.5, and (b) **Consultation workshops** (2 per cMDF) with early adopters/ambassadors, as part of T6.3. Other workshops (e.g. for **training, co-creation**, etc.) were also organised based on the specific needs of the cMDFs and their local communities. [see also D10.6 and D6.5]
Mobile app for social media-enabled feedback	Furniture manufacturers, designers and industrial stakeholders, FabLabs and maker communities, consumers and general public	Through the functionalities of the app, users collect feedback about a specific product through polls and interact with other users in real time. The mobile app is expected to increase interaction and therefore engagement among the local MMC communities of the cMDFs.
Infographics, short videos and animations	Educational institutions	Employed to communicate in a clear and direct way concepts and processes that are complex. Since students are targeted, exploiting these tools can facilitate understanding and encourage participation.

4.6.6. Conducted Engagement Activities within 2020-21

This section provides a brief overview of conducted engagement activities of the Danish cMDF. The applied strategy combined face to face communication (e.g. workshops with key stakeholders, etc.), ad hoc interactions, as well as a widespread flow of information to the public (e.g. through social media, press releases, etc.). In this report, emphasis is being put on the outcomes of the warm up engagement events that locally took place. **For a detailed analysis of *all* types of events hosted at the Danish pilot level, please refer to D10.6.**

Table 25. Danish cMDF – Conducted Stakeholders' Mobilisation and Engagement Events

ACTIVITY DESCRIPTION	DATE	AUDIENCE
		Number of engaged stakeholders
1st kick off - warm up event	27 Aug 20	15
1st school co-creation workshop	27 Aug 20	3
Women makers workshop	7 Oct 20	13
2nd school co-creation workshop	22 Oct 20	5
2nd women makers workshop	29 Nov 20	16
3rd women makers workshop	28 Feb 21	10
4th women makers workshop	11 April 21	13
5th women makers workshop	31 May 21	15
	Total Engaged Stakeholders	***90***

**a detailed description of consultation workshops with project ambassadors at the pilot level can be found in D6.5.*

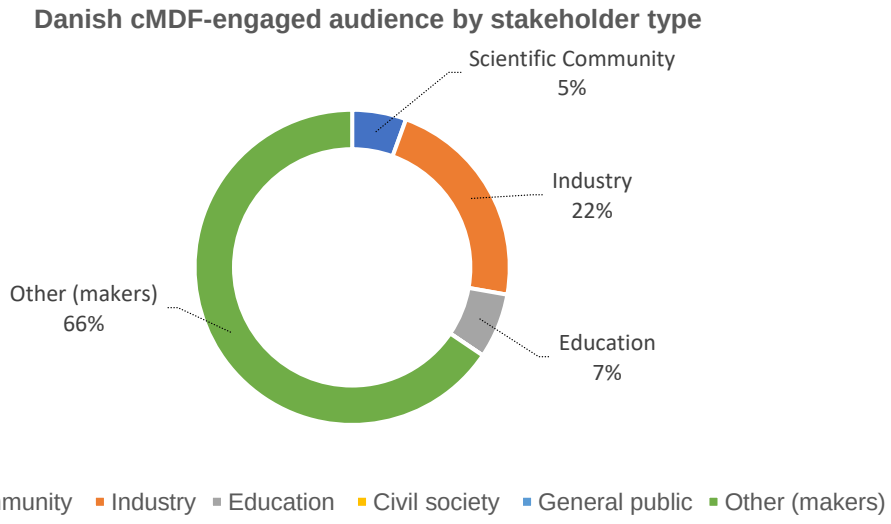

Figure 13. Danish cMDF-engaged audience by stakeholder type

The 1st warm-up event, held on August 27th, 2020 (n=15) at BetaFactory, successfully introduced the iPRODUCE project and its goals to a diverse audience, including representatives from the scientific community, industry, and education sectors. The event aimed to learn from participants' experiences

and engage them in collaboration with Fablabs and makerspaces. The 1-hour event featured presentations, a tour of BetaFactory, and a Q&A session. The outcome was positive, with attendees expressing interest in collaborating and further defining potential partnerships.

Over the same day, on August 27th, 2020, the Danish cMDF held another event; a school co-creation workshop, targeting school leaders and teachers. The workshop introduced the iPRODUCE project, collected insights from schools on collaboration possibilities, and facilitated the co-creation of the project value canvas. Despite a low turnout (n=3), the event gathered valuable information and data, generated new ideas, and established a framework for working with digital fabrication in schools. Another workshops of such kind took place on the 20th of October 2020 which yielded positive results.

The Women Makers workshop, held on October 7th, 2020 at BetaFactory, aimed to explore collaboration opportunities with women entrepreneurs and foster inclusive networks. With 14 attendees, the workshop presented the iPRODUCE project, conducted a betaFactory tour, and facilitated a Q&A session on wishes and opportunities. The participants expressed enthusiasm and identified key aspects for engaging with maker spaces. Follow-up activities were planned and organised within Nov 20 – May 21, including a day-making workshop to further explore opportunities in women entrepreneurship. These events received positive feedback, with participants highlighting the importance of open courses, selective pricing, network participation, a clean and organized space, access to support databases, and affordable materials for prototypes.

Overall, the iPRODUCE engagement strategy for the Danish cMDF helped to bring together the industrial expertise of architects, designers, furniture producers and manufacturers with the creative and innovative ideas of the maker communities, educators as well as the needs of end-users and scholars. Special emphasis was put on the requirement of industrial stakeholders, needs of school teachers and on woman entrepreneurship. Established events successfully introduced the project project to varying types of actors, gathered valuable insights, generated new ideas, and fostered engagement and collaboration. Stakeholders expressed interest in continuing their involvement and receiving further information regarding the project's progress.

Unfortunately, after the bankruptcy of BetaFactory (BF) - the key member of the Danish cMDF - in October of 2021, (see amended GA), there were no additional cMDF developments in Denmark. This is why this section solely presented the activities performed withing 2020-21.

5. Conclusions

The iPRODUCE engagement strategy effectively mobilised stakeholders across multiple countries, overcoming the challenges and limitations posed by the COVID-19 pandemic that severely impacted our activities' conducting capacity over the period of 2020-21. Through various mobilisation events and both online and physical activities, **the project successfully engaged actors from different sectors, including manufacturers, SMEs, start-ups, educators, designers, and the general public.**

The iPRODUCE stakeholder engagement events provided a platform for knowledge sharing, idea generation, and collaboration. Valuable insights were gathered, and areas for improvement were identified, contributing to the project's development and success. Employed approaches, tailored to local specificities, contexts and stakeholders, as thoroughly described in chapters above, were closely monitored throughout the project and have indeed facilitated and further empowered active participation in social manufacturing processes within and beyond the iPRODUCE framework.

As depicted in Table 26, considering both warm up events (T6.1) and consultation workshops with identified ambassadors and early project adopters (T6.3), a total of **42 stakeholders' mobilization events** were organised within the project's engagement axis (31 warm ups and 11 consultation workshops). These numbers further confirm that **the project KPIs of organising at least 3 warm up (T6.1) and 2 consultation (T6.3) events per pilot case were achieved.**

In total, **more than 1,400 stakeholders were engaged across all project's cMDFs.** The distribution shares of the varying types of project-engaged stakeholders are showcased in Figure 14. The engaged audience appears to be well aggregated with industrial stakeholders, researchers and makers cumulatively accounting for a 70% share.

Table 26. iPRODUCE mobilisation activities in the framework of T6.1 and T6.3

cMDF	Warm-up events (T6.1)			Consultation workshops (T6.3)			Total Engaged Audience
	Warm up events organised KPI per cMDF: *at least 3 events*	Engaged Stakeholders	◎	Consultation workshops organised KPI per cMDF: *at least 2 events*	Engaged Stakeholders	◎	
Spain	3	133	✓	3	26	✓	159
Germany	6	270	✓	2	8	✓	278
France	3	150	✓	2	18	✓	168
Italy	6	219	✓	2	24	✓	243
Greece	5	460	✓	2	7	✓	467
[5 cMDFs]	23	1,232	✓	11	83	✓	1,315
*Denmark**	*8*	*90*	✓				*90*
	** The Danish cMDF organised 8 mobilisation events - considered as warm ups - in total, engaging 90 stakeholders within 2020-21*						

Total [6 cMDFs]	Events	Stakeholders		Events	Stakeholders		Engaged audience
	31	**1,322**		11	**83**		**1,405**

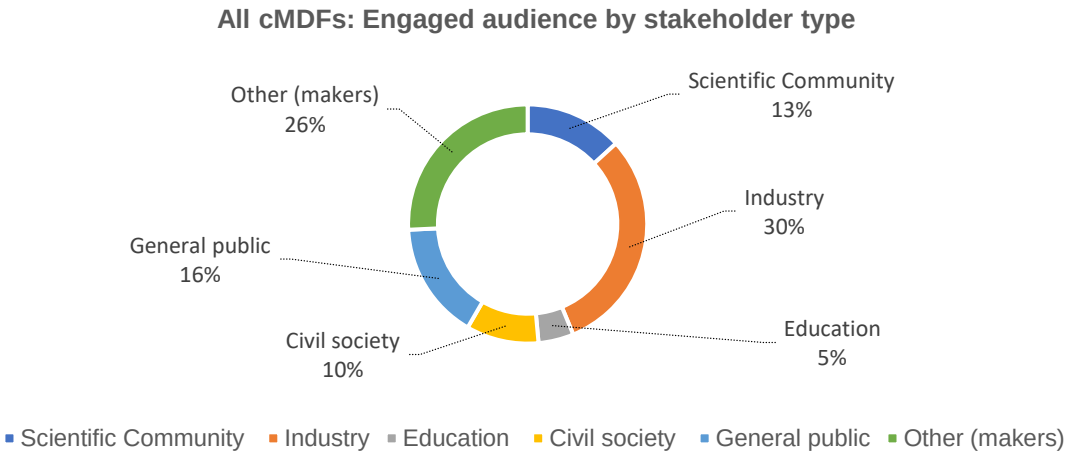

Figure 14. All cMDFs: Engaged audience by stakeholder type

During the past two years, following the conclusion of the pandemic, **the cMDF teams have exhibited remarkable extroversion in their approach**. They have effectively communicated the project's goals and simultaneously expanded their reach to a broader audience with enhanced capacity. Despite the adverse circumstances brought about by COVID-19, **all cMDF teams have demonstrated adaptability and resilience**. **They have creatively harnessed the available resources and technology to amplify their message and engage with a larger audience.** Through the utilisation of innovative communication platforms, hybrid events, and digital marketing strategies, they have reached several actors and organisations within their local spheres. By capitalizing on these advancements, the cMDF teams have maximized their impact and exceeded the - conservative, due to the pandemic - expectations set at the time of D6.1 submission (June 2021). The substantial progress achieved is illustrated in Table 27.

Table 27. iPRODUCE engagement strategies' effectiveness

Activity	Metric	D6.1 Internal Targets (June 21)	Final Status (June 23)
Warm-up events	Number of events	3 per cMDF	At least 3 per cMDF/ 31 in total
	Attendance	150 persons (in total)	more than 1,400 persons (in total)
Early adoption of iPRODUCE solutions	Number of events	2 per cMDF	At least 2 per cMDF/ 11 in total
	Number of ambassadors	> 10 early adopters (in total)	> 70early adopters (in total)

The iPRODUCE cMDFs' commitment to showcasing - through dedicated engagement strategies - the project's potential, coupled with their ability to adapt to challenging circumstances, has yielded remarkable outcomes. Not only have they surpassed the project's initial targets, but they have also fostered a **broader awareness and understanding of the project's significance**, while bringing together industrial expertise, maker communities, and consumer needs to promote collaborative manufacturing. **The successful mobilisation efforts paved the way for continued collaboration, future activities, and the advancement of the project's objectives.**

Note: As already described, D6.2 solely focuses on the project-engagement activities and **emphasises on the promotional and warm up events** that have taken place over the iPRODUCE lifecycle.

The **involvement of ambassadors and direct contacts with relevant professionals further facilitated stakeholders' identification and visibility for the project**. For a detailed description of the iPRODUCE Ambassador programme with an overview of **cMDF-conducted consultation workshops**, please refer to D6.5.

Warm-up events

- 'Extroverted'
- Open to the pubic / diverse audience
- Promoted through different channels to increase participation
- Aim to inform, increase awareness, familiarize people with iPRODUCE

KPI: at least 3 per cMDF - **Achieved** ✓

Consultation workshops

- 'Introverted'
- Open only to targeted audience (ambassadors)
- Communicated directly to the targeted audience
- Aim to discuss and collect feedback on specific aspects of iPRODUCE (concept, governance, platform and tools)

KPI: at least 2 per cMDF – **Achieved** ✓

Figure 15. Differences between warm up events (T6.1) and consultation workshops (T6.3)

For a thorough overview of all project's cooperation, dissemination and communication as well as capacity building events please refer to **D10.6.**

Moreover, the project-dedicated "iPRODUCE hackathon" with participants across all cMDFs is presented in **D6.6** Open Competitions on Consumer Products Innovation Challenges

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PRODUCE

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