DiMAT

D8.6 EXPLOITATION AND MARKET READINESS

08/11/2024

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D8.6 EXPLOITATION AND MARKET READINESS

Version 1

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Abstract	This document, titled Exploitation and Market Readiness Version 1 (D8.6), provides a comprehensive overview of the DiMAT Key Exploitable Results and the pathways towards their exploitation and sustainability. It details the exploitation methodology employed during the project to understand the incentives, goals, and intentions of the partners who own and have interest to use the results and serves to create a robust and applicable post-project exploitation strategy. The document provides a detailed overview of the exploitation activities conducted in the first 18 months of the project and shares the plan for activities for the second half of the project until month 36.
Keywords	EXPLOITATION, KEY EXPLOITABLE RESULTS, MARKET ANALYSIS, IPR, SUSTAINABILITY, END USERS, EARLY ADOPTERS, STAKEHOLDERS, VALIDATION, UNIQUE VALUE PROPOSITION, USE MODELS

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1.0	28-Jun- 2024	Final quality check and issue of final document	CERTH
1.1	08-Nov-2024	Update of deliverable according to PO/reviewers comments and quality check	F6S, CERTH

EXECUTIVE SUMMARY

This document, titled Exploitation and Market Readiness Version 1 (D8.6), provides a comprehensive overview of the DiMAT Key Exploitable Results and the pathways towards their exploitation and sustainability following the conclusion of the three-year EU-funded project. It details the exploitation methodology employed during the project to understand the incentives, goals, and intentions of the partners who own and partners who have interest in using the results.

An initial market analysis was conducted, along with individual and joint exploitation routes and assessments, and these findings are presented in this first version of the DiMAT exploitation and market readiness strategy. The document's results were also reviewed by an expert from the Horizon Results Booster program, who provided feedback aimed at enhancing the project's existing strategy.

A report from the expert was shared with the consortium and provided as Annex 1 of this document. Part of the feedback has been incorporated into the current strategy. More complex insights will be developed during the second half of the project, focusing on external studies and tests with end users, which aligns with the project's primary focus for this period.

At this stage, three primary exploitation routes for the DiMAT Key Exploitable Results were identified:

Option 1: Separate Exploitation of the DiMAT Suites

Option 2: Holistic Marketing via the DiMAT Platform

Option 3: Parallel Individual Exploitation of the separate toolkits

In the second half of the project, the suggested exploitation options will be further refined and assessed, particularly regarding the joint exploitation of the three key exploitable results – the DiMAT Suites. This assessment will consider whether they should be marketed separately or together via a single platform taking under account the necessary arrangements, such as transferring rights to a single entity or maintaining ownership with development partners while using the platform as a marketplace. Initial testing and feedback from users will support the validation of the abovementioned options and the results will be provided in the second iteration of this document, to be completed by the project's end.

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ABBREVIATIONS

AI	Artificial Intelligence
BMC	Business Model Canvas
CA	Consortium Agreement
CAD	Computer-Aided Design
CDL	Customer Discovery Loop
CLCA	Cost Life Cycle Assessment
DEL	Deliverable
DIH	Digital Innovation Hub
DTPC	Digital Twin for Process Control.
EoI	Expression of Interest
FAIR	Refers to FAIR data (Findable, Accessible, Interoperable, Reusable)
FEM	Finite Element Method
FTO	Freedom To Operate
GA	Grant Agreement
HRB	Horizon Results Booster
IP	Intellectual Property
IPR	Intellectual property rights
IT	Information Technologies
KER	Key Exploitable Result
KPI	Key Performance Indicator
LCA	Life Cycle Assessment
M	Month
MMS	Materials Mechanical Properties Simulator
MPS	Materials Processing Simulator
MVP	Minimal Viable Product
ROI	Return on Investment
SaaS	Software as a Service
SME	Small and Medium Sized Enterprise

T	Toolkit
Y	Year

DiMAT Toolkits

CMDB	Cloud Materials Database
KAF	Knowledge Acquisition Framework
MEC-LCA	Materials Environmental and Cost Life Cycle Assessment
MDF	Materials Design Framework
MM	Materials Modeler
MD	Materials Designer
MMS	Materials Mechanical Properties Simulator
MPS	Materials Processing Simulator
DTPC	Digital Twin for Process Control

1 INTRODUCTION

Deliverable D8.6. Exploitation and Market Readiness is the key document driving and showcasing the exploitation pathway for the DiMAT Key Exploitable Results. DiMAT comprises of three Suites for material manufacturing, each containing three integrated open digital toolkits, amounting to a total of nine toolkits. The toolkits can operate together exchanging information and enhancing results and can also work individually independently from one another.

The three Suites are:

Suite 1: Data and Assessment Suite

Suite 2: Modelling and Design Suite

Suite 3: Simulation and Optimization Suite

The purpose of the DiMAT solutions is to offer SMEs and Mid-Caps a set of advanced digital tools for full modeling, simulation, and optimization across the material value chain—design, processing, and manufacturing. These include data analysis services and visualization techniques to facilitate efficient design space exploration, reducing physical testing while improving quality, sustainability, effectiveness, and competitiveness. The DiMAT Suites are intended to be provided as a Software-as-a-Service (SaaS), enabling companies to utilize advanced materials knowledge acquisition, modeling, simulation, and optimization functionalities without significant initial investments or specific IT skills, thereby supporting the transition of SMEs and Mid-Caps toward industrial digitalization.

This document captures the work completed in the first half of the project to identify the most appropriate and feasible options for the use and sustainability of the DiMAT solutions. It outlines the exploitation options and initial intentions of each partner regarding these and provides a robust methodology towards the development of a practical post-project exploitation strategy, defining partners intentions, roles, responsibilities, actions and needed resources.

The document is structured as follows:

- Section 1: Introduction to the document.
- Section 2: Description of the exploitation methodology followed by the consortium to establish a robust post-project exploitation strategy.
- Section 3: Overview of the DiMAT Key Exploitable Results and initial market analysis conducted for each Suite.
- Section 4: Detailed exploitation roadmap, outlining three potential pathways and assessing partners' initial individual and joint exploitation plans.
- Section 5: Concluding remarks and next steps

2 METHODOLOGY

The DiMAT methodology is developed to serve as strategic guide for DiMAT's exploitation activities throughout the project lifetime. It applies a tailored innovation management methodology facilitating the development of a cohesive exploitation strategy for DiMAT's results post-project completion. Through the activities conducted within the project and described in the following sections, partners have a clear understanding on the exploitation pathway for DiMAT's results and what would be expected to be taken as an activity forward in any of the exploitation routes selected by different project partners – research, technological and commercial.

The methodology should be treated as a strategic roadmap, key for consortium members to grasp the exploitation process. It provides a step-by-step guide on the exploitation activities within the duration of the project and outlines the specific contributions expected from each partner, ensuring the development of tailored individual and collective exploitation plans that align both with their unique business needs and DiMAT's project objectives.

The ultimate goal of the activities enlisted in the DiMAT exploitation methodology is to bring the results of the DiMAT project to a wider audience and support the exploitation partners in bringing the technologies developed within the project forward.

2.1 DIMAT METHODOLOGY

For an exploitation strategy to be effective and put into action, it must adopt a lean approach. This involves two key aspects: firstly, fostering continuous feedback from users to solution developers as early as possible in the process; and secondly, ensuring that solution providers continuously assess the product feasibility and long-term viability.

To achieve the objective of creating a robust exploitation plan embraced by the relevant project partners, DiMAT utilizes a customized methodology based on the principles of the Customer Discovery Loop.

In its essence the execution of this methodology applies a two-folded inward and outward process. On the one hand significant effort will be directed to understanding solution developers and exploitation partners perceptions and willingness to exploit and sell to ensure the viability of the exploitation scenarios from the partners' point of view. On the other, the outward process focuses on engaging early adopters/end-users from outside the project, to enhance the uptake beyond DiMAT Project. This will involve testing the project's results by validating their (1) Desirability (Solving Customer-related uncertainty), (2) Feasibility (Testing available technology and resources, activities, and partners) and (3)

Viability (Financial opportunity assessment). This focus on end-user needs will ensure that the final products are well-adapted to the market and increase the chances of successful technology adoption. The result of this methodology is achieving a (4) Validated Business Model that allows partners to position themselves with a clear go-to-market plan. The exploitation process will progress from hypothesizing on potential market needs to real market introduction, with the aim of increasing the customer readiness level throughout the project where customers are involved in extended product testing.

The exploitation methodology utilized by DiMAT is summarized in five distinct stages, outlined in Figure 1 below. Each of the stages will be presented in a separate subsection.

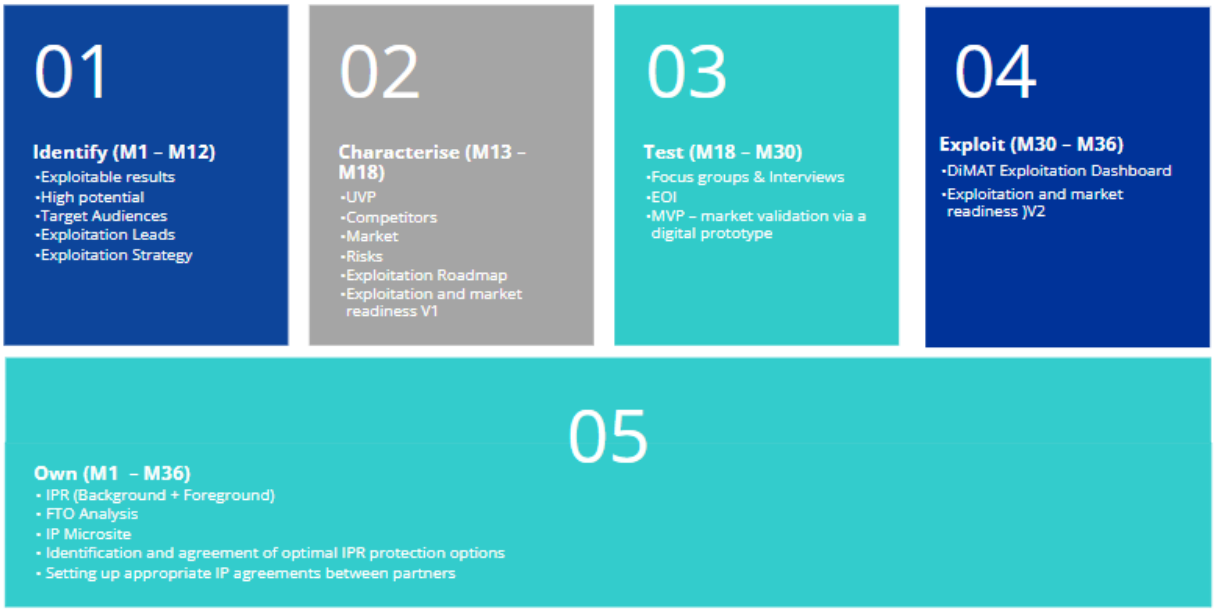

Figure 1: DiMAT Exploitation methodology - Stages

2.1.1 Identify

The identification stage initiates a comprehensive exploration of exploitation intentions and perceptions involving all project partners. This phase encompasses activities dedicated to pinpointing all project's exploitation results, with a particular emphasis on those with the highest economic, business, scientific, and societal impact. Additionally, it is focused on gaining insights into partners' initial interests in exploiting the identified results. Simultaneously, it aims to foster a robust, shared understanding and consensus on the exploitable and key exploitable results derived from the project.

It is comprised by the following activities:

#	Activity	Description	Month
1.	**Tailored Exploitation Questionnaire**	Collecting individual inputs from each project partner (Results, Key Exploitable Results, Background IP, Foreground IP, individual and joint exploitation pathways)	M8
2.	**Analysis of Responses**	Conducting a thorough examination of the gathered inputs	M9
3.	**DiMAT Results Table**	The table includes an overview of results, Key Exploitable Results (KERS), other exploitable outcomes, and individual partners' exploitation paths	M10
4.	**Results Validation Workshop**	Bringing together partners to validate and refine the identified results	M11
5.	**Analysis of Results and Next Steps**	Evaluating the outcomes and outlining the subsequent strategic actions	M12

Table 1: Stage 1 "Identification" Activities

The identification stage was executed within the first year of project activities. The steps taken are briefly presented below. As a result, the outcomes are readily available on DiMAT's repository and will be shared in the current document in section 3 – "Key Exploitable Results", section 4 – "Individual Exploitation Plans" and Section 5 "Joint Exploitation Plans".

2.1.2 Exploitation questionnaire

The questionnaire includes four sections, asking for the following information:

Project Results; Key exploitable results; Other exploitable results; Background IP; Foreground IP; Exploitation Leads; Initial Individual Exploitation Plans; Initial Common Exploitation Plans; Exploitation collaboration paths.

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EXPLOITATION QUESTIONNAIRE

Dear partners,

Following the discussion about exploitation and Key exploitable results (KERs) during the meeting in Lugano, we would like to delve deeper into your perspectives and better comprehend your expectations for the DiMAT exploitation strategy. This will enable us to customise our approach and tools effectively for executing the process.

SECTION 1: DiMAT Project Results

Below, please provide details regarding all project results you can identify.

A result can be any tangible or intangible output of the project, such as data, knowledge, and information whatever their form or nature. In the broader sense, they can be commercial, societal, political, or for improving public knowledge and action. This list should be extensive and should contain all project results, including KERs and OERs

Add rows as necessary.

RESULT NAME	INDICATE WHETHER KER/OER/OTHER	RESULT TYPE[1][2]	AUDIENCE/ TARGET GROUP

[1] SCI — Scientific discovery, model, theory; PROD — Product (new or improved); SERV — Service (new or improved); PROC — Industrial process (new or improved); BUS — Business model (new or improved); DSG — Design (new or improved); METH — Method, material, technology, design (new or improved); PO — Policy recommendation, guidance, awareness raising, advocacy; EVNT — Event (conference, seminar, workshop); STAFF — (qualified personnel exchanges); LEARN — learning and training (learning modules, curricula); INFRA — new or improved infrastructures or facilities; OTHER
[2] If the result is an OER the result type can be one of the following: Software; Workflow; Protocol; Prototype; Other

Figure 2: DiMAT Exploitation Questionnaire

Answers were received from 11 partners, comprising the technology providers and potential exploitation leads as identified in the Grant Agreement (GA).

2.1.2.1 Analysis of responses

A comprehensive examination of the gathered inputs was conducted. Out of the inputs received a total of 41 potential exploitable results were identified. To refine and manage these results more effectively, we conducted a follow-up workshop. It was recognized that some of the listed results were a constituent of a larger result which better represents the identified output. Consequently, we consolidated and redefined the results to provide a more accurate and complete representation of the project's exploitable outcomes.

2.1.3 DiMAT Results Table

#	Result Name	Result Type	KER	Market Maturity	Target Audience	TRL Start	TRL End	Partner identifi	Partner contrib	Partner contributions per GA	Exploitation Lead p
1	KER 1 DiMAT Data and Assessment St	PROD...	High t...		Material scientists, Materials Designe Materials Producers Digital Technologies Providers	4	7	AMS; AITEX; CE	AITEX; CETMA;	CERTH, UPV, Fraunhofer, AITEX, DRAXIS, NTUA, ROPARDO, AMS	Fraunhofer
2	KER 2 DiMAT Modelling and Design Su	PROD...	High t...	Mature: the market is already supplie	Engineers, Material Scientists, Materi Materials Producers Digital Technologies Providers	4	7	AMS; AITEX; CE	AMS; CERTH; C	CERTH, UPV, Fraunhofer, AITEX, DRAXIS, NTUA, ROPARDO, CETMA, AMS	CETMA
3	KER 3 DiMAT Simulation and Optimiza	PROD...	High t...	Market creating and Emerging; Matur	Material scientists, Materials Designe Materials Producers Digital Technologies Providers	4	7	AMS; AITEX; CE	AMS; AITEX; CE	CERTH, UPV, Fraunhofer, AITEX, DRAXIS, NTUA, SUPSI, ROPARDO, CETMA, AMS	AMS
4	Molecular dynamic model for polymers	SCI —...	High s...		Polymers manufacturers, Universities and Research centres			AMS			
5	Molecular dynamic toolkit for predicting	PROD...	High t...		Polymers manufacturers, Universities and Research centres			AMS			
6	Toolkit for predicting properties of glass	PROD...	High t...		Glass manufacturers, research centers, universities			AMS			
7	Wire modelization	SCI —...	High s...		Polymers manufacturers, wire manufacturer Universities and Research cent			AMS			
8	Wire modelling toolkit	PROD...	High t...		Polymers manufacturers, wire manufacturer Universities and Research cent			AMS			
9	Fishing mesh modelization	SCI —...	High s...		Mesh manufacturers, wire manufacturers, universities, research centres			AMS			
10	Mesh modelling toolkit	PROD...	High t...		Mesh manufacturers, wire manufacturers, universities, research centres			AMS			
11	Polymeric filament model	SCI —...	High s...		Polymers manufacturers, Universities and Research centres			AMS			
12	Filament modelling toolkit	PROD...	High t...		Polymers manufacturers, Universities and Research centres			AMS			
13	Glass bending model	SCI —...	High s...		Glass manufacturers, research centers, universities			AMS			
14	Glass bending toolkit	PROD...	High t...		Glass manufacturers, research centers, universities			AMS			
15	Laboratory tests results from synthetic t	METH...	N/A		Industrial partners			AITEX			
16	Configuration of machine elements for t	PROC...	N/A		Industrial partners			AITEX			
17	Prediction of yarn mechanical propertie	METH...	N/A		Industrial partners			AITEX			
18	DiMAT Materials Modeler	PROD...	N/A	Emerging; growing demand, scarce s	Material scientists/engineers, Industry stakeholders, DiMAT pilots stakehold Researchers, Open-Source Communities			CERTH			
20	MDF (Materials Design Framework)		N/A					CERTH			
21	MMS (Materials Mechanical Properties Simulation)		N/A					CERTH			
22	MPS (Materials Processing Simulation)		N/A					CERTH			
23	Material Designer		N/A		Engineers			CETMA			
24	Models able to predict material behaviour		N/A		Engineers			CETMA			
25	DiMAT Materials Environmental and Cost Life Cycle Assessment toolkit	PROD...	High t...		Decision-makers, product engineers, data analysts etc. It can be industry-ag			DRAXIS			
26	Life cycle assessment for pilots		N/A		DiMAT pilots primarily			DRAXIS			
27	DiMAT Architecture	DSG ...	High t...	Mature	Platform developers			Fraunhofer			
28	Linkage of CHADA/MODA to data	SERV ...	N/A		Material Scientists			Fraunhofer	Fraunhofer		
29	Bending glass with energy reduction	PROC...			Bending glass manufacturers			Hegla-Hanic			
30	Real-time model of bending process	SERV ...			Bending glass manufacturers			Hegla-Hanic			
31	Protocol for compounding R&D trials us	METH...	N/A		Compounders			Nature-Plast			
32	Formulations suitable for polymer textile	SCI —...	High t...		Marketing of materials (pellets) by Natureplast for yarn producers			Nature-Plast			
33	DiMAT Knowledge Acquisition Framew	PROD...	High t...		Material scientists, engineers			NTUA			
34	DiMAT Digital Twin for Process Control	PROD...	High t...		Material scientists, engineers			NTUA			
35	Materials Ontology		N/A					NTUA			
36	Design of material's data analysis algor		N/A					NTUA			
37	Develop a framework for predictive mai		N/A					NTUA			
38	Automatic simulation tool		N/A		Commercial			UPV			
39	Theoretical framework and knowledge t	METH...	High s...		Research, academia, and innovative community			UPV			
40	Dataset: Combination of open source s	SCI —...	High s...		Research, academia, and innovative community			UPV			
41	Analysis of the manufacturing processe	SERV ...	High t...		Commercial			UPV			

Figure 3: DiMAT Results Table prior refinement

2.1.4 Results Validation Workshop

The workshop was held on the 23rd of November 2023, via Zoom and a Miro board and gathered 31 attendees, representing all consortium partners in a 2-hour session. The workshop was divided into 4 parts:

- Results validation;
- DiMAT Suites Exploitation – Discussion;
- Exploitation Lead Validation
- KER exploitation Intentions

During the first part of the workshop, partners revisited the results they had provided via the questionnaire. Using a Miro board, they fine-tuned their contributions in response to several predefined questions: “Can it be exploited by my organization with the purpose to reach a larger stakeholder group”; “How will my organization exploit it”; “Can it be exploited

by more than one partner in the consortium"; "Can it be considered as part of another result within the project".

Figure 4: DiMAT Exploitation Results validation via Miro board

Partners revisited and refined their responses from the questionnaire. Consequently, an enhanced results table was produced (Figure 5), encompassing a total of 18 exploitable results. The results of the table show that apart from the three suites and nine toolkits, outputs such as "Multiscale modelling" as a parametric simulation constituent of the Materials Mechanical Properties Simulator are also considered. Additionally, the DiMAT Reference Architecture has been acknowledged as a recognized exploitable result. There are also various outputs arising from the involvement of Pilots.

The discussion around the KERs of the project continued as well in the second stage of the methodology implementation. As it will be seen out of the table of results provided (Figure 5), the Suites are still emerging as the ones with the highest exploitation potential. Additionally, a discussion unfolded whether apart from the suites the separate toolkits

should be classified as such, due to their proximity to market and ease of release considering the individual ownership.

#	Result Name	Result Typ	KER	Market Maturity	Target Audience	TRL Start	TRL End
1	KER 1 DiMAT Data and Assessment Suite	PROD — I	High technologic, business or economic potential		Material scientists, Materials Designers Materials Producers Digital Te	4	7
2	KER 2 DiMAT Modelling and Design Suite	PROD — I	High techr	Mature: the market is already supplied with similar p	Engineers, Material Scientists, Materials Designers Materials Produce	4	7
3	KER 3 DiMAT Simulation and Optimization Suite	PROD — I	High techr	Market creating and Emerging; Mature: the market is	Material scientists, Materials Designers Materials Producers Digital Te	4	7
4	Multiscale modelling of NET and Yarns	SCI — Sci	High scientific potential		Polymers manufacturers, Universities and Research centres		
5	Materials Mechanical Properties Simulator	PROD — I	High technologic, business or economic potential		Industrial partners, Universities and Research centres		
6	DiMAT Materials Modeler	PROD — I	N/A	Emerging: growing demand, scarce supply;	stakeholders, Researchers, Open-Source Communities		
7	MDF (Materials Design Framework)		N/A				
8	MMS (Materials Mechanical Properties Simulation)		N/A				
9	Material Designer	PROD — I	N/A		Material scientists/engineers, Industry stakeholders, DiMAT pilots stakeholders		
10	Materials Environmental and Cost Life Cycle Assessment toolkit	PROD — I	High technologic, business or economic potential		Decision-makers, product engineers, data analysts etc. It can be industry-agnostic.		
11	DiMAT Reference Architecture following CHADA/MODA ..... check with Fraunhofer	DSG — D	High techr	Mature	Platform developers		
12	Cloud Materials Database	SERV — S	N/A				
13	Real-time model of bending process - DGPC MPS	SERV —	Service (new or improved)		Bending glass manufacturers		
14	Protocol for compounding R&D trials using the DiMAT suite - yes	METH — I	N/A		Compounders		
15	Formulations suitable for polymer textile production	SCI — Sci	High technologic, business or economic potential		Marketing of materials (pellets) by Natureplast for yarn producers		
16	DiMAT Knowledge Acquisition Framework – DiKAF (part of KER1)	PROD — I	High technologic, business or economic potential		Material scientists, engineers		
17	DiMAT Digital Twin for Process Control (part of KER3)	PROD — I	High technologic, business or economic potential		Material scientists, engineers		
18	MPS - Materials Processing Simulator		N/A		Commercial		

Figure 5: DiMAT Results Table Refined V1

The second part of the workshop delved into the exploitation strategy of the DiMAT Suites and confirming the exploitation leads. Specifically, in terms of commercialization, there are various opportunities. Through the discussion, several options were identified: Option one is that each of the three suites is commercialized by a specific partner organization assigned as an exploitation lead. This aligns as well with the initial hypothesis provided in the GA. Another option is a more comprehensive approach – to commercialize all three suites together as a single platform. This platform would allow users to customize their toolkit bundle based on their unique needs. In parallel to these two another commercialization path focuses on the individual commercialization of each toolkit, with interested organizations taking charge. This last option has the potential for the fastest time to market, as the organizations who are developing the toolkit will be responsible for market uptake. It's noteworthy to consider additional partners not leading the development of a particular toolkit but still expressing interest in its commercialization. This adds another layer to the dynamics of potential collaborations.

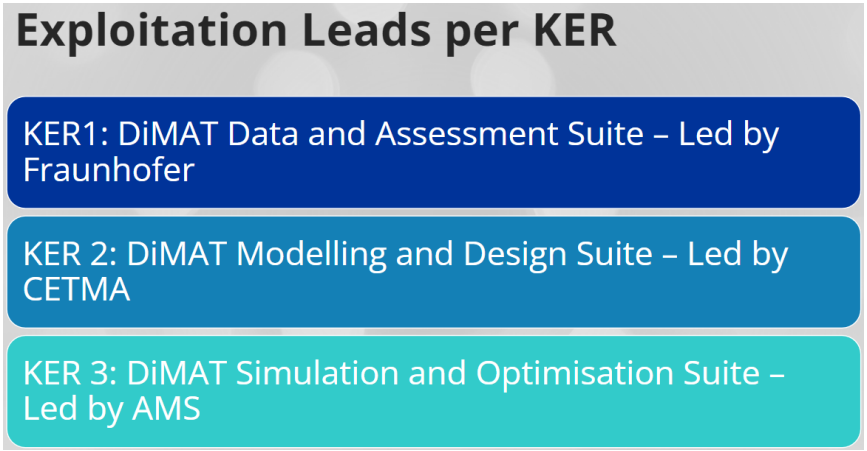

Figure 6: Exploitation Leads of DiMAT Suites

The third and final part of the workshop focused on the Exploitation intentions per partner. Here partners had to provide input to a predefined template provided by the Horizon Results Booster program. Due to time constraints, the template was distributed to partners for individual completion following the conclusion of the workshop. A total of nine responses were submitted and uploaded to the project's repository.

Partner name	**Key Exploitable Result (KER)**	**Your interest** (exploitation intention of this KER, intended market/customers)	**Your organization contribution to the generation of this KER** (what was/is/will be your input?)	**Role of each organisation** with regards to the KER and according to **the Grant and Consortium Agreement**

Figure 7: HRB Template KER Exploitation Intentions

2.1.5 Analysis of results and next steps

After compiling inputs from partners, encompassing information from both the Miro board and the KER exploitation intentions table, several conclusions can be drawn at this initial stage, paving the way for the next phase.

The consortium has pinpointed 18 potential exploitable results. As the project transitions to the next phase of exploitation activities, the focus is put on several key aspects:

1. Determining whether the three suites should be designated as the KERs, or if the nine toolkits should also be considered as key exploitable results;
2. Deciding on the product delivery strategy, including whether the suites will be marketed collectively or independently. This validation will be addressed in Stage 4 of the DiMAT methodology;
3. Further refining the exploitation interests of partners regarding the toolkits and suites. While these interests have been initially identified in Stage one, a more detailed and comprehensive understanding is anticipated to emerge in Y2 and Y3 of the project;

Stage one laid the foundation for DiMAT's exploitation activities by capturing partners' contributions, encompassing background and foreground IPR, and outlining initial exploitation intentions. It also ensured a shared understanding among partners regarding the project's exploitation pathways and goals. This collective insight is a pivotal input for Stage two of the current methodology.

2.1.6 Characterize

The characterization stage has a duration of six months and initiated in January 2024. During this period, a Horizon Results Booster Service - Portfolio Dissemination and Exploitation Strategy Module – C (HRB PDES-C) was activated, after a successful application of the DiMAT project, and a collaboration with a dedicated expert was started. The DiMAT exploitation manager (F6S), the project coordinator (CERTH) and the HRB expert held monthly meetings, aligning on the process, and receiving feedback integrated into the exploitation activities. During this stage the exploitation manager collaborated closely with the exploitation leads of each key exploitable result identified in phase 1.

In terms of timing, Stage Two encompasses the following activities:

#	Activity	Description	Month
1.	**Workshop**	Workshop with a duration of 1.5 h divided into two parts. Part 1: Partners work together on providing an updated picture of the solution, unique value proposition, problem solved, competitors, customers, early adopters, cost structure and revenue streams using the Lean Canvas model Part 2: Partners fill in a detailed Buyer Persona's template that will as well feed in Stage 4 and the Minimal Viable Product (MVP) testing	M14
2.	**Analysis of Results**	The exploitation manager analyzes the inputs provided and translates them to a KER Characterization Table. If any additional information is required, collaboration with pertinent partners will persist to ensure a thorough and well-defined representation of the identified KERs.	M15
3.	**Usage options and risk assessment**	Exploitation leads engage in a process aimed at identifying the use options for the KERs. Each partner identifies both the direct and indirect application of the solution - whether it will be commercialized, employed in new research, or utilized indirectly through paths such as assignment, licensing of IPR, contribution to standards, or development of new standards. An online session is conducted to streamline this process, during which the	M16

		HRB tables are distributed for completion and subsequently returned to the exploitation manager.	
4.	**Exploitation Roadmap**	In collaboration with the exploitation partners the exploitation manager develops a roadmap, including actions; roles; milestones; financial costs; revenues, other source coverage and impact in 3-year time. The roadmap is created for the 3 initially identified KERs, nevertheless the exploitation manager supports the individual exploitation partners who would like to uptake the toolkits to the market in developing their individual roadmaps.	M16
5.	**D8.6 – Exploitation and Market Readiness V1**	The outcomes of both Stage 1 and 2 activities are provided in DEL8.6"Exploitation and Market Readiness." In addition to the analysis spanning these 18 months, the deliverable encompasses comprehensive details, including background and foreground information, partners' strategic interests, a detailed description of the KERs, co-owners, Key Performance Indicators (KPIs) crucial for result exploitation, and an initial overview of the anticipated IPR agreements. Further details regarding these agreements will be delved into during Stage 5.	M18

Table 2: Stage 2 "Characterization" Activities

The primary objective during this stage is to outline a robust exploitation pathway for each key result. This involves a comprehensive examination analysis, including:

1. Identifying the specific problem addressed by each key result;
2. Exploring alternative solutions and highlighting unique selling points;
3. Assessing competitors and evaluating the potential market to strategically position the results and
4. Identifying usage options and conducting a thorough risk assessment;

As a tangible outcome, a preliminary version of the post-project exploitation roadmap was developed and will be presented in the following sections. Additionally, the report provided by the HRB expert as an outcome of HRB Service and Stage 2 activities is attached as an ANNEX to the current document.

The gathering of all information needed was achieved by following the activities described in Table 2 and was conducted in two iterations – first – via the physical workshop utilizing the Customer Persona Canvas, and the second one involving filling the templates provided by the Horizon Results Booster program – KER Characterization Table; Risk Assessment and Priority Map; Use options and finally Exploitation Roadmap.

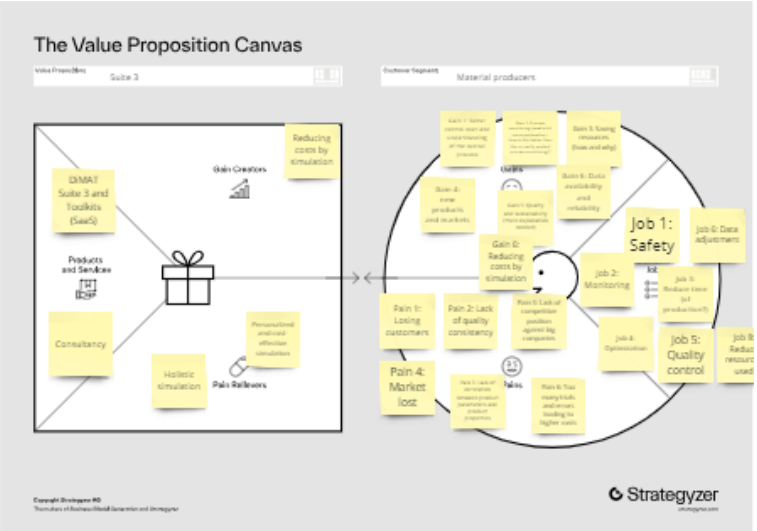

Figure 8: Value Proposition Canvas

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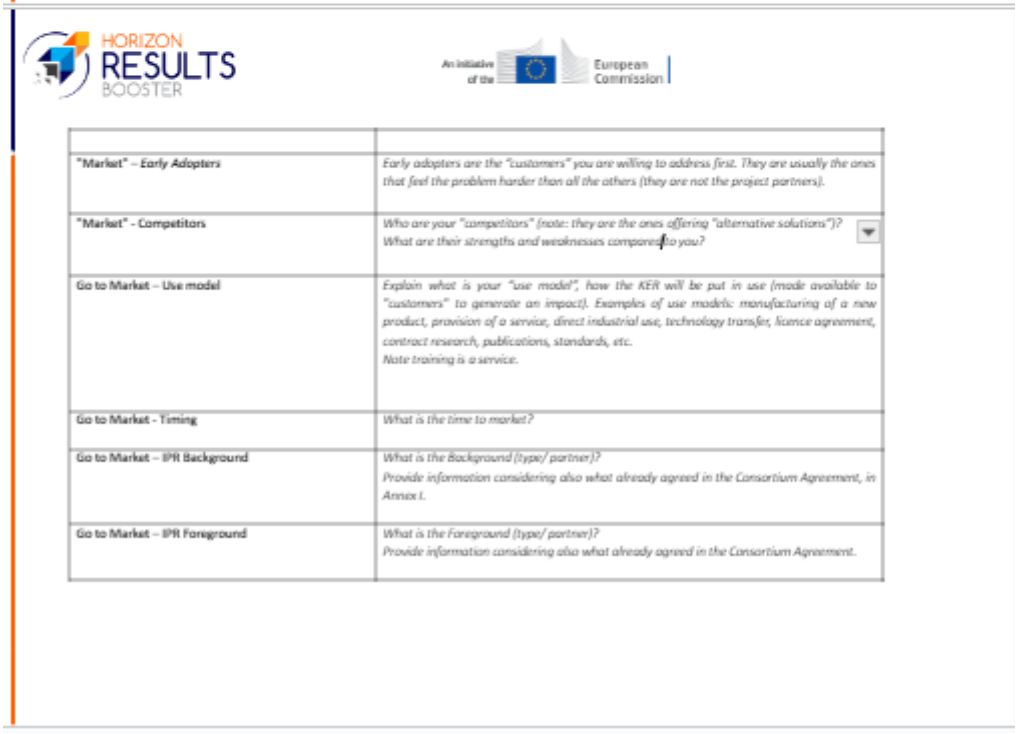
-The Characterisation table is designed to start the collection of information that will be then reviewed and further integrated during the project life. Partners in charge of the Key Exploitable Result (KER) should fill in the content and discuss it with the ones involved in the finalisation of the KER including the partners that will oversee the testing phase.

KER name	Input from the Beneficiary
Problem	*Describe the problem you are addressing (the problem your potential users have). Potential users are the people, companies, organisations, etc. that you expect will use the result (and generate an impact). They are your "Customers".*
Alternative solution	*Describe how your "customer" has solved the problem so far.*
Unique Selling Point USP - Unique Value Proposition UVP	*Describe the competitive advantages, the innovative aspects. What does your solution do better, what are the benefits considering what your user/customer wants, how does your solution solve his/her problem better than alternative solutions, what distinguishes the KER from the competition / current solutions?*
Description	*Describe in a few lines your result and/or solution (i.e., product, service, process, standard, course, policy recommendation, publication, etc.). Use simple wording, avoid acronyms, make sure you explain how your UVP is delivered.*
"Market" – Target market	*Describe the market in which your product/service will be used/can "compete", answering the following questions: - What is the target market? - Who are the customer segments?*



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"Market" – Early Adopters	*Early adopters are the "customers" you are willing to address first. They are usually the ones that feel the problem harder than all the others (they are not the project partners).*
"Market" - Competitors	*Who are your "competitors" (note: they are the ones offering "alternative solutions")? What are their strengths and weaknesses compared to you?*
Go to Market – Use model	*Explain what is your "use model", how the KER will be put in use (made available to "customers" to generate an impact). Examples of use models: manufacturing of a new product, provision of a service, direct industrial use, technology transfer, licence agreement, contract research, publications, standards, etc. Note training is a service.*
Go to Market - Timing	*What is the time to market?*
Go to Market – IPR Background	*What is the Background (type/ partner)? Provide information considering also what already agreed in the Consortium Agreement, in Annex 1.*
Go to Market – IPR Foreground	*What is the Foreground (type/ partner)? Provide information considering also what already agreed in the Consortium Agreement.*

Figure 9: Characterization Table

KER Risk Assessment Map

	Description of Risks	Degree of criticality of the risk related to the final achievement of this Key Exploitable Result. Please rate from 1 to 10 (1 low - 10 high)	Probability of risk happening Please rate from 1 to 10 (1 low - 10 high)	Risk Grade	Potential intervention	Estimated Feasibility/Success of Intervention Please rate from 1 to 10 (1 low- 10 high)	Conclusion
	Partnership Risk Factors						
1				0			Not Filled
2				0			Not Filled
3				0			Not Filled
4				0			Not Filled
5				0			Not Filled

Figure 10: Risk Assessment Map

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Use options

KER's Exploitation route (how the KER will be further exploited) Note: only an option is to be selected			
Selected route		Implementing actor	Yes
DIRECT USE	Commercialisation: *deployment of a novel product/service (offered to the target markets)*	One partner[1]	
		A group of partners[2]	
	Contract research (*new contracts signed by the research group with external clients*)	A partner	
		A group of partners	
	A new research project (*application to public funded research programmes*)	A partner	
		A group of partners	
	Implementation of a new university – course (*Note that a training course is a service*)	A partner	
		A group of partners	
		A new partnership	
INDIRECT USE	Assignment of the IPR	A partner	
		A group of partners	
	Licensing of the IPR	A partner	
		A group of partners	
	Development of a new legislation/standard	A partner	
		A group of partners	
	Spin- off	A partner	
		A group of partners	
		By assignment	
		By licensing	
	Other (*please describe*)		

Figure 11: Use options

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The Exploitation Roadmap is a tool designed to help the consortium to identify and plan activities to be performed after the end of the project. The highest risk a consortium faces is not being able to implement the exploitation and dissemination plan and increase the TRL level or go to market, due to lack of resources. The exploitation roadmap is designed to address this risk, mitigate it and pave to way toward use and a stronger impact.

Exploitation roadmap	
Actions	*Briefly describe actions planned to be executed 3-6 months after the end of the project.* *Make sure you do not just focus on technical activities (realisation of a prototype, software interface, etc) but also consider the finalisation of a business plan, the protection of intellectual property, the collection of authorisations, all it will be needed to start implement what is in your exploitation plan*
Roles	*Roles of partners involved in the actions defined above.*
Milestones	*List the milestones and KPIs to be used for monitoring the implementation of the actions listed above. Add timeline.*
Financials Costs	*Cost estimation to implement planned activities (1 year, 3 years).* *Provide information on the costs/investments needed to bridge the end of the project to the next steps planned and increase TRL or go to market (you may invest in a patent, in the realisation of a prototype, etc.).*
Revenues	*Projected revenues and eventual profits once the KER will be used (1 and 3 years after use)* *Consider revenues you will expect to collect by licensing, or thanks to service provision or sale of devices. They generate the cash flow that will make the use of the result sustainable over time (provide an estimation concerning the first year and what is expected after 3 years, if possible). It is recommended that you estimate the revenues according to your early adopters and potential customers and include the information in the draft exploitation plan.*
Other sources of coverage	*Resources needed to bridge the investment needed to increase TRL and ensure the result is used.* *Financial resources to cover costs incurred before collecting the first revenues (during the "time to market" – see costs) and their sources. Sources can be partners` own budget, other project grants, national/regional incentives, risk capital, loans, etc. Make sure to obtain them at the right timing.*
Impact in 3-year time	*Describe impact in terms of growth/benefits for the society* *Impact is the objective of H2020. Impact should mobilise measurable changes in terms of growth/benefits for the society (i.e. jobs created, investments mobilized, turnover generated).*

Figure 12: Exploitation Roadmap

Several revisions of these documents were made. Then they were shared with the HRB expert who produced a report with feedback to be incorporated in the following iterations of the project exploitation plan. The report is included as an annex to the current deliverable.

2.1.7 Test

The "Test" stage, scheduled for twelve months starting in July 2024, concentrates on two main aspects: 1) Minimal Viable Product (MVP) release and marketing planning and 2) Test of MVP. The primary goal is to gather insights during the project, grasping the early needs of adopters and end-users before final product development and integration. This involves a two-stage iteration process for testing Key Exploitable Results (KERs) with potential early adopters and end users.

First, an Expression-of-Interest (EoI) call will be initiated, targeting relevant F6S Community members. This will be done through launching an open call for applications through the F6S platform. This will be followed by 'focus group' sessions and 'customer interviews,' with a central focus on determining the "Willingness to pay" as a key component.

The second iteration aims to present a pre-validated hypothesis to the broader public using simple landing-page campaigns. To align with the consortium's business strategy, an additional loop will investigate the "willingness to sell," confirming the viability of exploitation scenarios from the results owners' perspective.

The feedback received will serve as a valuable tool to refine the business offering, considering both technological and commercialization perspectives.

Stage Three encompasses the following activities:

#	Activity	Description	Month
1.	**Validate key features and functionalities of the MVP**	The exploitation manager, in collaboration with the exploitation leads and technology developers, will assess which features and functionalities are prepared for testing. This will involve the creation of a technical specification document outlining how users will interact and validate the selected solutions.	M19
2.	**Creating documentation for the Expression of Interest**	An EoI Documentation Kit including Guidelines and a short EoI form will be developed in collaboration with the exploitation leads. A key focus will be laid on the value proposition for	M20

	(EoI) Call for Early Adopters	early adopters and end users who participate in the call.	
3.	**Launch of the EoI through the F6S Platform**	The call will be launched on the F6S platform and will be open for a duration of 2 months.	M22
4.	**Scouting for end users/early adopters**	Scouting activities to identify the most suitable candidates	M22
5.	**Selection of participants**	Participants will be selected by the consortium based on predefined criteria set in the EoI Guidelines	M24
6.	**Conduct focus groups and one-to-one interviews with selected participants**	The exploitation manager with the exploitation leads and technology developers will gather relevant information for the solutions and will assess the market feedback through both functionality and "willingness to pay" as key metrics.	M25
7.	**Iteration 1 Analysis**	Feedback from focus groups and interviews will be assessed, patterns and key insights will be identified, documented, and brought back to the partners as input to refine features based on initial feedback.	M26
8.	**Iteration 2: DiMAT Landing Page Campaign to Broader Audience**	Set up the Landing page and marketing tools – channels and campaign promotion.	M27
9.	**Launch DiMAT Landing Page Campaign**	The campaign will last for one month. During this period, the F6S team will monitor the landing page engagement and interactions and will capture user feedback through a standardized survey.	M29

10	**Iteration 2: Analysis**	User interactions and responses will be analyzed. Results will be documented and provided to the partners for product refinement.	M30

Table 3: Stage 3 "Test" Activities

The outcomes of this stage will contribute to the final refinement of DiMAT's value proposition and business model.

2.1.8 Exploit

The “Exploit” stage serves as the concluding phase and spans for six months starting in June 2025. Its primary objective is to consolidate all information gathered across preceding phases and additional market feedback, formulate the final post-project exploitation strategy. This strategy will be thoroughly outlined in D8.7 Exploitation and Market Readiness v2.

The final iteration of the exploitation plan will yield a robust strategy for sustaining partners' results beyond the project's conclusion. This entails a detailed exploitation roadmap encompassing actions, roles, milestones, financial costs, revenues, and anticipated impact for the key exploitable results. The plan will outline both individual and collective exploitation strategies, along with the required IPR agreements.

Stage four encompasses the following activities:

#	Activity	Description	Month
1.	DiMAT Exploitation Dashboard	A dashboard that allows a review of the exploitation processes and extract main KPIs, IP issues and financial simulations will be developed and shared with partners.	M32
2.	Final Review	A last review will be held with partners discussing the obtained results and exploitation model developed. During this review, partners will have the final chance to claim interests in exploiting the project’s results and position themselves towards the final solution with a clear status.	M33

3.	Exploitation and market readiness V2	This document will represent the updated and final post-project exploitation strategy of DiMAT, including both individual and common exploitation plans and required IPR agreements.	M36

Table 4: Stage 4 "Exploit" Activities

The exploitation strategy will offer project partners a clear and robust post project exploitation roadmap, instilling confidence and guiding effective results utilization for a strong impact.

2.1.9 Own

The "Own" stage extends from the project's initiation to its conclusion, making it a continuous process that runs parallel to all other stages.

Activities under this stage cater for the definition and implementation of a robust intellectual property rights (IPR) management strategy. The implementation of the strategy involves five key activities:

1. Set up a Consortium Agreement where partners background and foreground IPR is well defined, including access rights throughout the duration of the project;
2. Analysis that confirms the 'Freedom to Operate' FTO and continuous support to partners towards a regular review and assessment of the (FTO);
3. IPR Microsite: through series of activities partners are guided through the process and build knowledge around the IPR concepts and available opportunities for protection;
4. Identification and agreement of optimal IPR protection options: Identification of the most suitable IPR protection options such as patents, copyrights, trademarks, and trade secrets in line with the selected business model options and considering potential co-ownership;
5. Setting up appropriate IP agreements between partners for post project results exploitation;

As an outcome, it is expected that the execution of the IPR strategy will result in clear distinction of IPR between partners and transparent agreements on joint exploitation of the results co-developed within the consortium.

As an additional support, the Horizon Results Booster Go to market IPR Support Service was activated, through a successful application. Through it two workshops were conducted for

the consortium – one focusing on Basics of IPR and one on Management of IPR in research projects (including access rights, open source, freeware tools) plus the use of IP free database and the protection of software.

Stage Five encompasses the following activities:

#	Activity	Description	Month
	Consortium Agreement	The Consortium Agreement (CA) specifies the relationship between the partners in particular concerning the organization of the work between them, the management of the Project and the rights and obligations of the Parties concerning inter alia liability, Access Rights and dispute resolution. The CA includes information regarding the background IP brought by partners and relative settlements regarding the foreground rights. The CA has several iterations – the first one being released in December 2022 and last one signed in June 2023.	M1
2.	**Identification of background and foreground IP**	Through the exploitation questionnaire shared with the partners, detailed information regarding their background and foreground IP was gathered.	M8
3.	**HRB "Basics to IPR" Workshop**	The workshop focused on Introduction, Function, Patents, Trademarks, Copyrights, Trade Secret, Exploitation and Licensing. The workshop gathered 31 participants and as well included representatives of DiMAT's sister projects.	M12
4.	**Analysis report that confirms the FTO**	Report that includes preliminary patentability search with a freedom to operate analysis. The purpose of the report is to assess whether DiMAT suites have freedom to operate in the European and International markets. The FTO is available on the project repository and can be shared separately with the reviewer, due to the dissemination level of this deliverable.	M12
5.	**HRB "Management of IPR" Workshop**	Management of IPR in research projects (including access rights, open source, freeware tools) plus the	M13

		use of IP free database and the protection of software.	
6.	**Workshop "Individual FTO and patentability search"**	Partners will be provided with tailored guidance on how to conduct continuous FTO and patentability search. This guidance will cover essential considerations such as relevance, timing, required expertise and associated costs.	M19
7.	**Consultation on IPR protection and joint exploitation**	Leveraging the knowledge and inputs acquired throughout the different exploitation phases, a joint session will be held with partners. The aim is to collectively deliberate on the optimal Intellectual Property Rights (IPR) protection paths for jointly owned key exploitable results and determine the most fitting IP agreements among partners for the post-project exploitation of these results. The outcome of this activity will be described in detail in D8.7 – Exploitation and Market Readiness v2 due by M36.	M26

Table 5: Stage 5 "Own" Activities

3 DIMAT KEY EXPLOITABLE RESULTS

DiMAT recognizes three Key Exploitable Results (KERs) which are the three Suites, each comprising 3 toolkits, a total of 9 open digital toolkits integrated and interacting with each other.

3.1 KEY EXPLOITABLE RESULTS OVERVIEW

The three Suites are described in Table 6, below:

Name of Suite	Toolkits	Description
Suite 1 Di^{DAS} Data and Assessment Suite	• Cloud Materials Database • Knowledge Acquisition Framework • Materials Environmental and Cost Life Cycle Assessment	DiMAT data and assessment Suite provides a set of digital tools powered by semantic technologies that provide data storage, management and utilization solutions. The main goal of this suite is to improve the material data safety and material traceability, increase the use of materials from renewable resources and personnel digital skills, reduce material design cost, material economic and environmental impact and time to market. These tools will work together to offer a centralized repository for materials data, enable knowledge acquisition and assess materials based on their environmental impact and cost over their life cycle.
Suite 2 Di^{MDS} Modelling and Design Suite	• Materials Design Framework • Materials Modeler • Materials Designer	DiMAT Modelling and Design Suite provides a set of digital technologies for material design that allows for prediction of material behavior before manufacturing. The main goal of this suite is to improve material

		designs and personnel training ROI, to reduce material design errors and use of material during designing and modelling, to increase personnel productivity. Suite 2 set of tools will work together to enable material design in terms of internal structure, properties and performance.
Suite 3 DiSOS Simulation and Optimization Suite	• Materials Mechanical Properties Simulator (MMS) • Materials Processing Simulator (MPS) • Digital Twin for Process Control (DTPC)	DiMAT Simulation and Optimization Suite offers three products and their potential combinations within the suite and with other DiMAT toolkits. The suite products are: - MMS toolkit: A comprehensive numerical toolkit designed to predict material mechanical behavior. - MPS toolkit: A numerical toolkit for modelling industrial processes. - DT toolkit: A toolkit for developing process digital twins, encompassing maintenance tasks such as data compilation, analysis, and updating.

Table 6: DiMAT KERs

Each Suite has a designated exploitation lead and each toolkit is developed by either one or multiple project partners. Information regarding this is detailed in Table 7 below.

KER	KER Toolkits	KER Exploitation lead	Role of each organization in regard to the KER
Suite 1 Di[DAS] Data and Assessment Suite	T1 - Cloud Materials Database T2 - Knowledge Acquisition Framework T3 - Materials Environmental and Cost Life Life Cycle Assessment	Fraunhofer IWM	T1 - Fraunhofer IWM (lead); ROPARDO (contributor); CETMA (contributor)
			T2 - NTUA (lead); CERTH (contributor); UPV (contributor)
			T3 - DRAXIS (lead); AITEX (contributor)
Suite 2 Di[MDS] Modelling and Design Suite	T4 - Materials Design Framework T5 - Materials Modeler T6 - Materials Designer	CETMA	T4 – Fraunhofer IWM (lead); CERTH (contributor)
			T5 – CERTH (lead); CETMA (contributor); AMS (contributor)
			T6 – CETMA (lead); UPV (contributor); AITEX (contributor)
Suite 3 Di[SOS] Simulation and Optimization Suite	T7 - Materials Mechanical Properties Simulator T8 - Materials Processing Simulator T9 - Digital Twin for Process Control	AMS	T7 – AMS (lead); CERTH (contributor)
			T8 – UPV (lead); CERTH (contributor), CETMA (contributor)
			T9 – NTUA (owner)

Table 7: KER ownership

During the first 18 months of project execution the partners worked carefully on understanding the exploitation potential of the identified KERs and the underlying toolkits of each Suite. In the second half of the project, they will work on developing a sound business plan to effectively support joint and individual exploitation of the results with the highest potential. As it will be discussed in Section 4 – Exploitation Roadmap three exploitation routes were identified for the KERs. The partner responsible for orchestrating the exploitation activities within the DiMAT project (F6S) will support the exploitation leads and other relevant partners on taking a decision on which of the three routes will be followed and based on it the business plan, as per the GA will be developed. According to the work implemented in the first 18 months a potential for a shift was considered to exploiting the Suites as a holistic solution rather than 3 separate KERs and upgrading some of the toolkits that are developed by partners with commercial profile to KERs considering their high potential and market readiness. However, this is a matter to be carefully discussed with the responsible partners and to be presented in the final "Exploitation and Market Readiness" deliverable. At the stage of preparation of the current document there is no change in the identified KERs.

3.2 IDENTIFICATION OF THE EXPLPOITATION PLANS PER PARTNER

From the onset of the DiMAT project, partners were engaged in defining both individual and joint exploitation plans. This is a dynamic, iterative process that evolves based on ongoing developments and insights gained from the DiMAT solutions.

Following the project's exploitation methodology, partners completed an initial questionnaire to provide responses, including on their exploitation interests. As per the process they share periodic updates on their interests and intentions, with the latest information gathering coinciding with the M18 release of the DiMAT toolkits.

While Chapter 4, "Exploitation Roadmap," outlines the Key Exploitable Results (KERs) and the partners exploitation intentions per result, here we present a more detailed, information per partner initial exploitation intentions, structured around the three exploitation models outlined in the Grant Agreement:

1) Research exploitation model
2) Technological exploitation model
3) Commercial exploitation model

In alignment with the Grant Agreement, The DiMAT exploitation strategy follows the evolution of the scientific and technological domains (exploitation models 1 and 2) providing the analysis of collective and individual (partner) exploitation intentions. It outlines the future

sustainability and utilization models of the DiMAT results and aims to prepare the most relevant ones for future uptake based on their development status, market readiness, and alignment with each partner's organizational profile.

The tables below outline each partner's current exploitation intentions, mapped to the three established exploitation models. Preliminary collaboration arrangements are also provided; however, it is important to note that the formal structuring and options for future post-project collaboration will be addressed in the second half of the project and detailed in the final version of this document.

<table>
<tr><th colspan="3">CERTH:</th></tr>
<tr><th>KER</th><th>Toolkits</th><th>Exploitation plan</th></tr>
<tr><td rowspan="6">KER 1 DiMAT Data and Assessment Suite (Fraunhofer)</td><td rowspan="6">T1: Cloud Materials Database (Fraunhofer)

T2: Knowledge Acquisition Framework (NTUA)

T3: Materials Environmental and Cost Life Cycle Assessment (DRAXIS)</td><td>Research exploitation: Present at international conferences and journals;

Technological exploitation: Engage with industries to demonstrate toolkits result and activate well-established network for broader outreach and collaboration. Part of the strategy includes transition of the research results to practical applications via CERTH spin-off company CDXi Solutions.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>Contributor: Secondary role in the development of KAF. The contribution, though not primary, lies in exploring existing and emerging ontologies for the classification of materials. CERTH task is to align the Knowledge Acquisition Framework (KAF) effectively with the material modeler (KER 2, T5).</td></tr>
<tr><td>Collaboration arrangements:</td></tr>
<tr><td>CERTH is looking to work closely with Fraunhofer to pursue joint exploitation opportunities.</td></tr>
<tr><td colspan="3"></td></tr>
<tr><th>KER</th><th>Toolkit</th><th>Exploitation plan:</th></tr>
</table>

KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	Research: Target international conferences in order to disseminate the project's results that arise as parts of CERTH's contribution and involvement Technological: Contact industries in order to show demos of the toolkits for possible future collaboration. Commercial: To bring CERTH'S solution (MM) to the market, the organization is looking to transition the research results into practical industry applications through its newly established spin-off company, CDXi Solutions, https://www.cdxi.gr. interested in leading the exploitation of our other exploitable result – The Materials Modeler (MM)
		Role in the KER:
		CERTH is leading the development of T5: MM and therefore holds significant intellectual property rights for this tool within Suite 2. CERTH is the vice leader in the development of T4: MDF. The organization will provide guidance and expertise, in areas related to data management, ontology development, and the integration of knowledge databases Additionally, CERTH's involvement includes focusing on the technical alignment necessary for harmonising data and protocols, ensuring seamless interaction between the MDF and the MM
		Collaboration arrangements:
		CERTH has recognized the need for a collaboration arrangement with CETMA, the KER lead, to support joint exploitation efforts.. Via its spin-off company, CERTH is exploring partnerships with external stakeholders and

<table>
<tr><td></td><td></td><td>potential investors who see value in the Material Modeler. These combined efforts aim to ensure a successful market launch and continued growth of the product.</td></tr>
<tr><td>KER</td><td>Toolkits</td><td>Exploitation plan</td></tr>
<tr><td rowspan="5">KER 3 Simulation and Optimization Suite (AMS)</td><td rowspan="5">T7: Materials Mechanical Properties Simulator – MMS (AMS)

T8: Materials Processing Simulator - MPS (UPV)

T9: Digital Twin for Process – DTPC - control (NTUA)</td><td>Research: Present at international conferences

Technological: Engage with industries to demonstrate MMS result and explore potential collaborations.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>CERTH is the vice-leader of MMS (Materials Mechanical Properties Simulation) and MPS (Materials Processing Simulation). CERTH is set to take on explainable AI approaches for making MMS processes more transparent and understandable for users. Additionally, CERTH will apply ML/ AI algorithms to improve the predictive modelling of MMS.</td></tr>
<tr><td>Collaboration Arrangements:</td></tr>
<tr><td>CERTH is looking to work close with AMS for common exploitation efforts.</td></tr>
</table>

Table 8: CERTH Exploitation plan

<table>
<tr><td colspan="3">UPV:</td></tr>
<tr><td>KER</td><td>Toolkits</td><td>Exploitation plan</td></tr>
<tr><td>KER 1 DiMAT Data and Assessment</td><td>T1: Cloud Materials Database</td><td>Technological exploitation: UPV interest relies on the technological aspect of collaboration with the CMDB toolkit developer (Fraunhofer). This collaboration is intended to create an integration of the MPS and</td></tr>
</table>

Suite (Fraunhofer)	T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	CMDB toolkits so the CMDB can act as a database from which MPS gathers material properties for further analysis.
		Role in the KER:
		Contributor: UPV contribution is on providing different Payton scripts to automatize the dimensional changes of predefined mechanical models, in which the material properties from CMDB can be processed to predict material behavior during manufacturing processes.
		Collaboration arrangements:
		Collaboration arragements with Fraunhoffer (KER 1 lead and CMDB owner) are under discussion.
KER	**Toolkit**	**Exploitation plan:**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	No specific plan is identified at this stage.
		Role in the KER:
		N/A
		Collaboration arrangements:
		No collaboration arrangement needs are identified at this stage.
KER	**Toolkits**	**Exploitation plan**
KER 3 Simulation and	T7: Materials Mechanical	The exploitation plan consists of the research and technological exploitation model.

Optimization Suite (AMS)	Properties Simulator – MMS (AMS) T8: Materials Processing Simulator - MPS (UPV) T9: Digital Twin for Process – DTPC - control (NTUA)	Research: UPV interest is aimed at the continuous development and update of the MPS toolkit, ensuring that it remains at the forefront of technological advancements. This will enable its integration into a joint functionality with MMS and DTPC toolkits and its adaptation to provide efficient solutions. As an academic institution, UPV interest is also the publication of scientific communications, in collaboration with AMS and NTUA, from the most relevant outcomes and milestones achieved. Technological: UPV interest is in the release of activities in the form of tutorials, solved case studies, and trainings. These actions are intended to promote the increment of the user number, so at a later stage, they could be offered as paid courses and training. Moreover, the paid courses, as well as the use of the toolkits (individually or in an integrated manner) are mainly aimed at the industrial sector (small and medium-sized businesses) to offer joint solutions in the field of manufacturing process simulation.
		Role in the KER:
		Within the DiMAT Simulation and Optimization Suite, as KER 3, UPV's contribution is directed to the development of T8: Material Processing Simulator toolkit. The toolkit generates technical data related to material processing conditions and material behavior prediction during their processing stage. These data are generated using different Payton scripts to automatize the dimensional changes of predefined mechanical models. Furthermore, the predefined mechanical models are intended to be used in the interaction of the MPS toolkit with the DTPC to generate more accurate models in the continuous evaluation of manufacturing processes.
		Collaboration Arrangements:

		UPV interest is mainly directed toward collaboration with the developers of the MMS and DTPC toolkits (AMS and NTUA, respectively). With both organizations collaborations directed towards research and technological advancements have been identified. Specifically for collaboration with AMS a potential agreement on the further commercial utilization of MMS should be established in case IP from MPS will be utilized.

Table 9: UPV Exploitation plan

Fraunhofer:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	Technological: Fraunhofer envisages a web tool that is useful for science and industry. Next steps involve further development of the tools, test new features, as well as identification of potential avenues for future evolutions. In KER1, this mostly applies to the Cloud Materials Database (CMDB) and it's interactions with the other toolkits. Commercial exploitation: The developments in DiMAT will be used to assess and frame follow up commercial exploitation activities. These could include selling access (e.g. via DiMAT), licensing, subscription, etc.
		Role in the KER:
		Exploitation lead of KER 1. Developer of T1: Cloud Material Database and responsible for the continuous integration and validation.
		Collaboration arrangements:

		Collaboration agreements will be focused on establishing exploitation arrangements with the toolkit developers within KER 1 and as well with any of the toolkit developers from the other Suits depending on the integration advancements which are done in the second half of the project.
KER	**Toolkit**	**Exploitation plan:**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	Research: Fraunhofer mainly holds a research interest, which is to develop components (i.e. individual Apps) of the Materials Design Framework (MDF) toolkit following the needs of the DiMAT Pilots and also toolkits. Commercial exploitation will be relevant later. Possible routes are selling access via DiMAT or licensing. An alternative route is to make MDF available to customers via CMDB.
		Role in the KER:
		Fraunhofer is the developer of T4 MDF. The aim is to develop Apps that support users in finding information (i.e. exploring dataspaces, gather information about material models and make it available) and generating new knowledge based on the available information (e.g., find correlations using machine learning and data-science tools and gain new insights on this basis). Additionally, Fraunhofer contributes to the continuous integration and validation task, essential for general toolkit development and deployment.
		Collaboration arrangements:
		Collaboration arrangements will be established with the KER exploitation lead – CETMA and toolkit developers both within Suite 2 and the rest of the Suites depending on the integration developments

<table>
<tr><td></td><td></td><td>focus of the work within the second half of the project.</td></tr>
<tr><td>KER</td><td>Toolkits</td><td>Exploitation plan</td></tr>
<tr><td rowspan="5">KER 3 Simulation and Optimization Suite (AMS)</td><td rowspan="5">T7: Materials Mechanical Properties Simulator – MMS (AMS)

T8: Materials Processing Simulator - MPS (UPV)

T9: Digital Twin for Process – DTPC - control (NTUA)</td><td>Technological: Fraunhofer will be able to create more automated and rapid glass forming process design workflow which can fulfil the increasing needs for more complex glass structure design for various applications, such as automotive and architecture industries.

The commercial exploitation plan is related to identifying more industrial projects, collaborations and potential customers interested in digital technologies in the glass manufacturing sector and to offer research service, specifically involving topics like digital twins for glass processing.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>Fraunhofer contributes via the glass Pilot use-case and previous experience in process simulation and digitalization to the development of all the three toolkits in Suite 3 (but also Suite 1 and 2). Thereby, Fraunhofer is validating the DiMAT toolkits and transfers them to the glass manufacturing sector. Additionally, Fraunhofer contributes to the continuous integration and validation task, essential for general toolkit development and deployment.</td></tr>
<tr><td>Collaboration Arrangements:</td></tr>
<tr><td>Considering Fraunhofer transversal role in validating and testing the toolkits and additionally the expressed interest in T9 DTPC arrangements are expected with KER 3 Exploitation lead - AMS, T9 developer - NTUA and other partners – developers of toolkits depending on the integration advancements,</td></tr>
</table>

		focus of the work within the second half of the project execution.

Table 10: Fraunhofer - Exploitation plan

AITEX:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	Research: As a non-profit research organisation, AITEX strategy focuses on knowledge transfer and sharing insights at international industry forums and in relevant publications, collaborating with textile companies to highlight the impact of the project results, and utilizing its strong network of associated members to enhance visibility and create new opportunities for collaboration between the textile sector and ICT sectors. Technological: Main interest is focus on CMDB and KAF. These two toolkits will be used in projects in collaboration with industrial partners to develop new synthetic yarns. Participation in further refining the solutions under Suite 1 will be highly interesting in order to include new materials, properties and machine configurations.
		Role in the KER:
		AITEX will contribute with data from textile materials (synthetic yarns) to feed the AI algorithms and toolkits to make predictions based on existing results. Data from materials will be obtained from previous experiments and laboratory characterization tests.
		Collaboration arrangements:
		Collaboration agreements will be focused on establishing exploitation arrangements with the

		toolkit developers within KER 1, specifically Fraunhofer (KER lead and T1 developer) and NTUA (T2 developer).
KER	**Toolkit**	**Exploitation plan:**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	Technological: As a non-profit research organisation, AITEX strategy focuses on knowledge transfer and sharing insights at international industry forums and in relevant publications, collaborating with textile companies to highlight the impact of the project results, and utilizing its strong network of associated members to enhance visibility and create new opportunities for collaboration between the textile sector and ICT sectors. The primary focus of AITEX is on T5 MM and T6 MD, as these two toolkits will be utilized in upcoming EU projects where AITEX participates and in other collaboration projects with industrial partners to develop innovative synthetic yarns. Engaging in further refinement of the solutions within Suite 2 will be particularly valuable to incorporate and design new yarn structures.
		Role in the KER:
		AITEX is a contributor to T6 - MD toolkit. The toolkit will help to design new bicomponent yarns structures and yarn configurations (i.e.: core-sheath, side-by-side, segmented pie, islands-in-the-sea) will contribute with data from textile materials (synthetic yarns) to feed the AI algorithms and toolkits to make predictions based on existing results. Data from materials will be obtained from previous experiments and laboratory characterization tests
		Collaboration arrangements:
		Collaboration arrangements will be established with the KER exploitation lead – CETMA and toolkit

		developers within Suite 2, specifically with T5 developer – CERTH and T6 developer - CETMA.
KER	**Toolkits**	**Exploitation plan**
KER 3 Simulation and Optimization Suite (AMS)	T7: Materials Mechanical Properties Simulator – MMS (AMS) T8: Materials Processing Simulator - MPS (UPV) T9: Digital Twin for Process – DTPC - control (NTUA)	Research and technological: As a non-profit research organisation, AITEX strategy focuses on knowledge transfer and sharing insights at international industry forums and in relevant publications, collaborating with textile companies to highlight the impact of the project results, and utilizing its strong network of associated members to enhance visibility and create new opportunities for collaboration between the textile sector and ICT sectors. The primary focus of this suite is on toolkits T7 MMS and T8 MPS, as these two toolkits will be utilized in upcoming EU projects where AITEX participates and in other collaboration projects with industrial partners to develop innovative synthetic yarns with new mechanical properties. Engaging in further refinement of the solutions within Suite 3 will be particularly valuable to incorporate and design new yarn structures and improve industrial manufacturing processes basing on the simulations provided by MPS. **AITEX** main interest is in regards to T8 MMS toolkit as it will help to simulate the properties of the new yarns designed when combining different materials (polymers and additives). This process is done on a trial-and-error basis, and it takes lot of time to obtain the correct material mechanical properties.
		Role in the KER:
		AITEX contributes to T8 MMS with data from textile materials (synthetic yarns) to feed the AI algorithms and toolkits to make predictions based on existing results. Data from materials will be obtained from

		previous experiments and laboratory characterization tests.
		Collaboration Arrangements:
		Considering AITEX role and direct data input to T8 MMS arrangements are expected with AMS who is KER 3 Exploitation lead and T8 owner.

Table 11: AITEX - Exploitation plan

NTUA:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	Research: NTUA plans to target high impact journals and prestigious international conferences in order to disseminate the project's results that arise as part of NTUA's involvement in Suites 1 and 3 (KER 1,3). Particularly the university is interested in presenting its work in journals and conferences supported by the leading publishing houses such as IEEE, Elsevier, ACM, etc. Technological: NTUA will actively seek collaborations with other academic institutions and industrial partners, in order to employ the gained expertise and knowledge by joining with them in other projects aiming to increase the technological readiness in the respective fields._
		Role in the KER:
		NTUA is leading the development of T2 Materials Knowledge Acquisition Framework (KAF) as part of Suite 1. KAF concerns the design of a knowledge

		graph of materials and the provision of certain functionalities allowing the industry stakeholders to make decisions in their selections of materials (e.g., visualization techniques, information retrieval, data analytics, etc.).
		Collaboration arrangements:
		Collaboration agreements will be focused on establishing exploitation arrangements, specifically in the research and technological domain with toolkit developers in all three Suites. Specific focus will be put on the collaboration arrangements with Fraunhofer since the two organizations work on the integration of T1 CMDB and T2 KAF.
KER	**Toolkit**	**Exploitation plan:**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	Research: NTUA will target high impact journals and international conferences aiming to publish results from the development of the toolkits of KER2 alongside results from the other two suites relevant to KER1 and KER3 where it leads the development of KAF and DTPC toolkits respectively.
		Role in the KER:
		NTUA does not have a direct role in the development of the toolkits in KER 2. However NTUA contributes to this task by collecting vocabulary terms aiming to better represent knowledge in the KAF toolkit. Also, work is focused on examining potential connections of KAF and DTPC with the toolkits of Suite 2. NTUA will use the knowledge gathered from the development of the toolkits relevant for KER 2 in order to make better connections with KAF and DTPC toolkits that the university is leading. It will assist in the connection and interoperability between the KAF and DTPC toolkits with those developed in this suite.

		Collaboration arrangements:
		Collaboration arrangements are yet to be established with toolkit developers from this Suite depending on the integration advancements between the three different Suites.
KER	**Toolkits**	**Exploitation plan**
KER 3 Simulation and Optimization Suite (AMS)	T7: Materials Mechanical Properties Simulator – MMS (AMS) T8: Materials Processing Simulator - MPS (UPV) T9: Digital Twin for Process – DTPC - control (NTUA)	Research: NTUA plans to target high impact journals and prestigious international conferences in order to disseminate the project's results that arise as parts of NTUA's involvement in Suites 1 and 3 (KER 1 , 3). Particularly we are interested in presenting our work in journals and conferences supported by the leading publishing houses such as IEEE, Elsevier, ACM, etc. NTUA will actively seek collaborations with other academic institutions and industrial partners, in order to employ the gained expertise and knowledge and advance the research in the respective sectors of NTUA's involvement by joining with them in other projects aiming to increase the technological readiness in the respective fields. Interaction with open-source communities is envisaged based on the adoption and extension of the open-source software stack VOStack (aligned with W3C WoT).
		Role in the KER:
		NTUA is leading the development of T9 DTPC as part of Suite 3. In DTPC, a set of digital twins for manufacturing purposes will be developed. These twins will serve as the digital counterparts of the physical systems allowing for access in simulation algorithms (other toolkits of the suite) as well as forecasting and visualization techniques.

		NTUA's efforts will be also allocated in joining the operation of the toolkit with the other toolkits of the same suite as well as the KAF toolkit (Suite 1) which development is also led by NTUA.
		Collaboration Arrangements:
		Given NTUA's role, collaboration agreements will be established with AMS, the lead of KER 3 exploitation, and with UPV, developing T8 within the Suite. Arrangements will be made with Fraunhofer as well, who leads Suite 1, where NTUA's T2 KAF is positioned and is currently in the process of integration with DTPC.

Table 12: NTUA - Exploitation plan

CETMA:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	CETMA has not yet identified a specific exploitation interest for this KER. However, a potential for a holistic exploitation of the three KERs is identified: Regarding the holistic solution (KER1, 2 and 3) - CETMA is one of the EU Digital Innovation Hub designed by the EU Commission to improve the digital environment in Puglia and Basilicata regions (South of Italy). Modelling and simulation of advanced materials are part of the digital services CETMA has to perform for the local SMEs. DIMAT suites could be an additional service we can give and, in this sense, their commercial exploitation could be funded within the HUB.
		Role in the KER:

		Supports the definition of material ontologies, especially for composite materials – relevant for the development of T1 CMDB.
		Collaboration arrangements:
		In order to use the suites, an agreement with Fraunhofer and AMS will be necessary to decide who will be in charge to manage the suites and how to share the incomes linked to them.
KER	**Toolkit**	**Exploitation plan:**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	Research: At research level CETMA plans to secure other R&D funds to finalize the toolkits and bring them to TRL9. Technological: CETMA will further expand the class of materials that can be designed and optimized using the toolkits. Commercial: CETMA aim is to expand the offer of technical consultancy services regarding the modelling and simulation of composites (mainly), thanks to the further know-how acquired during the project. Regarding the holistic solution (KER1, ;2 and 3) - CETMA is one of the EU Digital Innovation Hub designed by the EU Commission to improve the digital environment in Puglia and Basilicata regions (South of Italy). Modelling and simulation of advanced materials are part of the digital services CETMA has to perform for the local SMEs. DIMAT suites could be an additional service we can give and, in this sense, their commercial exploitation could be funded within the HUB.
		Role in the KER:

		CETMA is the main developer of T6 MD. CETMA is also the vice-leader of the development of T5 MM. CETMA will cooperate in the development of the toolkit by implementing the interoperability with the MD toolkit and supporting in the definition and analysis of composite materials.
		Collaboration arrangements:
		In case of a holistic solution offer (Suite 1,2 and 3) an agreement with Fraunhofer and AMS will be necessary to decide who will be in charge to manage the suites and how to share the incomes linked to them.
KER	**Toolkits**	**Exploitation plan**
KER 3 Simulation and Optimization Suite (AMS)	T7: Materials Mechanical Properties Simulator – MMS (AMS) T8: Materials Processing Simulator - MPS (UPV) T9: Digital Twin for Process – DTPC - control (NTUA)	Research: CETMA plans to secure other R&D funds to further investigate the numerical modelling of the curing process.
		Role in the KER:
		CETMA has set-up a numerical model for the simulation of the curing process of composite materials that will be included into the Material Processing Simulator Toolkit. This model will allow the toolkit to optimize the manufacturing processes in terms of minimization of time, costs and energy consumption, while allowing the material to consolidate and offer the requested performances.
		Collaboration Arrangements:
		CETMA plans to cooperate with UPV in regard to the activities outlined in the exploitation plan section above, carrying on the efforts made during the project.

		As indicated in the previous sections for the other two Suites, in case of a holistic solution offering (Suite 1,2 and 3) an agreement with Fraunhofer and AMS will be necessary to decide who will be in charge to manage the suites and how to share the incomes linked to them. This will be detailed in the final version of the current document.

Table 13: CETMA - Exploitation plan

DRAXIS:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	Research and technological: On the one hand, T3 MEC-LCA toolkit will be further developed after DiMAT through other EU projects, as a way of utilising the research know-how acquired in future research activities to better explore relevant technologies. and overall improve the toolkit. Potential synergies will be tested within DiMAT with other DiMAT toolkits, such as CMDB. Commercial: At the same time, T3 is planned to be taken forward by DRAXIS as a product, which will include the paid provision of the platform to DRAXIS clients.
		Role in the KER:
		Development of the Materials Environmental and Cost Life Cycle Assessment toolkit.
		Collaboration arrangements:
		Collaboration arrangements will be defined based on the integration developments part of the work undertaken within the second half of the project.

KER	Toolkit	Exploitation plan:
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	DRAXIS' exploitation approach involves exploring tools and services around modelling techniques for the usage in the manufacturing or adjacent industries for research, technological innovation and commercialisation purposes, in the context of research proposals and for improving its overall offering to clients.
		Role in the KER:
		DRAXIS will act as an active observer and follower of the development of this suite to allow for potential future synergies between the toolkits in this suite and other DRAXIS tools and services or possible joint research opportunities with the partners involved in their development.
		Collaboration arrangements:
		Collaboration arrangements will be defined based on the integration developments part of the work undertaken within the second half of the project.
KER	**Toolkits**	**Exploitation plan**
KER 3 Simulation and Optimization Suite (AMS)	T7: Materials Mechanical Properties Simulator – MMS (AMS) T8: Materials Processing Simulator - MPS (UPV) T9: Digital Twin for Process –	DRAXIS' exploitation approach involves exploring tools and services around simulation techniques for the usage in the manufacturing or adjacent industries for research, technological innovation and commercialisation purposes in the context of research proposals and for improving its overall offering to clients.
		Role in the KER:
		DRAXIS will act as an active observer and follower of the development of this suite to allow for potential future synergies between the toolkits in this suite and

	DTPC - control (NTUA)	other DRAXIS tools and services or possible joint research opportunities with the partners involved in their development.
		Collaboration Arrangements:
		Collaboration arrangements will be defined based on the integration developments part of the work undertaken within the second half of the project.

Table 14: DRAXIS - Exploitation plan

AMS:		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	AMS has no direct exploitation plan related to this KER identified at this stage.
		Role in the KER:
		AMS will contribute with the integration of T7 MMS toolkit with DiMAT Data and Assessment Suite. MMS can connect with CMDB toolkit to extract material properties from existing databases.
		Collaboration arrangements:
		Depending on the integration activities between Suite 1 and Suite 3, collaboration agreements will take place between AMS and Fraunhofer. These will be detailed in the second version of the current document.
KER	**Toolkit**	**Exploitation plan:**

<table>
<tr><td rowspan="4">KER 2: Modelling and Design Suite (CETMA)</td><td rowspan="4">T4: Material Design Framework (MDF) - Fraunhofer

T5: Materials Modeler (MM) - CERTH

T6: Materials Designer (MD) - CETMA</td><td>AMS has no direct exploitation plan related to this KER identified at this stage.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>AMS will contribute with the integration of the MMS toolkit (part of KER 3) with DiMAT Modelling and Design Suite. The toolkits MM and MMS include Molecular Dynamic simulations. Both toolkits can solve similar problems. AMS and CERTH will collaborate looking for synergies in this point.</td></tr>
<tr><td>Collaboration arrangements:

The exploitation of the scientific results obtained from the combination of data-driven models and Molecular Dynamics will be jointly published with CERTH, representing one of the original contributions of the project in the fields of material science and engineering. Further collaboration arrangements will be defined based on the integration developments part of the work undertaken within the second half of the project.</td></tr>
<tr><td>KER</td><td>Toolkits</td><td>Exploitation plan</td></tr>
<tr><td>KER 3 Simulation and Optimization Suite (AMS)</td><td>T7: Materials Mechanical Properties Simulator – MMS (AMS)

T8: Materials Processing Simulator - MPS (UPV)</td><td>AMS is interested in the exploitation of the DiMAT Simulation and Optimization suite (KER 3) and the toolkit the organization is developing – T7 MMS.

The initial commercialization strategy, includes:

1) Exploring the polymer sector, offering tailored toolkits for modelling polymer mixtures and complex structures, such as nets or yarns.

2) Work with DiMAT SMEs, like TECNORED, to offer collaboration opportunities where the toolkits, such</td></tr>
</table>

	T9: Digital Twin for Process – DTPC - control (NTUA)	as net-modelling, can be integrated into their own products, adding significant value. 3) Exploring options for commercialization of the Digital Twin for Process Control (DTPC) by seeking partnerships with sensor developers. The integration of real-time sensor data with simulations will allow these companies to create new, innovative products.
		Role in the KER:
		AMS is the exploitation lead of KER 3 (Suite 3) and develops one of the toolkits of DIMAT Simulation and Optimization Suite (MMS). The organization also contributes to the development of the other two toolkits within the Suite (MPS and DTPC). The MMS toolkit will be validated in the polymer and glass pilots, solving 6 different technical problems. These 6 problems will lead to six different toolkit implementations and 6 different numerical models. AMS is developing the numerical models using molecular dynamic or finite elements, designing the modelling workflow, making the numerical simulation parametrically and constructing the toolkit. Molecular dynamic simulation could be considered part of KER2 or KER3. All the implementation of the toolkits combined a backend developed by AMS and a frontend developed as a collaboration between AMS and ROPARDO. The technological exploitation of the toolkits will leverage the combined capabilities of these two companies.
		Collaboration Arrangements:
		Collaboration arrangement with the toolkit developers within Suite 3 will be carefully identified

		by the end of the project considering the commercial aspirations of the organization. Additional arrangements should be put in place with ROPARDO if the frontend developed for the Suite will be used after the end of the project. Additional collaborations with other KER leads and toolkit developers will be defined based on the integration developments part of the work undertaken within the second half of the project.

Table 15: AMS - Exploitation plan

NaturePlast (Pilot):		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	NaturePlast (Pilot) has identified interest in further exploiting Suite 1. The Suite can help small companies like NaturePlast to store, use and compare data on materials: environmental performances, mechanical properties, etc.
		Role in the KER:
		NaturePlast contribution mainly consists in assisting the developers by sharing data on materials and processes.
		Collaboration arrangements:
		Potential collaboration can be continued with AITEX and Tecnored (the other members of Pilot 1) to develop biobased/biodegradable polymers for fishing/aquaculture sector.

Table 16: NaturePlast - Exploitation plan

<table>
<tr><th colspan="3">Tecnored (Pilot):</th></tr>
<tr><th>KER</th><th>Toolkits</th><th>Exploitation plan</th></tr>
<tr><td rowspan="5">KER 1 DiMAT Data and Assessment Suite (Fraunhofer)</td><td rowspan="4">T1: Cloud Materials Database (Fraunhofer)

T2: Knowledge Acquisition Framework

T3: Materials Environmental and Cost Life Cycle Assessment</td><td>Commercial: Tecnored (Pilot) interest is focused on all three toolkits - CMDB, KAF and MEC-LCA. The company intends to use these toolkits to reduce the time of producing a new net with new materials and properties, in collaboration with its customers to develop new synthetic yarns for their fishing nets.

Technological: Additionally, the company is keen to contribute to further refining the solutions under Suite 1, by providing data from internal tests of different materials the company normally works with.

The toolkits obtained are perceived as useful for the company in order to develop new nets for its customers, helping to reduce time and costs and focusing on integrating materials and processes that benefit both their operations and the broader fishing industry with more resistance and sustainable fishing nets.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>Tecnored supports the development of the toolkits by providing data from their internal operational processes.</td></tr>
<tr><td>Collaboration arrangements:</td></tr>
<tr><td></td><td>Depending on the advancements of the Suite and toolkits development. These will be detailed in the second version of the current document.</td></tr>
<tr><th>KER</th><th>Toolkit</th><th>Exploitation plan:</th></tr>
</table>

<table>
<tr><td rowspan="4">KER 2: Modelling and Design Suite (CETMA)</td><td rowspan="4">T4: Material Design Framework (MDF) - Fraunhofer

T5: Materials Modeler (MM) - CERTH

T6: Materials Designer (MD) - CETMA</td><td>Tecnored main interest is focused on T6 Material Designer (MD). Tecnored will use this toolkit to improve the design of its ropes and nets and to reduce the time spend on designing new braiding structures to improve mechanical properties and reduce stress in specific areas of the nets. The toolkits obtained are perceived useful for the company in order to design new nets for its customers, helping to reduce time and costs.</td></tr>
<tr><td>Role in the KER:</td></tr>
<tr><td>Tecnored contribution to KER 2 is oriented on providing its braiding and knotting structures production data from internal tests of different materials the company normally works with.</td></tr>
<tr><td>Collaboration arrangements:

Depending on the advancements of the Suite and toolkits development. These will be detailed in the second version of the current document.</td></tr>
<tr><td>KER</td><td>Toolkits</td><td>Exploitation plan</td></tr>
<tr><td>KER 3 Simulation and Optimization Suite (AMS)</td><td>T7: Materials Mechanical Properties Simulator – MMS (AMS)

T8: Materials Processing Simulator - MPS (UPV)

T9: Digital Twin for Process –</td><td>Tecnored main interest is on T7 MMS and T8 MPS toolkits. The company plans to leverage these resources to accelerate the production of new nets that incorporate advanced materials and properties, working alongside its customers to create synthetic yarns for its fishing nets. Both the MMS and MPS toolkits are perceived to assist the company in simulating the mechanical properties of the nets, enabling it to refine its industrial processes and enhance their efficiency. The toolkits will support the development of new nets for their customers, allowing to save time and reduce operating and production costs while integrating materials and increasing the efficiency of the company’s processes.</td></tr>
</table>

	DTPC - control (NTUA)	**Role in the KER:**
		Tecnored contributes to the enhancement of solutions within Suite 3 by providing data from its internal processes, machines and equipment on the nets they commonly manufacture.
		Collaboration Arrangements:
		Depending on the advancements of the Suite and toolkits development. These will be detailed in the second version of the current document.

Table 17: Tecnored - Exploitaiton plan

ACCELIGENCE (Pilot):		
KER	**Toolkits**	**Exploitation plan**
KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	The company has expressed main exploitation intentions towards Suite 2 DiMAT Modelling and Design Suite (DiMDS), and more specifically T4 Material Design Framework (MDF) and T6 Material Designer (MD) toolkits. These tools can improve the design process of composite parts for UAVs, leading to increased efficiency, reduced material waste, and lower costs.
		Role in the KER:
		ACCELIGENCE provides UAV data for the developments of T4 Material Design Framework (MDF) and T6 Material Designer (MD) toolkits to aid in their development.
		Collaboration arrangements:
		Depending on the advancements of the Suite and toolkits development, the company is interested in exploitation arrangements with Suite 2 Lead and MD

		developer - CETMA and MDF toolkit developer Fraunhofer. ACCELIGENCE is also interested in future collaborations with other project partners to jointly develop training programs for the use of DiMAT in the design of UAVs. These will be detailed in the second version of the current document.

Table 18: ACCELIGENCE - Exploitation plan

IMERYS (Pilot):		
KER	**Toolkits**	**Exploitation plan**
KER 1 DiMAT Data and Assessment Suite (Fraunhofer)	T1: Cloud Materials Database (Fraunhofer) T2: Knowledge Acquisition Framework T3: Materials Environmental and Cost Life Cycle Assessment	At this stage Imerys has expressed interests in all three toolkits within Suite 1. The CMDB toolkit is expected to improve the organization, traceability and accessibility of data, which is currently managed primarily via Excel files. The KAF toolkit must offer the possibility of identifying correlations between different data sets, simplifying and making analyzes more efficient. With the MEC-LCA toolkit, Imerys will be able to develop new products taking into account their environmental impact, a crucial aspect for the company.
		Role in the KER:
		The company has not identified a direct contribution role to the development of the toolkits.
		Collaboration arrangements:
		IMERYS remains open for future collaboration agreement, to be further assessed as part of the final exploitation plan of the DiMAT project.
KER	**Toolkit**	**Exploitation plan:**

KER 2: Modelling and Design Suite (CETMA)	T4: Material Design Framework (MDF) - Fraunhofer T5: Materials Modeler (MM) - CERTH T6: Materials Designer (MD) - CETMA	The company has identified an interest in exploiting T5 Material Modeler (MM). The MM toolkit is expected to help identify correlations between the characteristics of battery materials and their performance, reducing costly physical testing.
		Role in the KER:
		The company has not identified a direct contribution role to the development of the toolkits.
		Collaboration arrangements:
		IMERYS remains open for future collaboration agreement, to be further assessed as part of the final exploitation plan of the DiMAT project.

Table 19: IMERYS - Exploitation plan

3.3 MARKET ANALYSIS

An initial market analysis was conducted for the three key exploitable results, comprising the following components:

1. Problem Description: Identifying the problem the product solves.
2. Alternative Available Solutions: Evaluating current solutions in the market.
3. Unique Value Proposition: Highlighting what makes the product unique and valuable.
4. Target Market: Defining the ideal customers for the product.
5. Early Adopters: Identifying the first users who will adopt the product.
6. Competitors: Analyzing other companies offering similar solutions.
7. Go to Market Models: Strategies for bringing the product to the market.
8. Market Timing: Assessing the optimal timing for market entry.
9. IPR Background and Foreground: Reviewing intellectual property rights related to the product.

The results of the market analysis are provided in the sections below, separated for each KER. These were reviewed by the HRB expert who has provided feedback and suggestions for future improvement for the revised and definite exploitation plan of the project to be available at the end (M36). The HRB expert feedback can be reviewed under Annex 1.

3.3.1 KER 1 Suite 1

DiMAT Data and Assessment Suite – DiDAS	Description
Problem	Suite 1 provides solutions for data storage, knowledge acquisition and for life cycle assessment. The problems that the end user has and that the Suite addresses are: 1) Linking and structuring heterogenous materials data originating from different sources. This data is currently dispersed and not holistically available to materials designers and manufacturers 2) Data Interoperability and Traceability 3) Complexity and unease of accessibility of LCA tools for non-experts 2) Sustainability: Increasing the use of materials from renewable resources and reducing environmental impact. 3) Cost and Efficiency: Reducing material design costs, economic impact, and time to market. 4) Digital Skills: Enhancing the digital skills of personnel involved in material handling and assessment.
Alternative solutions	Customers use complex folder structures or classic relational databases to store files (e.g. Granta MI) and knowledge (often stored in folders or using excel or pdfs). This approach works for their momentary purposes, but the structures are not flexible and cannot be adjusted when it comes to sharing data, representing complex workflows of data processing. For assessing the data special tools must be developed and adjusted. Regarding Materials Environmental and Cost Life Cycle Assessment, Popular LCA tools include SimaPro, GaBi, and OpenLCA; they all require extensive domain knowledge and are used by expert analysts; other examples include the LCA Activity Browser or LCA to go. DiMAT's MEC-LCA also incorporates results from such tools and relevant databases but does not focus on the execution of the LCA assessment

	per se, rather on the final user and how they can continue to extract value from the LCA results.
Unique Selling Point USP - Unique Value Proposition UVP	• Semantic data and knowledge storage that allows for interoperability • Storage that allows for representing complex workflows of all kinds (mainly to improve traceability of information) • Structured knowledge representation and visualization • Unified access to data integration and knowledge discovery • Digitalized data storage • Data knowledge management and analysis • Data visualization • Environmental impact and process costs decision support • Process hotspot identification (cost or environmental impacts) • Discover new material connections and relations • Save time and money • Get unified access The Suite is interoperable with Suite 2 and Suite 3 and will be accessible via the DiMAT Platform. End users will have access to manuals, video tutorials and receive comprehensive training on demand to maximize the potential of the Suite.
"Market" – *Target market*	The target market can be roughly divided in the following segments: 1) Material Science and Design Companies: Companies involved in the research, development, and production of materials. Includes sectors such as metal, glass, graphite, polymer, aerospace, automotive, electronics, construction, and more. 2) Manufacturing Companies: Organizations involved in the manufacturing of products across various industries. These include both discrete manufacturing (e.g., automotive parts, electronics) and process manufacturing (e.g., chemicals, pharmaceuticals, etc.). 3) Environmental Compliance and Sustainability: Companies and agencies responsible for ensuring compliance with environmental regulations. Includes sustainability consultants, environmental agencies, and compliance officers.

	4) Research and Development Departments: R&D departments across industries that focus on material innovation and product development. 5) Educational and Research Institutions: Universities, research labs, and educational institutions offering programs in material science and engineering. 6) Procurement and Supply Chain: Professionals responsible for sourcing and procurement of materials and managing the supply chain. 7) Government Agencies and Regulatory Bodies: Agencies responsible for setting and enforcing environmental and safety regulations related to materials and manufacturing.
"Market" – *Early Adopters*	Early adopters of the DiMAT Data and Assessment Suite are organizations and professionals who are innovative, forward-thinking, and have a strong need for advanced data management, analysis, and sustainability solutions. It is expected that these are SMEs in material design and material manufacturing, as well as research institutions and universities that focus on material science.
"Market" - Competitors	1. **Ansys Granta MI** https://www.ansys.com/products/materials/granta-mi Features: Ansys offers enterprise-wide materials data management software to store, control and analyze, creating your materials' "gold-source." Granta MI Enterprise is built on the foundation of Granta's trusted materials reference data 2. **Palantir Foundry** https://www.palantir.com/platforms/foundry/ Features: The Foundry Ontology integrates the semantic, kinetic, and dynamic elements of a business allowing for harmonization and automation of decision-making in complex settings. 3. **Coscine https://about.coscine.de/** Features: Provides a research data management platform for research projects. Data managed within the platform becomes FAIR – from storage, description with metadata, collaboration with all participating researchers to archiving. 4. **Arangograph https://arangodb.com/** Features: Transforms graph data navigation, provides seamless connections, and accelerated discovery in intricate network landscapes 5. **CES Selector (Granta Design)**

	Features: Materials selection software that helps in choosing the right materials based on various criteria including environmental impact and costs. 6. **Matereality (DS Simulia, a part of Dassault Systèmes)** Features: Materials information management, digital material testing, simulation data management, and collaboration tools. 7. **Total Materia** Features: Comprehensive materials database, material property data, cross-referencing, and material comparison tools. 8. **EcoChain Technologies** Features: Life cycle assessment (LCA) software that calculates the environmental impact of products and processes. 9. **GaBi Software (Thinkstep, a Sphera Company)** Features: LCA software for analyzing the environmental impact of products, materials, and processes.
Go to Market – Use model	The Suite and the Toolkits within will be provided to the customers via the platform as software packages. In general, the toolkits can be used individually and can be adapted for specific purposes. However, also the toolkits can assist the functionalities of toolkits from the other Suites by providing data, knowledge and assessments for the life cycle of a material. Providing the toolkits as a Suite will enable users to better understand the information on the materials, the processes, the carried experiments and the life-cycle assessment. CMDB and KAF are expected to support a common ontological vocabulary for describing material and basic material properties and concepts that will aid in easier information retrieval and population of the toolkits. In this way, the toolkits can benefit from exchanging data and enhancing their capabilities. Besides direct industrial usage of the toolkits from DiMAT data and assessment Suite (and support), SaaS and consultancy services can be provided by the project partners.
Go to Market - Timing	Total Estimated Time: Approximately 12-24 months from the advanced prototype stage to full commercialization.
Go to Market – IPR Background	T1 - CMDB: The Code is developed mostly in other European and German national projects. T2 - No IPR background is applied for Toolkit 2: KAF. T3 - The development of MEC-LCA has utilized a variety of open-source and commercial technologies, such as Grafana for data visualization

	and Keycloak for authentication, or SimaPro for specific LCA tasks under existing commercial licenses.
Go to Market – IPR Foreground	• T1 - Fraunhofer is the owner of the CMDB code, with CETMA as a contributor • T2 - The owner is NTUA and the toolkit will be made available as open-source. • T3 - DRAXIS is the developer of MEC-LCA, with AITEX as contributor

Table 20: KER 1 - SUITE 1 Initial Market Analysis

3.3.2 KER 2 Suite 2

DiMAT Modelling and Design Suite	Description
Problem	A common challenge in industrial design is the optimization of parts and components. When advanced performances are required, or tight requirements must be satisfied, this process extends to the correct design of the material itself adopted for the solution. The design and optimization of material, instead of components, is particularly challenging because it generally involves multiple disciplines (mechanics, economics, environmental impact) and requires a lot of physical testing, increasing the time to market of the solution. Moreover, the higher developing costs can lead to a partial exploration of the design space and therefore, to final solutions which are sub-optimal in terms of, for example, weights, costs, environmental impact, and so on. This also can be due to the low knowledge of factors that can influence the performance of materials, both the pre-existing and the new ones.
Alternative solutions	When dealing with the listed problems, companies generally use two types of approaches. On one hand, they rely heavily on physical testing to try discovering and understanding relations between the material characteristics and processing and the final material performances. On the other hand, when digital tools are already integrated in the companies' business processes they are applied in a segregated way. Separate solutions are employed in different steps of their internal

	processes without the possibility of integrating the flow of information and, thus, carrying out a well-oriented and efficient design process.
Unique Selling Point USP - Unique Value Proposition UVP	The solution aims at speeding up the design process while, at the same time, obtaining more efficient and optimized design. These objectives are pursued in different ways. Digital design and virtual testing significantly reduce the need for physical testing, which directly decreases resource waste during this phase. Consequently, costs and time to market are also reduced because digital testing is far less time-consuming and resource-intensive than physical experimental campaigns. - The Materials Design Framework (MDF) is connected to all the other DiMAT toolkits and is therefore equipped with profound information on materials modelling and design. Additionally, by using semantic technologies it allows for necessary interoperability and flexibility to be coupled with other tools or used by experts. - The Materials Modeler (MM) toolkit provides advanced AI-driven predictive capabilities, which offer significant competitive advantages over traditional methods. Unlike empirical and trial-and-error approaches, the DiMAT MM utilizes AI and machine learning to provide accurate predictions of material properties and behavior. - The Material Designer (MD) provides a user-friendly interface to access the calculation code which, in contrast with other solutions, hides all unnecessary modelling details from the user, reducing the need for training. The solution is also developed with customization in mind, which means that it is possible to define specific workflows depending on the customer's needs, including different solvers, adding more types of materials or microstructures. Connections with other solutions are being developed and implemented, giving the customer the possibility to adopt a more elaborated workflow into their own business processes exploiting the capability of different solutions. The suite of tools allows for broader and more cost-effective exploration of the design space in terms of material and product design. This enables a better understanding of material behavior and improves the quality of

	final products in areas such as structural performance, environmental impact, and costs. Ultimately, the solution guides designers in selecting the appropriate materials and configurations based on the final requirements, even suggesting materials or configurations that were not initially considered.
"Market" – ***Target market***	The target market is companies working on design and manufacturing of structural parts and components. The solution is particularly focused on addressing problems and business cases of SMEs. Example of such companies and sectors, include: 1) Aerospace, as the suite's ability to optimize material properties and reduce physical testing aligns well with the aerospace industry's need for innovative materials and faster development cycles. 2) Automotive, as Virtual testing and broad design space exploration can help automotive companies develop lighter, stronger, and more cost-effective materials quickly. 3) Composite - The ability to conduct virtual testing reduces the need for extensive physical prototyping. This accelerates the development cycle, allowing for quicker iterations and fine-tuning of composite properties such as strength, stiffness, and weight. 4) Glass, as virtual testing and design will support the development of glass compositions with desired properties, such as increased durability, thermal resistance, or optical clarity faster and cheaper. 5) Plastic, as the Suite will lead to rapid formulation of plastic compounds with characteristics such as flexibility, durability, or chemical resistance. 3) Construction and Civil Engineering, as the solution can aid in the development of sustainable and cost-effective construction materials, ensuring compliance with environmental standards and reducing overall project costs. 4) Consumer Electronics, as DiMAT's tools can accelerate the development of new materials that meet the demanding requirements of consumer electronics, from heat dissipation to lightweight designs.

	5) Medical Devices, as Virtual testing can reduce the need for extensive physical trials, speeding up the development of safe and effective medical devices while ensuring compliance with stringent regulations. 6) Research and Development Organizations, which can leverage the suite to push the boundaries of material science, facilitating innovation and discovery.
"Market" – *Early Adopters*	Early adopters are likely to be companies, SMEs and organizations in high-tech industries such as aerospace, automotive, and advanced materials manufacturing. These sectors face significant challenges related to material performance and reliability under stringent conditions and thus have a pressing need for advanced predictive tools. Material scientists and engineers working in research and development departments within these industries will also be early adopters, as they require sophisticated tools to innovate and optimize material properties and manufacturing processes. The DiMAT Modelling and Design Suite capabilities in terms of prediction and optimization of manufacturing parameters, modelling and simulation of the internal material architecture and support to the design and optimization process will help customers in reducing material failure risks, certificating new materials and, overall, in all their business processes related to material development.
"Market" - Competitors	As competitors of the DiMAT Modelling and Design Suite one can consider big CAE companies like: 1. ANSYS - https://www.ansys.com/products/materials/granta-mi/ 2. Altair - https://altair.com/ 3. Dassault Systèmes Simulia - https://www.3ds.com/products/simulia which offer comprehensive material simulation tools. These competitors excel in general simulation capabilities and market penetration and offer products dedicated to material design, like Ansys Material Designer and Altair Multiscale Designer. Strengths of Competitors: • Established market presence and brand recognition. • Extensive databases of material properties and historical data. • Proven track record in various industrial applications. • Comprehensive support and training resources.

	Weaknesses of Competitors: • Limited real-time predictive capabilities compared to MM's advanced AI-driven approach. • Often reliant on trial-and-error methods, leading to higher costs and inefficiencies. • May lack the ability to suggest optimal configurations and prevent material failures as effectively So far, DiMAT Modelling and Design Suite distinguishes itself from its competitors in its unique integration of AI and causal inference, providing more interpretable and accurate predictions tailored to specific manufacturing and design processes. Moreover, commercial solutions require high licensing costs, adequate training and calculation resources in contrast to the implementation solutions adopted in the DiMAT solution.
Go to Market – Use model	The user model involves several avenues to make it available to customers. The customers will be granted access to the solution via the DIMAT platform for a certain time of period or a certain number of uses (material or model evaluations). Periodically the customer will be granted further usage by subsequent payments. Additionally, the toolkits can be offered as a software product that can be licensed to manufacturing companies, material scientists, and industrial organizations. They can be as well integrated directly into industrial use through technology transfer agreements, allowing companies to embed the tools within their existing manufacturing processes. Provision of training services will also be essential, ensuring that users can effectively utilize the toolkits. Furthermore, the toolkits can be used in contract research projects, enabling collaborative efforts with research institutions and industry partners to develop customized solutions. Finally, publications and standards derived from the use of the toolkits will disseminate knowledge and best practices, further supporting its adoption and impact across the industry. If the present Suite is provided together with the other Suites, this will represent an added value because in this case different tools of different suites can be used in different phases of the business processes.

Go to Market - Timing	Total Estimated Time: Approximately 12-24 months from the advanced prototype stage to full commercialization.
Go to Market – IPR Background	T4- No IPR background T5 - CERTH is the developer of both back and front-end operations and the owner of the Materials Modeler toolkit. The Background provided by CERTH includes advanced data integration, quality diagnosis, infrastructure monitoring, and machine passport tools. These components are essential for the implementation of the Materials Modeler, with access rights and usage conditions strictly regulated according to the consortium agreement. T6 - Background of the solution is property of CETMA. It consists of an integrated approach to characterization of composite materials and polymers and in the numerical modelling of innovative materials. Both are classified and protected by an internal secret methodology named BIM.
Go to Market – IPR Foreground	• T4 – The owner of the toolkit is Fraunhofer (CERTH contributor) • T5 - The owner of the toolkit is CERTH • T6 – The owner of the toolkit is CETMA

Table 21: KER 2 - SUITE 2 Initial Market Analysis

3.3.3 KER 3 Suite 3

DiMAT Simulation and Optimization Suite	Description
Problem	The main challenges companies face are related to optimization and control of the variables of a product or process to achieve the highest performance while ensuring quality and assessing integrity throughout the design and production phases. Manufacturers encounter common problems when introducing innovations, such as the following: - Too many trials and errors leading to higher costs - Lack of competitive position against big companies. Big companies typically possess greater resources for sustaining ongoing innovations compared to small and medium-sized enterprises.

	- Lack of correlation between product parameters and product properties can occur when new solutions are adopted without a proper model, leading to issues with quality and consistency.
Alternative solution	The optimization of a product and process variables is achieved by experience, data-driven models, or physical models. Experience can be considered in the group of data driven models and the physical numerical codes can be classified in these three groups: • Commercial FEM software (ex: ABAQUS, ANSYS, COMSOL, NASTRAN..) • Freeware FEM software (ex: Code-Aster, OpenFoam, Calculix...) • Toolkit from commercial FEM The control and monitoring of the industrial process has been traditionally done with a combination of manual observation, instrumentation, and feedback mechanisms. Quality control techniques involve systematic processes and methodologies to ensure products or services meet predefined standards and specifications. These techniques encompass methods such as statistical process control and quality assurance inspections to identify and rectify deviations or defects in the production process.
Unique Selling Point USP - Unique Value Proposition UVP	DiMAT Simulation and Optimization Suite (DiSOS) is a new set of open-source software solutions designed for application in design, processing, and industrial manufacturing. The suite comprises of a user-friendly interface that integrates mechanical and process models with artificial intelligence and digital twins. These features offer the following competitive advantages: - Provision of personalized and cost-effective simulation leading to resource savings. Alternatives to Di^{SOS} include commercial codes with high licensing fees or freeware modelling tools, which pose challenges in implementation adaptation and involve steep learning curves. - Provision of a holistic solution. Di^{SOS} solutions can integrate multiscale, multiphysics and process models with artificial intelligence and digital twins. Additionally, the potential utilization of the other DiMAT toolkits of Suite 1 - Data and Assessment, and Suite

	2 - Modelling and Design, complements the comprehensive commercial product, covering most of the manufacturing needs in a single package. - Reducing costs via simulation **Going into the specific toolkits:** - T7 – Materials Mechanical Properties Simulator (MMS) will reduce modelling costs as it is based on open-source software and will simplify modelling adoption using a user-friendly and personalized interface. The toolkit represents a cutting-edge, holistic integration of physical models, data-driven approaches, and AI. The alternative solutions emphasize functionality but are accompanied by high license fees and lack a holistic approach to integrating AI and mechanical models. Additionally, MMS offers the possibility of real-time results empowering users with immediate insights, fostering quick decision-making and agile responses to dynamic situations. - T8 – Materials Processing Simulator (MPS) is a digital toolkit developed to recreate manufacturing processes to predict materials' behavior when modifying the process parameters and material properties. The simulation variables, such as temperature, pressure, time, etc., are linked to the specific selected process, allowing users to test specific parameters during the study and introduction of new materials in manufacturing, with the support of computer-aided design (CAD) geometries and numerical models, thus preventing direct testing in production lines in situ which leads to material and energy consumption. - T9 - The Digital Twin for Process Control (DTPC), whether used alone or in conjunction with MMS or MPS, is a disruptive technology that facilitates the control and monitoring of industrial processes. DT offers competitive advantages such as: Better control and understanding of the overall process;

	Process monitoring; Data availability and reliability; Quality control; Safety
"Market" – *Target market*	The target market for the Di^{SOS} Suite includes industries involved in complex manufacturing that require comprehensive monitoring, optimization, and predictive capabilities. The primary target market for toolkits encompassing mechanical physical modeling, process modeling, and digital twins includes: - Manufacturing: Various sectors such as automotive, aerospace, machinery, and electronics would benefit from these toolkits to optimize production processes and ensure product quality. - Chemical Industry: Companies involved in chemical processing, oil refining, and petrochemical production can utilize these toolkits to simulate complex process reactions, optimize plant operations, and ensure safety and regulatory compliance. - Infrastructure Management: Engineering firms, construction companies, and infrastructure managers can use these toolkits to simulate structural behavior, monitor construction progress, and manage the lifecycle of buildings and infrastructures. - Engineering and manufacturing companies: These toolkits are aimed at companies involved in the design, manufacturing, and maintenance of products. They use physical mechanical modelling to simulate and analyze the behavior of physical systems, process modelling to optimize manufacturing processes, and digital twins to monitor and improve product performance in real time. - Research Institutions and Universities: Academic institutions often utilize such toolkits for research purposes, particularly in engineering, mechanical, and industrial fields. These tools help in both theoretical research and practical experimentation. - Technology and Software Companies: Companies specializing in software development often use these toolkits to integrate advanced simulation and modeling capabilities into their products. This enables them to offer solutions to a wide range of industries, from automotive to aerospace.

"Market" – *Early Adopters*	The potential early adopters can be categorized accordingly: - Small and Medium-sized Enterprises (SMEs) in Manufacturing: These companies may be attracted to the cost savings and customization potential of open-source software compared to expensive commercial solutions. - Manufacturing Companies with Existing Open-Source Software Experience: Companies already comfortable with open-source tools are more likely to be receptive to Suite 3. - Forward-Thinking Companies in Emerging Industries: These companies might be more open to adopting cutting-edge technologies like digital twins and advanced simulations. - Companies in Research-Focused Industries: These companies might value the flexibility and customizability of Suite 3 for their research and development activities. Considering the target of DiMAT, SMEs should be considered as the beachhead market. Small and medium-sized businesses facing similar challenges as the pilot companies in the DiMAT project can directly benefit from the experience gained. The process design and modelling experience applied in the glass and composite pilots can be used by materials manufacturers using similar manufacturing processes. Likewise, the knowledge gained from the polymer and graphite pilots may be advantageous to other analogous companies.
"Market" - Competitors	Competitors: • COMSOL App module, or similar commercial toolkits. • Eclipse Ditto • Start-up companies (ex: https://www.wimbitek.com/). • European projects (ex: https://www.pioneer-project.eu/). Strengths and Weaknesses: • COMSOL App module ○ Strengths: Established reputation, reliability of results, and ease of use. ○ Weaknesses: Costly licensing fees, and limited flexibility in integration with optimization, AI, or customization. • Eclipse Ditto ○ Strengths: supports communication over various protocols and is currently the most popular open-source digital twin solution

	○ Weaknesses: it does not offer additional functionalities out of the box such as those offered by DTPC and even does not offer storage for the time-series data captured by sensors or other IoT devices. In addition, and more crucially, it does not support the architecture of the DTPC in which small virtual objects interact in order to create a more complex digital twin. • Start-up companies (mainly based on data driven approaches): ○ Strengths: Service ready for the market. ○ Weaknesses: Lack of DiMAT framework without a holistic solution approach and integration of IT and Physics models. • Other European projects. ○ Strengths: Innovation, potentially disruptive technologies. ○ Weaknesses: Insufficient DiMAT ecosystem integration, lacking a comprehensive approach that integrates IT and Physics models holistically.
Go to Market – Use model	The KER will be put in use by a direct sales model. The Di^{SOS} toolkits will be sold directly to manufacturing companies via an online platform. The Di^{SOS} Suite could offer a subscription-based service, providing access to regular updates, modifications suggested by customers, support, and additional features for a recurring fee. The subscription-based model includes maintenance services primarily tailored for digital twins. Di^{SOS} will also include consulting and training services. Customers interested in utilizing numerical mechanical codes below the MMS or MPS toolkits will be supported by DiMAT partners.
Go to Market - Timing	Total Estimated Time: Approximately 12-24 months from the advanced prototype stage to full commercialization.
Go to Market – IPR Background	T7 - AMS – owner of backend of Materials Mechanical Properties Simulator (CERTH - contributor); ROPARDO – owner of frontend toolkit development T8 –UPV – owner of the toolkit T9 - The DTPC uses code developed by the NEPHELE Project for the Virtual Objects creation that is made available as open-source. No IPR background is applicable.

Go to Market – IPR Foreground	• T7 – AMS – owner of backend of Materials Mechanical Properties Simulator (CERTH - contributor); ROPARDO – owner of frontend toolkit development • T8 – UPV – owner of the toolkit (CERTH - contributor); ROPARDO – owner of frontend toolkit development. • T9 – NTUA is the owner of the toolkit. DTPC will be made available as open-source.

Table 22: KER 3 - SUITE 3 Initial Market Analysis

4 EXPLOITATION ROADMAP

The following section presents the initial iteration of the exploitation roadmap, outlining key actions and both individual and joint exploitation plans for the key exploitable results. Three distinct exploitation pathways have been identified as potential opportunities to maximize the value of the DiMAT solutions:

Option 1: Separate Exploitation of the DiMAT Suites

Each DiMAT Suite is exploited independently, with the respective exploitation lead coordinating with the relevant owners of the toolkits and components to arrange for their utilization.

Option 2: Holistic Marketing via the DiMAT Platform

The DiMAT Suites are marketed collectively as an integrated solution through the DiMAT platform. This could involve either a single lead partner taking charge and establishing contractual arrangements, such as licensing, with the co-owners, or the creation of a governance structure to ensure active involvement from all partners.

Option 3: Parallel Individual Exploitation

Alongside either of the above options, each toolkit owner also has the incentive to exploit their solution independently, developing a robust exploitation plan tailored to their specific toolkit.

All three options encompass research, technological, and commercial exploitation routes that the partners are eager to pursue. This has been informed by extensive collaboration through various means, including surveys, workshops, and both physical and online sessions.

The insights from these activities were shared with the HRB expert, who provided feedback, detailed in Annex 1. His key takeaways highlighted areas for the consortium to focus on during the second half of the project. Points that could be addressed immediately have been incorporated into this initial version of the exploitation plan. The more extensive recommendations will be addressed over the next 18 months, a period also dedicated to showcasing the DiMAT solutions and conducting end-user assessments.

Exploitation Roadmap (12 to 24 Months Post-Project Completion)
1. Establishment of a formal agreement outlining roles, responsibilities, and decision-making processes between the owners of the solutions. Appointment of a project manager or coordinator to oversee the exploitation activities. Definition of clear governance policies and procedures to ensure smooth collaboration.

2. Creation of a Comprehensive business plan to guide commercialization efforts.

3. Development of a financial projection, including funding requirements, revenue models, and pricing strategies.

4. Outline of a go-to-market strategy, including sales channels, marketing tactics, and customer engagement plans.

5. Intellectual Property (IP) Management: Protection and management of intellectual property associated with the solutions. Conduct an IP audit to identify all patentable innovations, copyrights, trademarks, and trade secrets. File for patents and register trademarks as needed. Establishment of clear ownership and licensing agreements among the partners.

4. Secure funding and establish strategic partnerships. Identification of potential funding sources such as government grants, venture capital, and industry partnerships. Development of compelling proposals for investors and funding agencies. Forge partnerships with industry players, technology providers, and potential customers to support market entry and growth.

5. Product Development and Enhancement: Finalization of product development and preparation for commercialization. Conduct of further development to address any feedback from the prototype phase. Esurance that the product meets all regulatory requirements and industry standards.

6. Development of user documentation, training materials, and support infrastructure.

7. Marketing and Sales Strategy: to generate awareness and drive adoption. Development of a branding and positioning strategy. Launch of targeted marketing campaigns using digital marketing, industry events, webinars, and content marketing. Build a sales team or partner with distributors/resellers. Creation of demo versions or pilot programs to showcase the solution to potential customers.

Financial Costs

1. Governance Structure

Costs: €10,000 - Legal fees for drafting agreements and establishing the governance structure. Initial meetings and coordination efforts.

2. Business Plan

Costs: €20,000, including Market research and analysis and Consulting fees for business plan development.

3. Product Development and Enhancement

Costs: €200,000 - Final development and feature enhancement based on feedback. Testing and quality assurance. User documentation and support infrastructure development.

6. Marketing and Sales Strategy

Costs: €150,000 - €300,000 - Branding and positioning strategy development. Marketing campaign costs (digital marketing, events, webinars, content creation). Development of demo versions and pilot programs. Sales team hiring and training or establishing distributor/reseller agreements.

*Note: This overview of the financial costs takes Option 2 as a reference, where the DiMAT Solutions are exploited together. In the case of Option 1 and Option 3 where the individual toolkits are exploited separately, a different, more granular approach should be provided. A detailed financial simulation will be shared in the final version of the Exploitation and Market Readiness plan for DiMAT, to be ready by the end of the project.

Joint exploitation plan

Option 1: The joint exploitation plan envisions that the exploitation leads for each Key Exploitable Result (KER) — Fraunhofer, CETMA, and AMS — will independently undertake exploitation activities for each Suite based on contractual arrangements with the respective DiMAT toolkit owners. The anticipated use model includes additional research activities and commercialization through the deployment of the solution via SaaS or standalone software. Licensing of the intellectual property rights (IPR) is also considered as an indirect use option.

Option 2: Adoption of the platform by a single organization, which will market the holistic solution based on contractual agreements with the solution owners. Alternatively, the platform could function as a marketplace, where each toolkit owner manages their individual toolkit and is responsible for its maintenance, functionality, and customer support. A key consideration here should be the responsibility of the platform owner.

Option 3: In addition to the individual exploitation plans detailed below, partners working on specific toolkits are also interested in collaborating with one or two other partners for

<table>
<tr><td colspan="2">each designated toolkit. These collaborations will be elaborated on in the following sections.</td></tr>
<tr><th colspan="2">KER 1 Data and Assessment Suite</th></tr>
<tr><td rowspan="2">Individual exploitation plans</td><td>T1 – CMDB (Fraunhofer – owner)

Research route: Aim for publications in peer-reviewed journals, participating at conferences and conduct industry workshops in order to make the toolkit more popular.

Technological route:

Develop and integrate technologies relevant for the industry (semantic technologies, data management, AI, …). Additionally, make the technology suitable for the industry (e.g., provide local deployments).

Commercial route:

Acquire industrial projects and offer CMDB as a service. Furthermore, we can sell licenses and there is also the option for a spin-off.</td></tr>
<tr><td>T2 - KAF (NTUA – owner) - the toolkit will be made available as an open-source.
According to the 3 exploitation routes identified for the DiMAT solution NTUA will:
Research route: target high impact journals and prestigious international conferences to disseminate the project’s results that arise as parts of NTUA’s work. Particularly the university is interested in presenting its work in journals and conferences supported by the leading publishing houses such as IEEE, Elsevier, ACM, etc. This means presenting KAF, pinpointing the benefits of its adoption for related manufacturing industries by showcasing the satisfaction of the KPIs that have been set by the DiMAT consortium.
Technological route: NTUA will explore collaborations with other academic institutions, both consortium partners and external organizations, in order to employ the gained expertise and knowledge and advance the research in the respective sectors.</td></tr>
</table>

	Commercial route: The toolkit will be offered as a provisioning service in the manufacturing domain as a software package. KAF is going to be made available under an open-source license, while custom versions may be developed that can be specific to the needs of an industry vertical.
	T3 - MEC-LCA – (DRAXIS – owner): **Research and Technological Routes:** The toolkit will go through multiple development rounds in the context of other European projects to engage with various industry partners who can pilot the tool in real-world scenarios, adapting it to meet diverse industry requirements and demonstrating its practical value. **Commercial route:** The toolkit will be available to customers as a service.
KER 2 Modeling and design Suite	
Individual exploitation plans	**T4 – MDF (Fraunhofer owner)** **Research and Technological Route:** The MDF will be developed into a web tool accessible to scientists and industry professionals. **Commercial Route:** The toolkit will be offered through subscription fees for direct industrial use.
	T5 – MM (CERTH owner) **Research and technological route:** MM toolkit can be used in contract research projects, enabling collaborative efforts with research institutions and industry partners to develop customized solutions. Publications and standards derived from the use of the toolkit will disseminate knowledge and best practices, further supporting its adoption and impact across the industry. **Commercial route:** The toolkit will be offered as a software product that can be licensed to manufacturing companies, material scientists, and industrial organizations. The MM toolkit can be integrated directly into industrial use through technology transfer agreements, allowing companies to embed the tool within their existing manufacturing

	processes. Provision of training services will also be essential, ensuring that users can effectively utilize the toolkit's advanced AI capabilities.
	T6 – MD (CETMA – owner) **Research and technological route:** CETMA plans to secure other R&D funds at national level and to expand the offer of technical consultancy services regarding the modelling and simulation of composites, thanks to the further know-how acquired during the project **Commercial route:** The use model will be the provision of a service. The customer will have granted access to the solution and to a fixed number of material design evaluation. Periodically the customer will be granted further material design evaluations by subsequent payments. As a coordinator of CETMA-DIHSME, the organization will further pilot and exploit the toolkit via providing it as a service to SMEs.
KER 3 Simulation and Optimization Suite	
Individual Exploitation Plans	T7 - MMS **(AMS – owner)** **Research and technological route:** Develop multiscale and multyphisic models, and data-driven models, collaborating with other partners. Seek strategic partnerships as research institutions, or universities. **Commercial route:** Direct sales model. The MMS toolkit will be sold directly to manufacturing companies via an online platform. Additionally, MMS toolkit could offer a subscription-based service, granting access to regular updates, modifications suggested by customers, support, and additional features for a recurring fee. The MMS tool will also include consulting and training services. Customers interested in utilizing numerical mechanical codes below the MMS toolkit will be supported.
	T8 – MPS (UPV owner) **Research and technological route:** UPV targets a continuous and active search for collaboration with both consortium partners and external organizations. These actions are intended to promote the dissemination of the project outcomes,

	including the pilots´ use cases and validation, through congress, conferences, and publication in high-impact journals. Also, it intends to promote continuous MPS toolkit enhancement and upgrading through knowledge and expertise exchange, leading to its tailored implementation on potential industrial partners. **Commercial route:** The MPS toolkit will be offered as a software product, enabling the possibility of validating the toolkit via tutorials, solved study cases, and training. These actions are intended to increase the number of users, so at a later stage, paid courses and training could be offered. In addition, the MPS toolkit could offer subscription-based services for potential industry partners to develop customized solutions.
	T9 – DTPC (NTUA owner) - the toolkit will be made available as an open-source. According to the 3 exploitation routes identified for the DiMAT solution NTUA will: **Research route:** Target high impact journals and prestigious international conferences in order to disseminate the project's results that arise as parts of NTUA's work. Particularly the university is interested in presenting its work in journals and conferences supported by the leading publishing houses such as IEEE, Elsevier, ACM, etc. In greater detail, this means presenting DTPC pinpointing the benefits of its adoption for related manufacturing industries by showcasing the satisfaction of the KPIs that have been set by the DiMAT consortium. **Technological route:** NTUA will actively seek collaborations with other academic institutions whether consortium partners or not, in order to employ the gained expertise and knowledge and advance the research in the respective sectors

Table 23: Exploitation Roadmap for KER 1; KER 2 and KER 3

The individual and joint exploitation plans outlined in Table 23 represent an initial snapshot of the considered use options by the consortium. During the second half of the project, these need to be streamlined and detailed, providing for a robust exploitation roadmap to be followed after the end of the project, securing commitment and direction for the DiMAT solutions.

5 CONCLUSIONS

"Exploitation and Market Readiness" Version 1 is a strategic document for the DiMAT project. It outlines the exploitation methodology and corresponding activities, applied throughout the duration of the project, involving solution developers and exploitation leads and guiding them towards the creation of a robust post-project exploitation plan. In this first version of the document, the focus is on assessing the potential of the DiMAT solutions, particularly identifying the value of the Key Exploitable Results. An initial market analysis was conducted for the three Suites, examining the user problems, unique value propositions, existing solutions and competitors, exploitation intentions and potential use options.

This comprehensive analysis was reviewed by an external expert who provided valuable feedback on continuing and enhancing the exploitation activities in the second phase of the project. Moving forward, the exploitation efforts will include involving external stakeholders through expressions of interest for early adopters, organizing interviews and focus groups, and launching mass campaigns to further assess user needs. These activities will help fine-tune the DiMAT exploitation strategy, ensuring it is ready by the project's conclusion and presented in version 2 of the current document.

6 ANNEX

PDES – MODULE C FINAL REPORT FOR DIMAT

HORIZON RESULTS BOOSTER

An initiative of the European Commission

PDES – Module C Final Report
for
“DiMAT”

Digital Modelling and Simulation for Design, Processing and Manufacturing of Advanced Materials

Project ID Number
101091496
Exploitation Strategy Seminar
delivered on 14/06/2024

Provided by:

PAOLO DE STEFANIS

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1 EXECUTIVE SUMMARY

This report summarises the process followed for the HRB Portfolio Dissemination and Exploitation Strategy - Module C (PDES-C) service delivered to the project DiMAT and the main outcomes of the exploitation strategy seminar (ESS) held on June 14 2024.

The Expert was appointed in October 2023 and the Project Coordinator and Exploitation manager were contacted in December 2023. The parties agreed that a monthly call will be held with the HRB expert sharing progress and receiving expert feedback regarding the project's Key Exploitable Results (KERs) and the overall advancement of the DiMAT Exploitation strategy.

The first call was held in December 2023 to discuss expectations, get a first insight on the state of the art, present the service and introduce preparatory activities. On the same day the Expert sent to the Project Coordinator and the Exploitation Manager all the info and the HRB PDES-C templates to be filled in by the responsible project partners. The exploitation manager of the project worked with the partners from December to May, conducting multiple sessions to gather the necessary information for the HRB expert to perform a comprehensive assessment and deliver his report.

A Preliminary Report was sent out by the HRB expert on the 31st of May. The report was reviewed by the project's exploitation manager and shared with project partners for review before the ESS to have a common starting point during the online session. The session was attended by the project coordinator, the exploitation manager, the KERs exploitation leads and the toolkit developers.

The seminar was conducted remotely (online).

It started by presenting the agenda of the day and the participants. It then introduced the terminology used, and the three main tools presented and exercised:

- the characterisation table
- the exploitation roadmap and
- the risk matrix.

During the seminar, the discussions included a focus on how exploitation needs to aim at sustainability of the activities, after the end of the project. Focus was put on the improvement of the exploitation strategy defined so far and how partners can move forward.

On the day of the ESS, the Expert sent to the Exploitation Manager all materials and slides presented as part of the support service.

Anonymous feedback will be gathered from participants through the HRB platform project's dedicated workspace. It was as well agreed that the project will continue with the Business Plan Development) HRB Service

From the Expert's perspective, some quick preliminary remarks that will be better detailed in the document include:

- The three KERs provide significant value per se, but their integration would make the whole business case more appealing from an investor's point of view.
- The development of a holistic solution would imply the identification of a lead integration partner among the consortium. As an alternative, the consortium might involve an external system integrator.
- This, in turn, would involve the definition of specific IP transfer and exploitation agreements among the partners.
- A good way to get attract investments for the project follow up is to build a credible business case (namely, prove that the solution is able to solve a pressing need, with a strong market potential, and having reached a satisfactory validation).
- Since progressing the technology to higher TRL requires substantial funding (>500k€) and the development and validation risks are still relevant, it is advisable to look for public funding as a viable source of capital.
- To succeed in this call (expected success rate <10%), it is of utmost important to have a credible commercial pathway, in addition to the business case, a sound prototype and a well-defined an IP protection and exploitation strategy.

Besides, given the current stage of development, the Consortium should focus on the following activities:

- Understand the specific needs, pain points, and requirements of target companies across different EU countries and regions.
- Financial Sustainability: Develop a viable eco-fin plan that takes into account the necessary investments and possible medium-to-long term returns.

2 LIST OF ABBREVIATIONS

Abbreviation	Definition
AI	Artificial Intelligence
DoA	Description of Action
DKI	Downstream Knowledge Increase
EC	European Commission
EoU	Ease of Use
GDPR	General Data Protection Regulations
GUI	Graphical User Interface
IT	Information Technology
KPI	Key Performance Indicator
PR	Preparation Readiness
SMART	Specific, Measurable, Achievable, Reasonable, Time-bound
SSCN	Secure and Standardised Communication Network
TEI	Time Efficiency Increase
UI	User Interface
US	Usefulness
UX	User Experience
WiFi	Wireless Fidelity (Network)
WP	Work Package

3 INTRODUCING THE PDES-C

3.1 THE PDES-C

The aim of this service is to strengthen the capacity of projects in using their research results enhancing partners' capacity to improve their exploitation strategy.

Project activities and the research work done or to be done are considered in terms of Key Exploitable Results (KERs). KERs are results which have commercial and/or societal significance. The results selected for the discussion during the service are analysed from a viewpoint which is exploitation only and considering how they will be used to generate, after the end of the project, impact. This is the market/customer demand or societal needs/user point of view.

The service and the virtual Exploitation Strategy Seminar (ESS) provided the participants with the opportunity to work on:

1) the identification/grouping of key exploitable results;
2) the first definition of the related use mode;
3) the identification and mapping of risks related to the exploitation;
4) follow-up actions.

The ESS for DiMAT was conducted remotely, online.

3.2 AGENDA OF THE DAY

14/06/2024
10,00 – 10,15, Ice breaking (Expert, all project partners)
Welcome, virtual tour de table, presenting the Exploitation Strategy Seminar agenda.
10,15 – 11,00, Achieving Project Goals – Characterisation Table and Exploitaiton Roadmap (Expert)
Introducing the main elements connected to the Characterisation of Key Exploitable Results.
11,00 – 12,00 – Next Steps (Expert).

3.3 LIST OF PARTICIPANTS

No. Partner	Organisation	Name and Surname
1.	F6S	Ellie Shtereva
2.	AMS	Javier Gomez
3.	UPV	Raul Poler

4.	DRAXIS	Artemis Lavasa
5.	ROPARDO	Gabriela Candea
6.	NTUA	Georgia Stavropoulou
7.	UPV	Harrison De La Rosa Ramirez
8.	AITEX	Jorge Domenech
9.	UPV	Julio Serrano
10.	NTUA	Kostas Tsisteklis
11.	CETMA	Leonardo Cosma
12.	SUPSI	Luca Dell'Agostino
13.	Hegla-Hanic	Silke Pflugrad
14.	F6S	Sara Canedo
15.	NTUA	Lydia Mavraidi

4 EXPLOITATION AND KEY EXPLOITABLE RESULTS

4.1 EXPLOITATION IN HORIZON EUROPE

Activities to disseminate and exploit results from research and innovation are an integral part of Horizon Europe. Enhanced dissemination and exploitation are strategic matters for the success of Horizon Europe, synergies with other programmes and for the achievement of impact on society at large. One of the most efficient ways of furthering dissemination and exploitation of research results is through education and training. When new discoveries and knowledge are integrated in education activities, students at all levels are able to bring state-of-the-art knowledge with them to workplaces across society.

In addition to the initiatives towards open science mentioned above, Horizon Europe introduces novelties in the way research and innovation results are disseminated and exploited, giving more **emphasis to third party uptake** with **private investments** and to the knowledge and **impact these results create after the end of research and innovation projects**.

Against this background, and in line with Horizon Europe's overarching objective of enhanced communication and engagement with the public, dedicated activities for the visibility, use and valorisation of research and innovation results, including mission outputs are introduced. Horizon Europe ensures support to beneficiaries for their dissemination and exploitation activities during and after their project lifetime. Furthermore, a framework for feeding consolidated outcome based on research and innovation results, into policy and decision making will be proposed.

The availability of top-quality talent and the effective circulation of knowledge between research, industry, education and training is a pre-requisite for maximising the impact of

European research and innovation investments. Integrating research and innovation activities with education and training and supporting activities for knowledge exchange and transfer across sectors, for instance via Marie Skłodowska-Curie Actions and Knowledge and Innovation Communities, is a powerful method to ensure research and innovation activities are informed by and directed towards citizens' and society's needs and the results are widely disseminated, for instance through a well-educated work-force. A balanced approach between research and innovation is a central part of Horizon Europe, built in the design which spans the full range of Technology Readiness Levels (TRLs) from curiosity-driven research to commercially driven innovation and support to market deployment, and within innovation, technological, non-technological and social innovation.

4.2 DEFINITIONS

Results: Any tangible or intangible output of the action, such as device, data, knowledge and information whatever their form or nature, whether they can be protected.
Communication: the **promotion of the project and its results** to a multitude audience (including the media and the public/society) in a strategic and effective manner.
Dissemination: the **public disclosure of the results** by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium.
Exploitation: the **utilisation of results** – up to four years after the action:

- in further research activities other than those covered by the action concerned, or
- in developing, creating and marketing a product or process, or
- in creating and providing a service, or in standardisation activities.

4.3 CHARACTERISATION TABLE

The characterisation table is the tool used in the ESS to summarises the main features of a KER and to provide information on the selected exploitation route. Information summarised in the characterisation table is to be further integrated and finalised after the ESS becoming the base for the PEDR/business plan for the result. It does not focus on the scientific dimension of the KER but offers a snapshot of the most important elements to be considered when dealing with the use of a result, following a problem oriented (demand driven) approach.
During the ESS project partners discuss the characterisation table in an interactive manner and further finalised it.
In the table, each element is described in a simple way highlighting the most important features that distinguish the result from current solutions. The table contains information on:

- **The novel solution:** Description of the Result, problem solved, Unique Selling Point (competitive advantages or innovativeness introduced compared to already existing Products/Services);

- **Market:** Product/Service Market Size, Market Trends/Public Acceptance, Product/Service Positioning; Competitors/Incumbents, Prospects/Customers;
- **External factors:** Legal or normative or ethical requirements (need for authorisations, compliance to standards, norms, etc.);
- **Go to market aspects:** Cost of Implementation (before Exploitation), Time to market, Estimated Product/Service Price, Adequateness of Consortium Staff, External Experts/Partners to be involved;
- **IPR Status*:*** Background (type and partner owner), Foreground (type and **partner owner)**;
- **Exploitation Strategy:** Exploitation Forms (direct industrial use, technology transfer, license agreement, publications, standards, etc.), Which partner contributes to what (main contributions in terms of know-how, patents, etc.) Partner/s' expectations, Sources of financing foreseen after the end of the project (venture capital, loans, other grants, etc.).

4.4 PRIORITY MAP AND RISK MATRIX

The Priority Map provides at a glance a snapshot on the main risks identified by the partners. It is based on risks selected in the Risk Matrix assessment tool (Risk Matrix) and the proposed remedy actions. The Risk Matrix helps the partnership identifying for each KER, the type of risk, its level of importance related to the use of the concerned KER, the probability for such a risk to happen, remedy actions and their probability to succeed.

The Risk Matrix analyses the following six different categories of risks:

- **1. Partnership Risks:** internal risk factors related to the composition of the partnership or specific behaviours of the partners, conflict of interests, etc.
- **2. Technological Risks:** external factors related to the feasibility of the technology, its level of development, presence of other emerging technologies, etc.
- **3. Market Risks:** external risk factors related to fulfilment of marked needs, presence of competitors or alternative products, etc.
- **4. IPR Risks:** factors related to the presence of similar previous patents, the possibility to protect the developed technology/product, patent counterfeit, etc.
- **5. Environmental risk factors:** are external factors related to the presence or changing in legislations, standards, etc. Special attention will be given to regulatory environment and standardisation issues.
- **6. Financial risk factors:** factors related to the availability of funds for bringing the research stage to prototyping industrialisation/commercialisation.

The severity grade is scored for each risk (1 = low; 10 = high). The grade shows the importance of the risk with respect to successful exploitation. For example:

- a previous patent, on the same technology, is a severe risk (10 points) if our exploitation route is fully relying on patenting;
- the sudden change of market conditions can be a severe risk if we want to introduce a product into the market.

After scoring the severity grade, the second step is to evaluate the probability for the risk to happen (1 = low; 10 = high). In the examples above:

- in the case of the patent, if we realize (after a quick search) that there is a patent preventing us to patent as well, then the probability of happening is 100% and the related mark is 10;
- in the case of market change: the apple market will not change so dramatically in the next future (grade 1) while apps market is changing every day (grade10).

The product of the severity and the probability grade will give the risk grade of the concerned risk factor (value on the x axis).

The risk grade coupled with the probability of success will position the risk in the Priority Map.

1. A high-risk grade and a low probability of success of the intervention, identifies a situation where we may consider discussing to stop the project (Warning). Examples:
   - There is a patent interfering with the one we would like to file. As a remedy, there is the plan to ask the owner for an agreement but, it is evident, chances of succeeding are very low. The selected exploitation path is blocked and there is not any possibility to go on;
   - The market is changing regulations and the product is not compliant anymore. As a remedy, there is the re-design of the product but with a very low probability of having something that will match the customers' needs. This may lead to the decision to stop the project.

2. A high-risk grade with a high probability of success for the remedy action defines a situation where there is the need for an immediate action to ensure exploitation (action). Examples:
   - There is a previous patent interfering with the one we are about to file in. An agreement with the previous patent is feasible. In this case, the exploitation of that technology, if the agreement is reached, it is still possible, but action should be taken as soon as possible;
   - The market is changing regulations and the product is not respecting the new one. The re-design of some components will fulfil both compliance to new regulations and customers' needs. Partnership should re-think our project as soon as possible.

3. A low-risk grade coupled with a high probability of success of the planned remedy defines a situation where it would be preferable to keep an eye on what is happening (Control) to be ready to act. Example:

- Regulations in the market have not changed since the last 20 years and our product is valid only with such regulations. As a remedy, we should re-design some components to continue to be on the market. We have to monitor the situation (regulatory framework) and in case it will change, we have to immediately re-design our product.

4. A low-risk grade and a low probability of success for the remedy, it is a situation does not call for immediate action (no action). Examples:
   - Regulations in the market have not changed since the last 20 years and our product is valid only with such regulations. We could think to re-design our product but there are low possibilities to get good results. Under these conditions it is better not consider any intervention;
   - Regulations in the market have not changed since the last 30 years and our product is fully compliant. There is no need at the current stage to modify our product nor to be worried about any change in regulations.

4.5 TOWARDS THE EXPLOITATION PLAN

The ESS is just one of the first steps of a structured path towards exploitation. Working with KERs calls for understanding what the actual results are (will be) and what needs to be until the end of a project (and beyond) to have a clear and actionable exploitation plan ready and agreed among partners.
In the following pages, we provide a table that illustrates how what it is discussed during the ESS is to be integrated and developed to prepare the exploitation plan. Using these tables will help project partners in better prepare and structuring the Plan for Exploitation and Dissemination of the Results (PEDR) by focusing on relevant information planning actions and ensuring resources needed for a sustainable use of the results.
Support in finalising is part of the Business Plan Development (BPD) service provided under the Horizon Results Booster [1].

Characterisation Table

Add KER name	
Problem	*Describe the problem you are addressing (the problem your potential users have).*

[1] https://www.horizonresultsbooster.eu/

	Potential users are the people, companies, organisations, etc. that you expect will use the result (and generate an impact). They are your "Customers".
Alternative solution	*Describe how your "customer" has solved the problem so far.*
Unique Selling Point USP - Unique Value Proposition UVP	*Describe the competitive advantages, the innovative aspects. What does your solution do better, what are the benefits considering what your user/customer wants, how does your solution solve his/her problem better than alternative solutions, what distinguishes the KER from the competition/current solutions?*
Description	*Describe in a few lines your result and/or solution (i.e., product, service, process, standard, course, policy recommendation, publication, etc.). Use simple wording, avoid acronyms, make sure you explain how your UVP is delivered.*
"Market" – *Target market*	*Describe the market in which your product/service will be used/can "compete", answering the following questions:* *- What is the target market?* *- Who are the customer segments?*
"Market" – *Early Adopters*	*Early adopters are the "customers" you are willing to address first. They are usually the ones that feel the problem harder than all the others (they are not the project partners).*
"Market" - Competitors	*Who are your "competitors" (note: they are the ones offering "alternative solutions")?* *What are their strengths and weaknesses comparing to you?*
Go to Market – Use model	*Explain what is your "use model", how the KER will be put in use (made available to "customers" to generate an impact). Examples of use models: manufacturing of a new product, provision of a service, direct industrial use, technology transfer, license agreement, contract research, publications, standards, etc.* *Note training is a service.*
Go to Market - Timing	*What is the time to market?*
Go to Market – IPR Background	*What is the Background (type/ partner)?*
Go to Market – IPR Foreground	*What is the Foreground (type/ partner)?*

Exploitation Roadmap

The roadmap is a tool designed to help the consortium to identify and plan activities to be performed after the end of the project. The highest risk a consortium faces is not being able to implement the exploitation and dissemination plan and increase the TRL level or go to market,

due to lack of resources. The exploitation roadmap is designed to address this risk, mitigate it and pave to way toward use and a stronger impact.

Exploitation roadmap	
Actions	*Briefly describe actions planned to be executed 3-6 months after the end of the project.*
Roles	*Roles of partners involved in the actions defined above.*
Milestones	*List the milestones and KPIs to be used for monitoring the implementation of the actions listed above. Add timeline.*
Financials Costs	*Cost estimation to implement planned activities (1 year, 3 years).*
Revenues	*Projected revenues and eventual profits once the KER will be used (1 and 3 years after use).*
Other sources of coverage	*Resources needed to bridge the investment needed to increase TRL and ensure the result is used.*
Impact in 3-year time	*Describe impact in terms of growth/benefits for the society.*

Use options

KER's Exploitation route (how the KER will be further exploited)			
Selected route		**Implementing actor**	**Yes**
DIRECT USE	Commercialisation: *deployment of a novel product/service (offered to the target markets)*	One partner[2]	
		A group of partners[3]	
	Contract research (*new contracts signed by the research group with external clients*)	A partner	
		A group of partners	
	A new research project (*application to public funded research programmes*)	A partner	
		A group of partners	
	Implementation of a new university – course (*Note that a training course is a service*)	A partner	
		A group of partners	
		A new partnership	
INDIRECT	Assignment of the IPR	A partner	
		A group of partners	
	Licensing of the IPR	A partner	

[2] Partners identifies the partners of the project receiving the ESS, not third parties that may be partner in the future.
[3] Provide the names of the partners.

		A group of partners	
	Development of a new legislation/standard	A partner	
		A group of partners	
	Spin- off	A partner	
		A group of partners	
		By assignment	
		By licensing	
	Other (*please describe*)		

5 DIMAT

5.1 PROJECT MAIN DATA

TITLE	Digital Modelling and Simulation for Design, Processing and Manufacturing of Advanced Materials
ACRONYM	DIMAT
CONTRACT NUMBER	101091496
BUDGET	€ 5 709 052,50
COORDINATOR	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS
STARTING DATE	01/01/2023
ENDING DATE	31/12/2025

5.2 PROJECT ABSTRACT

European materials industry is considered a key enabler for industrial development and the EU has a historically strategic position in this sector. However, there is a low uptake in European materials industry for digital technologies. Hereby, it is crucial to provide all stakeholders of the EU with advanced digital technologies to evolve towards an agile European materials industry with intelligent enterprises that maximise and integrate the utility of digital materials sciences knowledge. DiMAT will develop Open Digital Tools with a set of advanced technologies for offering European SMEs and Mid-Caps an affordable (in terms of cost, implementation and usability) full modelling, simulation and optimisation system in each stage of the material value chain (design, processing and manufacturing) for improving quality, sustainability, effectiveness, and competitiveness of materials. DiMAT will deploy 3 integrated Suites: 1) DiMAT Data and Assessment Suite: digital technologies for storing, sharing, representing and assessing materials data; 2) DiMAT DiMAT Modelling and Design Suite: digital technologies for material design, in terms of their internal structure, properties and performance, in order to predict the material behaviour before manufacturing; 3) DiMAT Simulation and Optimisation Suite: digital technologies for creating efficient materials manufacturing simulation processes and determining the behaviour of the material mechanical characterization models to be used in the AI training and prediction. The DiMAT Suites will be demonstrated in 4 Pilots of European designers and producers of different materials: textile, composite, glass and graphite.

5.3 KERS CONSIDERED AT THE ESS

The Consortium has identified 3 Key Exploitable Results to discuss at the ESS, which have been included in the Preliminary Report.

No.	DiMAT Data and Assessment Suite – DiDAS
1	The KER addresses three key areas: data storage, knowledge acquisition, and life cycle assessment (LCA). 1) Data Storage: The suite provides a data storage system capable of handling and integrating diverse types of materials data. This involves organizing and connecting data that may vary in format, structure, and origin, ensuring that all relevant information is accessible and manageable. 2) Knowledge Acquisition: The suite includes a tool for knowledge acquisition that help in organizing and structuring complex information. This involves capturing tacit knowledge (expert insights, experiences, and understandings) and formalizing it in a way that can be used and queried effectively. This is particularly useful for data that doesn't fit neatly into traditional relational databases. 3) Life Cycle Assessment (LCA): The suite offers a specialized tool for conducting life cycle assessments. LCA involves evaluating the environmental impacts of a product or process from cradle to grave (i.e., from raw material extraction through production, use, and disposal).
	DiMAT Modelling and Design Suite
2	This KER offers a collection of digital technologies specifically designed for material design, with several key objectives and functionalities: 1) Prediction of Material Behavior, 2) Improving Material Designs and ROI, 3) Reducing Material Design Errors, 4) Efficient Use of Materials, 5) Increasing Personnel Productivity.
	DiMAT Simulation and Optimisation Suite:
3	This KER aims to provide powerful tools and services that enable accurate prediction, efficient modeling, and continuous optimization of materials and industrial processes. By leveraging numerical simulations and digital twin technology, Suite 3 helps industries improve performance, reduce waste, and increase productivity.

By examining these 3 KERs, we aim to provide a thorough understanding of the complexities involved, ensuring the Consortium is well-equipped to make informed decisions and navigate the intricacies of the project.

6 IMPROVED EXPLOITATION STRATEGIES FOR KEY EXPLOITABLE RESULTS IN DIMAT

The Characterisation Table and the Exploitation Roadmap were drafted by the beneficiaries with feedback and suggestions from the expert. The final version is the result of several iterations, brainstorms and discussions during the webinars and coaching sessions. Some final feedback and pointers from the expert have been included in *red and italic*.

6.1 KER NO.1 – DIMAT DATA AND ASSESSMENT SUITE (KER LEADING BENEFICIARY: FRAUNHOFER)

6.1.1 Characterization of the result

The Characterisation table is designed to start the collection of information that will be then reviewed and further integrated during the project life.

KER name - DiMAT Data and Assessment Suite – DiDAS	Input from the Beneficiary	Comments by the Expert
Problem	The Suite provides solutions for data storage and knowledge acquisition as well as for life cycle assessment. In terms of data storage, the challenge is to store and link heterogenous	*I'd focus on highlighting the specific problems your users/customers suffer from, so that you can then tailor your value proposition around them. My understanding is that the following problems should be addressed:*

	materials data originating from different sources. Knowledge acquisition additionally help to structure knowledge that cannot be stored in traditional data base solutions. Finally, life-cycle assessment is very complex and cannot be handled by non-experts. Results cannot be interpreted easily and are typically static.	*1) Data Safety and Traceability: Ensuring material data is secure and traceable throughout its lifecycle.* *2) Sustainability: Increasing the use of materials from renewable resources and reducing environmental impact.* *3) Cost and Efficiency: Reducing material design costs, economic impact, and time to market.* *4) Digital Skills: Enhancing the digital skills of personnel involved in material handling and assessment.*
Alternative solution	Customers use complex folder structures or classic relational data bases to store files (e.g. Granta MI) and knowledge (often stored in folders or using excel or pdfs). This approach works for their purposes (for now), but the structures are not flexible and cannot be adjusted when it comes to sharing data, representing complex workflows of data processing. And for assessing the data special tools have to be developed/ adjusted. Specifically, regarding the Materials Environmental and Cost Life Life Cycle Assessment (Toolkit 3 of Suites 1), Popular LCA tools include SimaPro, GaBi, and OpenLCA; they	*The analysis of the customers could be done by segmenting the target groups, so that you can immediately identify those with highest need and prioritise those with highest immediate adoption rate.* *One approach might be:* *1) Material Scientists and Engineers:* *Problem They Face: They often struggle with managing and accessing vast amounts of material data efficiently. This includes difficulties in ensuring data safety, traceability, and utilizing data for research and development purposes.* *Solution Benefits: The suite provides a centralized repository for material data, enhancing data safety and traceability. It also offers tools for knowledge*

	all require extensive domain knowledge and are used by expert analysts; other examples include the LCA Activity Browser or LCA to go. MEC-LCA also incorporates results from such tools and relevant databases but does not focus on the execution of the LCA assessment per se, rather on the final user and how they can continue to extract value from the LCA results.	*acquisition and assessment, facilitating better decision-making and innovation.* *2) Manufacturing Companies:* *Problem They Face: Manufacturers need to ensure the materials they use are cost-effective, environmentally sustainable, and available from renewable sources. They also face challenges in reducing design costs and time to market.* *Solution Benefits: The suite helps in assessing materials based on their economic and environmental impact over their life cycle, which can reduce material design costs and the environmental footprint. It supports the use of renewable resources and streamlines the process from design to market.* *3) Environmental Compliance Officers:* *Problem They Face: Ensuring that the materials used in products comply with environmental regulations and sustainability standards can be complex and time-consuming.* *Solution Benefits: The tools enable better tracking and assessment of materials for compliance with environmental standards, thereby simplifying the regulatory compliance process.*

		4) R&D Departments: *Problem They Face: Research and Development departments often need to evaluate new materials quickly and effectively to stay competitive. They require reliable data and tools to predict the performance and impact of materials.* *Solution Benefits: The suite's capabilities in data management and material assessment support R&D activities by providing reliable data and comprehensive assessment tools, thus speeding up innovation and reducing time to market.* *5) Procurement Professionals:* *Problem They Face: Procuring materials that meet specific criteria for cost, performance, and sustainability can be a daunting task.* *Solution Benefits: The suite allows procurement professionals to assess materials easily based on various parameters, facilitating better-informed purchasing decisions.*
Unique Selling Point USP - Unique Value Proposition UVP	- Semantic data and knowledge storage that allows for interoperability	*The USPs of the DiMAT Data and Assessment Suite outline a robust set of features and benefits that cater to the needs of material science, manufacturing, and product development*

	- Storage that allows for representing complex workflows of all kind (mainly to improve traceability of information) - Structured knowledge representation and visualization - Unified access to data integration and knowledge discovery - Digitalized data storage - Data knowledge management and analysis - Data visualisation - Environmental impact and process costs decision support - Process hotspot identification (cost or environmental impacts) - Discover new material connections and relations - Save time and money - Get unified access	*industries. Here's a breakdown of my suggestions, criticisms, and remarks on these USPs:* *Suggestions:* *Focus on User-Centric Design: Ensure that the suite is designed with a user-centric approach, making it intuitive and easy to use for non-technical users such as procurement professionals and environmental compliance officers.* *Enhance Scalability: Ensure that the solution can scale effectively with the size and complexity of data and workflows in larger organizations.* *Include Collaboration Features: Consider integrating collaboration features to facilitate teamwork and knowledge sharing among users.* *User Training and Support: Provide comprehensive training and support materials to help users maximize the potential of the suite.* *Criticisms:* *Complexity in Implementation: The suite sounds highly sophisticated, which could potentially lead to complex implementation processes. It's crucial to*

		provide implementation support to ensure smooth adoption. *Integration Challenges: Achieving seamless integration across various existing systems and platforms might be a challenge, especially if the suite is not flexible enough to accommodate different IT infrastructures.* *Remarks:* *Demonstrate ROI: Provide case studies or use cases demonstrating how the suite has successfully improved efficiency, reduced costs, and supported sustainable practices in real-world applications.*
Description	DiMAT data and assessment Suite provides a set of digital tools powered by semantic technologies that provide data storage, management and utilisation solutions. The main goal of this suite is to improve the material data safety and material traceability, increase the use of materials from renewable resources and personnel digital skills, reduce material design cost, material economic and environmental impact and time to market. These tools will work together to offer a centralized repository for materials data, enable	

	knowledge acquisition and assess materials based on their environmental impact and cost over their life cycle.	
"Market" – *Target market*	The target market are companies along the complete materials value chain, that need to store and assess data. Mainly companies that are handling and processing large amounts of heterogeneous data and knowledge to be stored and assessed. Can be companies of all sizes in all sectors that manufacture materials. The solution is not limited to a specific sector.	*The target market can be roughly divided in the following segments:* *1) Material Science and Engineering Companies: Companies involved in the research, development, and production of materials. Includes sectors such as aerospace, automotive, electronics, construction, and more. 2) Manufacturing Companies: Organizations involved in the manufacturing of products across various industries.These include both discrete manufacturing (e.g., automotive parts, electronics) and process manufacturing (e.g., chemicals, pharmaceuticals).* *3) Environmental Compliance and Sustainability: Companies and agencies responsible for ensuring compliance with environmental regulations. Includes sustainability consultants, environmental agencies, and compliance officers. 4) Research and Development Departments: R&D departments across industries that focus on material innovation and product development.* *5) Educational and Research Institutions: Universities, research labs, and educational*

		institutions offering programs in material science and engineering. *6) Procurement and Supply Chain: Professionals responsible for sourcing and procurement of materials and managing the supply chain. 7) Government Agencies and Regulatory Bodies: Agencies responsible for setting and enforcing environmental and safety regulations related to materials and manufacturing.*
"Market" – *Early Adopters*	Customers for which data processing plays a significant role. Early adopters are the ones that handle and process a large amount of heterogeneous materials data and that recognizes the advantage the Suite provides in making data storage and assessment more efficient an time-saving. For example someone who gets experimental data from the lab (in-house or external), needs to structure it and makes life-cycle analysis on the basis of it. Also, users of DiMAT Modelling and Design Suite and DiMAT Simulation and Optimisation Suite.	*Early adopters of the DiMAT Data and Assessment Suite are likely to be organizations and professionals who are innovative, forward-thinking, and have a strong need for advanced data management, analysis, and sustainability solutions in the material science and manufacturing sectors. Some potential early adopters include:* *1) Material Science and Manufacturing Companies: Companies that are active in their respective industries and are looking to innovate and optimize their material sourcing, production processes, and sustainability efforts.* *2) Research Institutions and Universities: Educational and research institutions that focus on material science, where there is a strong need for advanced data management and analysis tools. These institutions could benefit from the*

		suite's capabilities in knowledge representation, data visualization, and material assessment. *Characteristics of Early Adopters are:* - *Innovative Mindset: They are open to adopting new technologies and solutions that can provide a competitive advantage.* - *Strong Need for Efficiency and Optimization: They face challenges in data management, sustainability, and cost reduction that the suite addresses.* - *Early Market Influence: They can influence other organizations and sectors to adopt the technology.*
"Market" - Competitors	Companies that offer relational data bases for storing data and as basis for assessing data. Such databases are not flexible enough to allow for data sharing, representation of workflows and to offer interoperbility. They also are not capable of storing data enriched with meaning (i.e. provided by semantic technologies) - *Ansys Granta MI https://www.ansys.com/products/materials/granta-mi/*	*1. CES Selector (Granta Design)* *Product: CES Selector* *Features: Materials selection software that helps in choosing the right materials based on various criteria including environmental impact and costs.* *2. Matereality (DS Simulia, a part of Dassault Systèmes)* *Features: Materials information management, digital material testing, simulation data management, and collaboration tools.* *3. Total Materia*

	- *Palantir Foundry https://www.palantir.com/platforms/foundry/* - *Coscine* https://about.coscine.de/ - *Arangograph https://arangodb.com/* Companies carrying out life cycle analyses or developing relevant tools either for the reporting of the results or for dynamically monitoring specific indicators (such as tools connected to on-site sensors). Other materials knowledge graphs creators (e.g., MatKG), other materials databases (e.g., materials project/companies that offer access to material-related datasets with pricing).	*Features: Comprehensive materials database, material property data, cross-referencing, and material comparison tools.* *4. EcoChain Technologies* *Features: Life cycle assessment (LCA) software that calculates the environmental impact of products and processes.* *6. GaBi Software (Thinkstep, a Sphera Company)* *Features: LCA software for analyzing the environmental impact of products, materials, and processes.*
Go to Market – Use model	Toolkits will be provided to the customers via the platform as software packages. In general, the toolkits can be used individually and can be adapted on specific purposes. However, also the toolkits can assist the functionalities of toolkits from the other Suites by providing data, knowledge and assessments for the life cycle of a material. Providing the toolkits as a Suite will enable users to better understand the	

	information on the materials, the processes, the carried experiments and the life-cycle assessment. CMDB and KAF are expected to support a common ontological vocabulary for describing material and basic material properties and concepts that will aid in easier information retrieval and population of the toolkits. In this way, the toolkits can benefit from exchanging data and enhancing their capabilities I. Besides direct industrial usage of the toolkits from DiMAT data and assessment Suite (and support), Saas and consultancy services can be provided by the project partners.	
Go to Market - Timing	Time to market should be two years after the end of the project. Integration of all functionalities necessary for industrial usage and improved user experience is envisaged for this.	*The suggested key Activities and Timeline include: 1) Prototype Assessment and Feedback Gathering, 2) Feature Enhancement and Development, 3) Pilot Testing and Validation, 4) Integration and Customization, 5) Regulatory Compliance and Certification, 6) Marketing and Sales Preparation, 7) Commercial Launch and Sales* *Total Estimated Time: Approximately 12-24 months from the advanced prototype stage to full commercialization.*

Go to Market – IPR Background	CMDB: Code was developed mostly in other European and German national projects. No IPR background is applied for Toolkit 2: KAF.	
Go to Market – IPR Foreground	- **Fraunhofer** - owner of CMDB toolkit - **DRAXIS** - owner of Materials Environmental and Cost Life Cycle Assessment Toolkit - **NTUA** - owner of Materials Knowledge Acquisition Framework **(toolkit) - UPV and CERTH - contributors** (requirements elicitation and evaluation)	

6.1.2 Exploitation Roadmap

The Exploitation Roadmap is a tool designed to help the consortium to identify and plan activities to be performed after the end of the project. The highest risk a consortium faces is not being able to implement the exploitation and dissemination plan and increase the TRL level or go to market, due to lack of resources. The exploitation roadmap is designed to address this risk, mitigate it and pave to way toward use and a stronger impact.

Exploitation roadmap	Input by the Beneficiary	Comments by the Expert
Actions	Finalisation of business plan. Further dissemination of results: organize a workshop with industry, participation at events like conferences, fairs, try to onboard first companies.	*To ensure the proper exploitation of the DiMAT Data and Assessment Suite, given the involvement of three partners and the lack of a clear leader for the exploitation activities, a strategic and collaborative approach is essential. Here are the key strategic activities I'd propose:* *1. Establish a Governance Structure: Form a joint exploitation committee or consortium among the research centers. Create a formal agreement outlining roles, responsibilities, and decision-making processes. Appoint a project manager or coordinator to oversee the exploitation activities. Define clear governance policies and procedures to ensure smooth collaboration.* *2. Develop a Business Plan: Create a comprehensive business plan to guide commercialization efforts. Conduct market analysis to identify target customers and market size.* *Develop financial projections, including funding requirements, revenue models, and pricing strategies.* *Outline a go-to-market strategy, including sales channels, marketing tactics, and customer engagement plans.* *3. Intellectual Property (IP) Management: Protect and manage intellectual property associated with the solution. Conduct an IP audit to identify all patentable innovations, copyrights, trademarks, and trade secrets. File for patents and register trademarks as needed. Establish clear*

		ownership and licensing agreements among the research centers. *4. Seek Funding and Partnerships: Secure funding and establish strategic partnerships. Identify potential funding sources such as government grants, venture capital, and industry partnerships. Develop compelling proposals and pitches for investors and funding agencies. Forge partnerships with industry players, technology providers, and potential customers to support market entry and growth.* *5. Product Development and Enhancement: Finalize product development and prepare for commercialization. Conduct further development to address any feedback from the prototype phase. Ensure the product meets all regulatory requirements and industry standards.* *Develop user documentation, training materials, and support infrastructure.* *6. Marketing and Sales Strategy: Execute marketing and sales activities to generate awareness and drive adoption. Develop a branding and positioning strategy. Launch targeted marketing campaigns using digital marketing, industry events, webinars, and content marketing. Build a sales team or partner with distributors/resellers. Create demo versions or pilot programs to showcase the solution to potential customers.* *7. Collaborative Coordination: Foster strong collaboration among the three research centers. Hold regular*

		coordination meetings to ensure alignment and progress tracking. *Use collaborative tools and platforms for project management and communication. Promote a culture of transparency and shared objectives among all partners.*
Roles	Fraunhofer, NTUA, DRAXIS should participate and support on all the actions (on their own and together). The partners are experts on their toolkits and try to increase the popularity of the toolkits. Toolkits are embedded in the Suite, for which the actions will be led by Fraunhofer.	
Milestones	Month 3: Business plan finalised Month 6: participation at one conference or fair (at least), or one workshop held with the industry	*A summary of the milestones to achieve is:* *Month 3: Completion of Market Analysis and Business Plan.* *Month 4: IP Audit and Filing for Patents/Trademarks.* *Month 6: Securing Initial Funding.* *Month 9: Establishment of Strategic Partnerships.* *Month 12: Completion of Final Product Development.* *Month 13: Launch of Marketing Campaigns.* *Month 14: Establishment of Customer Support System.* *Month 15: Sales Team or Distributor Network Established.* *Month 16: Implementation of Feedback Loop.*

		Month 18: First Performance Review and Strategy Adjustment.
Financials Costs	Costs for maintenance and possible support. Hardware costs. Social media marketing. Legal costs. 1 year: 40.000 Euro 3 years: 3*40.000 Euro	*Such costs don't include continuous support to operations, which account for a large scale of the operating costs of the platform. An idea of the possible budget is:* *1. Establish a Governance Structure* *Costs: €10,000 - Legal fees for drafting agreements and establishing the governance structure.* *Initial meetings and coordination efforts.* *2. Business Plan - Costs: €20,000, including Market research and analysis and Consulting fees for business plan development.* *3. Product Development and Enhancement* *Costs: €200,000 - Final development and feature enhancement based on feedback. Testing and quality assurance.* *User documentation and support infrastructure development.* *6. Marketing and Sales Strategy* *Costs: €150,000 - €300,000 - Branding and positioning strategy development. Marketing campaign costs (digital marketing, events, webinars, content creation). Development of demo versions and pilot programs. Sales*

		team hiring and training or establishing distributor/reseller agreements.
Revenues	Following a study done in a former EU project in 2023 (unpublished), the serviceable obtainable market (SOM) only for materials modelling is about 1-2 m Euros. The aim is: 1 year: 5% SOM = 50.000 – 100.000 Euros 3 years :25% SOM = 250.000 – 500.000 Euros	*Considering the customer segmentation provided above, it is advisable to make a deeper analysis of the TAM, SAM and SOM, as the number provided seem a little underestimated.*
Other sources of coverage	Public grants are an ideal source of funding for covering the expenses related to the system engineering and validation.	
Impact in 3-year time	- Increase in resilience - Increase in innovation in materials development and processing - Will create jobs in the EU and mobilize investments	

6.1.3 Risks Assessment and Priority Map

KER Risk Assessment Map

	Description of Risks	Degree of criticality of the risk related to the final achievement of this Key Exploitable Result. Please rate from 1 to 10 (1 low- 10 high)	Probability of risk happening Please rate from 1 to 10 (1 low - 10 high)	Risk Grade	Potential intervention	Estimated Feasibility/Success of Intervention Please rate from 1 to 10 (1 low- 10 high)	Conclusion
	Partnership Risk Factors						
1	Disagreement on further investments: some partners may leave.	*5*	*5*	**25**	Establish clear agreements with partners outlining the processes to be followed in case of their departure, including handover procedures and knowledge transfer obligations.	*8*	**Control.**

2	Industrialization at risk: a business partner leaves the market.	*7*	*1*	**7**	The Consortium is working in harmony and is approaching the final year of the project without any hint that this issue may arise.	*9*	**Control.**
3	Disagreement on ownership rules	*8*	*7*	**56**	Clear definition of ownerships/rights at developments during the project. Potential intervention - how will the exploitation lead and partners involve mitigate this risk from happening, or will there be any offered alternatives in case of occurence - for e.g. during the course of the project partners will dedicate sufficient time on defining the ownership and exploitation agreement for post project exploitation, etc.	*7*	**Action!**

4	Partners break out and create competitive products	*5*	*1*	**5**	Same approach as risk 2	*7*	**Control.**
	Technological Risk Factors						
5	The solution may face unforeseen technical challenges during final development, integration with existing systems, or scalability issues.	*5*	*5*	**25**	Conduct thorough testing and validation at every development stage. Maintain a flexible development approach to address and resolve issues promptly. Collaborate with external technical experts or consultants if necessary.	*9*	**Control.**
6	The solution might be vulnerable to cyber-attacks, data breaches, or other security issues.	*2*	*2*	**4**	Implement robust cybersecurity measures, including encryption, secure coding practices, and regular security audits. Develop a comprehensive incident response	*9*	**Control.**

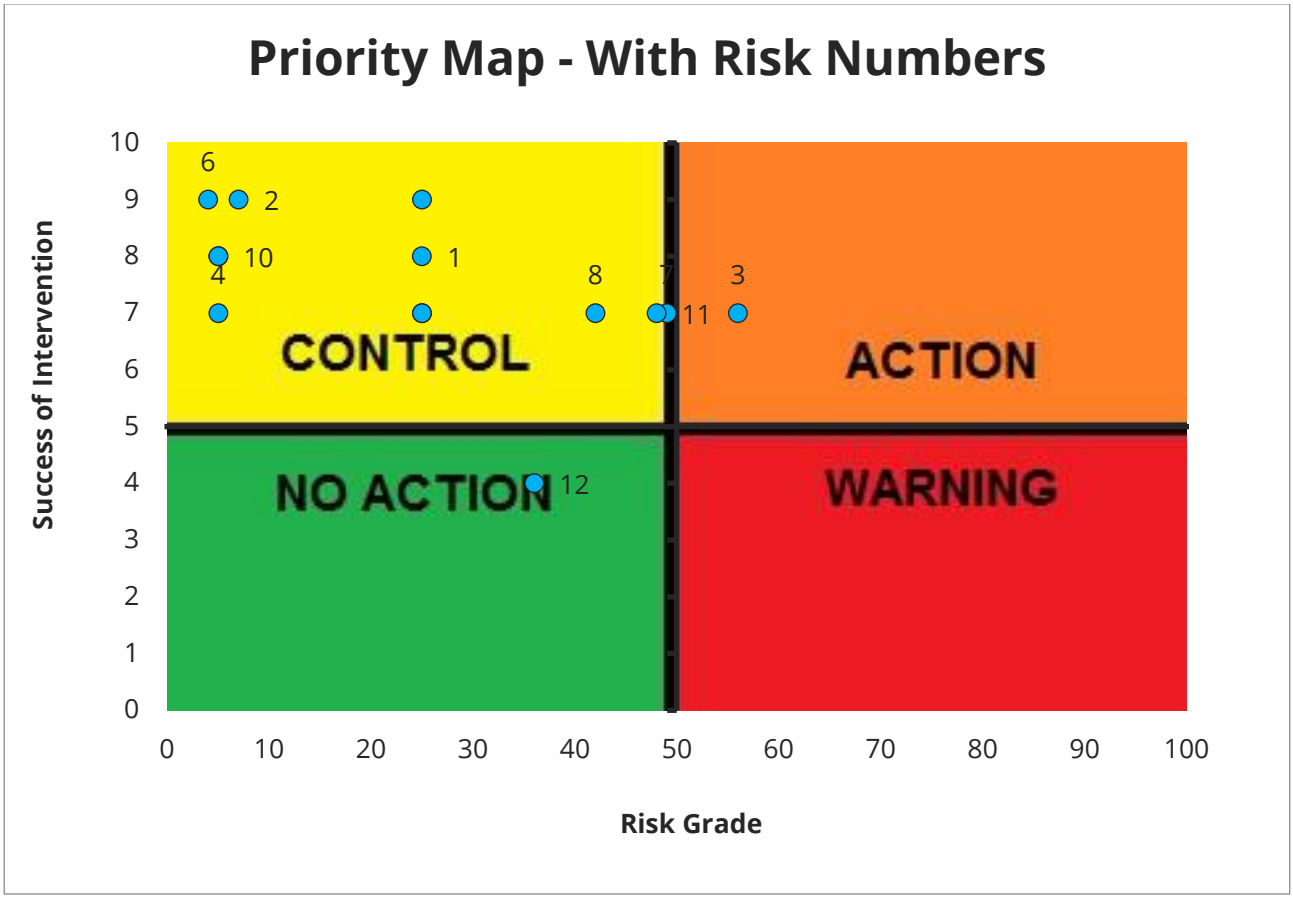
					plan. Provide regular cybersecurity training for the development and support teams.		
	Market Risk Factors						
7	The solution may not be well-received by the market, or the adoption rate may be slower than expected.	*7*	*7*	**49**	Conduct extensive market research to understand customer needs and preferences. Develop a strong value proposition and marketing strategy to communicate the benefits effectively. Start with pilot programs or beta testing to gather user feedback and refine the solution before a full-scale launch.	*7*	**Control.**
8	Competitors might release similar or superior solutions, making it challenging to capture market share.	*7*	*6*	**42**	Continuously monitor the competitive landscape and adapt the business strategy accordingly.	*7*	**Control.**

					Focus on differentiating features and unique selling points (USPs) such as semantic data storage and advanced analytics. Invest in ongoing innovation and improvement of the solution.		
	IPR/Legal Risk Factors						
9	There may be disputes or challenges regarding the intellectual property, potentially leading to legal conflicts.	*5*	*1*	**5**	Conduct a thorough IP audit and ensure all IP is properly documented and protected through patents, trademarks, and copyrights. Engage with experienced IP attorneys to handle IP filings and potential disputes. Monitor the market for potential IP infringements and take action when necessary.	*8*	**Control.**

10	Issues related to contracts with customers, partners, or suppliers might arise, leading to legal liabilities.	*5*	*1*	**5**	Develop clear and comprehensive contracts with all parties involved. Include clauses that address liability, indemnity, and dispute resolution. Consult legal experts to ensure contracts are enforceable and comply with relevant laws.	*8*	**Control.**
	Financial/Management Risk Factors						
11	Insufficient funding could delay development, marketing, or other critical activities.	*8*	*6*	**48**	Diversify funding sources by seeking grants, venture capital, and strategic partnerships. Maintain a detailed budget and monitor financial performance closely. Prioritize essential activities and	*7*	**Control.**

					develop a phased approach to roll out the solution.		
12	Development and commercialization costs might exceed initial estimates.	*6*	*6*	**36**	Implement rigorous project management practices to track and control costs. Establish a contingency fund to cover unexpected expenses. Regularly review and adjust the budget based on actual performance and emerging needs.	*4*	**No Action'**
	Environmental/Regulation/Safety risks:						
13	Failure to comply with relevant data protection, environmental, or industry-specific regulations could result in fines or operational restrictions.	*5*	*5*	**25**	Stay informed about relevant regulations and ensure the solution meets all compliance	*7*	**Control.**

					requirements. Engage regulatory experts to review the solution and provide guidance on compliance. Develop internal policies and procedures to maintain ongoing compliance and conduct regular audits.		
14	New regulations or changes to existing ones could impact the solution's viability or require significant modifications.	*5*	*5*	**25**	Monitor regulatory developments closely and assess their potential impact on the solution. Maintain a flexible development approach to adapt to regulatory changes. Participate in industry groups and forums to stay ahead of regulatory trends and influence policymaking.	*7*	**Control.**



The DiMAT Data and Assessment Suite project, while promising, faces a range of significant risks that must be carefully managed to ensure successful commercialization. Technologically, the project could encounter challenges in integrating with existing systems and ensuring scalability, which could require thorough testing and possibly external expertise. Cybersecurity threats also pose a significant risk, necessitating robust security measures and a comprehensive incident response plan to protect sensitive data.

Market risks are another major concern. There is always the possibility that the solution may not be widely accepted by potential customers, which could slow adoption rates. To address this, the project team needs to conduct extensive market research, clearly articulate the value proposition, and gather user feedback through pilot programs. The competitive landscape also presents a risk, as other players might introduce similar or superior solutions. Continuous monitoring of competitors and a focus on innovation will be essential to stay ahead.

Intellectual property and legal risks include the potential for IP disputes and the complexities of managing contracts with various stakeholders. Ensuring thorough IP protection and having clear, comprehensive contracts will be crucial to avoid costly legal issues. Financially, securing sufficient funding is critical to avoid delays in development and commercialization. The project

must explore diverse funding sources and maintain strict budget control to prevent cost overruns.

Lastly, regulatory compliance poses a significant risk, with potential fines or operational restrictions if the solution does not meet necessary standards. Staying informed about relevant regulations and engaging with regulatory experts will help ensure compliance. Additionally, the project must be prepared to adapt to any changes in regulations that could impact the solution's viability.

6.1.4 Use options

KER's Exploitation route (how the KER will be further exploited)			
Selected route		**Implementing actor**	**Yes**
DIRECT USE	Commercialisation: *deployment of a novel product/service (offered to the target markets)*	One partner[4]	
		A group of partners[5]	X
	Contract research (*new contracts signed by the research group with external clients*)	A partner	
		A group of partners	
	A new research project (*application to public funded research programmes*)	A partner	
		A group of partners	
	Implementation of a new university – course (*Note that a training course is a service*)	A partner	
		A group of partners	
		A new partnership	
INDIRECT USE	Assignment of the IPR	A partner	
		A group of partners	
	Licensing of the IPR	A partner	
		A group of partners	X
	Development of a new legislation/standard	A partner	
		A group of partners	
	Spin- off	A partner	
		A group of partners	
		By assignment	
		By licensing	
	Other (*please describe*)		

[4] Partners identifies the partners of the project receiving the ESS, not third parties that may be partner in the future.

[5] Provide the names of the partners.

6.2 KER NO.2 – DIMAT MODELLING AND DESIGN SUITE (KER LEADING BENEFICIARY: CETMA)

6.2.1 Characterization of the result

The Characterisation table is designed to start the collection of information that will be then reviewed and further integrated during the project life.

KER name - DiMAT Data and Assessment Suite – DiDAS	Input from the Beneficiary	Comments by the Expert
Problem	A common challenge in industrial design is the design and optimization of parts and components. When advanced performances are required, or tight requirements must be satisfied, this process extends to the correct design of the material itself adopted for the solution. The design and optimization of material, instead of components, is particularly challenging because it generally involves multiple discipline (mechanics, economics, environmental impact) and requires a	*From a business/exploitation point of view, it is important to qualify and validate this problem. To do so, I'd suggest to carry out the following activities:* *1. Literature Review: Look for case studies highlighting challenges in material design and optimization and research papers identifying the limitations of current methodologies and the need for extensive physical testing.* *2. Industry Surveys and Interviews: Engage with professionals in the field of material science and*

	lot of physical testing, increasing the time to market of the solution. Moreover, the higher developing costs can lead to a partial exploration of the design space and therefore, to final solutions which are sub-optimal in terms of, for example, weights, costs, environmental impact, and so on. This also can be due to the low knowledge of factors that can influence the performances of materials, both the pre-existing and the new ones.	*engineering to gather insights about the challenges they face.* *Conducting in-depth interviews with key stakeholders such as R&D heads, project managers, and engineers in industries that heavily rely on material optimization (e.g., aerospace, automotive, construction).* *3. Case Studies and Real-world Examples: Study specific instances where material design and optimization have posed significant challenges. Focus on documenting projects that experienced delays or increased costs due to extensive physical testing. Identify projects that ended up with sub-optimal solutions and analyze the reasons behind these outcomes.* *4. Quantitative Analysis. Collect and analyze data on the costs, time, and resources required for physical testing in material design. Measure the extent of design space exploration in typical projects and its impact on the final material properties.*
Alternative solution	When dealing with the listed problems, companies generally use two types of approach. On one hand, they rely heavily on physical testing to try discovering and understanding relations between the material characteristics and processing and the final material performances.	*While DiMAT's value proposition emphasizes several key benefits, many competitors offer similar performance advantages:*

	On the other hand, sometimes digital tools are already integrated in the companies' business processes but, generally, in a segregated way. Separate solutions are employed in different steps of their internal processes without the possibility of integrating the flow of information and, thus, carrying out a well-oriented and efficient design process.	*Digital and Virtual Testing: Most of the competitors provide robust digital and virtual testing environments.* *Design Space Exploration: Tools from Autodesk, ANSYS, and others support broad and cost-effective design space exploration.* *Optimization: Competitors also emphasize optimization in terms of structural performance, environmental impact, and costs.*
Unique Selling Point USP - Unique Value Proposition UVP	The solution aims at speeding up the design process while, at the same time, obtaining more efficient and optimize design. These objectives are pursued in different ways. Digital design and virtual testing significantly reduce the need for physical testing, which directly decreases resource waste during this phase. Consequently, costs and time to market are also reduced because digital testing is far less time-consuming and resource-intensive than physical experimental campaigns. Additionally, the suite of tools allows for broader and more cost-effective exploration of the design space in terms of material and product design. This enables a better understanding of material	*The DiMAT Data and Assessment Suite presents a compelling value proposition focusing on reducing time to market, cost savings, and design optimization through digital and virtual testing. However, to strengthen its position in a competitive market, it is essential to 1) Clearly differentiate from competitors by emphasizing unique features and capabilities. 2) Address potential adoption challenges by highlighting ease of integration and providing comprehensive support. 3) Offer realistic and detailed cost-benefit analyses to substantiate claims of savings. 4) Tailor the value proposition to specific industry needs to enhance its appeal and relevance.*

	behaviour and improves the quality of final products in areas such as structural performance, environmental impact, and costs. Ultimately, the solution guides designers in selecting the appropriate materials and configurations based on the final requirements, even suggesting materials or configurations that were not initially considered.	
Description	Suite 2 provides a set of digital technologies for material design that allows for prediction of material behaviour before manufacturing. The main goal of this suite is to improve material designs and personnel training ROI, to reduce material design errors and use of material during designing and modelling, to increase personnel productivity. These set of tools will work together to enable material design in terms of internal structure, properties and performance.	
"Market" – *Target market*	The target market are companies working on design and manufacturing of structural parts and components. The solution is particularly focused on addressing problems and business cases of SMEs.	*The expected customers of the DiMAT Data and Assessment Suite are diverse, spanning multiple industries where material design and optimization are critical. These include: 1) Aerospace and Defense, as the suite's ability to optimize material properties and reduce physical*

		testing aligns well with the aerospace industry's need for innovative materials and faster development cycles. 2) Automotive, as Virtual testing and broad design space exploration can help automotive companies develop lighter, stronger, and more cost-effective materials quickly. *3) Construction and Civil Engineering, as the solution can aid in the development of sustainable and cost-effective construction materials, ensuring compliance with environmental standards and reducing overall project costs. 4) Consumer Electronics, as DiMAT's tools can accelerate the development of new materials that meet the demanding requirements of consumer electronics, from heat dissipation to lightweight designs. 5) Medical Devices, as Virtual testing can reduce the need for extensive physical trials, speeding up the development of safe and effective medical devices while ensuring compliance with stringent regulations. 6) Research and Development Organizations, which can leverage the suite to push the boundaries of material science, facilitating innovation and discovery.*
"Market" – *Early Adopters*	Early adopters of the solution are high-tech industries and advanced manufacturing enterprises	*Some possible early adopters include Boeing, Lockheed Martin, Airbus, as these companies*

	in sectors like aerospace, biomedical, and automotive. These industries require precise and reliable material performance where the costs of failure are high. The DiMAT Modelling and Design Suite capabilities in terms of prediction and optimization of manufacturing parameters, modelling and simulation of the internal material architecture and support to the design and optimization process will help customers in reducing material failure risks, certificating new materials and, overall, in all their business processes related to material development.	*constantly push the boundaries of material science to develop lightweight, durable, and high-performance materials. Besides, automotive Manufacturers as Tesla, General Motors, Toyota would benefit from faster development cycles and cost-effective material testing. Finally, High-Tech Consumer Electronics Firms require cutting-edge materials for miniaturization, heat management, and durability. The DiMAT suite might accelerate their material design process, enabling quicker product iterations and innovations.*
"Market" - Competitors	As competitors of the DiMAT Modelling and Design Suite one can consider big CAE companies like ANSYS, Altair or Dassault Systèmes Simulia which offer comprehensive material simulation tools. These competitors excel in general simulation capabilities and market penetration and offer products dedicated to the material design, like Ansys Material Designer and Altair Multiscale Designer. So far, DiMAT Modelling and Design Suite distinguishes itself from its competitors in its unique integration of AI and causal inference, providing more interpretable and accurate predictions	

	tailored to specific manufacturing and design processes. Moreover, commercial solutions require high licensing costs, adequate training and calculation resources in contrast to the implementation solutions adopted in the DiMAT solution.	
Go to Market – Use model	The user model will be the provision of a service. The customers will have granted access to the solution via the DIMAT platform for a certain time of period or a certain number of uses (material or model evaluations). Periodically the customer will be granted further usage by subsequent payments. The inclusion of different toolkits into the present solution gives to the customer the possibility to exploit alternative and complementary approaches to the solution of its problem, rather than choosing an a-priori method. Moreover, if the present solution is provided together with the other solutions developed in this project, this would represent an added value because in this case different tools of different suites could be used in different phases of the business	

	processes. In fact, depending on the specific tool, data exchange has already been implemented or at least planned to be.	
Go to Market - Timing	The expected time to market of the solution is at least one year after the end of the project.	*Given that a prototype of the DiMAT Data and Assessment Suite is available, the main activities required to bring it to market can be broadly categorized into several phases: development refinement, validation, regulatory compliance, market preparation, and launch.* *1. Development Refinement. This includes gathering and integrating feedback from initial users and beta testers to refine the prototype, as well as a focus on improving the user interface and overall user experience to ensure ease of use.* *2. Validation and Testing. This includes conducting pilot programs with select early adopters to validate the performance and effectiveness of the suite in real-world scenarios.* *3. Market Preparation, which includes a thorough market research to fine-tune the value proposition, pricing strategy, and target market segments, as well as a comprehensive go-to-market strategy, including marketing, sales, and distribution plans.* *4. Launch: Pre-launch marketing campaigns to build awareness and generate interest as well as*

		product launch through a combination of digital and physical events, press releases, and targeted advertising.
Go to Market – IPR Background	Background of the solution property of the owners of the toolkit developed, Cetma, Fraunhofer and Certh.	
Go to Market – IPR Foreground	- **CERTH** - owner of the Material Modeler toolkit (CETMA contributor) - **Fraunhofer** - owner of Material Design Framework (MDF) (CERTH contributor) - **CETMA** - owner of Materials Designer (MD) - UPV and AITEX - contributors	

6.2.2 Exploitation Roadmap

The Exploitation Roadmap is a tool designed to help the consortium to identify and plan activities to be performed after the end of the project. The highest risk a consortium faces is not being able to implement the exploitation and dissemination plan and increase the TRL level or go to market, due to lack of resources. The exploitation roadmap is designed to address this risk, mitigate it and pave to way toward use and a stronger impact.

Exploitation roadmap	Input by the Beneficiary	Comments by the Expert

Actions	-To look for a funding instrument to finance the way to TRL9 (like https://www.eitmanufacturing.eu) -To promote the solution developed through the networking channels available thanks to Cetma's coordination of the Eu Digital Innovation Hub named CETMA-DIHSME https://www.cetma-dihsme.eu/ and the participation to the BRIDGECOMIES Consortium, one of the 6 Italian Consortia that offers the services of the Enterprise Europe Network.	*To maximize the benefits of the DiMAT Data and Assessment Suite, a well-defined collaborative strategy is crucial, especially considering the involvement of multiple research centers. The actions to undertake include:* *1. Establish a Leadership Structure: Form a joint committee or consortium among the research centers to oversee exploitation activities. Create a formal agreement outlining roles, responsibilities, decision-making processes, and appoint a project manager to ensure smooth collaboration. Develop a Business Plan: Conduct market research to identify target customers and market potential. Create a comprehensive business plan with financial projections, funding requirements, revenue models, pricing strategies, and a go-to-market plan outlining sales channels, marketing tactics, and customer engagement strategies.* *2. Protecting Innovation: Intellectual Property Management: Conduct an IP audit to identify all patentable inventions, copyrights, trademarks, and trade secrets associated with the DiMAT solution.* *Secure Ownership: File for patents and register trademarks as necessary. Establish clear ownership and licensing agreements among the research centers.* *3. Funding and Partnerships: Explore Funding Avenues: Identify potential funding sources such as government grants, venture capital investments, and industry partnerships.*

		4. Product Development and Enhancement:Based on prototype feedback, finalize product development to ensure it meets all regulatory requirements and industry standards. *5. Marketing and Sales Strategy: Develop a branding and positioning strategy to create a strong market presence. Launch targeted marketing campaigns leveraging digital marketing channels, industry events, webinars, and content marketing.*
Roles	CETMA as the main owner of the KER will be in charge for the actions above detailed. Other partners of DIMAT will be involved if needed.	*As indicated above, a partnership agreement defining the responsibilities, stakes and potential upsides for all partners should be discussed.*
Milestones	KPI 1: at least 1 funding instrument identified (M3 after the end of the project) KPI 2: at least 1 proposal ready to be submitted (M6 after the end of the project) KPI 3: at least 40 SMEs aware of the toolkit availability (M6 after the end of the project)	*A more granular breakdown of key milestones to achieve successful commercialization of the DiMAT Data and Assessment Suite is:* *Months 1-2: Building the Foundation: Establish a Joint Exploitation Committee to guide commercialization efforts.* *Month 3: Charting the Course: Complete market analysis and finalize a comprehensive business plan.* *Month 4: Protecting Innovation: Conduct an IP audit and file for patents and trademarks as necessary.*

		Months 5-6: Securing Resources: Secure initial funding to support commercialization activities. *Months 7-8: Building Partnerships: Forge strategic partnerships to expand reach and expertise.* *Months 9-11: Perfecting the Product: Finalize product development based on market feedback and industry standards.* *Month 12: Go to Market: Launch targeted marketing campaigns to generate awareness. Establish a robust customer support system to ensure a smooth user experience.*
Financials Costs	Costs for promotion are already included in the above-mentioned networking channels. Costs for hardware estimated in 30k€ (1 year after project's end)	*While the initial budget proposal provides a starting point, it may not fully account for the resources needed to bring the DiMAT solution to market. Here's a revised breakdown with a more realistic cost perspective:* *1. Governance Structure: Cost: €10,000 - €20,000* *Rationale: Legal fees for agreements and governance establishment can be complex, requiring additional considerations beyond initial drafting. Initial meetings and coordination may also require more resources than initially anticipated.* *2. Business Plan: Cost: €20,000 - €30,000* *Rationale: Comprehensive market research for a successful business plan might require additional resources.*

		Consulting fees may vary depending on the scope and complexity of the plan. *3. Product Development and Enhancement:* *Cost: €200,000 - €500,000* *Rationale: Product development costs can be highly variable based on the complexity of DiMAT and the level of required enhancements. Testing, quality assurance, and user documentation development are crucial and potentially resource-intensive.* *4. Intellectual Property (IP) Management* *Cost: €5,000 - €15,000* *Rationale: An IP audit, filing for patents and trademarks, and establishing ownership agreements require legal expertise and incur associated costs.* *5. Marketing and Sales Strategy* *Cost: €150,000 - €500,000* *Rationale: Effectively reaching the target audience through branding, targeted marketing campaigns, and demo/pilot programs can be resource-intensive. Building a sales team or distributor network adds significant personnel costs.*

Revenues	We think 18-24 months are needed to bring the solution to TRL9 but, in the meantime we can sell the know-how developed in consultancy activities to interested enterprises. Revenues forecast is: - €30.000, 1 year after the end of the project - €100.000 2 years after the end of the project - €200.000 3 years after the end of the project	*Considering the customer segmentation provided above, it is advisable to make a deeper analysis of the TAM, SAM and SOM, as the number provided seem a little underestimated.*
Other sources of coverage	About 120.000€ (CETMA's staff only) are needed to bring the solution to TRL9 in 2 years after the end of DIMAT. Possible source of coverage: EU/national/regional incentives.	
Impact in 3-year time	The DIMAT Modelling and Design suite is a set of tools for material design that enable the prediction of material behaviour before manufacturing. The set of tools will work together with the goal of improving the material and component design, reducing errors, time and resources needed. By utilizing the suite, companies can enhance their design processes and	

	outcomes, thereby creating opportunities to increase turnover and generate new jobs. Additionally, final customers will benefit from optimized parts and components that are more efficient and cost-effective. The estimated cost reduction linked to the solution is about 25%.	

6.2.3 Risks Assessment and Priority Map

KER Risk Assessment Map

	Description of Risks	Degree of criticality of the risk related to the final achievement of this Key Exploitable Result. Please rate from 1 to 10 (1 low- 10 high)	Probability of risk happening Please rate from 1 to 10 (1 low - 10 high)	Risk Grade	Potential intervention	Estimated Feasibility/Success of Intervention Please rate from 1 to 10 (1 low- 10 high)	Conclusion
	Partnership Risk Factors						
1	Disagreement on further investments: some partners may leave.	*5*	*5*	**25**	Establish clear agreements with partners outlining the processes to be followed in case of their departure, including handover procedures and knowledge transfer obligations.	*8*	**Control**

2	Industrialization at risk: a business partner leaves the market.	*7*	*1*	**7**	The Consortium is working in harmony and is approaching the final year of the project without any hint that this issue may arise.	*9*	**Control**.
3	Disagreement on ownership rules	*8*	*7*	**56**	Clear definition of ownerships/rights at developments during the project. Potential intervention - how will the exploitation lead and partners involve mitigate this risk from happening, or will there be any offered alternatives in case of occurence - for e.g. during the course of the project partners will dedicate sufficient time on defining the ownership and exploitation agreement for post project exploitation, etc.	*7*	**Action!**

4	Partners break out and create competitive products	*5*	*1*	**5**	Same approach as risk 2	*7*	**Control**.
	Technological Risk Factors						
5	The solution may face unforeseen technical challenges during final development, integration with existing systems, or scalability issues.	*5*	*5*	**25**	Conduct thorough testing and validation at every development stage. Maintain a flexible development approach to address and resolve issues promptly. Collaborate with external technical experts or consultants if necessary.	*9*	**Control**.
6	The solution might be vulnerable to cyber-attacks, data breaches, or other security issues.	*2*	*2*	**4**	Implement robust cybersecurity measures, including encryption, secure coding practices, and regular security audits. Develop a comprehensive incident response	*9*	**Control**.

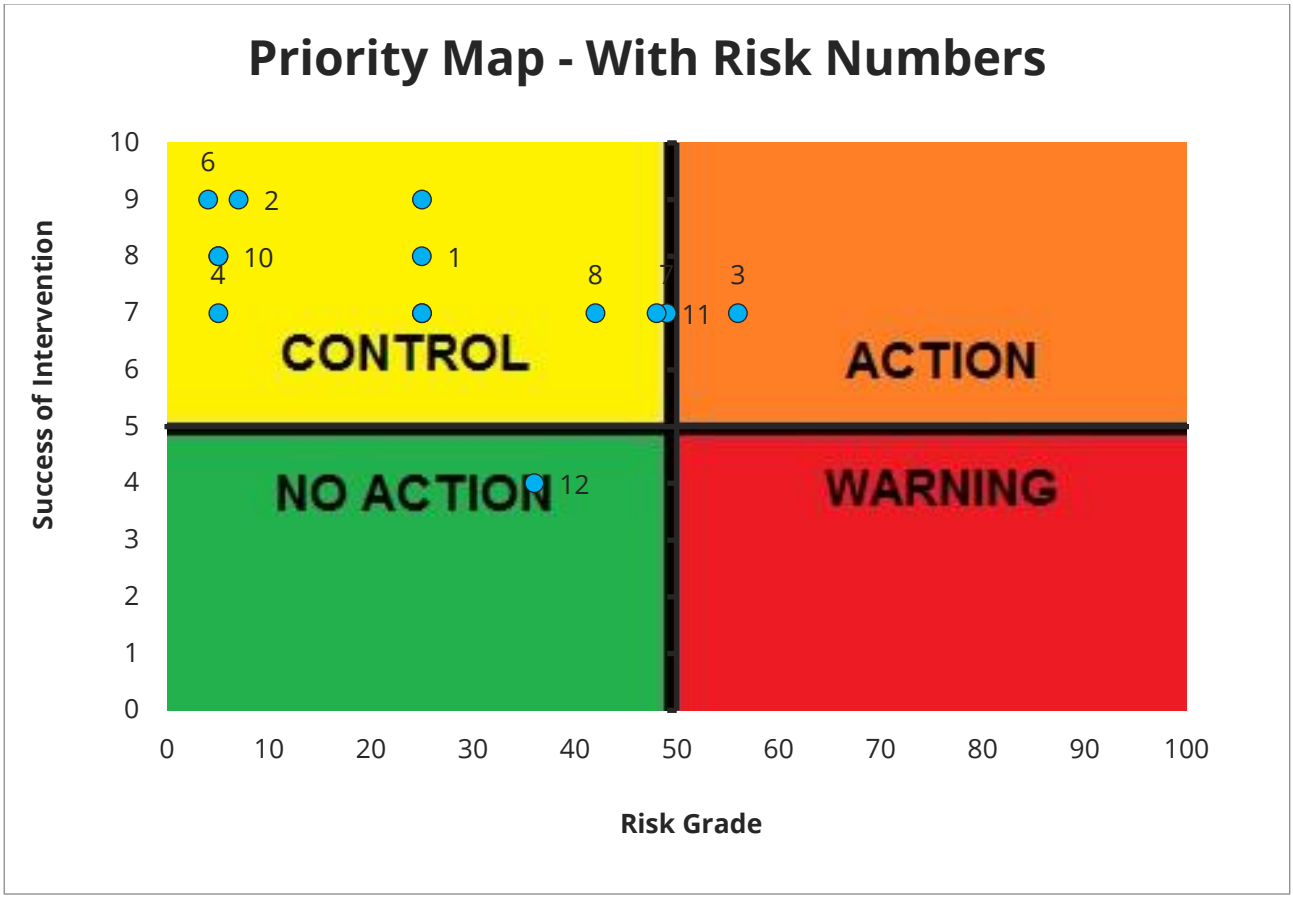
					plan. Provide regular cybersecurity training for the development and support teams.		
	Market Risk Factors						
7	The solution may not be well-received by the market, or the adoption rate may be slower than expected.	*7*	*7*	**49**	Conduct extensive market research to understand customer needs and preferences. Develop a strong value proposition and marketing strategy to communicate the benefits effectively. Start with pilot programs or beta testing to gather user feedback and refine the solution before a full-scale launch.	*7*	**Control**.
8	Competitors might release similar or superior solutions, making it challenging to capture market share.	*7*	*6*	**42**	Continuously monitor the competitive landscape and adapt the business strategy accordingly.	*7*	**Control**.

					Focus on differentiating features and unique selling points (USPs) such as semantic data storage and advanced analytics. Invest in ongoing innovation and improvement of the solution.		
	IPR/Legal Risk Factors						
9	There may be disputes or challenges regarding the intellectual property, potentially leading to legal conflicts.	*5*	*1*	**5**	Conduct a thorough IP audit and ensure all IP is properly documented and protected through patents, trademarks, and copyrights. Engage with experienced IP attorneys to handle IP filings and potential disputes. Monitor the market for potential IP infringements and take action when necessary.	*8*	**Control**

10	Issues related to contracts with customers, partners, or suppliers might arise, leading to legal liabilities.	*5*	*1*	**5**	Develop clear and comprehensive contracts with all parties involved. Include clauses that address liability, indemnity, and dispute resolution. Consult legal experts to ensure contracts are enforceable and comply with relevant laws.	*8*	**Control**
	Financial/Management Risk Factors						
11	Insufficient funding could delay development, marketing, or other critical activities.	*8*	*6*	**48**	Diversify funding sources by seeking grants, venture capital, and strategic partnerships. Maintain a detailed budget and monitor financial performance closely. Prioritize essential activities and	*7*	**Control**

					develop a phased approach to roll out the solution.		
12	Development and commercialization costs might exceed initial estimates.	*6*	*6*	**36**	Implement rigorous project management practices to track and control costs. Establish a contingency fund to cover unexpected expenses. Regularly review and adjust the budget based on actual performance and emerging needs.	*4*	**No Action'**
	Environmental/Regulation/Safety risks:						
13	Failure to comply with relevant data protection, environmental, or industry-specific regulations could result in fines or operational restrictions.	*5*	*5*	**25**	Stay informed about relevant regulations and ensure the solution meets all compliance	*7*	**Control.**

					requirements. Engage regulatory experts to review the solution and provide guidance on compliance. Develop internal policies and procedures to maintain ongoing compliance and conduct regular audits.		
14	New regulations or changes to existing ones could impact the solution's viability or require significant modifications.	*5*	*5*	**25**	Monitor regulatory developments closely and assess their potential impact on the solution. Maintain a flexible development approach to adapt to regulatory changes. Participate in industry groups and forums to stay ahead of regulatory trends and influence policymaking.	*7*	**Control.**



Similarly to the previous KER, this product faces relevant challenges, as:

Technological Risks:

- Integration and Scalability Challenges: Thorough testing with existing systems is essential to ensure seamless integration. Engaging external expertise may be necessary for complex scenarios.
- Cybersecurity Threats: Robust security measures, including encryption and access control, are paramount. Developing a comprehensive incident response plan will prepare the project for potential breaches.

Market Risks:

- Limited Customer Adoption: Extensive market research will identify customer needs and pain points. A clearly defined value proposition, highlighting the benefits of DiMAT, is crucial. Pilot programs with user feedback will further refine the solution for optimal market acceptance.
- Competitive Landscape: Continuous monitoring of competitors will inform strategic decisions. Focusing on innovation and unique features will help DiMAT stand out in the market.

Legal and Intellectual Property Risks:

- IP Disputes and Contractual Complexities: Securing strong intellectual property protection (patents, trademarks) is essential. Clear and comprehensive contracts with all stakeholders will minimize potential legal conflicts.

Financial Risks:

- Funding Shortages: Exploring diverse funding avenues (grants, venture capital) and maintaining strict budget control will ensure financial stability and avoid development delays.

Regulatory Risks:

- Non-compliance: Staying updated on relevant regulations and collaborating with regulatory experts will guarantee compliance. The project needs to be adaptable to implement any necessary changes to maintain the solution's viability.

6.3 KER NO.3 – DIMAT SIMULATION AND OPTIMIZATION SUITE – DISOS (KER LEADING BENEFICIARY: AMS)

6.3.1 Characterization of the result

The Characterisation table is designed to start the collection of information that will be then reviewed and further integrated during the project life.

KER name - DiMAT Simulation and Optimization Suite	Input from the Beneficiary	Comments by the Expert
Problem	Optimize and control the variables of a product or process to achieve the highest performance while ensuring quality and assessing integrity throughout the design and production phases. Manufacturers encounter common problems when introducing innovations, such as the following: Too many trials and errors leading to higher costs Lack of competitive position against big companies. Big companies typically possess greater resources for sustaining ongoing innovations compared to small and medium-sized enterprises.	*Some ideas to better characterise and validate the problem are:* *1. Industry Surveys and Reports: Look for industry reports on the challenges faced by manufacturers, particularly when introducing innovations. Search for surveys conducted by manufacturing associations or research institutions that address issues like trial and error, competitiveness, and quality control.* *2. Case Studies and Industry Publications: Analyze case studies of successful product launches and identify the role of optimizing variables in achieving desired outcomes.*

	Lack of correlation between product parameters and product properties can occur when new solutions are adopted without a proper model, leading to issues with quality and consistency.	*3. Interviews with Manufacturers: Conduct interviews or surveys with manufacturers, especially small and medium-sized enterprises (SMEs). Ask them about their specific challenges when introducing new products.* *Focus questions on:* *- Trial and error processes during product development.* *- Difficulties competing with larger companies in innovation.* *- Maintaining quality and consistency when adopting new solutions.* *4. Benchmarking Existing Tools and Methods: Research existing tools and methodologies used for process optimization and quality control in manufacturing.* *Identify limitations or gaps in these methods that emphasize the need for a more comprehensive approach.*
Alternative solution	The optimization of product and process variables is reached by experience, data-driven models, or physical models. Experience can be considered in the group of data driven models and the physical numerical codes can be classified in these three groups:	*Same comments as for the previous KERs.*

	• Commercial FEM software (ex: ABAQUS, ANSYS, COMSOL, NASTRAN..) • Freeware FEM software (ex: Code-Aster, OpenFoam, Calculix...) • Toolkit from commercial FEM. The control and monitoring of the industrial process has been traditionally done with a combination of manual observation, instrumentation, and feedback mechanisms. Quality control techniques involve systematic processes and methodologies to ensure products or services meet predefined standards and specifications. These techniques encompass methods such as statistical process control and quality assurance inspections to identify and rectify deviations or defects in the production process.	
Unique Selling Point USP - Unique Value Proposition UVP	DiMAT Simulation and Optimization Suite (DiSOS) is a new set of open-source software solutions designed for application in design, processing, and industrial manufacturing. The suite comprises a user-friendly interface that integrates mechanical and process models with artificial intelligence and digital twins. These features offer the following competitive advantages: - Provision of personalized and cost-effective simulation leading to resource savings.	*Areas for Improvement:* *- Specificity: The USP could benefit from quantifying the cost savings and resource reduction potential of DiSOS.* *- Focus on Benefits: While mentioning features like multiscale models is interesting, the USP should focus more on the tangible benefits these features bring to the user (e.g., improved product quality, faster development cycles).*

	Alternatives to DiSOS include commercial codes with high licensing fees or freeware modelling tools, which pose challenges in implementation adaptation and involve steep learning curves. - Provision of a holistic solution. DiSOS solutions can integrate multiscale, multiphysics and process models with artificial intelligence and digital twins. Additionally, the potential utilization of the other DiMAT toolkits of Suite 1, Data and Assessment Suite, and Suite 2, Modelling and Design Suite, complements the comprehensive commercial product, covering most of the manufacturing needs in a single package. - Reducing costs via simulation Digital Twin, whether used alone or in conjunction with MMS or MPS, is a disruptive technology that facilitates the control and monitoring of industrial processes. DT offers competitive advantages such as:	*- Digital Twin Integration: While mentioning digital twins, the USP could elaborate on how DiSOS integrates this technology to deliver specific benefits.*

	- Better control and understanding of the overall process. The combination of DT with physical modelling offers a powerful tool for understanding the real process and the link between the process variables and performance. - Process monitoring - Data availability and reliability. - Quality control - Safety	
Description	Suite 3 offers three products and their potential combinations within the suite and with other DiMAT toolkits. The suite products are: - **MMS** toolkit: A comprehensive numerical toolkit designed to predict material mechanical behavior. - **MPS** toolkit: A numerical toolkit for modelling industrial processes.	- *The following elements should be analysed in detail:* - *Model Complexity: Balancing user-friendliness with the ability to handle complex multiscale and multiphysics models could be a challenge.* - *Integration: Ensuring seamless integration between the MMS, MPS, and DT toolkits, as well as with other DiMAT suites, requires careful design and testing.* - *Digital Twin Maintenance: The DT service needs a robust process for data collection,*

	- **DT** toolkit: A toolkit for developing process digital twins. Suite 3 provides also a DT service. This service encompasses maintenance tasks such as data compilation, analysis, and updating. This service ensures the accuracy and relevance of the digital twin models over time, facilitating ongoing optimization and performance monitoring for industrial processes.	*analysis, and model updates to maintain accuracy and relevance over time. This requires expertise in data management and machine learning.* - *Open-Source vs. Commercial Alternatives: Convincing manufacturers to adopt an open-source solution over established commercial software might require demonstrating clear benefits (cost savings, customization).* - *Monetization Strategy: While the toolkit itself might be open-source, a clear strategy for generating revenue is needed. This could involve the DT service, premium support options, or partnerships with engineering service providers.* - *Sustainability: Maintaining and updating the open-source toolkits requires ongoing development and support. A sustainable funding model is necessary to ensure the suite's long-term viability.* - *Security: Data security is a major concern, especially when dealing with industrial process data. Robust security measures need to be implemented for both the toolkits and the DT service.* - *Scalability: The suite needs to be scalable to accommodate the needs of various*

		manufacturing operations, from small-scale to large-scale industrial processes.
"Market" – *Target market*	The target market for the DiSOS suite includes industries involved in complex manufacturing that require comprehensive monitoring, optimization, and predictive capabilities. The primary target market could include: - Manufacturing: Various sectors such as automotive, aerospace, machinery, and electronics would benefit from these toolkits to optimize production processes and ensure product quality. - Chemical Industry: Companies involved in chemical processing, oil refining, and petrochemical production can utilize these toolkits to simulate complex process reactions, optimize plant operations, and ensure safety and regulatory compliance. - Infrastructure Management: Engineering firms, construction companies, and infrastructure managers can use these toolkits to simulate structural behaviour,	

	monitor construction progress, and manage the lifecycle of buildings and infrastructures. *- Who are the customer segments?* The customer segment for toolkits encompassing mechanical physical modeling, process modeling, and digital twins typically includes: - Engineering and manufacturing companies: These toolkits are aimed at companies involved in the design, manufacturing, and maintenance of products. They use physical mechanical modelling to simulate and analyse the behaviour of physical systems, process modelling to optimize manufacturing processes, and digital twins to monitor and improve product performance in real time. - Research Institutions and Universities: Academic institutions often utilize such toolkits for research purposes, particularly in engineering, mechanical, and industrial	

	fields. These tools help in both theoretical research and practical experimentation. - Technology and Software Companies: Companies specializing in software development often use these toolkits to integrate advanced simulation and modeling capabilities into their products. This enables them to offer solutions to a wide range of industries, from automotive to aerospace.	
"Market" – *Early Adopters*	Small and medium-sized businesses facing similar challenges as the pilot partners can directly benefit from the experience gained. The process design and modelling experience applied in glass and composite pilots can be used by materials manufacturers using similar manufacturing processes. Likewise, the knowledge gained from the polymer and graphite pilots may be advantageous to other analogous companies.	*Some considerations about early adopters. These might include:* - *Small and Medium-sized Enterprises (SMEs) in Manufacturing: These companies may be attracted to the cost savings and customization potential of open-source software compared to expensive commercial solutions.* - *Manufacturing Companies with Existing Open-Source Software Experience: Companies already comfortable with open-source tools are more likely to be receptive to Suite 3.* - *Forward-Thinking Companies in Emerging Industries: These companies might be more*

		open to adopting cutting-edge technologies like digital twins and advanced simulations. - *Companies in Research-Focused Industries: These companies might value the flexibility and customizability of Suite 3 for their research and development activities.* *More than the type of industry, it is crucial to target specific Roles and departments:* - *Design Engineers: These individuals can utilize Suite 3 for material behavior prediction during the design phase, optimizing product performance.* - *Process Engineers: The MPS toolkit can help them model and optimize industrial processes, leading to increased efficiency and cost savings.* - *Manufacturing Operations Teams: Real-time insights from digital twins can aid in process monitoring, predictive maintenance, and overall production optimization.* - *Data Scientists and Analysts: These individuals can leverage Suite 3's data analysis capabilities for improving digital twin accuracy and process understanding.*

		Besides, early partnerships with universities can foster a user base, generate valuable feedback, and contribute to the ongoing development of Suite 3. *The strategy for reaching early adopters include the participation in Industry events and conferences, the development of Case Studies, the possibility to offer free trials to lower the barrier to entry and facilitate user adoption, and to build a strong community for users to share experiences and collaborate.*
"Market" - Competitors	Competitors: - EU projects (ex: https://www.pioneer-project.eu/) - Data-driven startups companies (ex: https://www.wimbitek.com/). - Digital twins startups companies. Strengths and Weaknesses: - EU projects	

	- Strengths: Innovation, potentially disruptive technologies. - Weaknesses: Insufficient DiMAT ecosystem integration, lacking a comprehensive approach that integrates IT and Physics models holistically. - Data-driven startups companies. - Strengths: Service ready for the market. - Weaknesses: Lack of DiMAT framework without a holistic solution approach and integration of IT and Physics models. - Digital twins startups companies. - Strengths: Service ready for the market.	

	- Weaknesses: Digital Twins is a disruptive technology and there do not exist open-source digital twin platforms tailored to material manufacturing. Proprietary solutions exist but are closed source and require payment.	
Go to Market – Use model	*Explain what is your "use model", how the KER will be put in use (made available to "customers" to generate an impact). Examples of use models: manufacturing of a new product, provision of a service, direct industrial use, technology transfer, license agreement, contract research, publications, standards, etc.* *Note training is a service.* The KER will be put in use by a **direct sales** model. The DiSOS toolkits will be sold directly to manufacturing companies via an online platform. The DiSOS suite could offer a **subscription-based** service, providing access to regular updates, modifications suggested by customers, support, and additional features for a recurring fee. The	

	subscription-based model includes maintenance services primarily tailored for digital twins. DiSOS will also include **consulting and training services**. Customers interested in utilizing numerical mechanical codes below the MMS or MPS toolkits will be supported by DiMAT partners.	
Go to Market - Timing	At the conclusion of the project, the DiSOS suite will be developed and prepared for market launch.	
Go to Market – IPR Background	- **UPV** - owner of Materials Processing Simulation (CERTH - contributor) - **AMS** - owner of Materials Mechanical Properties Simulator (CERTH - contributor) - **NTUA** - owner of Digital Twin for Process control **ROPARDO** – owner of frontend toolkit development	- *Outline a document with roles and responsibilities of each partner. This includes contributions made (technology, resources), intellectual property ownership, and decision-making power within the consortium.* - *Establish a clear and agreed-upon process for resolving any potential disputes that may arise between partners. This could involve mediation, arbitration, or other mechanisms.* - *Identify all patentable inventions, copyrights, and trademarks associated with Suite 3 and its component toolkits.* - *Negotiate and document a clear ownership structure for the identified intellectual property. This might involve joint ownership,*
Go to Market – IPR Foreground	- **UPV** - owner of Materials Processing Simulation (CERTH - contributor) - **AMS** - owner of Materials Mechanical Properties Simulator (CERTH - contributor) - **NTUA** - owner of Digital Twin for Process control	

	- **ROPARDO** – owner of frontend toolkit development	*tiered licensing agreements, or other arrangements.* - *Establish clear guidelines for how intellectual property can be shared and licensed to third parties. This ensures all partners benefit from commercialization efforts.*

6.3.2 Exploitation Roadmap

The Exploitation Roadmap is a tool designed to help the consortium to identify and plan activities to be performed after the end of the project. The highest risk a consortium faces is not being able to implement the exploitation and dissemination plan and increase the TRL level or go to market, due to lack of resources. The exploitation roadmap is designed to address this risk, mitigate it and pave to way toward use and a stronger impact.

Exploitation roadmap	Input by the Beneficiary	Comments by the Expert
Actions	Finalization of the business plan Signing of the Partner agreement Dissemination activities: Oral presentations at industrial events, participation in industrial fairs, publication of articles in specialized newspapers. Development of the DiMAT toolkit for new customers	*Similarly to the previous KERs, the actions to undertake include:* *1. Establish a Leadership Structure: Form a joint committee or consortium among the research centers to oversee exploitation activities. Create a formal agreement outlining roles, responsibilities, decision-making processes, and appoint a project manager to ensure smooth collaboration.*

		Develop a Business Plan: Conduct market research to identify target customers and market potential. Create a comprehensive business plan with financial projections, funding requirements, revenue models, pricing strategies, and a go-to-market plan outlining sales channels, marketing tactics, and customer engagement strategies. *2. Protecting Innovation: Intellectual Property Management: Conduct an IP audit to identify all patentable inventions, copyrights, trademarks, and trade secrets associated with the DiMAT solution.* *Secure Ownership: File for patents and register trademarks as necessary. Establish clear ownership and licensing agreements among the research centers.* *3. Funding and Partnerships: Explore Funding Avenues: Identify potential funding sources such as government grants, venture capital investments, and industry partnerships.* *4. Product Development and Enhancement:Based on prototype feedback, finalize product development to ensure it meets all regulatory requirements and industry standards.* *5. Marketing and Sales Strategy: Develop a branding and positioning strategy to create a strong market presence. Launch targeted marketing campaigns leveraging digital marketing channels, industry events, webinars, and content marketing.*

Roles	*Roles of partners involved in the actions defined above.* AMS and other interested partners	*As indicated above, a partnership agreement defining the responsibilities, stakes and potential upsides for all partners should be discussed.*
Milestones	*List the milestones and KPIs to be used for monitoring the implementation of the actions listed above. Add timeline.* • Month 2: Finalization of the business plan KPI1: Signing of the Partner agreement. • Month 3: Dissemination activities. KPI2: Participation in at least one industrial event, with at least one publication in an economic newspaper. • Month 6: Initial DiMAT toolkit development for new customers. KPI3: First deployment of DiMAT toolkit for new customers.	*A more granular breakdown of key milestones to achieve successful commercialization of the KER is:* *Months 1-2: Building the Foundation: Establish a Joint Exploitation Committee to guide commercialization efforts.* *Month 3: Charting the Course: Complete market analysis and finalize a comprehensive business plan.* *Month 4: Protecting Innovation: Conduct an IP audit and file for patents and trademarks as necessary.* *Months 5-6: Securing Resources: Secure initial funding to support commercialization activities.* *Months 7-8: Building Partnerships: Forge strategic partnerships to expand reach and expertise.* *Months 9-11: Perfecting the Product: Finalize product development based on market feedback and industry standards.* *Month 12: Go to Market: Launch targeted marketing campaigns to generate awareness. Establish a robust customer support system to ensure a smooth user experience.*

Financials Costs	1 year -> 20000 euros. Including dissemination activities and discounts for first customers 3 years -> 40000 euros. Adding dissemination activities during the second and third year	*Here's a revised breakdown with a more realistic cost perspective:* *1. Governance Structure: Cost: €10,000 - €20,000* *Rationale: Legal fees for agreements and governance establishment can be complex, requiring additional considerations beyond initial drafting. Initial meetings and coordination may also require more resources than initially anticipated.* *2. Business Plan: Cost: €20,000 - €30,000* *Rationale: Comprehensive market research for a successful business plan might require additional resources. Consulting fees may vary depending on the scope and complexity of the plan.* *3. Product Development and Enhancement:* *Cost: €200,000 - €500,000* *Rationale: Product development costs can be highly variable based on the complexity of DiMAT and the level of required enhancements. Testing, quality assurance, and user documentation development are crucial and potentially resource-intensive.* *4. Intellectual Property (IP) Management* *Cost: €5,000 - €15,000*

		Rationale: An IP audit, filing for patents and trademarks, and establishing ownership agreements require legal expertise and incur associated costs. *5. Marketing and Sales Strategy* *Cost: €150,000 - €500,000* *Rationale: Effectively reaching the target audience through branding, targeted marketing campaigns, and demo/pilot programs can be resource-intensive. Building a sales team or distributor network adds significant personnel costs.*
Revenues	1 year -> 30K – 50K euros. We expect to have 2 – 4 customers during the first year 3 years ->100K - 300K euros. 5 – 15 customers during the first 3 years	*Considering the customer segmentation provided above, it is advisable to make a deeper analysis of the TAM, SAM and SOM, as the number provided seem a little underestimated.*
Other sources of coverage	Regional grants	
Impact in 3-year time	2-6 new jobs in Suite3, encompassing MMS, MPS, and DT. Development of new methodologies integrating multiscale modelling, process modelling, AI and digital twins, resulting in: - New projects - Publication of scientific papers	

	- Launch of new industrial modelling services Customer profits: - Cost reductions: The toolkits streamline design, processes, and manufacturing. - Enhanced resource utilization.	

6.3.3 Risks Assessment and Priority Map

KER Risk Assessment Map

	Description of Risks	Degree of criticality of the risk related to the final achievement of this Key Exploitable Result. Please rate from 1 to 10 (1 low- 10 high)	Probability of risk happening Please rate from 1 to 10 (1 low - 10 high)	Risk Grade	Potential intervention	Estimated Feasibility/Success of Intervention Please rate from 1 to 10 (1 low- 10 high)	Conclusion
	Partnership Risk Factors						
1	Disagreement on further investments: some partners may leave.	*5*	*5*	**25**	Establish clear agreements with partners outlining the processes to be followed in case of their departure, including handover procedures and knowledge transfer obligations.	*8*	**Control**

2	Industrialization at risk: a business partner leaves the market.	*7*	*1*	**7**	The Consortium is working in harmony and is approaching the final year of the project without any hint that this issue may arise.	*9*	**Control.**
3	Disagreement on ownership rules	*8*	*7*	**56**	Clear definition of ownerships/rights at developments during the project. Potential intervention - how will the exploitation lead and partners involve mitigate this risk from happening, or will there be any offered alternatives in case of occurence - for e.g. during the course of the project partners will dedicate sufficient time on defining the ownership and exploitation agreement for post project exploitation, etc.	*7*	**Action!**

4	Partners break out and create competitive products	*5*	*1*	**5**	Same approach as risk 2	*7*	**Control**.
	Technological Risk Factors						
5	The solution may face unforeseen technical challenges during final development, integration with existing systems, or scalability issues.	*5*	*5*	**25**	Conduct thorough testing and validation at every development stage. Maintain a flexible development approach to address and resolve issues promptly. Collaborate with external technical experts or consultants if necessary.	*9*	**Control**.
6	The solution might be vulnerable to cyber-attacks, data breaches, or other security issues.	*2*	*2*	**4**	Implement robust cybersecurity measures, including encryption, secure coding practices, and regular security audits. Develop a comprehensive incident response	*9*	**Control**.

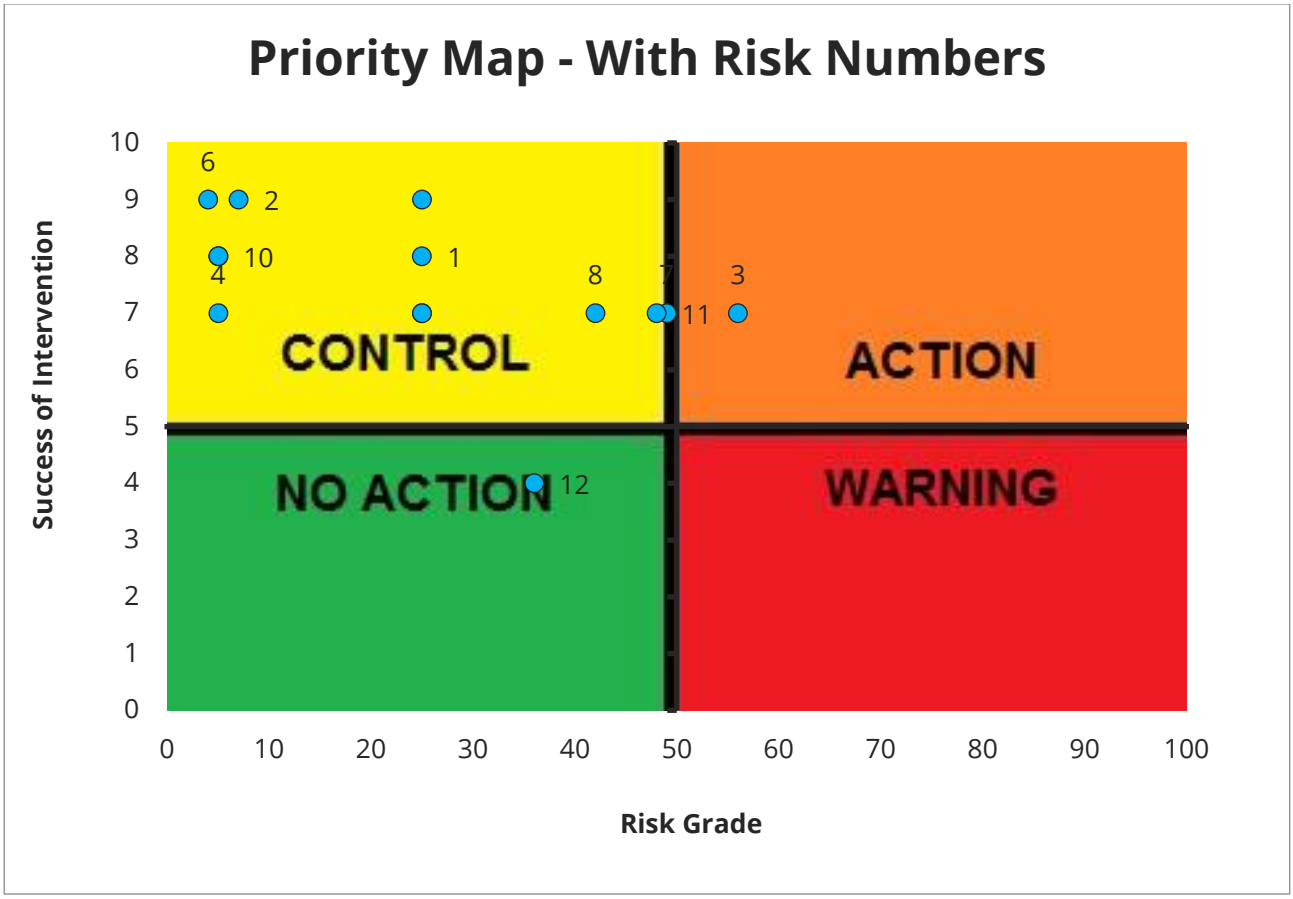
					plan. Provide regular cybersecurity training for the development and support teams.		
	Market Risk Factors						
7	The solution may not be well-received by the market, or the adoption rate may be slower than expected.	*7*	*7*	**49**	Conduct extensive market research to understand customer needs and preferences. Develop a strong value proposition and marketing strategy to communicate the benefits effectively. Start with pilot programs or beta testing to gather user feedback and refine the solution before a full-scale launch.	*7*	**Control**.
8	Competitors might release similar or superior solutions, making it challenging to capture market share.	*7*	*6*	**42**	Continuously monitor the competitive landscape and adapt the business strategy accordingly.	*7*	**Control**.

					Focus on differentiating features and unique selling points (USPs) such as semantic data storage and advanced analytics. Invest in ongoing innovation and improvement of the solution.		
	IPR/Legal Risk Factors						
9	There may be disputes or challenges regarding the intellectual property, potentially leading to legal conflicts.	*5*	*1*	**5**	Conduct a thorough IP audit and ensure all IP is properly documented and protected through patents, trademarks, and copyrights. Engage with experienced IP attorneys to handle IP filings and potential disputes. Monitor the market for potential IP infringements and take action when necessary.	*8*	**Control**

10	Issues related to contracts with customers, partners, or suppliers might arise, leading to legal liabilities.	*5*	*1*	**5**	Develop clear and comprehensive contracts with all parties involved. Include clauses that address liability, indemnity, and dispute resolution. Consult legal experts to ensure contracts are enforceable and comply with relevant laws.	*8*	**Control**
	Financial/Management Risk Factors						
11	Insufficient funding could delay development, marketing, or other critical activities.	*8*	*6*	**48**	Diversify funding sources by seeking grants, venture capital, and strategic partnerships. Maintain a detailed budget and monitor financial performance closely. Prioritize essential activities and	*7*	**Control**

					develop a phased approach to roll out the solution.		
12	Development and commercialization costs might exceed initial estimates.	*6*	*6*	**36**	Implement rigorous project management practices to track and control costs. Establish a contingency fund to cover unexpected expenses. Regularly review and adjust the budget based on actual performance and emerging needs.	*4*	**No Action'**
	Environmental/Regulation/Safety risks:						
13	Failure to comply with relevant data protection, environmental, or industry-specific regulations could result in fines or operational restrictions.	*5*	*5*	**25**	Stay informed about relevant regulations and ensure the solution meets all compliance	*7*	**Control.**

					requirements. Engage regulatory experts to review the solution and provide guidance on compliance. Develop internal policies and procedures to maintain ongoing compliance and conduct regular audits.		
14	New regulations or changes to existing ones could impact the solution's viability or require significant modifications.	*5*	*5*	**25**	Monitor regulatory developments closely and assess their potential impact on the solution. Maintain a flexible development approach to adapt to regulatory changes. Participate in industry groups and forums to stay ahead of regulatory trends and influence policymaking.	*7*	**Control.**



Similarly to the previous KER, this product faces relevant challenges, as:

Technological Risks:

- Integration and Scalability Challenges: Thorough testing with existing systems is essential to ensure seamless integration. Engaging external expertise may be necessary for complex scenarios.
- Cybersecurity Threats: Robust security measures, including encryption and access control, are paramount. Developing a comprehensive incident response plan will prepare the project for potential breaches.

Market Risks:

- Limited Customer Adoption: Extensive market research will identify customer needs and pain points. A clearly defined value proposition, highlighting the benefits of DiMAT, is crucial. Pilot programs with user feedback will further refine the solution for optimal market acceptance.
- Competitive Landscape: Continuous monitoring of competitors will inform strategic decisions. Focusing on innovation and unique features will help DiMAT stand out in the market.

Legal and Intellectual Property Risks:

- IP Disputes and Contractual Complexities: Securing strong intellectual property protection (patents, trademarks) is essential. Clear and comprehensive contracts with all stakeholders will minimize potential legal conflicts.

Financial Risks:

- Funding Shortages: Exploring diverse funding avenues (grants, venture capital) and maintaining strict budget control will ensure financial stability and avoid development delays.

Regulatory Risks:

- Non-compliance: Staying updated on relevant regulations and collaborating with regulatory experts will guarantee compliance. The project needs to be adaptable to implement any necessary changes to maintain the solution's viability.

6.3.4 Use options

KER's Exploitation route (how the KER will be further exploited)			
Selected route		**Implementing actor**	**Yes**
DIRECT USE	Commercialisation: *deployment of a novel product/service (offered to the target markets)*	One partner[6]	
		A group of partners[7]	X
	Contract research (*new contracts signed by the research group with external clients*)	A partner	
		A group of partners	
	A new research project (*application to public funded research programmes*)	A partner	
		A group of partners	
	Implementation of a new university – course (*Note that a training course is a service*)	A partner	
		A group of partners	
		A new partnership	
INDIRECT USE	Assignment of the IPR	A partner	
		A group of partners	
	Licensing of the IPR	A partner	
		A group of partners	X
	Development of a new legislation/standard	A partner	
		A group of partners	
	Spin- off	A partner	
		A group of partners	
		By assignment	
		By licensing	
	Other (*please describe*)		

[6] Partners identifies the partners of the project receiving the ESS, not third parties that may be partner in the future.

[7] Provide the names of the partners.

7 RECOMMENDATIONS

Issues	Recommendations
Characterisation of KERs	A more in-depth analysis of the need to be addressed and on the value delivered by DiMAT is needed to attract potential partners and investors. An investor should be approached by adopting the same strategy and tools used by startups to raise investments, which includes the preparation of a pitch deck following consolidated standards (for instance, the Sequoia Capital template). To this scope, the approach should be: **Storytelling**: Don't just present facts and figures. Weave a narrative around your business idea. Explain the problem you're solving, how your product is the solution, and the impact it will create. **Focus on the Problem**: Clearly define the problem your business addresses. Why is it important? How big is the market for a solution? **Solution & Value Proposition**: Showcase your product or service as the answer to the problem. Explain what makes your solution unique and valuable compared to competitors. **Keep it Concise**: Keep your deck short and to the point, ideally around 10 slides. **Visual Appeal**: Use high-quality visuals to complement your message. Charts, graphs, and images can make your deck more engaging and easier to understand. **Call to Action**: End your deck with a clear call to action. What do you want the audience to do next?
New KER Policy Recommendation	-
Discussing Exploitation at Consortium Meetings	Exploitation is an important component of a project. At every Consortium meeting, there should be a session to discuss practical and strategical aspects of exploitation as it was exercised during the ESS. This will allow to update KERs characterisation and risks analysis and contribute to the further development of the technologies and approaches to be showcased at the demo plants. The project should consider the Exploitation Plan as a living document and: ▪ Update the plan according to the progress and emerging results of the project;

	▪ Consider reviewing the UVP and the use model during the project lifetime; ▪ Involve the advisory board and colleagues from marketing and business development departments in the finalisation of the plan. ▪ Discuss and finalise, at consortium meetings, exploitation roadmap.
Internal use of KERs	The opportunity to use internally the solutions developed, to create a suite of innovative solutions to be offered on the market, is an advantage that the project partners are taking. Very well! Please continue updating them highlighting the competitive advantage that partners will gain over competitors.
Exploitation Plan-Planning	When addressing Exploitation (and Dissemination) Plans, it is suggested to: ▪ Keep it flexible enough and in line with the economic, environmental, societal and legal context in which the project has been set up; ▪ Use the lean canvas to better define early adopters, current solutions, unique value proposition and commercialisation channels (see **Σφάλμα! Λανθασμένο αποτέλεσμα για πίνακα.** for further information); ▪ Identify KPIs and milestones to define a roadmap, with all the activities needed to pave the way for use of the selected KERS (see Chapter 4 Paragraph 5); ▪ Take into consideration the time and resources needed for implementing the next steps after the end of the project, considering that most of the partners have guidelines and procedures for spin-offs, joint ventures, licencing that require time. ▪ Consider consistency among the selected route to market, competition, early adopters, proposed exploitation actions and the expected impact of the project; ▪ Highlight the value chain dimension of the project and make sure this is considered to find the best set up in terms of future collaboration as partnership and as individual entities;
Monitoring Risk Analysis	Risk assessment should be carried out continuously, particularly for what concerns market risks (users' acceptance, ergonomics, added value, pricing, etc.)
IP ownership and partnerships for exploitation	If any KER will be jointly exploited by two or more partners, joint owners of KERs have to agree amongst themselves as soon as possible upon the detailed terms of exercising ownership and protection of such results in accordance and in proportion with the agreed intellectual contribution to its development. If relevant, bilateral/multilateral Memorandum of Understanding agreements should be signed among relevant partners. A template for the MoU is provided enclosed to this report.

Horizon Results Platform	It is strongly suggested for Dissemination purposes to upload each key Exploitable result on the EC Horizon Results Platform https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-results-platform Detailed step-by-step instructions here: https://webgate.ec.europa.eu/funding-tenders-opportunities/display/IT/Managing+Project+Results+in+the+Horizon+Results+Platform Please note that to be authorised to upload you should have granted one of the following roles for the project: PCoCo (Primary Coordinator Contact), CoCo (Coordinator Contact) or PaCo (Participant Contact) roles in the project. This is all explained in the instructions in the link above.
Further exploitation related support service	The aim of Go-to-Market services is to address one or more specific aspects for the implementation of the business/action plan: • Pitching (capacity to present in front of interested stakeholders) • IPR support (orientation in the IPR landscape) • Innovation Management (specialised training) • Exploitation options (exploration and in-depth analysis of the different options) • Business services (one among commercialisation plan, evaluation of business plan potential, creation of start-up) • Access to non-EU funding (analysis of funding options for follow-on financing) **Please be aware that service delivery must be completed by 7th of November 2024.**

8 ANNEX 1: RELATED INFORMATION

This chapter reports the results of specific projects related to specified key words on the Internet, also a list of projects (found on Cordis) of similar interest with a brief description and related patents.

8.1 RELATED LINKS

Activities

Some upcoming conferences and activities in the field include:

- COMSOL Conference
- The International Manufacturing Science and Engineering Conference (MSEC)
- NAM Manufacturing Conference & The NAM Show
- Autodesk Manufacturing Conference
- SLM Solutions Conference
- Formnext Connect
- EMO Hannover
- IMTS - International Manufacturing Technology Show
- Digital Manufacturing Conference
- International Conference on Product Lifecycle Management (PLM)

8.2 RELATED PROJECTS

Some relevant projects, which also involve partners that might be interested to cooperate with DiMAT, include:

1. APRIORI (Active PRoduct-to-Process LearnIng fOR Improving Critical Components Performance) (EU Project, Horizon 2020): Focuses on reducing uncertainties in production processes that contribute to waste and climate change. Aims to develop a methodology for integrating knowledge from various sources (sensors, simulations) for real-time process optimization and improved performance of critical components.

2. EXCITO (EXcellence in Composite manufacturing through Integrated and Collaborative digiTal OperatiOns) (EU Project, Horizon 2020): Develops a digital platform for the entire composite manufacturing value chain, from design to production and after-sales services. Focuses on

process optimization, real-time monitoring, quality control, and predictive maintenance for composite materials.

3. POEMA (POrtale Europeo per l' Ottimizzazione dei Materiali) (Italian Project): Provides an online platform for material selection and process optimization in manufacturing. Offers access to a database of materials, simulation tools, and expertise for material selection and process design.

4. SMaRT-LP (Smart Manufacturing through Laser Processing) (EU Project, Horizon 2020): Focuses on developing innovative laser-based manufacturing processes for high-value products. Aims to integrate sensors, real-time control systems, and machine learning for process optimization and automation in laser-based manufacturing.

5. e-LAST (e-manufacturing for Laser Additive STamping) (EU Project, Horizon 2020): Develops a novel laser-based additive stamping technology for high-volume and cost-effective metal part production. Focuses on process monitoring, control, and optimization for high-quality and consistent production using laser additive stamping.

6. ADAM (Advanced Additive Manufacturing for Metals) (EU Project, Horizon 2020): Aims to develop new materials and process optimization strategies for metal additive manufacturing (AM).

Focuses on in-situ process monitoring, control, and feedback loops to ensure high-quality and reliable metal AM parts.

7. OPTI-NET (Optimisation Network for Intelligent Manufacturing) (EU Project, Horizon 2020): Creates a network of excellence for research and innovation in intelligent manufacturing. Focuses on process optimization, data analytics, and machine learning for improving efficiency and sustainability in manufacturing.

8.3 RELATED PATENTS

A freedom to operate analysis has been carried out by the consortium and already includes the most relevant patents in the field.

9 ANNEX 2: MEMORANDUM OF UNDERSTANDING (MOU)

1. Valorisation and exploitation of … (please refer to the specific KER)
1.1 Agreement between partner, partner, partner ……
1.2 The following Memorandum of Understanding is made on the dd/mm/yyyy by and between

- **Partner a**, VAT …, registered in …, hereinafter referred to as …
- **Partner b**, VAT …, registered in …, hereinafter referred to as …
- **Partner c**, VAT …, registered in …, hereinafter referred to as …
- **……..**

Individually referred to as a "Party" or collectively as the "Parties".

1.3 Background of the Agreement

During the xxx project's life the KER was developed… *(clearly describe the KER)*

As per consortium agreement of the Project signed by the Parties, [number of Section]: Results, … Results are owned by the Party that generates them.

Partner a, b, c, x, y and z contributed to the generation of the KER. Each one contributed in the following way:

- **Partner a, …**
- **Partner b, …**
- **Partner c, …**
- **Partners x, …**
- **Partner y, …**
- **Partner z, …**

Upon successful conclusion of the project activities, Parties agreed to jointly define the best way to exploit and valorise the KER.

Partners a, b, c, … expressed the willingness to further valorise and exploit the above-mentioned KER, securing the needed resources, while partners x, y, and z agreed to give to partners a, b, c, … the full right to exploit declaring to have nothing to claim.

Given the uniqueness and further impact potential of KER/s above mentioned, all Parties through this agreement aim to define clear roles and modalities to exploit the programme beyond the grant received from the European Commission.

1.4 Purpose of the Agreement

The agreement is therefore aimed at clarifying and regulating

A. Scope and objectives of KER
B. Use of the brand *(example)*
C. Use of the data collected via the platform *(example)*

D. Use of the DB (software) *(example)*
E. Procedures and Roles of the Parties *(example)*

2. Scope and objectives of KER .....

The Parties agree that KER is ... (KER description)

The KER is built around... and it is implemented through:

A. A network(s)-based outreach approach; *(example)*
B. ...;
C. ...;
D. ....

3. Use of the brand

....

...

4. Use of the data collected

...The registered data are the property of each of the Parties, who can use them for other activities in respect of GDPR and only for non-competing purposes with the current agreement (to be finetuned by partners legal offices).

5. Use of the ....

5.1 Procedures and Roles of the Parties

All Parties shall appoint 1 person within their respective organisation as the first and foremost contact point for ensuring swift and clear communication between the Parties and for implementation of the exploitation plan for this KER as approved by XXX and annexed to this MoU.

The initial persons responsible for being the contact point are:

- Partner a: Name, email address, telephone number
- Partner b: Name, email address, telephone number
- Partner c: Name, email address, telephone number
- Partner .....

All partners will be informed of changes in the contact points in a timely fashion, not exceeding 5 working days from the moment the appointment from the organisation.

Partners a, b, c, ... who expressed the willingness to further valorise and exploit the KER will proactively look for potential business development opportunities. Each time one of the Parties is clearly informed by a potential customer, the Party must inform the other Parties' relevant contact points and receive organisational approval (X out of X) to proceed.

It is the responsibility of each Party to ensure the contact points of the other Parties are informed using, if necessary, more than one communication channel (*e.g., email, WhatsApp, phone, etc*). It is the responsibility of the other Parties to ensure the approval to proceed (or

denial thereof) is communicated back to the Party in a timely fashion, not exceeding 1 working week (5 working days) from the moment the latter's communication has reached them.

5.2 Dedicated KER management (in the case of a horizontal governance set-up – to be finetuned according to the governance set up chosen by the concerned partners, before the end of the project))

The Party in charge of any new contract will inform all partners about the client, the scope of the contract and foreseen role for each partner (if possible and to different degrees). In order to progress with a new programme, partners must agree on its relevance and viability. Parties have 5 working days to register non-agreement, otherwise the proposal will be considered suitable.

When the contract is finalised, agreed by all Parties and service sold to the client, the Party in charge will act as main contract manager and coordinator, responsible and liable for the smooth implementation of the envisaged activities throughout all phases.

The partner who secures the contract should also perform a "client financial check" and all Parties will be paid promptly upon payment from the client according to the payment schedules agreed upon.

The Party will be the interface between the client and the Parties and will also be responsible for proposing the allocation of resources among partners.

5.3 Promotion and marketing

Parties a, b, c, … who expressed the willingness to further valorise and exploit the KER will ensure the proper outreach, using their networks and contacts (social media, newsletters, websites) to promote the KER toward the target markets and early adopters initially identified in the exploitation plan annexed to this MoU.

The most suitable party to deliver the communication activities will be decided on the basis of the scope of the contract and the main target audience.

Cost of marketing and sales activities will be split among partners according to the provisions of the exploitation plan for the current KER.

5.4 To summarise:

Activity	*Party responsible*	*Cost split between parties (%)*
Programme management and coordination	*Party who secured a contract*	
KER and methodology management	*…*	
Innovation and IPR management		
KER update		
Outreach and communication	*…*	

…	…	

6. Intellectual Property Rights and NDA

The Parties acknowledge that nothing in this Agreement shall affect any pre-existing (background) and future (foreground) ownership of any intellectual property rights.

Dedicated NDA will be developed and signed between Parties and customers every time needed.

7. Miscellaneous

In the event of further participation in call for proposals covering actions that fall in the scope of this Agreement, the parties mutually recognize a first right of information and best effort to bid together.

This Agreement is at-will and may be modified by mutual consent of all the Parties. This Agreement shall become effective upon signature by the authorised officials and will remain in effect until modified or terminated by any one of the Party by mutual consent. In the absence of mutual agreement by the Parties this Agreement shall remain in force for twenty-four months.

Any dispute that might arise concerning this Agreement shall be settled amicably.

8. Date & Signatures

FOR [please insert name of participant or potential or current partner]

Partner a: Name, Position
Partner b: Name, Position
Partner c: Name, Position
Partner x: Name, Position
Partner y: Name, Position
Partner z: Name, Position

10 ANNEX 3: THE LEAN CANVAS

10.1 HOW TO APPROACH THE BUSINESS MODEL

The Business Model is the plan for the successful operation of any "business", identifying, the intended "customer" base, products/services, sources of revenue and details of financing. It describes the way in which "value" can be extracted from an exploitable R&D result.
When working on the "business" model it is important to focus on the following elements:

<table>
<tr><td colspan="2">Your ultimate goal
• Why am I doing this thing?
• Which are my goals? (Best and worst scenario)
• Am I really better?</td></tr>
<tr><td>Global market
• Competitors
• Incumbents
• Investors (geography matters)
• Level of investment</td><td>Local market
• Competitors
• Incumbents
• Investors
• Peculiarities</td></tr>
<tr><td colspan="2">6-12-18 months plan
• KPI
• Product roadmap
• Cashflow
• Valuation target
• Next step</td></tr>
</table>

Every customer has a problem, every problem has a solution

When working on the business model, it is crucial to start from the problem not from the solution. New initiatives, including spin-off, fail because their offer (a product, a service, a license) is not designed for the customers. Every customer has a problem; every problem has a solution. Vice versa, not every solution has a problem, not every problem has a customer. Brainstorm and identify the problem (forget the solution) focus on the problem, identify a common definition.

Early Adopters

To develop the exploitation model, it is important to look at early adopters and how to go from early adopters to "early majority". Innovators are the ones that "use" the "alfa" version (2,5%, often the industrial partner in an R&D project); early adopters are the customers ready to "use" the "beta" version (13,5%). Next step is to reach the "early majority" (34%). New initiatives fail before reaching out the early majority and this is connected with the capability to reach early adopters.

Identify the "customers", who will pay, focus on the riskier ones and describe them in the most specific way. Why that customer has that problem is the way to select the assumptions (how they deal with the problem, what are they looking for). Focus on the most important one, the one that, if not validated, will make everything fall down.

UVP

The Unique Value Proposition, or Unique Selling Proposition (USP), is a clear statement describing the benefits of the novel offer, how you solve your customer's needs and what distinguishes you from the competition. It is clearly related to the customers' needs and how their problems are solved so far.

In defining the UVP you do not want a "point of parity" when your features are similar to the ones of the competitors". What counts are the points of difference, what you do, that the others do not and that matters to the customers. You do not want to be better than your competitors, you want to be better for your customers. Do not imitate/mirror competitors. Keep in mind customers, not competitors.

10.2 HOW TO APPROACH THE LEAN CANVAS

For preparing the Exploitation Plan (your business plan) of a R&D result it is useful to use the Lean Canvas. The Lean Canvas is an adaptation of Business Model Canvas by Alexander Osterwalder which Ash Maurya8 created in the Lean Startup spirit (Fast, Concise and Effective startup). Lean focuses on problems, solutions, key metrics and competitive advantages.

The canvas is a good tool to focus on the exploitation model and start collecting information for the exploitation plan. Among the different type of canvas, the lean business model canvas, by Ash Maurya, is the most suited for R&D projects. It is a powerful tool to be used by the partners to further develop the characterization of their KERs, prepare the materials to be discussed at consortium meetings and draft the exploitation/business plan for a KER.

The lean canvas helps to fine-tune and develop the exploitation strategy for a KER having in mind four questions:

1) Who is "my customer"?
2) What is "her/his" problem?
3) How does "She/he" solve the problem now?
4) Is our solution more efficient than the current one?

[8] For more information about this canvas, please refer to the blogpost explaining Lean Canvas and the ideas behind it on his website: http://www.ashmaurya.com/2012/02/why-lean-canvas/

10.3 HOW TO FILL OUT A LEAN CANVAS FOR A KER

The end goal of the lean canvas is that an unknowing third-party will be able to review it from start to end and, and through this revision, understand what your KER is about. They will understand the problem in focus, the customer groups that you target, the solution you provide, how it differentiates from competitors, how you intend to create value, etc. Due to this, it is very important to avoid the use of highly technical language, abbreviations etc. They can result in third parties not understanding the nature of your KER.
Below a description of the main steps to draft the canvas.

1) **PROBLEM** - find 3 main problems you are addressing.

Explain: ***What*** is the problem and ***why*** is it a problem.
Additionally, attempt to add numbers or quantifiable measures that will clearly highlight the scale of the problem.
Describe EXISTING ALTERNATIVES - Find out how they are solving the problem now (today's alternatives)

2) **CUSTOMER SEGMENT** - identify who has the problem, define target customers (do not confuse with users).

Be clear on explaining the geographic location of your customers, the industry in which they are operating in, as well as connecting them to the problem in question.
EARLY ADOPTERS - find a small niche that is having the biggest problem, the ones that suffer the most (early adopters).
These will be the first customers of your solution; Be sure to find as much information about these as possible. Explain the geographic location, connect them to the problem, explain exactly why these will be the first adopters, clarify your current connection to them etc.

3) **UNIQUE VALUE PROPOSITION**

Define your UVP based on the today's alternative, what makes your product/service more efficient for your customers, a single and compelling sentence that makes everybody understand why you are far better (your features need to be compelling to the customers' needs, otherwise are irrelevant to clients).
Ensure that you clearly define how you differentiate from alternative solutions, and why the customer will come to you; Explain the ***uniqueness*** of your solution.
Provide facts and data, explaining the performance of your product compared to alternative solutions (efficiency increase of 20%, decreased energy consumption of 10%, 30% fewer development costs etc.).

4) **SOLUTION** – outline the main features of your solution.

When your features are similar of the ones of the competitors, this is an equality. What matters are the points of difference! What you do, that the others do not do and are what matters to the clients.
Be sure to explain the format of your solution (is it a machine, an equipment, a software, a service, a process, etc.), what it does, and how it does it.

5) **UNFAIR ADVANTAGE** – what is it that gives you an advantage in front of the competition? Something that can't be easily copied or bought.

This could be IPR, being first movers on new technology that takes years to develop etc. Be sure to explain, *why* the listed points provide you with an advantage. It can be difficult for third parties to understand if they do not have a wide array of knowledge regarding your industry.

6) **CHANNELS** – How will you reach your customers?
   Be sure to investigate whether the chosen channels are suitable for your choice of customers and consider whether they will be enough to establish the needed reputation on the market.
7) **REVENUE STREAMS**
   Which will be the main revenue streams when the solution is ready for the market. Explain how each of them will generate revenue and how much you expect to generate from each stream.
   Estimate revenues for seed stage after 6 months and after 3 years. Quantify amounts and prices by detailing, for example, the expected number of services provided and paid, number of licenses sold at which prices etc.
8) **KEY METRICS** – key activities you will measure to track the success (e.g. units sold, users registered, retaining users, paying customers, number of complaints ...)
9) **COST STRUCTURE** – which will be the main costs when the solution is ready for the market (e.g. customer acquisition costs, distribution costs, hosting, people etc). As with revenues, estimate the total costs issued after 6 months and 3 years along with the estimated cost of each "cost-entity". This will connect your revenues to your costs.

After you finish the exercise, test your hypothesis "out the lab", with at least 2 to 3 real potential customers. Validate the following assumptions:

- Are the problems you assume really the ones? Is your solution to solving their problem?
- Are the features your solution is offering the ones the market needs and looks for?
- Are the explanations provided in the canvas enough to provide the customer with an understanding of your project?

Write down the feedbacks and update, revise, iterate the Canvas accordingly.

Lean Canvas by Ash Maurya

<table>
<tr>
<td rowspan="2">Problem
1)
Top 3 problems

His main problem
Which job has to accomplish

What and why?

4)
Existing alternatives to address the same problems</td>
<td>Solutions
6)
Top 3 features
Based on the VP
(why it is better than others)
Use MVP to test assumptions

Remember: the first sentence should clarify what it does, how it does it.</td>
<td rowspan="2">Unique Value proposition
5)
Why you are different and worth buying
(How you help customer doing his job, accomplish his mission
Improve his position
…. better than others.
Provide

Explain how you differentiate from alternative solutions and thus the uniqueness of your solution.
Provide numbers to the performance of your solutions (see earlier explanation).</td>
<td>Unfair Advantage
7)
Can it be easily copied or brought?
What is the customer retaining costs?
Acquisition costs
Switching costs

See the earlier explanation for clarification.
….</td>
<td rowspan="2">Customer segment
2)
Who are they?

Distinguish between users and customers (customers buy, users “use”)
Split into vertical segments
Pick the strongest customer segment

Remember geographic location, Industry and connection to the problem.

3)
Early adopters

Remember geographic location, Industry and connection to problem.
+ why are they early adopters? What is your relation to these etc.</td>
</tr>
<tr>
<td>Key Metrics
9)
Key aspects/activities you need to measure for a feedback</td>
<td>Channels
8)
How you contact your customers/early adopters,
How you deliver value
How you promote value</td>
</tr>
<tr>
<td colspan="3">Cost structure
11)
Prototyping
HR costs, Eng. costs, MFG costs, marketing costs etc.
Estimate costs for each “cost-entity”
Estimate costs after seed stage 6 months and 3 years.</td>
<td colspan="3">Revenue Streams
10)
The different revenue streams How each stream generates revenue Estimation of how much each stream will generate Estimation of revenue at seed stage 6 months and 3 years.</td>
</tr>
</table>

11 ANNEX 4: COMMERCIALISATION OPTIONS AND EXAMPLES OF CONTRACTS

11.1 LICENSING

Exclusive:
Only the licensee can use the licensed IP or technology (the licensor cannot use or license it);
Sole:
The licensor agrees not to grant any additional licenses but retains the right to make use of the licensed IP.
Non-Exclusive License:
The licensee and the licensor can both use the licensed intellectual property or technology. The licensor is also allowed to negotiate further non-exclusive licenses with other companies.

11.2 FRANCHISING

While on the one hand, franchising helps franchisors to expand their business with the need for less investment, on the other hand, it enables franchisees to enter into a market more easily since the business is based on an established brand and/or on a proven business model. Franchising means less risk and low costs for both parties with higher chances of surviving within the first years of business.
In Europe, the regulation of franchising is not harmonized. Also, in most EU Member States there are no independent codes establishing all the rules for this particular partnership. However, this sector has the particularity of being self-regulated in the EU through the European Code of Ethics for Franchising establishing a set of guidelines and principles for both franchisors and franchisees. Therefore, it is important for potential franchisors and franchisees to get to know the requirements that they must meet under their national law and become familiar with the European Code of Ethics for Franchising.
Due diligence: potential franchisees should carry out a due diligence to detect potential risks, which may arise during the franchise. Such an audit may include verification of the related IP, financial and business information about the franchisor, sufficiency of the goods/services, training and assistance to be provided by the franchisor, etc.

11.3 JOINT VENTURES (JVS)

JVs are business alliances of two or more independent organisations (ventures) to undertake a specific project or achieve a certain goal by sharing risks. IP has an important role in the creation of such collaborations, since venture bring their own intellectual assets for the

success of a JV and they should agree on their initial contributions, responsibilities and obligations within the alliance as set out in JV agreements.

Advantages

- Gives opportunity to exploit and share IP assets with reduced financial investment.
- Allows companies to access new markets by sharing risks.
- Creates possibilities to leverage existing technologies and patents developed by each venture.
- Provides companies with the chances to develop new IP with less investment.
- Allows utilization of unused IP assets.

Disadvantages

- There may be an imbalance in expertise, intellectual assets and investment brought into the JV by the ventures.
- Coping with different management cultures in IP management may be difficult.

Key terms in the JV agreements: Background, foreground and access rights

In JVs, the ventures bring into the project their previously owned IP assets - which are known as background - and they should decide on the access rights to their background for other ventures. Furthermore, the project implementation will also generate IP, which is referred to as IP foreground or results. The ownership of foreground/results and determination of access rights should be clarified before entering a JV partnership together with compensation of IP registration and/or maintenance costs.

11.4 SPIN-OFF (NEWCO)

A Spin-off (or newco) is a separate legal entity created by a parent organisation (PO) to bring its IP assets into the market. It is generally an efficient solution for the parent organisations, who may not be fully capable of commercialization of their own IP assets, such as for universities and research institutions. Spin-offs are an important means of technology transfer since they are acting as an intermediary between the research environment and industries while putting research results into the commercial market with a marketable product. Moreover, through spin-offs, research organisations can focus on their main task of "research" instead of "marketing", which is the main task of commercial companies (spin-off). A spin-off company can be formed by a person external to the PO for the exploitation of the IP asset created by the parent organisation. In this type of spin-off, as the new company is owned by an external professional, the IP assets to be exploited by the new company (spin-off) are generally transferred by licensing, to allow the PO to keep control over them. The external professionals can also be venture capitalists, who foresee a market potential in commercialisation of IP.

Conducting due diligence

A due diligence study allows the investors to ascertain the ownership of the IP to be transferred and any obligations affecting the transfer.

11.5 MATERIAL TRANSFER AGREEMENTS (MTAS)

MTAs are used when exchanging tangible materials between parties to secure the IP rights of the material provider against possible disclosure by the recipient party. The material exchanged can take many forms, such as product samples, prototypes, software, chemical compounds or biological materials etc. Generally, such a transfer occurs during:

- feasibility studies to check whether the material is compatible with the recipient facilities,
- research activities on the material in R&D partnerships,
- provision of samples or prototypes to future clients for trials, etc.

12 ANNEX 5: FOLLOW-UP FUNDING OPPORTUNITIES

12.1 EUROPEAN INVESTMENT PROJECT PORTAL (EIPP)

The European Investment Project Portal (EIPP) is the EU matchmaking portal, enabling EU-based project promoters – public or private – to reach potential investors worldwide. The Portal is a free service offered by the European Commission and is part of the Investment Plan for Europe, which aims to mobilise investment, boost economic growth and create jobs across the EU.

For more information check here: https://ec.europa.eu/investeuportal/desktop/en/index.html

12.2 THE INVESTEU PROGRAMME

The InvestEU Programme builds on the successful model of the Investment Plan for Europe, the Juncker Plan. It will bring together, under one roof, the European Fund for Strategic Investments and 13 other EU financial instruments. Triggering more than €372 billion in additional investment over the period 2021-27, the InvestEU Programme aims to give an additional boost to sustainable investment, innovation and job creation in Europe.

The Programme consists of:

- **The InvestEU Fund which aims to mobilise more than €372 billion of public and private investment through an EU budget guarantee of €26.2 billion that backs the investment of implementing partners such as the European Investment Bank (EIB) Group and other financial institutions.**
- **The InvestEU Advisory Hub which provides technical support and assistance to help with the preparation, development, structuring and implementation of investment projects, including capacity building.**
- **The InvestEU Portal which brings together investors and project promoters on a single EU-wide platform, by providing an easily accessible and user-friendly database of investment opportunities available within the EU.**

https://europa.eu/investeu/home_en

12.3 CASCADING GRANTS

Cascade Funding, also known as Financial Support for Third Parties (FSTP), is a European Commission mechanism to distribute public funding in order to assist beneficiaries, such as start-ups, scale-ups, SME and/or mid-caps, in the uptake or development of digital innovation.

This funding method aims at simplifying the administrative procedures, creating a light, SME-friendly application scheme, by allowing that some EU-funded projects may issue, in turn, open calls for further funding.
This scheme is based on the model of Erasmus students and was first introduced by the European Commission in Horizon 2020, the Framework Programme for Research and Innovation (2014-2020). It will be used also in the new Horizon Europe Framework Programme for Research and Innovation (2021-2027).
More information and open calls available here: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/competitive-calls

12.4 ACCESS TO FINANCE IN EUROPE

University technology transfer offices (UTTOs) often perform the function of transferring technology and commercialising innovations emerging from the University sector to the market place.
For more information check here:
http://europa.eu/youreurope/business/funding-grants/access-to-finance/index_en.htm
This site can help to apply for loans and venture capital supported by the European Union.
Click on your country to locate banks or venture capital funds that provide finance supported by the EU.

12.5 AD HOC GRANTS FOR EIC PATHFINDER AND EIC TRANSITION GRANT HOLDERS

The grant holders of EIC Pathfinder projects (including grants resulting from certain EIC pilot Pathfinder, FET-Open and FET-Proactive calls) and of EIC Transition projects are eligible to receive ad hoc grants with fixed amounts of up to EUR 50 000, as specified in the relevant call sections of the EIC work programme.
In line with Article 47(3)(b) of the Horizon Europe Regulation, the ad hoc grants are not subject to any call. They reflect the necessity and hence the possibility for the EIC to proactively support, at any stage of a project implementation, the assessment of any potentially innovative lead stemming from a EIC Pathfinder project, or reinforce the coordination and management of a Portfolio where needed.
These ad hoc grants fund either complementary activities to explore potential pathways to commercialisation (for EIC Pathfinder grant holders) or portfolio activities (for EIC Pathfinder and EIC Transition grant holders).
These ad hoc grants do not fund research or activities that were already foreseen in the original project. A maximum of three ad hoc grants can be awarded for each EIC Pathfinder project and more than three may be awarded in exceptional and duly justified cases. A maximum of one ad

hoc grant can be awarded for each EIC Transition project. Any such ad hoc grant can be awarded to an individual grant holder or a group of grant holders.
EIC grant holders, after discussion with a EIC Programme Manager or following a project review, can apply for such an ad hoc grant.

12.6 FAST TRACK SCHEME TO APPLY FOR THE EIC ACCELERATOR

The 'Fast Track' scheme is a novelty under Horizon Europe and a specific process applicable to the EIC Accelerator. It provides for a specific treatment of applications that result from existing Horizon Europe or Horizon 2020 projects.
Under the Fast Track scheme, applicants do not apply directly to the EIC Accelerator call. Instead, a project review is carried out by the responsible funding body to assess the innovation or market deployment potential of an existing project, to decide whether the project is suitable for support under the EIC Accelerator.
The responsible funding body can submit the outcome of the projects review to the EIC Accelerator, if the project review concludes that the following conditions are met:

- the proposal meets the two first criteria of the EIC Accelerator (excellence and impact),
- there is no duplication of funding of activities to be supported under the EIC Accelerator with the existing grant, and
- the applicant meets the eligibility criteria for the EIC Accelerator.

The applicant will then be invited to prepare a full application for the EIC Accelerator to one of the cut-off dates within the next 12 months following initial review. They will receive support through the EIC artificial intelligence-based IT platform and coaching.

12.7 EIC TRANSITION

The EIC Transition funding scheme builds on promising research results to demonstrate and mature the technology and develop business plans.
EIC Transition funds innovation activities that go beyond the experimental proof of principle in laboratory to supports both:

- the maturation and validation of your novel technology in the lab and in relevant application environments
- the development of a business case and (business) model towards the innovation's future commercialisation.

Grants of up to €2.5million and more are available to validate and demonstrate technology in application-relevant environment and develop market readiness.
EIC Transition has open funding for projects in any field of science or technology as well as challenge driven funding on specific strategic fields.
Single applicants (SMEs, spin-offs, start-ups, research organisations, universities) or small consortia (max 5 partners) may apply.

https://eic.ec.europa.eu/eic-funding-opportunities/eic-transition_en

12.8 EIC ACCELERATOR

The EIC Accelerator supports individual Small and Medium Enterprises (SMEs), in particular Startups and spinout companies to develop and scaleup game-changing innovations. In some cases, small mid-caps (up to 500 employees) are supported.
The EIC Accelerator provides substantial financial support with:

- grant funding (non-dilutive) of up to €2.5 million for innovation development costs,
- investments (direct equity investments) of up to €15 million managed by the EIC Fund for scale up and other relevant costs.

In addition, EIC selected companies receive coaching, mentoring, access to investors and corporates, and many other opportunities as part of the EIC community.
Applications can be submitted at any time through the EIC platform. Applicants have to submit a video pitch, a slide deck and respond to a short set of questions about their innovation and their team.
Applications that meet all the criteria at the remote evaluation stage and are assessed positively by the EIC jury but not recommended for funding, will be awarded a Seal of Excellence to help them secure funding from other sources. Companies with a Seal of Excellence can also get support from EIC Business Acceleration Services.

https://eic.ec.europa.eu/eic-funding-opportunities/eic-accelerator_en

12.9 EIC PRIZES

The EIC Prizes are awarded to whoever can most effectively meet a pre-defined challenge, without prescribing how that challenge should be solved. These will boost breakthrough innovation across sectors by fostering cutting-edge solutions which bring major benefits to citizens and society.
In 2021 the following challenges are defined:

- EU Prize for Women Innovators (3 prizes of €100k, 1 prize for 'Women Innovators' main category, 1 prize of €50k for 'Rising Innovator' category)
- The European Capital of Innovation Awards (iCapital) (total budget €1,8 million, European Capital of Innovation winner €1 million)
- The European Innovation Procurement Awards (total budget €300k)
- The European Social Innovation Competition (total budget €200k)

12.10 EUREKA AND EUROSTARS FUNDING

Eurostars supports international innovative projects led by research and development-performing small- and medium-sized enterprises (R&D-performing SMEs). With its bottom-up approach, Eurostars supports the development of rapidly marketable innovative products, processes and services that help improve the daily lives of people around the world. Eurostars has been carefully developed to meet the specific needs of SMEs. It is an ideal first step in international cooperation, enabling small businesses to combine and share expertise and benefit from working beyond national borders.
Eurostars applies a decentralized funding procedure; participants do not receive funding directly from the EUREKA Secretariat or the EU. All funding to participants in approved projects is managed by their respective funding body and according to their national funding rules and procedures. These rules and procedures are dependent on the member countries involved in the project. Project partners are strongly advised to contact their National Project Coordinators (NPCs) and browse on the Eurostars in each country. https://www.eurostars-eureka.eu/

12.11 ENTREPRENEURSHIP AND SMALL AND MEDIUM-SIZED ENTERPRISES (SMES)

The dedicated section on EU portal offers a wide focus dedicated to information on possible EU funding opportunities for SMEs and in general on what EU does for SMEs: https://ec.europa.eu/growth/smes
Furthermore, to know if a programme is relevant to your particular case, we strongly suggest that you contact your local Enterprise Europe Network partner, who can give you one-to-one advice and support in applying for EU funding.
Contact details of the Enterprise Europe Network members: http://een.ec.europa.eu/about/branches/

12.12 SEAL OF EXCELLENCE – EUROQUITY INITIATIVE

This initiative is dedicated to those companies who have received the Seal of Excellence from the EU Horizon 2020 SME Instrument Programme. Matchmaking activities and support services will be provided in order to facilitate their access to risk finance and enhance their visibility, through a specific on-line community based on the EuroQuity platform.
Each "Seal of Excellence" SME will gain in this way instant visibility among different actors: the main EU business angels' networks, VCs, corporate investors, and new business partners, at the same time investors will be guarantee on the quality of SMEs' projects and their innovation potential. Free services will also be offered to these companies allowing them to grow on a European level:

- Visibility and access to European investors

- Possibility to pitch online in front of investors during e-pitch sessions
- Connections with National Contact Points of your Country

More information available here https://www.euroquity.com/fr/community/Access4SMEs--Seal-of-Excellence-5bb56459-4f88-4d3c-a2eb-8e4b6e865ea5/

12.13 CONTRACTS AND GRANTS - ACCESS TO BUSINESS OPPORTUNITIES

Several different contracts and grants are regularly made available for companies or organisations who want to work with Directorate General (DG) for Internal Market, Industry, Entrepreneurship, and SMEs or apply for funding.
In the framework of public procurement contracts, DG Internal Market, Industry, Entrepreneurship, and SMEs regularly organizes calls for tenders. Calls for tenders are special procedures to generate competing offers from different businesses looking to obtain works, supply, or service contracts.
Those tenders/calls also give an insight in competitors' activities as well as ideas for partnerships and stakeholders. Furthermore, there are possibilities for winning contracts.

12.14 TENDERS ELECTRONIC DAILY

TED provides free access to business opportunities from the European Union, the European Economic Area and beyond.
Every day, from Tuesday to Saturday, a further 2,000 public procurement notices are published on TED.
You can browse, search and sort procurement notices by country, region, business sector and more.
Information about every procurement document is published in the 24 official EU languages. All notices from the EU's institutions are published in full in these languages. For more information check here:
http://ted.europa.eu/TED/search/search.do

12.15 INNOVACCESS - INTELLECTUAL PROPERTY PORTAL

Innovaccess aims to enhance Intellectual Property (IP) support services to Small and Medium-sized Enterprises (SMEs) to turn their Intellectual capital into commercial values and competitiveness.
The portal helps to protect IP rights and to understand IP security rules. For more information check here: http://www.innovaccess.eu/.

12.16 EUROPEAN GREEN DEAL

Background

On 11 December 2019, the Commission presented the European Green Deal, with the ambition of becoming the first climate-neutral bloc in the world by 2050. Europe's transition to a sustainable economy means significant investment efforts across all sectors: reaching the current 2030 climate and energy targets will require additional investments of €260 billion a year by 2030.

The success of the European Green Deal Investment Plan will depend on the engagement of all actors involved. It is vital that Member States and the European Parliament maintain the high ambition of the Commission proposal during the negotiations on the upcoming financial framework.

A swift adoption of the proposal for a Just Transition Fund Regulation will be crucial.

The Commission will closely monitor and evaluate the progress on this transition path. As part of these efforts, every year the Commission will hold a Sustainable Investment Summit, involving all relevant stakeholders, and it will continue to work for promoting and financing the transition. The Commission invites the investment community to make full use of the enabling regulatory conditions and ever-growing needs for sustainable investments, and authorities to take an active role in identifying and promoting such investments.

The Just Transition Mechanism

The Just Transition Mechanism (JTM) is a key tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind. While all regions will require funding and the European Green Deal Investment Plan caters for that, the Mechanism provides targeted support to help mobilise at least €100 billion over the period 2021-2027 in the most affected regions, to alleviate the socio-economic impact of the transition. The Mechanism will create the necessary investment to help workers and communities which rely on the fossil fuel value chain. It will come in addition to the substantial contribution of the EU's budget through all instruments directly relevant to the transition.

The Just Transition Mechanism will consist of three main sources of financing:

1) **A Just Transition Fund**, which will receive €7.5 billion of fresh EU funds, coming on top of the Commission's proposal for the next long-term EU budget. In order to tap into their share of the Fund, Member States will, in dialogue with the Commission, have to identify the eligible territories through dedicated territorial just transition plans. They will also have to commit to match each euro from the Just Transition Fund with money from the European Regional Development Fund and the European Social Fund Plus and provide additional national resources. Taken together, this will provide between €30 and €50 billion of funding, which will mobilise even more investments. **The Fund will primarily provide grants to regions. It will, for**

example, support workers to develop skills and competences for the job market of the future and help SMEs, start-ups and incubators to create new economic opportunities in these regions. It will also support investments in the clean energy transition, for example in energy efficiency.

2) A dedicated **just transition scheme under InvestEU** to mobilise up to €45 billion of investments. It will seek to attract private investments, including in sustainable energy and transport that benefit those regions and help their economies find new sources of growth.
3) **A public sector loan facility with the European Investment Bank** backed by the EU budget to mobilise between €25 and €30 billion of investments. It will be used for loans to the public sector, for instance for investments in district heating networks and renovation of buildings.

The Commission will come with a legislative proposal to set this up in March 2020.**The Just Transition Mechanism is about more than funding: relying on a Just Transition Platform, the Commission will be providing technical assistance to Member States and investors** and make sure the affected communities, local authorities, social partners and non-governmental organisations are involved. **The Just Transition Mechanism will include a strong governance framework centred on territorial just transition plans.**

More information available here https://ec.europa.eu/info/research-and-innovation/strategy/european-green-deal/call_en

12.17 EUROPEAN INSTITUTE OF INNOVATION AND INNOVATION

Under EIT's Knowledge and Innovation Communities (KICs) are partnerships that bring together businesses, research centers and universities. Through the KICs, EIT strengthen cooperation among businesses (including SMEs), higher education institutions and research organisations, form dynamic pan-European partnerships, and create favourable environments for creative thought processes and innovations to flourish. These partnerships are called Innovation Communities and each is dedicated to finding solutions to a specific global challenge, from climate change and sustainable energy to healthy living and food.

There are 8 Innovation Communities and each focuses on a different societal challenge:

- EIT Climate-KIC
- EIT Food
- EIT Health
- EIT Digital
- EIT Manufacturing
- EIT Innoenergy

- EIT Urban Mobility
- EIT Raw Materials

12.18 LIFE PROGRAMME

LIFE programme is the EU's funding instrument for the environment and climate action. The programme is divided into two sub-programmes, one for environment (representing 75% of the overall financial envelope) and one for climate action (representing 25% of the envelope).

- The programme includes large scale demos/pilots with focus on Environment and Climate Action; with clear impact aims during the project; and clear environmental/climate problem baseline (de-risk).
- Projects start at TRL 6-7 aiming up to 9 to bridge valley of death (income allowed – end-user important).
- The funding programme uses bottom-up approach (call-topics are broad) allowing proposers to define their solutions needed for their environmental context/problem.
- Focus is on making Environmental impacts in the EU.
- Even proposals from single EU beneficiaries are allowed.
- Proposers can apply in their own language.
- There is no set proposal budget limit.

12.19 DEALFLOW

Dealflow is sponsored by the European Commission to support EU-funded innovations with fundraising, venture building and networking. It supports EU-funded projects from H2020.
Three typologies of support are foreseen:

- Venture-building: giving tailored support on challenging business topics (e.g. sales strategy, market sizing & research, organizational structure, and pitching);
- Fundraising (preparation): preparing investor materials and providing access to investor networks;
- Networking: introductions to industry experts, potential clients and new partners through their matchmaking platform, community & events.

https://dealflow.eu/

12.20 ACCELERATORS AND INCUBATORS

If you have the intention to create a startup/spinoff, you are suggested to check Accelerators/Incubators in your area.
Here below there is a non-exhaustive list of international and pan-European Accelerators/Incubators networks:

- Startup Bootcamp: founded in 2010, Startup Bootcamp is a well-known global network of startup accelerators that offer an intense 3-month program. After Selection Days, 10 startups join diverse accelerator programs (Amsterdam, Istanbul, London, Barcelona, Copenhagen, Berlin, Eindhoven and Haifa) where they receive mentoring, free workspace, great networking opportunities, and pitching opportunities to over 400 investors on Investor Demo Day.
- Startup Weekend: Startup Weekend brings together developers, designers, product managers, aspiring entrepreneurs, marketers and tech enthusiasts to launch a startup in 54 hours. These weekend-long events are focused on learning through creating, building professional relations and networking.
- StartupBus Europe: is a unique project founded in 2010. It is a hackathon for European tech entrepreneurs ("buspreneurs") where they compete over the course of a 3-day bus ride on the way to Vienna.
- IMPACT Accelerator: (Internet Mobile Projects Accelerator) offers premium acceleration services for European mobile start-ups and small and medium-sized business for a period of six months. It operates in several locations in Spain and Italy and given it is one of the 16 consortia selected by the European Commission within the framework of the Seventh Framework Programme, the selected start-ups in the extended phase can count on the Buongiorno Headquarters in 14 countries.
- Wayra: launched in 2011, Wayra is a startup accelerator financially backed by Telefonica, one of the biggest telecommunication companies in the world.

Here below a non-exhaustive list of Accelerators/Incubators in Member States:

- Austria: i5invest, INiTS, Up to Eleven, Kubator
- Belgium: Telenet Idealabs, NEST'Up
- Bulgaria: 3Challenge, Eleven, LAUNCHub
- Croatia: Zip
- Czech Republic: StarCube, Startup Yard
- Denmark: Accelerace
- Estonia: GameFounders,Garage48, Startup Wise Guys
- Finland: Startup Sauna
- France: TheFamily, Numa (Le Camping)
- Greece: OpenFund
- Germany: Axel Springer Plug & Play, hub:raum
- Hungary: iCatapult
- Italy: H-Farm, LuissEnLabs
- The Netherlands: Rockstart
- Norway: betaFACTORY
- Lithuania: StartupHighway
- Portugal: The Lisbon Challenge

- Poland: Gamma Rebels
- Romania: SeedForTech, Innovations,
- Spain: SeedRocket, Tetuan Valley

12.21 INNOVFIN

InnovFin – EU Finance for Innovators is a joint initiative launched by the European Investment Bank Group (EIB and EIF) in cooperation with the European Commission under Horizon 2020. InnovFin aims to facilitate and accelerate access to finance for innovative businesses and other innovative entities in Europe.
Innovfin makes available specific instruments for different typologies of financing.

Start-up and SME financing

- InnovFin Equity provides equity investments and co-investments to or alongside funds focusing on early-stage financing of enterprises operating in innovative sectors covered by Horizon 2020, located or active in the EU or Horizon 2020 Associated Countries. InnovFin Equity is available via four products: InnovFin Technology Transfer, InnovFin Business Angels, InnovFin Venture Capital, InnovFin Fund-of-Funds.
- InnovFin Guarantee SME guarantee provides guarantees and counter-guarantees on debt financing between EUR 25 000 and EUR 7.5 million, in order to improve access to loan finance for innovative small and medium-sized enterprises (SMEs) and small mid-caps (up to 499 employees).

Corporate finance

- InnovFin Emerging Innovators offers a range of tailored products which provide financing in support of R&I by small, medium-sized and large companies and the promoters of research infrastructure. It provides loans or guarantees directly or indirectly via financial intermediaries.
- InnovFin MidCap Guarantee provides guarantees and counter-guarantees on debt financing of up to EUR 50 million, in order to improve access to finance for innovative midcaps (up to 3 000 employees) which are not eligible under the InnovFin SME Guarantee.
- InnovFin Corporate Research Equity (in collaboration with EFSI) increases the supply of equity-type financing under the European Fund for Strategic Investments (EFSI) to large research and innovation (R&I) programmes and to innovative large mid-caps and small or medium-sized enterprises (SME). It addresses the market gap for large equity-type investment in the form of contingent loans, in particular with mid- to long-term repayments profile that are directly linked to product development cycles.

Science

- InnovFin Science (for research institutions and universities) aims at supporting research and innovation (R&I) investments by public or private research institutes/organisations and universities, including the financing of buildings and other infrastructure directly related to R&I activity. It provide different forms of debt or equity-type financing.

Thematic financing

- InnovFin Energy Demo Projects provides loans, loan guarantees or equity-type financing to innovative demonstration projects in the fields of energy system transformation, including but not limited to renewable energy technologies, smart energy systems, energy storage, carbon capture and storage or carbon capture and use, helping them to bridge the gap from demonstration to commercialisation. The product is deployed directly by the EIB.
- InnovFin Infectious Diseases provides financial products ranging from standard debt to equity-type financing for amounts typically between EUR 7.5 million and EUR 75 million, to innovative players active in developing innovative vaccines, drugs, medical and diagnostic devices or novel research infrastructures for combatting infectious diseases. The product is being made available directly through the European Investment Bank.

12.22 STARTUP EUROPE

STARTUP Europe is an initiative of the European Commission to connect high tech startups, scale-ups, investors, accelerators, corporate networks, universities and the media. The 4 main objectives of Startup Europe are to:

- Connect people
- Connect local start up ecosystems
- Help start-ups soft land in other market
- Celebrate entrepreneurs' success

In order to help build a strong European ecosystem where startups can thrive, Startup Europe is empowering 7 projects, funded under Horizon 2020, that are connecting local ecosystems across Europe. These projects will connect deep tech startup ecosystems and support cross-border activities for startups and scale-ups. The cross-border activities include the following: connecting tech entrepreneurs with potential investors, business partners, accessing skills, and services helping startups soft land in new international markets.

- Scaleup4Europe: The Scaleup Labs will provide deep tech start-ups with a structured open innovation approach in which they can achieve cross-border market success, through first successful collaborations with corporate customers, investors and/or public institutions.
- B-HUB FOR EUROPE: Will target deep tech vertical startups in the blockchain domain. The initiative is aimed at: discovering high-potential innovations, shaping suited proof of concepts and business models, providing specialised acceleration services to overcome

current market barriers and assist the go-to-market process, unlocking new market channels with potential private/public customers, scaling up innovative businesses across five startups ecosystems in Europe: IT (Rome), FR (Paris), DE (Berlin), LT (Vilnius) and RO (Cluj-Napoca).

- The Scale-up Champions: Project builds on the premise of equalising opportunities of scaling up for startups across five countries represented through the partners of the consortium: Estonia, Lithuania, Poland, Denmark and Spain. Main activities targeting: corporate-startup collaboration, investment readiness and internationalization
- STARTUP 3: Will scout for top founding teams to identify (uptake) breakthrough innovations from deep tech verticals (i.e., built on tangible scientific discoveries or engineering/ technical advances). Then STARTUP3 will help them fine tune (upgrade) their technologies/ business models and align their value proposition to the actual market demand (the so-called Key Performance Areas – KPAs). Finally, STARTUP3 will bring together top deep tech startups/ SMEs and the most prominent corporate innovators – CVC arms, incubators and accelerators, and innovation labs (facilitated by clusters and digital innovations hubs – DIHs) with the aim of catalysing productive interaction (upscale).
- X-Europe: Brings together leading training, acceleration, events, and media companies from across Europe. Through the delivery of training, matchmaking & promotional services X-Europe will support 150 deeptech startups and help them to internationalize, grow across borders, and into developing frontiers.
- INNODEC - (Innovation Radar Data-based Identification & Commercialisation): Aims to close the gap between investors and research projects from both sides. On the one hand, this is achieved through placing investors/partners in contact with the research projects with the highest potential, and then on the other, to coach the projects on raising capital, identifying a business model and developing a sound go-to-market strategy. This approach will ensure scalability while simultaneously catering to the large diversity between projects and their needs.
- MediaMotorEurope: Will boost solutions that can address challenges. Its goal is to nurture high-potential European deep tech innovators, solving today's most prominent media industry challenges and support them in building the media solutions of tomorrow such as misinformation, accessibility, user interfaces and use of data. A large focus will be on deep tech solutions, such as AI and machine learning, and their potential application in the domain of media and creative industries.

12.23 INTERREG EUROPE

Interreg Europe can help in the following ways:

- **Financial support** – funding is available for interregional cooperation projects, which have the potential to lead to longer-term collaborations and partnerships
- **Expand your network** – meet new like-minded partners, stakeholders, and business colleagues across Europe.

The DG also gives the opportunity to organisations to get some grants through calls for proposals. These are invitations for suppliers to submit a proposal on a specific commodity or service. A grant or a subvention is a direct financial contribution from the European Commission to support a specific action or project of a non-commercial nature, to cover eligible costs directly incurred by the beneficiaries.

For more information check here: http://www.interregeurope.eu/

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