D.T3.2.2 – AMiCE-project development support plans for promising AM-related innovation teams from SMEs and R&D

Version 1
07 2020

Abstract

The present deliverable ultimately describes the development process and the implementation of the support plans for innovative teams/ projects in Central Europe in the fields of additive manufacturing and resource efficient advanced manufacturing technologies that have been selected from the AMiCE Cooperation Hotspot. The deliverable will highlight and apply efficient and reliable supporting measures that follow a standardized process while keeping the individual needs and requirements of the innovation team/ project selected in a previous step within the AMiCE project in the focus.

The motivation of this deliverable is to support the project partners in developing the right support plans not only for the selected teams/projects but beyond that. Different aspects within the project development framework and the strategies behind those including knowledge, tools and approaches for successful project development, finding the right partners as well as the relevant funding scheme/ financing opportunity are discussed in detail.

This deliverable relies on the knowledge, expertise and work of previous deliverables, thus, this deliverable will reference those or revert to previously developed schemes and strategies.

The outcome of the present document will enable project partners to kick off their collaboration with the SMEs in a standardised way.

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Abbreviations

ABBREVIATION	DEFINITION
AM	Additive Manufacturing
CE	Circular Economy
CT	Computed Tomography
CZ	Czech Republic
DE	Germany
EC	European Commission
EU	European Union
ICT	Information and Communications Technology
IPO	Initial Public Offering
IPR	Intellectual Property Rights
IT	Italy
OEM(s)	Original Equipment Manufacturer(s)
PL	Poland
R&D	Research and Development
RTO(s)	Research and Technology Organisation(s)
SLM	Selective Laser Melting
SME(s)	Small & Medium sized Enterprise(s)
SK	Slovakia
TRL	Technology Readiness Level
3DP	3d-printing

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1 Introduction (scope of the deliverable)

This deliverable documents the development and implementation of the AMiCE-support plans (support for innovation teams/projects in Central Europe). Each tandem chose 11 innovation teams and projects that will be supported leading to 55 in total among the consortium. Those projects were chosen among the projects submitted to the AMiCE Cooperation Hotspot following the criteria that were outlined in a previous deliverable. LEITAT as a forerunner will evaluate and review the support system and the individual plan with regard to quality, sustainability, and impact and will lead and support the common continuous improvement process.

In previous deliverables (D.T1.1.2 and D.T1.1.3) AMiCE highlighted that SMEs in Europe and in Central Europe are slow to adopt new technologies and concepts such as advanced manufacturing technologies or circular economy measures. The main reasons for that have been highlighted as:

- Lack of knowledge/awareness,
- Lack of investment capital,
- Lack of partnerships with forerunners and experts.

2 Development of support plans (systematics)

Following the conclusion of these deliverables mentioned, the support that AMiCE plans to offer to SMEs in Central Europe is clustered into 4 main areas, where the support will be offered in order to:

- increase the knowledge/ fill expertise gaps,
- allow for successful project development,
- find the right partners and set-up successful partnerships and
- finance the projects/ find the right funding mechanism.

To develop successful projects support plans for the SMEs selected from the Cooperation Hotspot, AMiCE partners developed a standardized process that will guide the collaboration. This process allows to analyse and evaluate the projects' needs and requirements and will create the framework that all innovation actors will operate in.

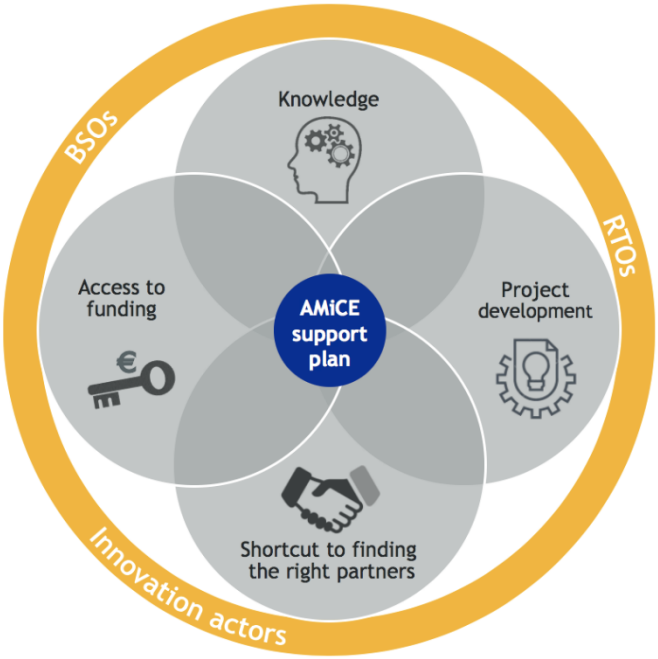


Figure 1 AMiCE support systematics.

2.1 Knowledge

Access to knowledge is a fundamental step of the AMiCE support systematics in order for SMEs to realise the true potential and benefits of advanced manufacturing technologies and the circular economy.
AMiCE will follow the process described in Figure 2.

Figure 2 "Knowledge" support process.

In a first step, the available knowledge and the knowledge gap of each Innovation team/project will be assessed. Beside the Knowledge Share Point developed in the first Work Package of AMiCE, we will draw on the diagnostic process developed in D.T1.1.3 with the focus on getting a clear picture of the organisations framework and the potential project idea. The highlighted steps of the diagnostic process i) Benefits for organisation; ii) Analysis of organisation; iii) Technology assessment and iv) benchmarking will be touched in this step.

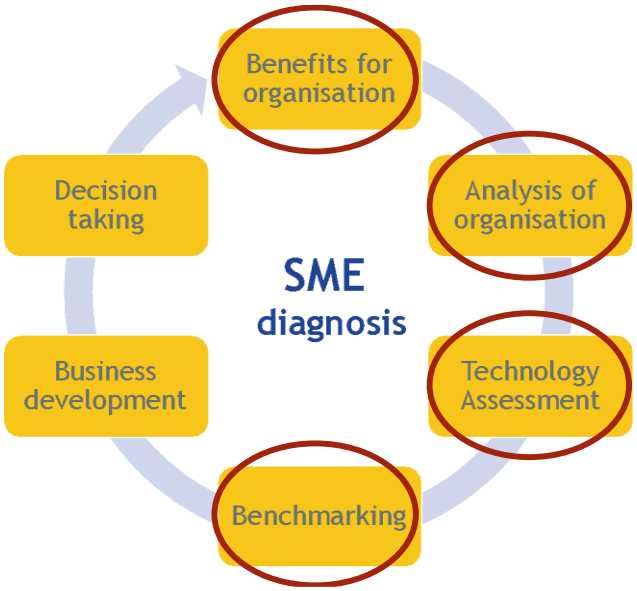


Figure 3 Relevant steps of the diagnostic process related to "knowledge".

In the following sections, the AMiCE (self-)assessment process for the first step is described in detail. This will allow to find the right AMiCE innovation actors to accompany this project (based on the expertise mapped in D.T.3.2.1), to match the right experts (internal or external) to these projects in a later step and to guide the discussions in the project development.

Part of the project support for some selected projects will be also an "out-of-the-box-thinking" sessions, where AMiCE connects experts of areas that might not yet have been in the focus of the innovation team/project in order to bring added value into their innovation process. This allows the team to create and analyse multiple ideas and scenarios before finalising the strategy and the focus of their project (see 2.1.2).

2.1.1. Additive manufacturing

Even though additive manufacturing has been around for multiple years, answering the mass customisation production trend, SMEs struggle to adopt this technique because of a lack of accessible knowledge on

multiple levels. To identify on which level the innovation teams/projects lack knowledge, the following short assessment was developed. Based on the outcome of this assessment, AM experts will be matched to the right projects to help them bridging their knowledge gaps.

Material(s) considered	•(Polymer, metal, ceramic, composites,…)
Value chain step of production process	•(Design, prototyping, production, post-processing, qualification and certification)
Product (batch) information	•(Indicative product size, indicative batch size, product complexity)
Targeted sectors and their requirements	•(e.g. automotive, aerospace, construction, energy intensive industries, chemical industry…)
Considered AM processes if any	•(Stereolithography, fused deposition modelling, selective laser sintering, electron beam melting, laser metal deposition…)

Figure 4 Assessment of organizational needs/ expertise gaps related to additive manufacturing

2.1.2. Circular economy

As the concept of a circular economy and many of its strategies are still rather new or insufficiently explored in the industry there is a considerable lack of knowledge. As it has been discussed in D.T1.1.2 SMEs lack the access to knowledge to be able to adopt those strategies. AMiCE developed a short assessment that allows to understand the ideas of the innovation teams/projects and their potential knowledge gaps.

Additive manufacturing creates opportunities for applying circular design strategies (AM uses almost the exact amount of material needed generating less waste while scrap can usually be reused in the same process) and can support multiple product lifecycles. Therefore, AMiCE supports also the transfer of the AM-related knowledge to innovation teams/projects with a focus on a circular economy.

Material(s) in the focus	•(Polymer, metal, ceramic, textiles, composites, biomass/bio-based, water…)
Value chain step of circular action	•(Sourcing, design, manufacturing, use-phase, end-of-use/ recovery)
Type of circular action envisaged	•(Improved circular design, adoption or development of new technologies, new products, circular business models)
Targeted sectors and their requirements	•(e.g. automotive, aerospace, construction, energy intensive industries, chemical industry…)
Linkages to AM	•(e.g. feasibility of 3d printing and key enabling technologies)

Figure 4 Assessment of organizational needs/ expertise gaps related to circular economy.

2.2 Project development

The AMiCE consortium supports the project development of the preselected 55 innovation teams/projects in a stepwise process.

Figure 5 "Project development" support process.

To be selected for (public/private) funding, competitive project proposals typically include 5 sections. These are common to most (if not all) projects that are selected over a competitive basis. The five sections include i) Concept, ii) Approach, iii) Ambition, iv) Work plan, and v) Impact. Those steps ideally are also applied for non-competitive project developments to develop a project in a holistic and sustainable way.

Table 1 lists the main questions to answer and to address in each of these sections referring also to the tools and exercises that support the considerations in each step.

Table 1 Steps of successful project development.

Step	Important questions to answer	Useful exercises
Concept	What does the project intend to do? What are the main objectives?	"Out-of-the-box thinking" sessions with e.g. different departments or experts allow creating a holistic, sustainable and convincing concept Applying the **S.M.A.R.T. method**: Objectives should be Specific, Measurable, Attainable, Reliable and Timely Thinking about the milestones to achieve the objectives
Approach	How will the concept be carried out? Is it possible to split the project into phases or stages? Are these consecutive? What is their relationship? What are the main inputs and outputs per phase/stage?	Answering all these and visualise them in a simple figure
Ambition	**Current status:** What is the state of the art? What are the existing products and technologies available in the market? **Main challenges:** What challenges (technical, market, social, etc.) were identified? Why haven't these challenges been solved? What is the main obstacle? What is the Project offering that would allow overcoming these challenges? **Innovation potential:** What other fields of expertise are directly benefited? Indirectly benefited?	See Figure 6 and Table 2

	Replicability and scalability: Can the innovation be replicated to other applications in the same or other sectors?	
Work Plan	What tasks and activities are needed? Are there specific roles per partner? What is the timeline of the project per task? What inputs and outputs per task per partner are expected? What types of resources (personnel effort, materials, equipment), and to what extent are needed in each of the activities?	Gantt and PERT charts allow keeping the overview
Impact	For competitive projects: what are the impacts mentioned in the program/call topic? (address those before any other) What is the baseline for the project (absolute values whenever possible)? Scenarios of adoption: who will adopt our innovations? Under which assumptions?	Calculating the impact with the following equation: *Added value (performance) x adoption = impact*

In the following paragraphs, several important considerations and tools that AMiCE partners will use in their support for SMEs are presented.
Successful project development that aims to advance the technology readiness of an innovation and finally the commercialisation of the innovation requires making a considerate effort e.g. in identifying the uniqueness or novelty of the innovation as well as its potential in the market. Patent search in order to develop an Intellectual Property Rights (IPR) strategy, Technology Readiness Level (TRL) determination, planning the demonstration/piloting phase, and route-to-market planning are important aspects to consider in early stages (Figure 6).

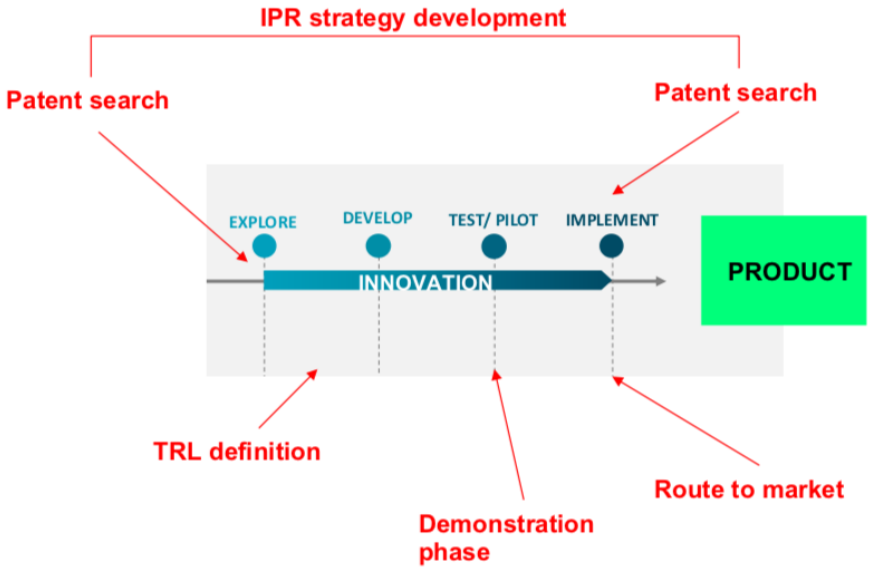
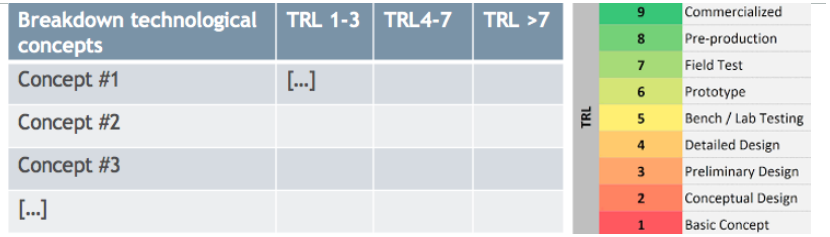
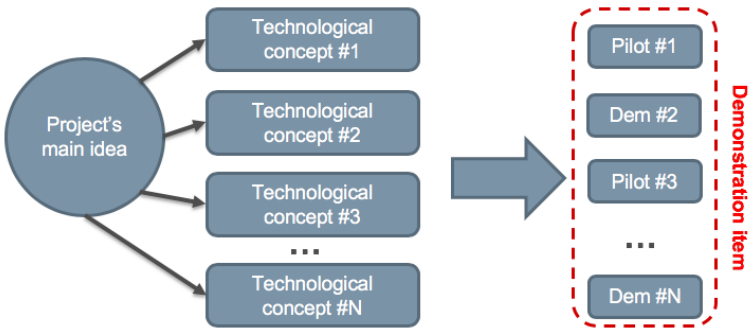
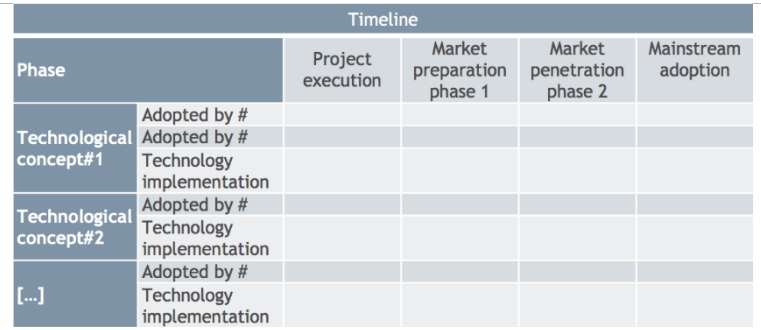


Figure 6 Key aspects of successful project development.

These key elements are explained in detail in Table 2 displaying some tools that ease the execution of the development of each of the elements.

Table 2 Key elements for successful project development.

Elements	Explanation/ Questions to answer	Relevant tools/ considerations
IPR strategy development	IPR strategy development enables protection & potential licenses and ease of investments. Patent search can be time-consuming and requires a lot of effort (other routes are also possible).	
TRL identification	▪ What is the current TRL? ▪ How will the TRL of the concepts be advanced? ▪ Which concept is holding back the rest?	
Demonstration/ piloting	▪ Technology concepts should be trialled in pilots or through demonstrators ▪ Ideally for each demonstrator/ pilot the funding should be secured and known before the start of the project	
Route-to-market	▪ Adoption: targeted sectors & industries should be defined/ identified. Ideally, those are based on a previous Strength-Weakness-Opportunities-Threats-analysis (SWOT) and/or the identified state of the art ▪ Technology implementation includes the definition of the aimed TRL for those targeted stakeholders	

2.3 Shortcut to finding the right partners

To identify the right partners that SMEs need in their innovation projects, AMICE will follow the process shown in Figure 7.

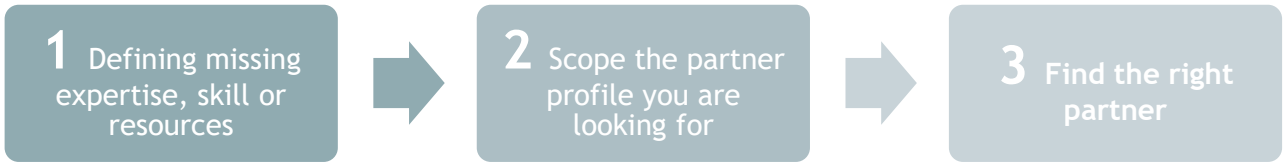


Figure 7 "Finding the right partners" support process.

In the first step, the SME will define what expertise they currently lack. This lacking expertise could be in form of knowledge, similar to the knowledge gaps in section 2.1.1 but also in form of a lack of certain skills (design, certification etc…) or resources (access to machinery or trained employees). The mapping of an SME expertise to detect these gaps can be done using a mapper tool shown in Figure 8.

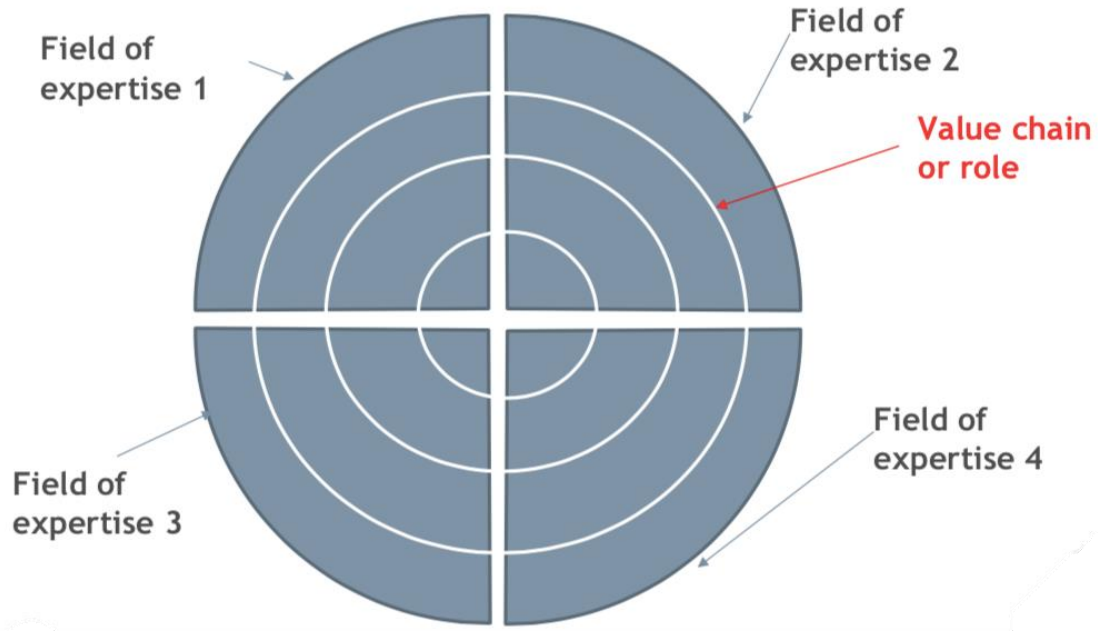


Figure 8 Mapping the expertise (tool).

After defining what the SME lacks, a process will start to scope the different types of partners that can successfully complement the SME. As shown in Table 3, the scoping builds on the expertise gap defined in section 1 and looks further into partner type, partner sector, the covered locations by the partner and specific resources if needed.

Table 3 Partner profile scoping example.

	Lack of knowledge	Lack of skill	Lack of resources
Define expertise gap	Lack of knowledge on different metals that can be used to 3d print engine part	No skills in computational design for redesigning part	No access to expensive Selective Laser Melting (SLM) metal 3d printer
Type of partner that would fill gap	Universities/RTO/industrial partner	RTO/industrial partner	Industrial partner

Sector that this partner would operate in	Automotive would be preferred	No sector preference	Sector that uses AM of metals (machinery, automotive, aerospace…)
Geographical area the partner would operate in	No preference, knowledge transfer can be done online however possible language problems have to be taken into account	No preference, design can be shared online	Geographically close to actually produce part at the partner's premises
Specific resources needed	None	Computational design software	SLM metal 3d printer with available capacity

To find the right partner(s), multiple existing matchmaking platforms can be used where collaboration requests can be published displaying the information defined in steps 1 and 2. AMiCE organizes a matchmaking event at its final stage (D.T3.1.4). However, an overview of several matchmaking platforms that SMEs can make use of in Europe is provided in . The table also presents core information as well as the advantages and drawbacks of each platform.
Table 4. The table also presents core information as well as the advantages and drawbacks of each platform.

Table 4 Overview of matchmaking platforms for collaborative innovation projects (selection).

Platform	Information	Advantages	Disadvantages
Innoget	▪ **Organisation type:** all ▪ **Sectors targeted:** all ▪ **Funding program bound:** no ▪ **Geographical spread:** global ▪ **Potential confidentiality issues:** yes	Not limited to any funding program. They allow: ▪ Posting offers and needs ▪ Finding partners with specific offers and needs	Confidentiality issues due to the open format of the platform. Registering only required for contact data
Enterprise Europe Network*/ Up2Europe	▪ **Organisation type:** all ▪ **Sectors targeted:** all ▪ **Funding program bound:** no ▪ **Geographical spread:** Europe ▪ **Potential confidentiality issues:** no	Not limited to any funding program. They allow: ▪ Posting offers and needs ▪ Finding partners with specific offers and needs. Access to confidential/ contact data only post-registration	*On the EEN platform, partners rely on EEN to matchmake interested partners and put them in touch. The process might be slower compared to other platforms
EC Portal - Partner search	▪ **Organisation type:** all ▪ **Sectors targeted:** limited to those covered by past EU projects ▪ **Funding program bound:** no ▪ **Geographical spread:** EU + Associated countries ▪ **Potential confidentiality issues:** not applicable	Not limited to any funding program	Only a **general search** tool of partners involved in past projects. **Does not allow:** ▪ Posting offers ▪ Knowing present specific needs of partners

EC Portal- Specific H2020 calls/ Ideal-ist/ NCPs CaRE	▪ **Organisation type:** all ▪ **Sectors targeted:** dependant on H2020 calls /mainly H2020 calls on ICT/ H2020 Societal Challenge ▪ **Funding program bound:** H2020 ▪ **Geographical spread:** EU + Associated countries ▪ **Potential confidentiality issues:** yes	Related to a specific H2020. They allow: ▪ Posting offers and needs ▪ Finding partners with specific offers and needs	Only possible to find partners linked to a specific H2020 call Confidentiality issues due to the open format of the platform
Interreg	▪ **Organisation type:** all ▪ **Sectors targeted:** related to Interreg themes ▪ **Funding program bound:** Interreg ▪ **Geographical spread:** EU + Associated countries ▪ **Potential confidentiality issues:** yes	Allows, within Interreg: ▪ Posting offers and needs ▪ Searching for profiles and for project ideas	Limited to Interreg Confidentiality issues due to the open format of the platform
IN-PART / AcademicLabs/ CLUSTER COLLABORATION EU	▪ **Organisation type:** University-Company/ R&D Partnerships/ part of a cluster ▪ **Sectors targeted:** all ▪ **Funding program bound:** no ▪ **Geographical spread:** global ▪ **Potential confidentiality issues:** no	Not limited to any funding program. They allow: ▪ Posting offers and needs ▪ Finding partners with specific offers and needs Access to confidential/contact data only post-registration	Limitation on the type of partners. Either focusing only on University-Company and R&D partnerships or limiting only to organisations that are part of a cluster

In the case of competitive project development several considerations have to be made in terms of finding the right partner/ forming a competitive team:

1. Requirements of the funding programme:
- Types of entities: SME, Industry, Research Centres and Universities,
- Minimum number of partners,
- Geographical coverage.

2. Project team: How to identify if the team is competitive enough?
- Fields covered,
- Value chain stages,
- Complementarities: roles should not overlap,
- Right balance between research/industry? (especially relevant for high TRL projects),
- Competitiveness.

2.4 Access to funding

It has been highlighted that SMEs often require support in making educated choices about what type of funding their project needs. In order to support SMEs in finding the right funding AMiCE will follow the process highlighted in Figure 9.

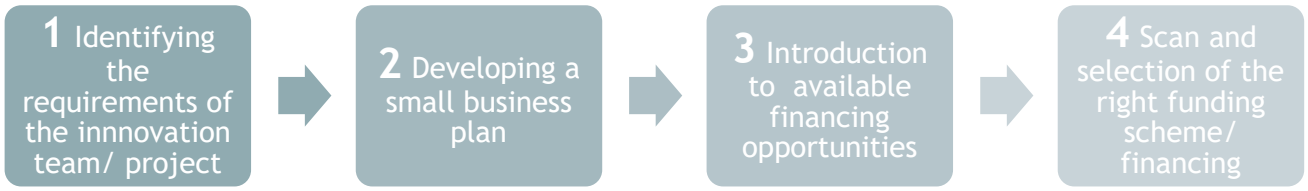


Figure 9 "Access-to-funding" support process.

First, respective partners of AMiCE support the SMEs in identifying and documenting their needs, thus pointing out the requirements for the funding. Those include the aspects displayed in the following list:

- Solo project/ collaborative approach (Types of entities: SME, Industry, Research Centres and Universities/Min. Number of partners/Geographical coverage).
- Research (fundamental/ applied) or implementation project.
- TRL (current and targeted – if applicable)
  - Proof-of-concept/ basic research (below TRL 5),
  - Development & demonstration (above TRL 5),
  - Go-to-market.
- What needs to be funded? (staff, resources, equipment and/ or large research infrastructure).
- What is the overarching topic/challenge addressed? (Advanced materials, advanced manufacturing, resource/energy efficiency, circular economy, safety in transport, inclusive mobility, health, etc.).
- Type of funding/financing required (e.g. loans, grants).
- Amount required (budget limits).
- Duration aimed at/ project timeline.
- IPR issues/ requirements.
- Importance of liquidity (advanced payments/ pre-financing, reimbursement).
- Importance of funding (success rate).

Secondly, after all these points are clear the AMiCE partners will help the SME in developing a small business plan. There are two primary purposes for preparing a business plan, on the one hand to clearly define the strategic plan and on the other hand to describe the financial plan by analysing the profitability and economic feasibility of the project which should be quantifiable after the impact assessment included in project development support (section 2.2). A business plan includes: i) Analysis of the present situation, ii) Defining the objectives and goals, iii) Defining the strategic plan (values, mission and vision) and iv) Defining the Financial Plan. AMiCE will support to progress from the Project Development stage to a Business Plan that will help securing financial support.

Finally, AMiCE will be matching the SME's requirements with the requirements and offers of different financing/funding opportunities by scanning those in detail. In general, three different types are distinguished: debt financing, equity investment, grants & subsidies as it is shown in Table 5.

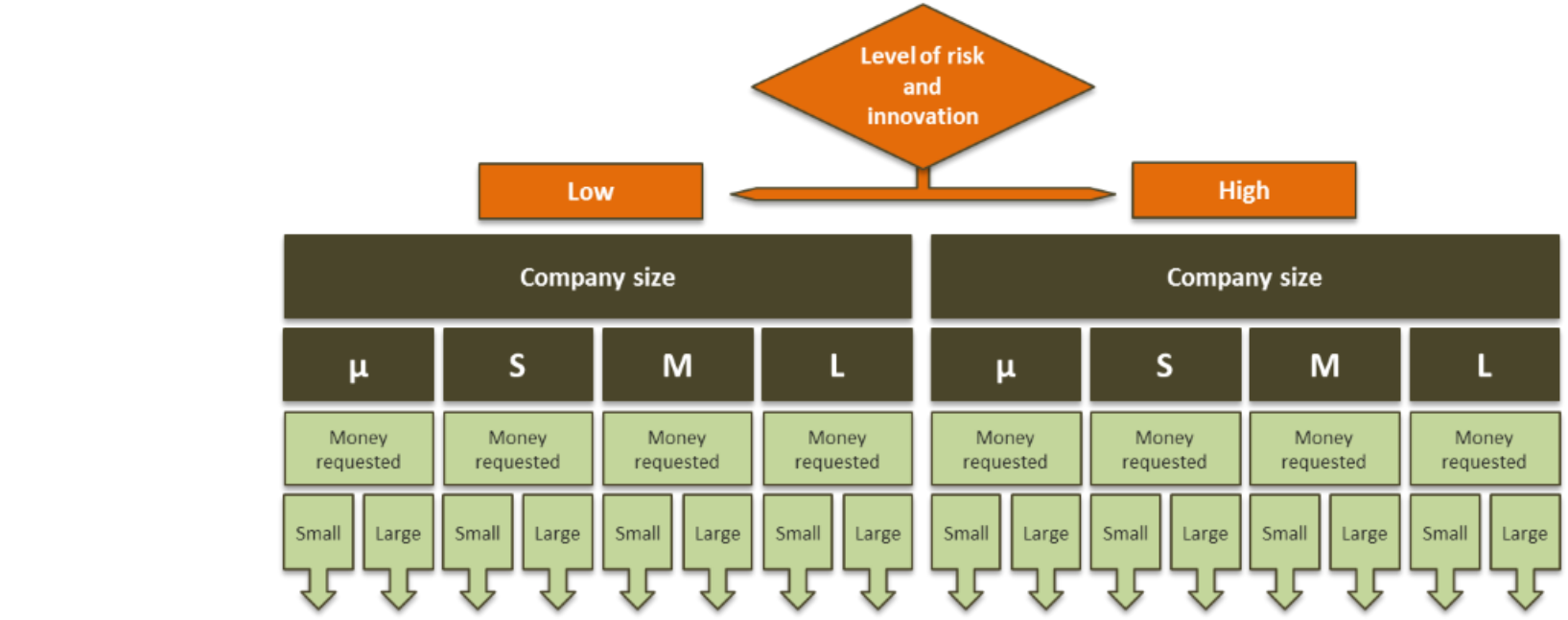
Table 5 Types of financing for SMEs.

Type	Debt financing	Equity investment	Grants & subsidies
Subtypes	▪ Secured/unsecured loans (banks) ▪ Friends and family (non-secured), ▪ Micro-loans (Invoice-trade financing) ▪ Leasing ▪ Crowd-lending ▪ Bonds	▪ Venture Capital ▪ Business Angels ▪ IPO ▪ Crowd Investing ▪ Strategic Investor such as corporate (M&A) ▪ Friends and family ▪ Own resources/ internal funding	▪ EU (ERDF, EIC Accelerator, Horizon, ESIF) ▪ (Trans)national ▪ (Trans)regional
Definition	**Debt Financing** refers to raising money through external sources (individual and/ or institutional investors) which become creditors. The money needs to be fully repaid (usually) with pre-agreed interest on the debt.	**Equity financing** refers to raising capital through the sale of shares. By selling those shares, buyers obtain partial ownership of the company in return.	**Grants** refer to funding that do not or only partially have to be repaid. Among the available grants, most are distributed through competitive funding programs which can be at regional, national, or EU level. Furthermore, collaborations between specific regions or nations in competitive funding programs are common. **Subsidies** are any type of direct contributions, tax breaks, and other special assistance e.g. provided by governments or organisations under governmental supervision.

All of these types of financing come with risks, drawbacks or specific requirements, thus they are not equally applicable for all types of entities and operations. In ANNEX A the advantages and disadvantages of each financing/funding source are highlighted. Figure 10 supports the matchmaking for the right financing by answering the questions below:

- What is the size of the company e.g. in annual turnover?
- Is the finance for a low-risk investment with predictable cash flows or a high-risk investment?
- Is the innovation level high or low?
- What amount is required?

Finally, AMiCE aims at pointing out a selection of funding schemes that can be narrowed down in collaboration with the SMEs and their potential teams.



	Low								High							
	Company size								Company size							
	µ		S		M		L		µ		S		M		L	
	Money requested		Money requested		Money requested		Money requested		Money requested		Money requested		Money requested		Money requested	
	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large
Secured loans (banks)				x	x	x	x						x		x	
Friends and family (non secured)	x	x	x						x		x					
Micro loans (Invoice-trade financing)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Leasing	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Crowd-lending	x		x						x		x					
Bonds								x								x
Venture Capital						x		x				x	x	x	x	x
Business Angels									x	x	x	x				
IPO						x		x						x		x
Crowd Investing									x	x	x	x				
Strategic Investor (M&A)				x		x		x				x	x	x	x	x
Friends and family	x		x						x		x					
EU grants	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
National grants	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Regional grants	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Subsidies	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Figure 10 Types of financing and their fit to different company sizes and risk levels (Source: UCLIG)

3 Implementation of the AMiCE-support plans

In the following, the 55 promising innovation teams/ projects from the Cooperation Hotspot (11 per regional tandem) that have been selected are presented. For each of the projects an individual support plan was developed following the systematics presented in the previous chapter. The support plans will follow a standardised structure. Table 6 shows the project codes per regional tandems.

Table 6 Selected projects from the Cooperation Hotspot per regional tandem

	Czech selection	Slovak selection	Polish selection	Ligurian selection	Saxon selection
1	CZ1033	SK1026	PL1059	IT1016	DE2010
2	CZ1035	SK1005	PL2051	IT1002	DE2015
3	CZ1031	SK2007	PL1058	IT1003	DE2002
4	CZ1032	SK2004	PL2036	IT1004	DE2004
5	CZ1005	SK1037	PL2037	IT1008	DE1005
6	CZ1006	SK2047	PL2038	IT1011	DE1013
7	CZ1017	SK1036	PL2026	IT1012	DE2011
8	CZ1009	SK2044	PL1010	IT1013	DE2012
9	CZ1016	SK1035	PL2053	IT1017	DE2013
10	CZ1001	SK2046	PL1013	IT1020	DE1024
11	CZ1002	SK1006	PL1011	IT1023	DE2007

In the following section, the projects and the specific support plans are clustered per region. Below presented icon will guide the understanding of similarities and synergies between projects.

Additive Manufacturing

Circular economy

Railway

Heavy-duty transport

Automotive

Aerospace

Space/ Military

Marine

Medical/ Health

Assistive Technology

Sports/ Recreation

Construction

Manufacturing

Urban environments

Waste treatment

Recycling/ Recyclability

Energy

Food (packaging)

Consumer goods/ Luxury goods

Testing/ Monitoring

Support plans (CZ)

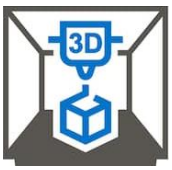
Project 1	Paper plates treatment	CZ1033
Key words	Nanotechnology, biodegradable, plates	
AMiCE contact	Adam Blazek (TUL)	
Background	The SME is a manufacturer of disposable paper products (trays, cups, etc.). By reducing the use of plastics for these products, the company produces paper products with fluorocarbonate addition to provide oleophobic and hydrophobic properties. However, the products prepared are not biodegradable and compostable in normal domestic environments. The idea is, therefore, to design a liquid emulsion that is degradable and imparts the desired properties to the products.	

Relevant sectors	

Support plan

	AMiCE will support the orgnisation with access to expertise in the fields of surface treatment.
	For the project development the following objectives have been identified: ▪ Development and modification of surface treatment, which would impart hydrophobic and oleophobic properties to modified cellulose substrates. ▪ The finished product must also be compostable under domestic conditions. The technology readiness of the idea was assessed with TRL4 since laboratory component testing has been performed.
	The company is seeking research organizations with expertise in surface treatment. The laboratories at TUL are geographically the closest and initial testing is already taking place there. TUC – as an AMiCE partner - also expressed interest in the topic.
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities in a collaborative approach. An application for a regional Innovation Voucher that involves the company and TUL has committed to fund the initiation of this project.

Additional comments	The project has a big potential in case the research is successful. The project was selected for participation in the 1st Innovation Camp.

Project 2	Composite materials with intrinsic sensory properties	CZ1035
Key words	Sensing materials, structural health monitoring	
AMiCE contact	Stanislav Petrik (TUL)	
Background	The project was submitted by the SME in cooperation with TUL. The aim is to develop materials with intrinsic sensory properties which will be used for monitoring of their history (exposure to excessive thermal or mechanical stress, impacts, chemical influence, etc.). They should be used for enhancement of safety of critical components, namely parts of chassis of vehicles.	

Relevant sectors	

Support plan

	AMiCE actors will support the SME in understanding the use of nanomaterials for enhancement of the responsivity as well as defining the way to integrate the materials into critical mechanical composite parts of vehicles.
	AMiCE supported the TRL definition. The assessment showed that the technology readiness is at TRL1 as basic principles were observed. AMiCE defined the following aspects in the project development that require support: ▪ Technology development ▪ Extensive testing (material sensitivity, mechanical and climatic tests, etc.)
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network. A research group from TUC, who are specialized in sensing elements and their integration in composite structures, was connected with the company. Also, an SME from Slovakia that develops sensors has showed interest on this project and also took part in the 2nd Innovation Camp.
	AMiCE will support the search for adequate funding opportunities in a collaborative approach keeping the low TRL of the innovative idea in the focus. A project proposal was submitted to the Technical Agency of the Czech Republic (TACR) to fund a complementary idea for this project.

Additional comments	The project was selected for participation in the 2nd Innovation Camp.

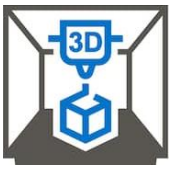
Project 3	Portable coffee mugs or food boxes	CZ1031
Key words	Sustainability, waste materials, natural renewable resources	
AMiCE contact	Adam Blazek (TUL)	
Background	The company would like to develop a material that combines local waste materials such as coffee grounds, buckwheat peels, fruit residues after squeezing juice, cork from wine bottles, etc. Their idea is to create a press (or 3DP) portable coffee mugs or food boxes. The main points that the final product should fulfil are functionality, locality of sources, utilization of waste materials to follow the principles of circular economy.	

Relevant sectors	

Support plan

	The company needs advice on the ratio and sizing of certain materials so that they can become a functional product while maintaining the sustainability of production. Also, they lack the knowledge on how these materials are tested and the procedure itself. AMiCE will provide this expertise.
	AMiCE supported the technology readiness assessment, where TRL 5 was identified due to the developed component prototype. Steps of project development covered: market research, sample preparation and development of technological process of production.
	AMiCE will connect the SME with organizations that can offer the needed facilities/infrastructure in order to reach the objectives.
	The organization requires additional funding. AMiCE will support the search for adequate financing/funding opportunities.

Additional comments	

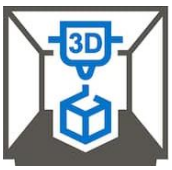
Project 4	Tow me	CZ1032
Key words	3DP, material, plastic	
AMiCE contact	Adam Blazek (TUL)	
Background	The aim of the development is a “towing” device that allows safe assistance to the less fit person (and children) during some outdoor activities. In particular, the device will serve as a compact replacement for the towing bar of the children's wheel. The first prototype is made using 3DP.	

Relevant sectors	

Support plan

	Technological support is required, AMiCE will therefore support the organisation with the respective expertise in the field of technological processes of production.
	As a pilot plant is already available the technology Readiness of this project idea was assessed with TRL 7 (>5% commercial scale). The objectives defined for this project development are focusing on lowering the cost of the production which requires the development of a new process of production.
	AMiCE will connect the SME with organizations that can offer the needed facilities/infrastructure in order to reach the objective.
	Financial support is also required. AMiCE will, therefore, scan potential funding/financing opportunities. A series of prototypes have already been produced with the support of a national grant for applied research. After testing in operation, AMiCE will look for a strategic investor.

Additional comments	

Project 5	Micro-CT sample mount	CZ1005
Key words	MicroCT, 3DP	
AMiCE contact	Mohamed Eldessouki (TUL)	
Background	Prepare a holder for Computed Tomography (CT) samples. The holder should have material that does not interfere with the x-rays and include movable parts to allow applying loads on the sample during measurement. The product should attract attention of research institutes in the region, which opens the door for international collaboration.	

Relevant sectors	

Support plan

	Material and testing expertise were required which were provided by AMiCE in order to study the interference of materials with the x-ray source.
	AMiCE provided the 3DP facility that allows the production of prototypes for different holder designs. The prototypes were tested in X-ray CT equipment that was also provided within AMiCE network, with promising results.
	The organization required access to 3D printers with high resolution to allow printing of assembled parts. It was also required to try different materials to study their interference with the x-ray source. AMiCE provided the production facility at TUL laboratories and connected the users with the experts in the field who helped in developing initial prototypes.
	Funding already secured via internal resources at TUL that covered the production of the prototypes. Further developments for the holder may need more funding that can be secured from regional programs in the Czech Republic.

Additional comments	Considering the technical challenges of the materials and design, the project is achievable.

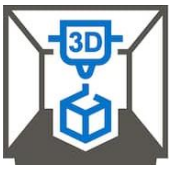
Project 6	3D printed braille objects on textiles and flexible structures	CZ1006
Key words	Blind, braille, textile	
AMiCE contact	Mohamed Eldessouki (TUL)	
Background	The SME had the idea to 3d-print signs and instructions using braille language used for blind people. The prints should be performed on flexible materials such as textiles, which adds the challenges of installation and surface morphology. The project should attract textile SMEs and researchers in the central European region and allow international collaboration.	

Relevant sectors	

Support plan

	Access to knowledge on 3DP is required which will be provided by AMiCE. Different production technologies will be tested to produce the samples.
	The technology readiness of the project idea was assessed with TRL 1 as the basic principles were observed. With the realization of the initial prototypes with AMiCE's partner support the TRL increased to 3.
	AMiCE connected the user with particular experts in the field of 3DP and materials and with access to different types of printers. 3DP laboratories at TUL offered the support to produce some prototypes.
	The SME requires access to financing to scale up the process of producing these samples. AMiCE will scan available funding/financing opportunities that fit the requirements of the project as well as taking into account the low TRL.

Additional comments	Some prototypes already exist.

Project 7	Robotic system for composite material production	CZ1017
Key words	Robotic system, composites	
AMiCE contact	Adam Blazek (TUL)	
Background	The project envisages the development of technology for robotic production of complex composite shapes based on glass fibrous prepreg material. The final products should be cheaper and can be used in many areas like automotive, constructions or energy sector.	

Relevant sectors	

Support plan

	The project is looking for expertise in automation and in composite materials. AMiCE will provide this.
	The technology readiness of the project idea was defined as TRL7 since a pilot plant is already available (>5% commercial scale). AMiCE will support the project development. Automatic production of complicated composite material is needed.
	AMiCE will connect the organisation with experts in programming and machine control. AMiCE has a pilot plant on which the planned production can be verified. It also offers the services of experts and the possibility of subsequent analysis and testing.
	The organization requires additional funding in order to implement the project. AMiCE scans potential financing sources. Contract research with specific applicants is preferred, but support from national grant providers is also considered.
Additional comments	The achievability is likely.

Project 8	Antibacterial paint	CZ1009
Key words	Painting, TiO_2	
AMiCE contact	Adam Blazek (TUL)	
Background	Development of special composite nanomaterial coatings based on Titanium Dioxide (TiO_2) that can be used in the construction industry and which have unique properties in response to incident light. It is mainly about cleaning, disinfecting, but also about reducing toxic gases in the air.	

Relevant sectors	

Support plan

	The project focuses on the international expansion of technology. AMiCE will identify potential partners in the field of technology support, production and sales.
	The technology readiness of the project idea was defined as TRL7 as a pilot plant (>5% commercial scale) is already available.
	AMiCE identified partners for the commercialization of developed products. TUL offers experts and technology equipment and is prepared to continue in research development in other business areas.
	AMiCE will support the organization in the search for an investor and the involvement of the organization in international cooperation.

Additional comments	

Project 9	Glass fibrous composite material	CZ1016
Key words	Glass fibres, composite	
AMiCE contact	Adam Blazek (TUL)	
Background	Development of new glass fibre composite material with better properties. Preparation of new prepreg glass fibrous material using different types of pre and after treatment. Final product should have better properties which will lead to less energy consumption and will be cheaper.	

Relevant sectors	

Support plan

	After analysing the project idea AMiCE identified two expertise gaps in the field of the technology and material testing. AMiCE will give access to that.
	The technology readiness was assessed with TRL6 since the component prototype has been demonstrated (0.1–5% of full scale).
	AMiCE connected partners in the field of technology development and material testing as well as potential final users of the technology to set up the consortium.
	AMiCE will support the organization in the search for national and/or international grants.
Additional comments	The project has international dimension and achievability is highly likely.

Project 10	3D printing of optical component for glasses	CZ1001
Key words	3DP, material, plastic	
AMiCE contact	Adam Blazek (TUL)	
Background	Analysis and testing of a suitable material for the need to produce special prototypes using PolyJet technology and according to the required mechanical properties specified by the customer.	

Relevant sectors	

Support plan

	Support will be provided by AMiCE filling the expertise gaps on the PolyJet technology.
	The TRL was defined with TRL 5 (component prototype development).
	The Czech SME is looking for the R&D partner that is equipped with the PolyJet technology to help them to develop new material for their products.
	Funding secured from contract research or relevant national or international grants.
Additional comments	The project does not have an international dimension. The achievability of level of the idea is highly likely.

Project 11	Composite material with natural filler	CZ1002
Key words	Composite, automotive, testing	
AMiCE contact	Adm Blazek (TUL)	
Background	Development and testing of new composite material which can be used in the automotive industry with a special requirement for recyclability of the new material.	

Relevant sectors	

Support plan

	The organization requires access to expertise in the injection moulding technology as well as material testing.
	The TRL was defined with TRL 5 (component prototype development). AMiCE will support the project development with particular steps in order to achieve the following objectives: ▪ to prepare samples using injection moulding technology ▪ to analyse test prepared samples
	The company has shown interest in this technology in the application of windshield seals. Cooperation agreement has been signed.
	Funding has been secured from the project financed by TAČR TREND. First stage of cooperation will last till 2022.
Additional comments	International cooperation is not necessary, while international dimension of the final product development is obvious. The achievability level of the idea is very likely.

Support plans (DE)

Project 1	3D-printing integration in sports equipment production	DE2010
Key words	AM, fibre reinforcements, metal inserts	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	The project aims at the development of technologies for the integration of 3DP in the production of special lightweight sports equipment. The SME is a snowboards' manufacturer that wants to include 3D-printed endless fibres to reinforce this equipment and strives to integrate a near net-shape production of components.	

Relevant sectors	

Support plan

	AMiCE has been providing technological know-how for the implementation of the new process and will support with material's assessment.
	The technology readiness of the project idea was assessed with TRL5 as the component prototype development is finalised. Business development consultancy will be provided by a regional partner (Life cycle management, scaling up of production).
	The SME was seeking for international partners for the development and validation of the manufacturing process as well as for the further product qualification (i.e. functionalisation). AMiCE has supported in finding interested partners in other sectors (automotive, marine).
	Funding already secured.

Additional comments	High transfer potential of the technology. The project was selected for participation in the 1st Innovation Camp.

Project 2	CENTAUR	DE2015
Key words	AM, ceramics, smart materials, energy harvesting	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	The project aims to develop functionalised Ceramic Matrix Composites (CMC) with energy harvesting and embedded sensor capabilities. It aims to do so by producing this innovative material by extrusion-based processes for manufacturing components with enhanced functionalities in high temperature applications, enabling resource efficiency.	

Relevant sectors	

Support plan

	AMiCE partners have supported with their wide knowledge in sensor capabilities (including energy harvesting), AM and smart materials.
	AMiCE has supported the project implementation by providing the framework to be able to discuss and align with all the partners the preliminary steps towards a successful kick-off, including: reviewing the proposal document submitted, preparing the resources needed for the initial activities in each work package and analysing potential obstacles at the short term and propose ways to solve them.
	AMiCE will support in identifying potential partners to cover the industrial aspects related to the project in order to complement the research and technical partners that are already part of the Consortium.
	Funding is already secured; CENTAUR was selected by the M-ERA net funding program in February 2020 and has the kick-off meeting towards the end of May 2020.

Additional comments	The project was selected for participation in the 2nd Innovation Camp.

Project 3	Natural Fibre Slackline	DE2002
Key words	Natural Fibres, sustainable sports equipment, circular economy	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	Slacklines are used as a sports equipment for balancing. Due to the requirements of the product (breaking load, elongation and outdoor durability) they are usually made out of man-made fibres. The SME is seeking for support to develop a slackline made out of natural fibres following the principles of circular economy.	

Relevant sectors	

Support plan

	AMiCE will support the SME in the assessment of the various material options based on natural fibres and their fit in a circular economy framework.
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed. The SME required Project development support, AMiCE can help the company to further develop the Concept and the Ambition by defining the current status of materials and applications (state of the art), the main challenges and the innovation potential.
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network. AMiCE will connect the SME with partners with expertise in R&D as well as in pilot production and testing.
	The SME requires access to financing to scale up the process of producing these samples. AMiCE will scan available funding/financing opportunities that fit the requirements of the project as well as taking into account the low TRL.

Additional comments	

Project 4	3D-printing of ceramics	DE2004
Key words	AM, compliant robot hand, soft robot hand, monolithic object	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	The aim of this project is to develop a printable multi-material based on oxide CMCs for parts and components in high temperature applications. The team intends to develop the appropriate material and to adopt the AM process for the manufacturing of fibre-reinforced ceramics.	

Relevant sectors	

Support plan

	AMiCE has provided the know-how and expertise in terms of materials processing (i.e. printing of fibre-reinforced ceramics) and of product requirements engineering for applications in different sectors (automotive, aerospace, energy generation, chemical ind.).
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed. AMiCE supports the proposal development with the particular steps required e.g. for M-ERA Net or H2020 programmes.
	AMiCE supports the initialisation of a European consortia with several potential partners identified (e.g. TUL, LEITAT, UB) for a proposal development.
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities in a collaborative approach (e.g. M-ERA Net, H2020).

Additional comments	

Project 5	Investigation of the recyclability of a vulcanized elastomer	DE1005
Key words	Circular economy, recyclability, elastomer	
AMiCE contact	Marlen Krause (HSZG)	
Background	This project focuses on the recyclability of vulcanized elastomers. It aims to gather detailed information on the properties of mixtures containing recycled material in different percentages, focusing on both mechanical properties and necessity and scope of adaptation of the material recipe.	

Relevant sectors	

Support plan

	AMiCE partners will support the SME with their knowledge on recyclability of elastomers and Circular Economy. Especially Zittau/Görlitz University of Applied Sciences will support in research activities.
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed.
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can perform the material analysis. Furthermore, a regional partnering with TUC who has a demonstrator available is foreseen.
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network. AMiCE will connect the SME with partners with expertise in R&D as well as in pilot production and testing.

Additional comments	

Project 6	Investigation of the recyclability of elastomer	DE1013
Key words	Circular economy, recyclability, elastomer	
AMiCE contact	Marlen Krause (HSZG)	
Background	This project focuses on the recyclability of elastomers. It aims to gather detailed information on the properties of mixtures containing recycled material in different percentages, focusing both on mechanical properties (mainly deformation and tear behaviour) and necessity and scope of adaptation of the material recipe (mainly sulphur content).	

Relevant sectors	

Support plan

	AMiCE partners will support the SME with their knowledge on recyclability of elastomers and Circular Economy. Especially Zittau/Görlitz University of Applied Sciences will support in research activities.
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed.
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can perform the material analysis. Furthermore, a regional partnering with TUC who has a demonstrator available is foreseen.
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network. AMiCE will connect the SME with partners with expertise in R&D as well as in pilot production and testing.

Additional comments	Potential synergies with DE1005.

Project 7	Process-integrated further processing of fibre waste residues into a novel semi-finished product	DE2011
Key words	Circular economy, carbon fibre cutting waste, FRP	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	This project aims to develop a novel semi-finished material made of carbon fibre cutting waste to achieve mechanical properties in the range between glass mat and UD tape. It aims to reuse carbon fibre prepreg cutting waste for novel semi-finished material to be used for Fibre-Reinforced Plastics (FRP) structural components. Adopting this circular process, it hopes to reduce the manufacturing costs significantly compared to UD tape material.	

Relevant sectors	

Support plan

	AMiCE will provide its knowledge in the areas of: cutting, handling control, detection of shapes, positioning and fibre alignment of cutting waste.
	The technology readiness was assessed with TRL6 since the component prototype has been demonstrated (0.1–5% of full scale).
	AMiCE will connect the SME with partners with expertise in R&D.
	Funding already secured.
Additional comments	This project could lead to potential substitution of expensive materials in high-loaded composite parts.

Project 8	Development of down skin parameters for selective laser melted steel alloys by melt pool monitoring	DE2012
Key words	AM, steel, SLM, surface quality, down skin, melt pool monitoring	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	SLM is powerful technology for creating metallic lightweight structures. The development of high-dense process parameters is very time consuming for new metal alloys. It is hard to achieve high quality surface down skin areas. Objective of this project is to reduce time by processing the melt pool radiation information. This is to be applied for high performance steel alloy.	

Relevant sectors	

Support plan

	AMiCE will provide technological know-how in in-line process control and monitoring.
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed.
	AMiCE will connect the SME with organizations that can offer the needed facilities/infrastructure in order to reach the objectives.
	The organization requires additional funding. AMiCE will support the search for adequate financing/funding opportunities.

Additional comments	

Project 9	Significant increase of surface quality for SLM titanium by using fine powder grain fractions	DE2013
Key words	AM, titanium, SLM, surface quality, grain fraction, particle size	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	SLM process using titanium is used for the manufacturing of aircraft components. The standard powder material (grain size 15-63 microns) leads to high surface roughness. To smoothen the surface, chemical or mechanical post-treatments need to be integrated. The project aims to develop a new particle size distribution to minimize post treatments. The new powder standard shall be applicable for powder bed machines using a dosing platform and a recoating blade for powder layer creation.	

Relevant sectors	

Support plan

	AMICE will provide technical know-how on the particle size distribution and their impact on surface smoothing.
	The technology readiness of the project idea was assessed with TRL1 as Basic Principles were Observed. AMiCE will support in the development and the implementation of the collaborative research project.
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities.
	AMiCE will scan available funding/financing opportunities that fit the requirements of the project as well as taking into account the low TRL.
Additional comments	

Project 10	Plastic components from alternative plastic powder in laser sintering process	DE1024
Key words	AM, laser sintering, alternative powder	
AMiCE contact	Marlen Krause (HSZG)	
Background	This project focuses on the production of plastic components using a laser sintering process from alternative plastic powder. This process requires a great deal of experience in optimising the process parameters in relation to the material properties generated and the surface qualities. Therefore, the project aims at the execution of laser sintering tests on the existing machine and peripheral equipment (sieving and beam system) to optimise the process parameters.	

Relevant sectors	

Support plan

	Support on laser sintering processes with different alternative plastic powders will be provided by AMiCE.
	AMiCE supported the TRL definition. The assessment showed that the technology readiness is at TRL1 as basic principles were observed.
	AMiCE will connect the German SME with partners with experience in optimising process parameters linked to material properties and surface quality. Regional partnerships will be prioritised since the project does not have an international dimension.
	Funding already secured.

Additional comments	

Project 11	Fuel management system for ELVs to avoid harmful pollutants	DE2007
Key words	Waste management, end-of-life vehicles	
AMiCE contact	Katharina Schoeps (TU Chemnitz)	
Background	The aim of the project is the fully automated drainage of the end-of life vehicles and to increase the drainage efficiency. Through the reduction of overhead working, the safety for the workers will be increased. Furthermore, the direct skin contact with oil radiator water, brake fluid etc. will be prevented. The project aims at developing a fully automated holistic system which drains the gas tank, the engine and the gearbox. The best suited position for drilling and siphoning will be evaluated with a detection system.	

Relevant sectors	

Support plan

	AMICE will provide technical know-how on handling technology, detection systems for car position, automated tool position correction and control technology.
	The technology readiness was assessed with TRL6 since the component prototype has been demonstrated (0.1–5% of full scale).
	AMiCE will connect the SME with an RTO to support with project development and implementation. International cooperation is not necessary, but can be beneficial to fill some of the knowledge gaps.
	Funding already secured.

Additional comments	

Support plans (IT)

Project 1	3D printing of form-features for vibratory bowl feeders	IT1016
Key words	AM, automation, machinery, vibratory bowl feeders	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	The SME Superfici offers solutions in the field of automatic machines. In this field, vibratory bowl feeders are widely employed for feeding and orienting small parts. The part orientation is achieved by means of geometric constraints, whose morphological characteristics allow the elimination of parts which are not oriented as desired. The morphology of these constraints depends on the morphology of the part to be oriented. This project looks into 3D printing to allow a fast re-adaption of existing bowl feeders for usage on parts with different geometry.	
Relevant sectors		

Support plan

	AMICE will offer the SME knowledge support from its experts on optimal material choice as well as optimisation of surface roughness for this process
	AMICE will support the development of the project towards prototype demonstration
	If needed, AMICE will connect the SME to partners with experience in SLS processes especially with applications to improve efficiency and surface roughness
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities, possibly in a collaborative approach.
Additional comments	The project has a big potential in case the research is successful. The project was selected for participation in the 1st Innovation Camp.

Project 2	Sensorized rubber-reinforced compliant joint	IT1002
Key words	AM, Compliant joint, flexible sensor	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	Compliant Joints are flexible connectors that can provide limited displacement between two rigid parts through material's deformation. This projects aims to test the additive manufacturing (AM) of such components that can allow the direct production of multi-material CJ with improved performance.	

Relevant sectors	

Support plan

	AMiCE actors will support the SME in understanding the different materials and processes focused on in this project: urethane, silicone and polysulfide rubbers with ABS, NYLON 12 and ULTEM produced by hybrid deposition manufacturing.
	AMICE will support the development of the project towards prototype demonstration of the process
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network.
	AMiCE will support the search for adequate funding opportunities in a collaborative approach.

Additional comments	

Project 3	A low-cost gripper for the manipulation of parts	IT1003
Key words	AM, compliant gripper, manipulation of soft objects	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	Compliant parts are flexible connectors that can provide limited displacement between two rigid parts through the deformation of the material. This project will explore a gripper that features 3 monolithic compliant fingers with fabric-reinforced elastomeric flexures that also integrate sensing elements, and dimensions compatible with the manipulation of made-for-human tools (i.e. 10-20N gripping force, 1Kg overall gripper weight incl. actuators).	

Relevant sectors	

Support plan

	AMiCE actors will support the SME in understanding the possibilities to produce such compliant grippers in terms of materials and processes
	AMICE will support concept definition and elaboration of the project taking into account its low TRL
	AMiCE will support the SME in finding the right partners that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network.
	AMiCE will support the search for adequate funding opportunities in a collaborative approach.

Additional comments	

Project 4	Monolithic 3D printed prosthetic hand	IT1004
Key words	AM, compliant robot hand, soft robot hand, monolithic object	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	This projects focuses on the design and manufacturing of a low-cost, under-actuated anthropomorphic hand to be used as a prosthetic device. In its optimal embodiment design, the device should be produced via AM as a single, monolithic plastic object. The motion of the fingers will be therefore realized by means of compliant joints, purposely designed to achieve large rotations (i.e. 90 degrees) without failing. In this context, recent advances in FDM plastics (e.g. Ultem) may allow the production of reliable devices (also in terms of fatigue life).	
Relevant sectors	 	

Support plan

	AMICE will support overcoming the SMEs current knowledge gaps in terms of FDM and hybrid deposition manufacturing materials mainly focused on prosthetic devices.
	While the concept is already defined, AMICE will support the process design of this project, ensuring that a prototype of the hand will be produced using one of the foreseen production techniques.
	The knowledge gaps defined above can be overcome by partnering up with organisations with expertise in the field. AMICE will put the SME in contact with relevant partners in the network.
	Financial support will be offered in terms of funding opportunities.
Additional comments	

Project 5	Development of Silicone 3D printer	IT1008
Key words	AM, 3D printer, Silicone	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	Very recently, silicone 3D printing has been tested by several companies (e.g. ACEO, a subsidiary of German chemical company, Wacker Chemie) and research institutes (e.g. Harvard School of Engineering). Even though the technology looks really promising, it is still at its early development stage and further studies are needed to reach higher TRLs. Therefore this project will start exploring this technology.	

Relevant sectors	

Support plan

	There is a big knowledge gap present on the topic in general. Therefore AMICE will offer expertise by connecting their experts with experience in Silicone 3D printing.
	This project starts from a very low TRL. Therefore AMICE will offer support to structure both concept, approach as well as ambition and possible impact.
	In line with the knowledge gap, partners with expertise in MJ and UV lights technologies for silicon 3D printing will be connected to the SME by AMICE
	AMiCE will support the search for adequate funding opportunities, preferably in a collaborative approach.

Additional comments	

Project 6	Jewelry	IT1011
Key words	AM, precious metals	
AMiCE contact	Massimiliano Avalle (UNIGE)	
Background	In the production process of jewellery, additive manufacturing is already widely used for rapid prototyping and quick creation of complex moulds for casting of precious metals within the districts were jewels are traditionally made (e.g. Valenza). While benefits of AM use have been proven, direct AM of precious metals could give additional freedom to the designer and production process. The project explores AM in combination with precious alloys.	

Relevant sectors	 

Support plan

	While the SME has experience with additive manufacturing to make moulds, it needs knowledge support on AM technologies to handle precious alloys. AMICE will offer expertise on this topic.
	Basic principles of the project are already in place. AMICE can support on work plan development.
	Partnership with organisations that have experience on AM of precious allys in jewelry or other applications can be useful.
	AMICE will detect adequate funding opportunities for this type of projects

Additional comments	

Project 7	High Temperature Components	IT1012
Key words	AM, high temperature materials	
AMiCE contact	Massimiliano Avalle (UNIGE)	
Background	Several parts of gas turbines could be enormously improved thanks to the introduction of AM. Advantages include the decreasing weight of blades and other components by shape and topological optimization, increasing the operating temperature by exploiting complex internal duct for cooling, improving the mixing of fuel and combustion with reduction of pollutant emissions by realizing more complex geometry of the burners. This project aims to develop prototypes of components that could withstand the conditions in gas turbines and offer the above mentioned advantages.	

Relevant sectors	  

Support plan

	Knowledge gap of performance of high-temperature alloys when produced by DMLS, SLS or EBM. AMICE will connect the SME to the relevant experts in its network.
	While several aspects of the project are already defined, AMICE will support the further project development.
	Involvement of experts on gas turbines as well as high-temperature resistant material production is welcome.
	Adequate funding opportunities will be bundled and shared by AMiCE.

Additional comments	

Project 8	Lightweight simplified carabiner	IT1013
Key words	AM, lightweight, climbing equipment	
AMiCE contact	Massimiliano Avalle (UNIGE)	
Background	Sport equipment gives almost unlimited freedom for improved solutions since sport enthusiast are used to spend important amount of money for the last novelties and high performance equipment. Alpine climbing equipment is an interest field for improvements that gives great challenges due to the necessary strict safety requirements. This project will focus on climbing equipment, and more specifically the carabiner. This is a basic relatively simple device but largely used. The project aims to make simpler, more efficient, lighter designs and overcoming the difficult challenge of metal replacement (typically aluminium 7075-T6).	
Relevant sectors		

Support plan

	SME needs knowledge support on AM technologies to handle high temperature alloys mainly focusing on DMLS and EBM. AMICE will offer expertise on this topic.
	Basic principles of the project are already in place. AMICE wills support the project development towards prototype demonstration.
	Partnership with organisations that have experience on AM of high-strenth aluminium alloys or alternatives such as composites can be useful.
	AMICE will detect adequate funding opportunities to finance this project.
Additional comments	

Project 9	3D printing of carbon-fibre motorcycle parts	IT1017
Key words	AM, carbon-fibre, aerodynamic, lightweight	
AMiCE contact	Giovanni Berselli (UNIGE)	
Background	This project will focus on the development of custom-made components in sport bike/car field. The main aim of these new components will be to minimise weight while optimising the aerodynamic performance.	

Relevant sectors	

Support plan

	
	Support SME in the demonstration of the prototypes and the road to get there.
	
	Funding opportunities will be scanned and shared with SME.

Additional comments	

Project 10	3D printing of ultrasonic transparent polymer for skull surgeries	IT1020
Key words	AM, polymer, medical devices	
AMiCE contact	Fabrizio Barberis (UNIGE)	
Background	Brain tumours like Glioma can only be treated by complete removal of the tumour. After the surgery, the brain has to be frequently inspected. To enable this, currently, the skull is originally sealed with specifically modelled polymer parts produced on site by the surgeon. This project looks at the possibility to create 3D printed components by directly using the data from the medical images to print a perfect fitting closure. A challenge currently present is that the adopted polymers are opaque to ultrasounds and this drives doctors to use more invasive techniques to make the post-surgery follow up. A 3D printing process with a composite/polymer able to be robust, medical grade and transparent to ultrasounds would be extremely important to greatly reduce the amount of energy and radiations absorbed by the patient. A material and printing process solution able to manage and fix this issue is highly demanded in medicine.	

Relevant sectors	

Support plan

	Support will be provided by AMiCE filling the expertise gaps on using additive manufacturing for advanced medical grade polymers.
	While all requirements and the concept of the project are more or less defined, AMICE will support the development of the project.
	Partners with experience in the printing of medical grade polymers both on material and process level can help to cover current present knowledge gaps.
	Funding opportunities will be monitored.

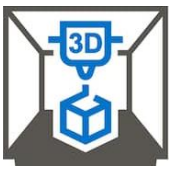
Additional comments	

Project 11	Polymer and Composite Robotics components	IT1023
Key words	AM, robotic devices, polymer, composite	
AMiCE contact	Fabrizio Barberis (UNIGE)	
Background	Robotics need high level technology and specialized devices. In order to create them at best a joint Program between University of Genoa and Italian Institute of welding was created: GeAM – Genova Additive Manufacturing. In this cooperation, robotics parts, either in Metal (SLS) either in polymer (FDM) are created by following the specific need of the Project. A follow up project would focus on the challenge to test materials and technologies in these different application scenarios while evaluating their capability to guarantee the same, or even better reliability of those devices created with traditional techniques.	
Relevant sectors		

Support plan

	
	AMICE will support the project on TRL 4 to test the different components on laboratory level.
	Partnership between University of Genoa and the italian institute of Welding is already set up.
	Funding already secured, follow up funding needed to test materials and technologies.
Additional comments	

Support plans (PL)

Project 1	Digital Inventory Creator	PL1059
Key words	CAD, Technical Drawings, Image recognition, Machine learning	
AMiCE contact	Maria Rosienkiewicz (LETIA)	
Background	Industrial companies around the world struggle to estimate the real value of AM in their business, because it is difficult to find good AM applications in their big catalogues of parts, spare-parts and toolings. It is challenging to manually analyze technical feasibility and cost-effectiveness of changing the manufacturing technology to 3D printing, having ~800,000 products/parts (average size in top Tier 1 Automotive suppliers) with technical information in their catalogue. As a result, companies miss the opportunity given by Additive Manufacturing, and tend to produce their parts in traditional, subtractive technologies. The vision of the project is to create a tool allowing manufacturing companies an easy Digital Transformation and creation of Digital Warehouse/Inventory. The subject of the project is a software helping to automatically scan existing technical CAD drawings of parts, spare-parts and toolings to allow easy 3D printing technology assessment. The software can analyze big batches of CAD drawings, and automatically extract crucial technical information like part dimensions, complexity, material, weight, tolerances, etc.. and store them in a easy-to-use format like Excel Spreadsheet, which can be further analyzed to identify the best candidates to change the technology to 3D Printing. As a 2nd use-case, analyzed technical data can be used by suppliers to speed up their process of quoting jobs for milling, cutting, drilling, grinding, and other technologies. The algorithm behind the software is based on Image Recognition and Deep Learning methods and it has been developed in Matlab by graduates of the Technical Universities of Science and Technology of Wrocław and Gliwice. The software can be used by manufacturing companies and their suppliers, regardless of the location. The final product should be addressed mainly to companies with big numbers of stored technical drawings, especially for spare-parts/legacy parts. The achievability of the project has been already confirmed with the Minimum Viable Product built in September 2019. The software is currently being beta-tested by a CNC service company from Berlin, Germany and further developed based on provided know-how and feedback. Nevertheless, the algorithm requires performance improvements and programming language change, to ensure better scalability in the future.	

Relevant sectors	

Support plan

	AMiCE supports the project by filling the expertise gaps in the field of image recognition and deep learning.

	AMiCE supports the project development with technical knowledge support by experienced Image recognition and Deep learning specialists to improve existing algorithms. Furthermore, AMiCE gives access to business knowledge in order to define an optimal and scalable business model.
	AMiCE might support finding a partner within one of the German's digitalization project.
	AMiCE supports the organization by scanning for available funding that focuses on digitalization. The main focus will be for regional and/or national (PL) financing opportunities.
Additional comments	The project was selected for participation in the 1st Innovation Camp

Project 2	3D printing of continuous fibre reinforcement	PL2051
Key words	Fibre reinforcement	
AMiCE contact	Mariusz Cholewa	
Background	The project submitted to the Cooperation Hotspot evolves around the idea to 3D print e.g. rips with continuous fibre reinforcement (glass, carbon) for lightweight structures.	

Relevant sectors	

Support plan

	AMiCE will support the organisation with expertise on 3d printing processes as well as materias that can replace injection moulding from the manufacturing process.
	AMiCE will with the several measures support the organization to achieve the objectives: ▪ To replace/remove injection moulding from manufacturing process ▪ To control rips structure and its design for different and customized applications ▪ Design of the machine and/or head, Development of dedicated head to deliver fibre with plastic matrix
	As possible partners for a collaborative approach several partners will be connected to the organization. Those include the Technical University of Liberec (CZ), the Università degli Studi di Genova (IT) as well as Superfici company (IT) to work on common project application opportunity.
	AMiCE supports the organization by scanning for available international specific calls like H2020 Fast Track to Innovation.

Additional comments	The project was selected for participation in the 2nd Innovation Camp. Similarities with the following project have been identified: CZ1016, CZ1002.

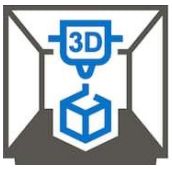
Project 3	4D printing of resorbable Magnesium bone implants	PL1058
Key words	SLM, Mg, Mgalloys, corrosion, metal solubility	
AMiCE contact	Maria Rosienkiewicz (LETIA)	
Background	Magnesium based materials due to low corrosion resistance and low toxicity were investigated since XX century as material for bone implants. Their solubility was too fast and it was the main reason why this topic was abandoned. New processing techniques open new possibilities to achieve new material properties (e.g. change in corrosion rate).	

Relevant sectors	

Support plan

	The organisation identified several technical challenges that need to be solves in order to successfully implement the project. Those relate to the robustness and reliability of SLM process for Mg based materials. Therefore, technical support and expertise will be provided by AMiCE.
	The project aims to discover the opportunity to design the corrosion resistance of Mg alloys processed in SLM with different process parameters. AMiCE will identify the fit of the project idea as a European collaborative project about bone regeneration. Furthermore, AMiCE will support the definition of other use cases e.g. for aerospace or military applications.
	The project has a need for an industrial partner that is interested in such an application. AMiCE creates the framework for an efficient partner search. Possible partners already preidentified are: Biomedical Engineering (SK), TU Dresden – Medical Cluster, Università degli Studi di Genova (IT), EEN support to find biomedical clusters, e.g. TU Dresden, ask FutureSax, Feyerabend (Hamburg) is dealing with AM and Magnesium "
	The inclusion of an industrial partner will increase a chance to get funding. AMiCE will furthermore scan for the right financing schemes in order to create a service for such prototyping.

Additional comments	The problem is uniform and global and can have an international dimension. Not only local researchers/companies are interested in such a topic. The experience with processing of Mg alloys is significant (5 different materials) and low porosity has been achieved (<1%). The process parameters should be tuned in order to obtain demanded mechanical and chemical properties (e.g. elongation, corrosion rate).

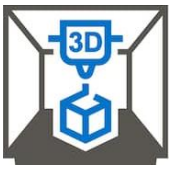
Project 4	Fast microsatellites structures prototyping as a service	PL2036
Key words	Fast prototyping, low cost, microsatellites, CubeSat	
AMiCE contact	Mariusz Cholewa	
Background	Fast CubeSat microsatellites structures prototyping. The service is already available on the market, but there are too few service providers. The additional infrastructure creation for such prototyping is the aim of the project.	

Relevant sectors	

Support plan

	AMiCE will connect the organization to experts in the field material testing printing as well as with experts in the application areas.
	The Technology Readiness Level of the innovation defined was assessed with TRL5. AMiCE will support the Project development particularly in the steps to be taken in order to be able to develop the component prototype. AMiCE partners will provide the necessary infrastructure for that.
	Possible partners have been identified for this Project as: Toptech (optics for aerospace), the Technical University of Liberec (CZ) in the field of material testing and as experts for printing as well as the aerospace cluster in Rzeszów.
	AMiCE will furthermore scan for the right financing schemes in order to create a service for such prototyping.

Additional comments	The Project has International dimension. The achievability level of the idea is very high, due to existence of such services.

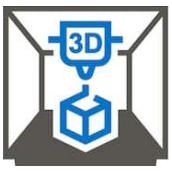
Project 5	Fast microsatellites structures prototyping workshop	PL2037
Key words	Fast prototyping, low cost, microsatellites, CubeSat	
AMiCE contact	Mariusz Cholewa	
Background	Fast CubeSat microsatellites structures prototyping. The service is already available on the market, but there are too few service providers. Creating own prototyping workshop is the aim of the project.	

Relevant sectors	

Support plan

	AMiCE will connect the organization to experts in the field material testing printing as well as with experts in the application areas.
	AMiCE will support the organization in creating its own prototyping workshop.
	Possible partners have been identified for this Project as: Toptech (optics for aerospace), the Technical University of Liberec (CZ) in the field of material testing and as experts for printing as well as the aerospace cluster in Rzeszów.
	AMiCE will furthermore scan for the right financing schemes in order to create a service for such prototyping.

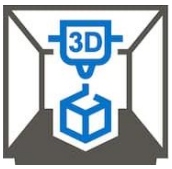
Additional comments	

Project 6	Optical systems elements prototyping	PL2038
Key words	Fast prototyping, low cost, optics, precise, details	
AMiCE contact	Mariusz Cholewa	
Background	A precise optics elements are using in industry, military and space applications. Developing a optical systems needs frequent modifications in optical elements which are not standardized shaped. The printing such elements could advance a development of optical systems. The aim of the project is to develop a fast 3d printing technology in optical industry.	

Relevant sectors	 

Support plan

	AMiCE might support the project by filling the expertise gaps in the field of suitable technology
	As the Project formulated the potential application the TRL of this Project was assessed for TRL2. AMiCE supports the organization in the project development in two main steps: ▪ technology selection for this application with specific requirements ▪ and the actual project development for such a project (organisational)
	AMiCE identified possible partners such as: Toptech (optics for aerospace), the Technical University of Liberec (CZ) with its expertise in material testing and printing as well as the aerospace cluster in Rzeszów.
	AMiCE will furthermore scan for the right financing schemes in order to create a service for such prototyping.
Additional comments	There is an international dimension of the project: The achievability level of the idea is very high, due to existence of such services

Project 7	Safety shields for robots tools in industry 4.0	PL2026
Key words	Safety shields, robot, industry 4.0, cobot	
AMiCE contact	Mariusz Cholewa	
Background	Industry 4.0 introduces robots cooperating with people - cobots. Cooperating with robots is safe for workers but it could produce dangerous fragments escaping from a workspace. Thus the safety shields for robot tools are necessary. Because of many kinds of tools and robotic arms the safety shields need to have different shapes. Addictive manufacturing seems to be the ideal solution for safety shields production.	
Relevant sectors	 	

Support plan

	AMiCE might support the project by filling the expertise gaps in the field of suitable technology
	AMiCE supports the organization in the project development in two main steps: ▪ Technology selection that allows the development of such application components with the specific requirements ▪ Creation of a material for shields that comply with the safety requirements
	Potential partners were identified with Leitat (ES) which can provide expertise in this particular field and allowing for small facility tests (polymer applications).
	The organisation requires additional financing, therefore, AMICE scans interesting funding/financing opportunities.
Additional comments	No international dimension of the project: The achievability level of the idea is high, due to durability of printed elements.

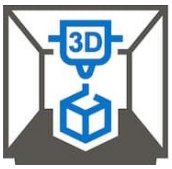
Project 8	Safety of AM technologies	PL1010
Key words	Safety, additive manufacturing, human, health	
AMiCE contact	Maria Rosienkiewicz (LETIA)	
Background	Advanced research on safety issues related to AM technologies. The aim of the project is to investigate the influence of selected AM technologies on human's health. Infrastructure enabling research is available.	

Relevant sectors	

Support plan

	AMiCE might support the project by filling the expertise gaps in the field of suitable technology
	AMiCE might give access to business knowledge in order to define an optimal and scalable business model.
	A potential partners in his project was identified with Leitat (ES) with its nanomaterials safety department.
	The organisation requires additional financing, therefore, AMICE scans interesting funding/financing opportunities.

Additional comments	International cooperation is possible.

Project 9	FRCs (Fibre Reinforced Composite) thermoforming machine with advanced thermal management	PL2053
Key words	Fibre reinforcement, mould design	
AMiCE contact	Mariusz Cholewa	
Background	The project evolves around the idea to 3D print moulding inserts. The current method has two stages and consists in heating the material and then its forming. The idea is a one-step solution in which the material would be plasticized in form. The impact would be a faster component manufacturing process with lower costs.	

Relevant sectors	

Support plan

	AMiCE will provide expertise to the organisation mainly focused on requirements and technologies on forming plastics and composites and also access to a machine park necessary to trial the idea.
	AMiCE might give access to business knowledge in order to define an optimal and scalable business model.
	As a possible partner the Technical University of Liberec (CZ) was identified with its experience in forming plastics and composites.
	The organisation requires additional financing, therefore, AMICE scans interesting funding/financing opportunities.

Additional comments	

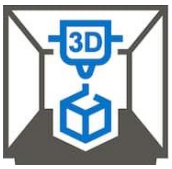
Project 10	New post-processing technology for SLS/FDM	PL1013
Key words	Post-processing, FDM, SLS, polymers	
AMiCE contact	Maria Rosienkiewicz (LETIA)	
Background	The project focues on the development of a new post-processing technology for parts manufactured with polymer Additive Manufacturing technology (e.g. SLS, FDM). The infrastructure is already available.	

Relevant sectors	

Support plan

	AMiCE might support the project by filling the expertise gaps in the field of suitable technology
	AMiCE might give access to business knowledge in order to define an optimal and scalable business model.
	The organisation requires an industrial partner in order to achieve the objectives and be close to the application markets and their requirements. Furthermore, possible partners were identified with the TU Chemnitz – MERGE (DE) and the Technical University of Liberec (CZ) with their specific expertise in the field.
	The organisation requires additional financing, therefore, AMICE scans interesting funding/financing opportunities.

Additional comments	International cooperation is possible. The achievability of level of the idea is very likely.

Project 11	Thermal treatment post-processing technology for SLM	PL1011
Key words	Heat treatment, post-processing, metals, SLM, furnace	
AMiCE contact	Maria Rosienkiewicz (LETIA)	
Background	Development of a technology for thermal treatment (post-processing) for parts manufactured with metal AM technologies (e.g. SLM). A furnace for the heat treatment will be bought soon, so infrastructure for the research will be available.	

Relevant sectors	

Support plan

	AMICE supports the organisation with particlar expertise on additive manufacturing for metal (e.g. SLM) and the requirements.
	AMiCE might give access to business knowledge in order to define an optimal and scalable business model.
	The organsiation is looking for partners for international cooperation. Interested parties with the relevant expertise were already defined by the AMiCE consortium as the Chemnitz University of Technology – MERGE (DE) and the Technical University of Liberec (CZ).
	The organisation is interested in finding the right funding. AMiCE scans different funding opportunities at regional, national and EU level.

Additional comments	

Support plans (SK)

Project 1	Project preparation for electronic vehicle batteries	SK1026
Key words	Project preparation, circular economy, battery	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	A SK SME is seeking for support in project preparation for a consortium of companies and universities that develop electric vehicle batteries. The project includes defining the basic material (lithium,etc.), developing and testing the battery, implementing it in cars and assessing the battery for its second life use or recycling. The project should also focus on extending battery life.	

Relevant sectors	

Support plan

	AMiCE supports to bridge expertise gaps and highlight the state of the art.
	AMiCE will support the project preparation' The TRL has been assessed at TRL 6: Component Prototype Demonstration (0.1–5% of full scale)
	AMiCE will support the SME in finding the right partners (including companies and universities) that fill the expertise gaps by connecting them with experts and complementary profiles of the wider AMiCE network.
	Financial support is required, therefore, AMiCE will support the search for adequate national funding opportunities in a collaborative approach.

Additional comments	The project has a high innovation potential and strong added value. The project was selected for participation in the 1st Innovation Camp.

Project 2	FDM printer platform	SK1005
Key words	Oversized printer, multiple materials	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	KAKAO 3D s.r.o. Development and testing of industrial FDM printer platform, capable of printing oversized (400x200x400mm plus) multi-material parts. The 3D printing platform will implement new technology of printhead switching allowing for printing methods that create single part from multiple materials, creating parts with unique properties, which would be impossible or too expensive to manufacture by different processes. Those parts are intended primarily for use in automotive and aerospace industry.	
Relevant sectors		

Support plan

	AMiCE actors will help in researching the depth of scope of usage those parts in manufacturing industries (automotive, aerospace...) with the goal to identify several case studies where this new printing process could produce superior parts at competitive costs.
	AMiCE will provide consultation with experts in development of cost-effective processes of production. The technology readiness was determined as TRL: 5: Component Prototype Development
	
	AMiCE will support the search for adequate funding opportunities.
Additional comments	The project has a high innovation potential and medium added value. The project was selected for participation in the 1st Innovation Camp.

Project 3	Extremely durable sensor cases	SK2004
Key words	Resistant, plastic, case	
AMiCE contact	Peter Kopkáš (BIC)	
Background	A Slovak SME submitted a project idea evolving around extremely durable sensor cases. The company that produces special sensors for urban environment would like to develop 3D printed case for their sensors that fulfil their requirements. The following properties were selected for the product: ● Extremely durable in all environments (heat waves, rain, storms, snow, minus temperatures). ● Resistant to vandalism. ● Plastic or composite materials suitable for GSM signal transmitting. Metals need to be avoided. ● Heat resistant (cooling during overheating and heating at low temperatures). The two applications FloverMote and FloverGate were introduced by Grissp in order for the innovation team to understand the technical background. Figure 6 shows the two applications pre identified for this project. The idea was already explored previously and led to the submission of a project proposal (IoT Device Management (Standards-based IoT device management)) to a competitive funding programme. The respective framework programme Horizon 2020 – Industrial Leadership – Innovation in SMEs (incl. SME Instrument) opened a call with the title: Call for Collaborative Projects 2, H2020- INNOSUP-1-2017 that closed in June 2019. In this round the project was not selected for funding.	
Relevant sectors		

Support plan

	AMiCE actors will help in use case applications assessment and design ideas.
	AMiCE partners will provide support by reviewing the scope and the first outcomes of the idea/ proposal for a successful project development. It was agreed by the participants to focus in a first step on the Flovermote application. UNIZA agreed to develop some first design ideas for the Flovermote casing that will be then both produced through additive manufacturing and tested by TUL to guarantee the performance required. The technology readiness level was determined with TRL6: Component Prototype Demonstration (0.1–5% of full scale).

	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities (Designing the new Flovermote box, Printing of samples and testing of Flovermote box).

	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities in a collaborative approach. The main aim is the resubmission of the application for the specialized European Program for Materials research (M-ERA-NET). To achieve this the innovation support team, set the following objectives for this Innovation Camp session: ● To review the scope and the first outcomes of the idea/ proposal submitted by the SME to understand the technical background. ● To connect the necessary innovation actors to build a support framework and identify opportunities. ● To identify the requirements of the funding scheme. To identify necessary next steps and potentially already plan the follow-up actions.

Additional comments	The project was selected for participation in the 2nd Innovation Camp.

Project 4	Cellulose fibre	SK2007
Key words	Cellulose, fibre	
AMiCE contact	Peter Kopkáš (BIC)	
Background	A young SME located in the eastern part of Slovakia engaged in collecting, sorting and recycling of waste, as well as disposal of industrial waste. Its core business evolves around an important part of the circular economy – waste treatment and reintroduction of materials in the cycle. The company developed a recycling process that processes paper and cardboard waste from household and industrial operations into a fibrous product. The SME is demanding a material analysis of the output of this process.	
Relevant sectors		

Support plan

	AMiCE will support the SME in understanding the properties of the fibrous material and in identifying potential applications that promote circular economy and allow closing the loop.
	AMiCE will review the scope and the first outcomes of the material research in order to help the SME identify and define the main milestones for the project development. The TRL as determined with TRL3: Analytical, 'Proof of Concept'.
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can perform the material analysis.
	Financial support is required, therefore, AMiCE will support in identifying the right funding scheme
Additional comments	The project was selected for participation in the 2nd Innovation Camp.

Project 5	Aluminium tool	SK1037
Key words	Aluminium tool, 3D printing	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	The SME is seeking for alternatives for printing aluminium tools produced on 5 axis milling machine. Currently the process is based on material removing technologies by CNC machines which is time and material consuming, scrap can be even more than product. The SME is interested in assessing the potential of using 3D printing.	

Relevant sectors	

Support plan

	AMiCE actors will support on bridging knowledge gaps regarding Additive Manufacturing, from an analysis of the value chain step of the production process to the specific AM process that should be considered and including cost assessment.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL5: Component Prototype Development.
	AMiCE will support this SME in connecting the necessary innovation actors to find suitable funding and develop alternatives for printing aluminium tools.
	AMiCE will search for suitable funding opportunities.

Additional comments	

Project 6	Building insulation from recycled plastics	SK2047
Key words	Insulation, building, plastics	
AMiCE contact	Peter Kopkáš (BIC)	
Background	The biggest Slovak creative and innovative hub is looking for new solutions in order to make their building more sustainable. They would like to insulate building of former school with non-traditional materials. They have already developed couple of interventions, and they have the ambition to develop insulation based on recycled plastic. This material must be certified and tested (fire-proof).	

Relevant sectors	

Support plan

	AMiCE will support in identifying the solutions that are already available in traditional and non-traditional insulation materials and assess the potential of new materials based on recycled plastic.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL: 3. Analytical, 'Proof of Concept'
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can support with R&D, material testing and certification.
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.
Additional comments	Impact: There is a construction boom in Slovakia and this kind of solution could support circular economy.

Project 7	Dental chair	SK1036
Key words	Model, 3DP	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	The SME is very successful in developing chairs for dentists. The company needs a smaller version of their chair for presentation and demonstration purposes to customers. The aim is printing a 1:5 model of the dental chair. Printing can be done on PA, parts will be painted after printing.	

Relevant sectors	

Support plan

	AMiCE actors will support on bridging knowledge gaps regarding Additive Manufacturing, from an analysis of the value chain step of the production process to the specific AM process that should be considered and including cost assessment.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL5: Component Prototype Develop
	
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.

Additional comments	Not highly innovative project with added value only to the company. The project's innovation meets a pressing need of a company:

Project 8	Biofuel production waste challenge/ potential	SK2044
Key words	Biofuel, waste, UCO, circular economy	
AMiCE contact	Peter Kopkáš (BIC)	
Background	During the production of biofuels from used cooking oil (UCO) is ca. 15% of the whole amount waste. The assumption is that generated waste could be further recovered and used for other purposes. The company would like to discover the potential of this waste in different directions (energy, lubricants, additives etc.). This topic is very broad and there is a need for expert R&D.	

Relevant sectors	

Support plan

	AMiCE actors will support on bridging knowledge gaps regarding circular economy, from an analysis of the value chain step of the production process to the specific potential of use that should be considered and including cost assessment.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL7: Pilot Plant (>5% commercial scale)
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can support with R&D.
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.

Additional comments	Impact: Using waste from biofuel production could be great example of circular economy and has big potential in Europe

Project 9	Aluminium parts from 3D printer	SK1035
Key words	Aluminium, 3D, parts	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	The SME is interested in producing aluminium parts using 3D printing. The project includes testing of mechanical properties and comparation with current prototyping methods.	

Relevant sectors	

Support plan

	AMiCE actors will support on bridging knowledge gaps regarding Additive Manufacturing, from an analysis of the value chain step of the production process to the specific AM process that should be considered, comparing it with current prototyping methods.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL5: Component Prototype Development
	
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.
Additional comments	Potential synergies with SK1037.

Project 10	Electricity production from biofuel waste	SK2046
Key words	Waste, electricity, biofuel	
AMiCE contact	Peter Kopkáš (BIC)	
Background	A Slovak company is starting a plant for biofuel production from used cooking oil. During the biofuel production is ca 15% of the whole input generated waste. The whole production needs huge amount of electricity. If this waste could be turned into electricity, the whole process could be much more ecological. The company is looking for funding and R&D partner in order to solve this challenge.	

Relevant sectors	

Support plan

	AMiCE actors will support on bridging knowledge gaps regarding circular economy, from an analysis of the value chain step of the production process to the specific potential of use that should be considered and including cost assessment.
	AMICE supports the project development of this project. The technology readiness level was determined with TRL7: Pilot Plant (>5% commercial scale)
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can support with R&D.
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.

Additional comments	Potential synergies with SK2044.

Project 11	High-precision FDM 3D printing farm	SK1006
Key words	High precision printer, printing farm, injection moulding	
AMiCE contact	Anna Zavodska (UNIZA)	
Background	Development and implementation of high-precision FDM 3D printing farm capable of fast production of medium sized batch (50-500) of small sized (150x150x150mm) parts. The goal is to finish development of custom made low-cost high-precision FDM 3D printer, that will be implemented in test 3D printing farm of 50 printers. Which will be capable of producing plastic parts of comparable quality to injection moulding in terms of dimension accuracy and surface finish.	
Relevant sectors	 	

Support plan

	
	AMICE supports the project development of this project. The technology readiness level was determined with TRL5: Component Prototype Development
	AMiCE will support the SME in connecting the necessary innovation actors to build a support framework and identify opportunities focusing on research/technical partners who can support with R&D and provide access to precision measurement laboratories along with personnel that the company can consult regarding measuring goals and processes
	Financial support is required, therefore, AMiCE will support the search for adequate funding opportunities.
Additional comments	High innovation potential and medium added value. The project's innovation meets a pressing need on global markets, traditional manufacturing could be transformed to additive manufacturing.

4 Conclusions

While evaluating the support plans that have been developed for the 55 SMEs several conclusions can be drawn:

- Although all projects have a very individual character it became clear that SMEs in the 5 regions of AMiCE operating in/ for different sectors face very similar challenges which were tackled in the support systematics as:
  - Access to knowledge,
  - Support in project development,
  - Need for partnerships and
  - Access to financing/ funding.
- Many recurring points in the support plans are summarised below:
  - A moderation on the state of play was a recurring topic in the project support plans as well as the exploration of the individual challenges faced which connected well with the challenges that were identified in the AMiCE Foresight Study (D.T1.1.2).
  - An important topic was the exploration of existing R&D results and the access to the specific knowledge that varied a lot from expertise on process technologies and material to application and industry-specific insights. AMiCE was able to deliver this knowledge transfer which is an important tool for SMEs to stay innovative.
  - Furthermore, it has been shown that access to (research) infrastructure is a big issue for SMEs in the respective regions. AMiCE could provide that access for many SMEs with their specific needs.
  - Finally, the integration in (existing) consortia and the connection of the SMEs to actors on the market was repeatedly mentioned.

The regional disparities that were defined in the Foresight Study (D.T1.1.2) where considered while drafting those plans. Furthermore, the strategy for effective SME support developed in D.T1.1.3 was connected and applied to the individual support plans of this deliverable.
The individual support of the AMiCE consortium led to several success cases among the projects. Here is to name the project development of CENTAUR which has been invited for funding through the M-ERA net funding programme.
Furthermore, AMiCE allowed to connect SME to other support programme in the relevant regions e.g. the SME support programme of Saxony.

AMiCE supported, initiated and facilitated innovation in Central Europe in the thematic areas of Circular Economy and Advanced Manufacturing through those 55 projects that link key players in the regions and beyond in the respective areas.

Beyond the 55 projects for which individual support plans were drafted in this deliverable, several other projects were evaluated as very promising and competitive. Thus, the AMiCE consortium is committed to also take those projects into consideration for further collaboration and support.

Annex A: Funding schemes/ fiancing options under the microscope

Subtype	Advantages	Disadvantages
	Debt funding	
Bank loans (secured/ unsecured)	▪ Company retains equity and all profits generated from the development project. ▪ Can be very attractive when the risk of failure is judged very small.	▪ Often only possible when the company can offer assets or guarantees as security. ▪ There is a risk of losing key assets (estate, patents) if the business fails. ▪ Set-up charges may add to the overall cost of loan. ▪ Bank does not share any of the financial risks associated to the development plan.
Friends and family (unsecured loans)	▪ Attractive when the risk of failure is very small. ▪ Can be attractive if business owner has wealthy friends or relatives.	▪ Unsuitable for large amounts of money. Friends and relatives might feel unduly under pressure or resentful.
Micro loans: Invoice financing, trade financing	▪ Can provide working capital fairly easy. ▪ Long-term bank customers may receive preferential rates.	▪ Set-up charges may add substantially to overall cost of loan.
Leasing	▪ Reduces the size of upfront payments and provides a more balanced cash flow. ▪ There are many products available in the market.	▪ At the end of the leasing period the company does not own the asset. Ownership would require extra payment.
Crowd-lending	▪ Finding funding providers, as individuals contribute to the overall financing request of the company with very small portion. ▪ If the presentation of the concept behind the capital request is well prepared it may gain traction among the community and succeed.	▪ Generally, unknown business concepts limit the potential audience. Therefore, a powerful message to stimulate the interest of the investment community is needed. ▪ Rejection rates in crowd-lending platforms may reach 98%.
Bonds	▪ It can secure a large amount of financing without granting ownership rights	▪ The entire financing cycle can become lengthy and expensive ▪ More suitable for bigger SMEs
	Equity financing	
Own resources / Internal Funding	▪ Good source of funding for companies which are profitable.	▪ A failed business venture could leave the entrepreneur much worse off.
Friends and family	▪ Could be attractive if an entrepreneur has rich friends or relatives.	▪ Not suitable for large amounts. ▪ Friends and relatives might feel resentful.
Strategic Investor (such as a big client or a strong partner in	▪ A good client can also bring funding (usually multinationals). ▪ Collaboration could create a ready market for the product	▪ Working with some clients can slow down progress due to company procedures.

the target market)	development or can reduce the product development costs and timescale. ▪ The strategic investor may provide a market for the product development or may be able to provide help and facilities to speed up the development, also adding credibility to the business venture.	▪ The entrepreneur may stimulate competitive activities or lose control of IP assets. ▪ The entrepreneur could lose the overall control of his/her project. ▪ Internal changes may mean that other partners lose interest. ▪ Attracting interest takes time. The company may put undue pressure on the direction of the development plan.
Business Angels (BAs)	▪ Good BAs will bring both practical help as well as funding. ▪ The investment is usually right for an early-stage business. ▪ Satisfactory progress will often trigger further investment later. The financial risk is shared with the BAs .	▪ It can take a considerable time to find a BA interested in the project. ▪ BAs will only invest if there is a good chance of a high reward. ▪ The effectiveness of the collaboration between BAs and the management becomes a critical success factor.
Venture Capital (VC)	▪ Usually the best source of finance for medium/large investments (over EUR250.000). ▪ Companies with good business prospects usually attract venture capital funds. ▪ An experienced VC investor can assist with the business development. ▪ The financial risk is shared with the VC organisation(s)	▪ VCs are rarely interested in small investments with early-stage companies. ▪ The level of 'due diligence' associated with obtaining VC is considerable. ▪ VCs are very experienced at maximising the value of their investment. ▪ Some VCs have a narrow business focus and an early exit strategy
Grants and subsidies		
Grants (EU, national, regional)	▪ Some grants come with few strings attached and are a real bonus. ▪ Getting a grant or an award often attracts publicity and other funding providers. ▪ Successful completion of projects should make it easier to obtain other grants. ▪ Grants for collaborative research can generate useful business partnerships. ▪ Good credit is not needed.	▪ Preparation of a grant application request is often a complex undertaking. ▪ The deadlines for some grant applications may not fit the project timescale. ▪ An unsatisfactory collaborative programme may bring more trouble than it is worth. ▪ The awarding body may want to steer the development in a different direction. ▪ Potential audits may become problematic. Probably a specialist is needed for financial reporting.
Subsidies	▪ Can help certain industry sectors gain traction. Considering the circumstances, can reduce cost of production or the effective retail	▪ In most cases, they do not improve competitiveness and have static effect in efficiency.

	prices. In the present context, subsidies means anything else than funding (tax exemptions for instance).	▪ Is typically horizontal and applies to a category of companies or products.