Mapping of regional priorities, policies and support mechanisms

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Abstract

The potential benefits of increased lightweight technology can vastly apply to different sectors, contributing to getting closer to sustainable value chains and industrial products. As companies represent the main actors of industrialization of advanced materials, the collaboration and financial support represents an important leverage to speed up the process in discovering, developing and applying new lightweight solutions.

The development of this deliverable involved all the cluster partners of AMULET - MECH, IMAST, MAV, AKL, SWHEC and BIC – with purpose of presenting the mapping of the priorities, policies and support mechanisms for the European regions represented within AMULET. The analysis focalized on desk research concerning the Smart Specialization Strategies (S3) of the regions, identifying single priorities of each one and highlighting the specific areas in which lightweight technologies and processes play a relevant role.

Thereafter, based on the listed priorities, a description of the main funding programmes – allocated to support small and medium enterprises' R&D activities and project – is provided per each represented region.

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List of acronyms

Abbreviation / Acronym	Description
AKL	Moravian-Silesian Automotive Cluster
AMULET	Advanced Materials and Manufacturing Technologies united for Lightweight
BAX	Bax Innovation Consulting SL
BIC	Bydgoszcz Industrial Cluster
CMC	Ceramic Matrix Composites
EAB	External Advisory Board
ELCA	European Lightweight Cluster Alliance
IMAST	IMAST Scarl
LMA	Light Metal Alloys
MAV	The Advanced Materials Cluster of Catalonia
MECH	Clust-ER MECH
PBC	Polymer Based Composites
POL	Polymeris
RTO	Research and Technology Organization
SME	Small and Medium-sized Enterprise
SWHEC	Chamber of Commerce and Industry of Pécs-Baranya (on behalf of the South West Hungarian Engineering Cluster)
TUC	TECHNISCHE UNIVERSITÄT CHEMNITZ
TWGE	Thematic Working Group of Experts

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1. Introduction

The European Green Deal targets climate change and environmental degradation by addressing goals and initiatives for Europe to become a modern, resource-efficient and competitive economy, ensuring that:

- Europe will not produce any positive net emissions of greenhouse gases by 2050
- The European economic growth will be decoupled from resource use
- no person and no place will be left behind

The challenges raised by the climate change are nowadays driving a vast set of European initiatives. Goals as reducing the emissions of CO2 and enhancing the circularity of materials – by updating and innovating products and processes – are fundamental targets which are influencing both private and public activities.

The application of advanced materials to different economic sectors with the clear and specific purpose of making products lighter is a fundamental trend of research and development both in public research institutions and in private ones, as it targets the CO_2 emission and circular economy goals.

Furthermore, this trend of R&D is highly cross-sectoral, as its application address problems in several industries, as:

- **Automotive:** counting for 20,4% of the CO_2 emissions in Europe, the reduction of emissions for cars and vans by 2025 is set at 15%[1]. The direct benefit of reducing weight is also represented by the number of challenges gathered for the first AMULET Open Call (see D4.1 –Educational curriculum and planning).

- **Energy:** the production and use of energy account for more than 75% of the EU's greenhouse gas emissions[2].

- **Aerospace and Aeronautics:** the Space Economy is constantly growing and an increase in the number of launches of small satellites is foreseen. This sector can benefit directly from saving weight on single components, resulting in cheaper operational costs. This importance has been reflected by the number of challenges received for this sector – which has been the most represented sector during the first AMULET Open Call (see D4.1 –Educational curriculum and planning).

- **Buildings:** the building and construction sector accounts for about 50% of all extracted material and is responsible for over 35% of the EU's total waste generation[3].

Lightweight technologies, and their broad variety of potential applications, can contribute to decarbonization of the European economy. On the other side, the implementation of new technologies

[1] https://ec.europa.eu/commission/presscorner/detail/en/fs_21_3665
[2] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/energy-and-green-deal_en
[3] https://single-market-economy.ec.europa.eu/industry/sustainability/buildings-and-construction_en

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within the private sector needs to reach the vast majority of enterprises operating in the European area, represented by SMEs – which constitute 99% of European firms[4] .

Within the AMULET consortium several partners are cluster organizations, subjects able to aggregate relevant numbers of firms (mostly SMEs) around specific industry-related specializations. Cluster organizations have the competences and the capabilities of supporting the transmission of European challenges – such as decarbonization – to regional SMEs, with the aim of improving the structural companies' resilience.

Within AMULET, the cluster organizations are:

Cluster of excellence MERGE - Technische Universität Chemnitz - TUC
MERGE - Technologies for Multifunctional Lightweight Structures - is Germany's first and exclusive Federal Cluster of Excellence in the field of lightweight structures. It is hosted by TUC and is organised as a University Central Unit. That facilitates intensive and efficient crosscutting and interdisciplinary R&D projects with more than 250 industry partners. The cluster promotes the vision of merging basic technologies suitable for mass production in order to produce lightweight structures resource efficiently, with a plethora of functions and with a high performance.

Bydgoszcz Industrial Cluster – BIC
Established in 2006, Bydgoszcz Industrial Cluster incorporates companies of the tool and plastics processing industries and a range of business-related institutions, including universities, research and development units, offices, entrepreneurs' associations and financial institutions. The cluster's aim is the integration of processing and tool experts, representing their interests outside the industry and also establishing a network of business connections facilitating the operations of companies, access to human resources, technological development and an increase of innovation in production.

Advanced Materials Cluster of Catalonia - MAV
The Advanced Materials Cluster of Catalonia is a multidisciplinary and transversal cluster covering all the value chain, from raw materials to transformation and distribution and, finally, to end-users, proposing solutions to a large representation of European industries. One of the major objectives included in its strategic plan (2020-2023) is to prioritize advanced materials to address some of the current challenges that European SMEs companies are facing, such as digitalisation, energy storage power system solutions, and circular economy.

Technological district for the engineering of polymeric and composite materials and structures - IMAST
IMAST, the Italian technological district for the engineering of polymeric and composite materials and structures, gathers the most important Italian companies working on the engineering of polymeric and composite materials and structures. It is organized as a holding of public and industrial research laboratories with the aim of creating an integrated system of research, training and technological innovation. It implements an integrated innovation system, develops knowledge and innovative applications in products and technologies, and ensures tech transfer of research in SMEs.

POLYMERIS
The French Competitiveness Cluster for Rubbers, Plastics and Composites draws on more than 15 years of expertise and experience in supporting businesses. The cluster has main establishments in the region of Auvergne-Rhône-Alpes and Centre Val de Loire and maintains regional branches in 4 other

[4] https://ec.europa.eu/commission/presscorner/detail/en/fs_20_425

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regions. Polymeris leads a network of 380 industrial members and an ecosystem of 65 partner organizations in research training, laboratories and Industrial Technical Centers. Polymeris accelerates technological and scientific synergies between industry and academia to meet the challenges of the circular economy (eco-design, recycling, saving resources, social responsibility) and the industry of the future (digitalization, agility, adaptability, performance).

Chamber of Commerce and Industry of Pécs-Baranya - SOUTH WEST HUNGARIAN ENGINEERING CLUSTER (SWHEC)

The South West Hungarian Engineering Cluster was established in 2011 and is authorized to use the National Accredited Cluster title and ownership of the ESCA Silver Label Certificate. The Cluster is the largest grouped organization throughout the region, in respect to more than 300M EUR annual revenues and a Cluster membership numbering 5000 employees with their 40 members. SWECH portfolio encapsulates the entire spectrum with regards to contemporary forms of the engineering industry, spanning from metal processing and production, mechanical engineering through machine production, vehicle superstructure manufacturing, cutting components production, on-site commissioning, maintenance of complete technological mechanical system to automation services, industry 4.0 solutions, sensor technology and education.

Clust-ER MECH Manufacturing and Automotive

Emilia-Romagna region mechanical sector employs over 350,000 people and is the most important in terms of revenues and exports. Clust-ER MECH is the regional association of +120 public and private bodies: start-up, small, medium and large and companies, research centres and training institutions that share skills, ideas and resources to support the competitiveness of the sector. MECH's mission is to multiply innovation opportunities through a R&D collaborative approach. It focuses its activities in 8 value chains – among which specific group working on Advanced Materials, Automotive and Mobility, Electrification and Aerospace. Together with the Technopoles and the High Technology Network laboratories, they are one of the key players in the regional innovation ecosystem coordinated by ART-ER, the Emilia-Romagna consortium for innovation, technology transfer and attractiveness.

The Moravian-Silesian Automotive Cluster - AUTOKLSTR (AKL)

AKL has been established with the mission to increase competitiveness and encourage innovation and export capacity of interconnected companies, entrepreneurs, and institutions in the region. It seeks to build a common identity of companies in the cluster and wants to create confidence and positive attitudes towards the automotive industry and the whole region. Cluster actively provides sustainable development services for its 88 members and coordinates the innovative approaches in the development of human resources, trade relations and R&D activities. Moravian-Silesian Automotive Cluster has experience with R&D, international and educational projects. Our executive board members are well experienced and with connection to automotive industry.

The cluster organizations represent an important tool for involving regional SMEs in tackling the European challenges by investing, developing, and applying lightweight technologies. As each cluster operates mainly on a regional level, the main purpose of this analysis is to map Regional Governments priorities in R&D topics, in order to have a representation of the potential lightweight opportunities for local SMEs.

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2. Mapping of regional priorities, policies and support mechanisms

The mapping of the regional priorities, policies and support mechanisms starts with desk research conducted by the partners with respect to the Smart Specialization Strategy of the corresponding regions.

The Smart specialisation' approach combines industrial, educational and innovation policies to suggest that regions identify and select a limited number of priority areas for knowledge-based investments, focusing on their strengths and comparative advantages.

Within AMULET, the represented regions are:

- Emilia-Romagna, Italy, by MECH
- Campania, Italy, by IMAST
- Saxony, Germany, by TUC
- Catalonia, Spain, by MAV
- Kujawsko-Pomorskie, Poland, by BIC
- Baranya County, Hungary, by SWHEC
- Moravian-Silesian region, Cech Republic, by AKL
- Auvergne-Rhône-Alpes and Nouvelle Aquitaine, France, by POL

The first step conducted by partners has been the identification of the priorities declared in each Strategy. The following table (table 1) show the whole list of priorities.

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Table 1 - Smart Specialization Strategies (S3) for chosen regions

	Emilia-Romagna	Campania	Saxony	Catalonia	Kujawsko-Pomorskie	Baranya County	Moravian-Silesian Region	Auvergne Rhône Alpes	Nouvelle Aquitaine
1	CLEAN, SECURE AND ACCESSIBLE ENERGY	AEROSPACE	ADVANCED PRODUCTION TECHNOLOGIES	FOOD & DRINK	HEALTH AND SAFE FOOD	CUTTING EDGE TECHNOLOGIES	NEW ENERGY	MANUFACTURING INDUSTRY (INCLUDING MATERIALS)	GREEN INDUSTRY AND ECO-TECHNOLOGY
2	CIRCULAR ECONOMY	BIOTECHNOLOGY AND HUMAN HEALTH	NEW MATERIALS	ENERGY & RESOURCES	HEALTH AND HEALTH TOURISM	HEALTH	NEW LAND USE	DIGITALISATION	AGRICULTURE
3	CLIMATE AND NATURAL RESOURCES (AIR, WATER AND SOIL)	AGRITECH	BIOTECHNOLOGY	INDUSTRIAL SYSTEM	ADVANCED MATERIALS AND TOOLS	DIGITALISATION	GREEN INDUSTRY	DECARBONATION	HEALTH AND SAFE FOOD
4	BLUE GROWTH	CULTURAL HERITAGE, TOURISM, SUSTAINABLE CONSTRUCTION	NANO TECHNOLOGY	DESIGN-BASED INDUSTRIES	TRANSPORT AND MOBILITY	AGRICULTURE, FOOD INDUSTRY	NEW BUSINESS	HEALTH AND SAFE FOOD	GREEN CHEMISTRY AND ECOPROCESS
5	INNOVATION IN MATERIALS	ENERGY, ENVIRONMENT AND SUSTAINABLE BUILDING	MICROELECTRONICS INCLUDING ORGANIC AND POLYMER ELECTRONICS	INDUSTRIES RELATED TO SUSTAINABLE MOBILITY	CULTURAL HERITAGE AND CREATIVE INDUSTRIES	RESOURCE-EFFICIENT ECONOMY	COMPETENT PEOPLE	TOURISM AND CULTURE	ADVANCED MATERIALS
6	DIGITISATION AND ARTIFICIAL INTELLIGENCE	TRANSPORT AND LOGISTICS	PHOTONICS	HEALTH INDUSTRIES	ICT	CREATIVE INDUSTRY	INNOVATION ECOSYSTEM	AGRICULTURE	AEROSPACE, DEFENSE, MECHANICAL SUBCONTRACTORS
7	MANUFACTURING 4.0	ADVANCED MATERIALS AND ENABLING TECHNOLOGIES	ICT AND DIGITAL COMMUNICATION	CULTURAL AND EXPERIENCE-BASED INDUSTRIES.	ECO-INNOVATIONS	SERVICES	DIGITAL AND CREATIVE REGION	TRAINING EDUCATION	SUSTAINABLE AND INTELLIGENT TRANSPORT
8	GROUND AND SPACE BASED CONNECTIVITY OF SYSTEMS	FASHION			INDUSTRIAL AUTOMATION	ENERGY, CLIMATE	CIRCULAR ECONOMY		PHOTONIC
9	SUSTAINABLE AND INNOVATIVE MOBILITY	BLUE GROWITH				TRAINING EDUCATION			TOURISM AND CULTURE
10	CITY AND COMMUNITIES OF THE FUTURE					PUBLIC SECTOR AND UNIVERSITY INNOVATION			MANUFACTURING 4.0
11	TERRITORIAL HERITAGE AND REGIONAL IDENTITY - MADE IN EMILIA-ROMAGNA								
12	WELLBEING OF THE PERSON, DIET AND LIFESTYLE								
13	HEALTH								
14	SOCIAL INNOVATION AND PARTICIPATION								
15	INCLUSION AND SOCIAL COHESION								

The immediate analysis of the priorities of the selected regions reveals that the term "**Lightweight**" is not directly included in any of the Smart Specialization Strategies analysed.

On one side, the diffusion of this trend of innovation is quite new to many fields of research and is slowly and constantly gaining importance. On the other side, a second and deeper analysis can quickly identify several priorities which are directly and indirectly correlated to lightweight – considering the potential impact of lightweight improvements on these areas.

Thus, the analysis proceeds with the following Table (2), which shows the areas with a strong correlation to lighweight applications:

Table 2 - Identification of lightweight-correlated priorities

	Emilia-Romagna	Campania	Saxony	Catalonia	Kujawsko-Pomorskie	Baranya County	Moravian-Silesian Region	Auvergne Rhône Alpes	Nouvelle Aquitaine
1	**CLEAN, SECURE AND ACCESSIBLE ENERGY**	**AEROSPACE**	**ADVANCED PRODUCTION TECHNOLOGIES**	FOOD & DRINK	HEALTH AND SAFE FOOD	**CUTTING EDGE TECHNOLOGIES**	**NEW ENERGY**	**MANUFACTURING INDUSTRY (INCLUDING MATERIALS)**	GREEN INDUSTRY AND ECO-TECHNOLOGY
2	**CIRCULAR ECONOMY**	BIOTECHNOLOGY AND HUMAN HEALTH	**NEW MATERIALS**	**ENERGY & RESOURCES**	HEALTH AND HEALTH TOURISM	HEALTH	**NEW LAND USE**	DIGITALISATION	AGRICULTURE
3	**CLIMATE AND NATURAL RESOURCES (AIR, WATER AND SOIL)**	AGRITECH	BIOTECHNOLOGY	**INDUSTRIAL SYSTEM**	**ADVANCED MATERIALS AND TOOLS**	DIGITALISATION	**GREEN INDUSTRY**	**DECARBONATION**	HEALTH AND SAFE FOOD
4	BLUE GROWTH	CULTURAL HERITAGE, TOURISM, SUSTAINABLE CONSTRUCTION	NANO TECHNOLOGY	**DESIGN-BASED INDUSTRIES**	**TRANSPORT AND MOBILITY**	AGRICULTURE, FOOD INDUSTRY	NEW BUSINESS	HEALTH AND SAFE FOOD	GREEN CHEMISTRY AND ECOPROCESS
5	**INNOVATION IN MATERIALS**	**ENERGY, ENVIRONMENT AND SUSTAINABLE BUILDING**	MICROELECTRONICS INCLUDING ORGANIC AND POLYMER ELECTRONICS	**INDUSTRIES RELATED TO SUSTAINABLE MOBILITY**	CULTURAL HERITAGE AND CREATIVE INDUSTRIES	**RESOURCE-EFFICIENT ECONOMY**	COMPETENT PEOPLE	TOURISM AND CULTURE	**ADVANCED MATERIALS**
6	DIGITISATION AND ARTIFICIAL INTELLIGENCE	**TRANSPORT AND LOGISTICS**	PHOTONICS	HEALTH INDUSTRIES	ICT	CREATIVE INDUSTRY	INNOVATION ECOSYSTEM	AGRICULTURE	**AEROSPACE, DEFENSE, MECHANICAL SUBCONTRACTORS**
7	MANUFACTURING 4.0	**ADVANCED MATERIALS AND ENABLING TECHNOLOGIES**	ICT AND DIGITAL COMMUNICATION	CULTURAL AND EXPERIENCE-BASED INDUSTRIES.	ECO-INNOVATIONS	SERVICES	DIGITAL AND CREATIVE REGION	TRAINING EDUCATION	**SUSTAINABLE AND INTELLIGENT TRANSPORT**
8	**GROUND AND SPACE BASED CONNECTIVITY OF SYSTEMS**	FASHION			INDUSTRIAL AUTOMATION	**ENERGY, CLIMATE**	**CIRCULAR ECONOMY**		PHOTONIC
9	**SUSTAINABLE AND INNOVATIVE MOBILITY**	BLUE GROWITH				TRAINING EDUCATION			TOURISM AND CULTURE
10	CITY AND COMMUNITIES OF THE FUTURE					PUBLIC SECTOR AND UNIVERSITY INNOVATION			MANUFACTURING 4.0
11	TERRITORIAL HERITAGE AND REGIONAL IDENTITY - MADE IN EMILIA-ROMAGNA								
12	WELLBEING OF THE PERSON, DIET AND LIFESTYLE								
13	HEALTH								
14	SOCIAL INNOVATION AND PARTICIPATION								
15	INCLUSION AND SOCIAL COHESION								

Totally, nine (9) Smart Specialization Strategy documents of corresponding regions identified 81 priority areas.

Out of these listed priorities, we were able to identify 30 priorities that are closely related to the development of products and process leading to a decrease of the weight of industrial tools.

In order to simplify and standardise the analysis, and with the aim of identifying the main categories of priorities which could lead to improvement in lightweight, the following classification is derived by Table 2:

	Emilia-Romagna	Campania	Saxony	Catalonia	Kujawsko-Pomorskie	Baranya County	Moravian-Silesian Region	Auvergne Rhone Alpes	Nouvelle Aquitaine
ADVANCED MATERIALS	X	X	X	x	X				X
SUSTAINABLE MOBILITY / TRANSPORT	X	X		X	X				X
ENERGY	X	X		X		X	X		
CLIMATE/ENVIRONMENT	X	X				X	X	X	
AEROSPACE	X	X		x					X
INDUSTRIAL SYSTEM			X	X			X	X	X
CIRCULAR ECONOMY	X			x		X	X		

The cross-sectoral nature of the lightweight discipline leads us to take into account various and different priorities. In particular:

- The most cited priorities are the **Advanced Materials** – which is confirmed as a priority by 6 out of the 9 regions. The research and the development of new typologies of material constitutes a pillar of lightweight, with the specific scope of replacing heavy components with lighter ones, maintaining mechanical and physical properties. The advancement in material research as a key enabling activity for lightweight is witnessed also by the analysis of the challenges of the first AMULET Open Call (see D4.1), which reveals that the first keyword among all the challenges has been “Advanced material development”.
- Secondly, we find the development of **Sustainable Mobility**, which includes a wide range of transportation methods. The benefits by developing solution able to decrease the overall weight of different means of transport consists in the use of less resources both for the creation of the vehicle and for its use – defining a lower level of fuel and/or energy needed for its functioning. In the analysis, 5 regions declare the mobility to be a priority.

With a lower representation in terms of numbers of regions considering them priorities, we find:

- **Energy** – represented specifically as one of the sectors in AMULET, the energy sector is evolving rapidly towards to application of materials, specifically with the purpose of energy generation and storage, as witnessed by the first AMULET Open Call[5].
- **Climate/Environment** - with the specific definition of increasing the efficiency in the use of resources and raw materials, the climate is overall the main challenge leading multiple choice in the R&D around Europe.
- **Aerospace** – the whole Space Economy is constantly increasing with important impact on other downstream sectors – up to 60€ billion in 2021[6]. Thus, the research of new way to reduce the weight of shuttles, drones, and other means of Air-Transportation, is becoming an important challenge. To confirm the high interest and growth it is worth to highlight that the Aerospace and Aeronautics sector has been the sector with the highest number of launched challenges during AMULET first Open Call[7].
- **Industrial System** – as the production of components on an industrial scale affects directly the Life Cycle Assessment of materials, the modernisation of production plants, and the technological advancements for producing new materials, will require important adaptation and resilience from producers.
- **Circular Economy** – the development of new materials is highly correlated with the use of the components at its end of life. In this topic, highly linked to climate and environmental theme, the circularity and recyclability of products and materials gain an important weight. As the R&D activities and initiatives are rapidly growing, especially with reference to the recycling of composites, during AMULET's first Open Call this topic has been subjects to several challenges.[8]

The analysis result in a framework that potentially offers opportunities for regional and local SMEs to pursue innovation in products supported by the regional public authorities. Even if the term "lightweight" is not present within the agenda and the Smart Specialization Strategy, its multi-faced nature – including elements from advanced materials, mobility, climate and circular economy, aerospace, and energy – offers the opportunity to look for supporting programmes in several sectors. Thus, with the main goal of mapping the policies and support mechanisms available to SMEs, the following paragraphs analyse the situation in each single regional ecosystem.

[5] See Deliverable 4.1 - Educational curriculum and planning - Figure 5: Analysis of challenges according to general keywords

[6] https://esamultimedia.esa.int/multimedia/publications/Space_economy_creating_value_for_Europe/esa_space-economy_brochure.pdf

[7] See Deliverable 4.1 - Educational curriculum and planning - Figure 3: Analysis of challenges according to application sector

[8] See Deliverable 4.1 - Educational curriculum and planning - Figure 5: Analysis of challenges according to general keywords

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3. Italy - Emilia-Romagna

Before presenting the support mechanisms available to local SME, it is worth to notice that Emilia-Romagna, within its own S3 document, identified two specific productive areas defined as "with high development potential):

- Aerospace Economy
- Critical infrastructures

The identification of the aerospace economy does not directly point at the lightweight, but the promotion and the support of the whole supply chain in the region will offer new opportunities for addressing lightweight challenges. Emilia-Romagna region developed several initiatives for supporting the development of regional value chains, fostering collaboration and cross-fertilization among industries and universities. Recently, it established the Regional Forum for Aerospace – an initiative established in December 2021 for gathering different regional stakeholder concerning aerospace activities[9].

On support mechanisms and programs, Emilia-Romagna has recently published its strategy and operations for the use of the European Regional Development Fund (ERDF).

The Regional Programme has been closely defined in accordance with the main European and national strategies. The programme follows the two main pillars for economic and social development while strengthening the cohesion between regions - the green and the digital transition.

In Emilia-Romagna the programme has four main priorities – so called Policy Objectives, each of which has various Specific Objectives and different implementing Actions. The entire fund – for the 2021 – 2027 period – counts over 1 billion euros for the implementation of the regional programme.

1. Research, innovation, competitiveness[10]
   Among the specific objectives, the funds allocated to this strand foresees to boost SMEs sustainable growth and competitiveness and improve job creation by investing in the productive system, in addition to seek invest in the sustainable growth and competitiveness of SMEs and job creation by investing in the productive system. A total of 530 million €, 52% of the whole fund, will be allocated to this strand.

2. Sustainability, decarbonisation, biodiversity and resilience[11]
   The main elements of this priority include, among others, enhancing climate change adaptation and promoting an increasingly circular economy. Under the Regional Pact for Work and Climate[12] the Emilia-Romagna region set important target as achieving carbon neutrality before 2050 and transitioning to 100% clean and renewable energy by 2035. A total of 303 million € funds, equal to 30% of the whole programme, will be available.

3. Green mobility and air quality[13]

[9] https://www.regione.emilia-romagna.it/notizie/2021/dicembre/aerospazio-la-regione-insedia-il-forum-strategico-per-promuovere-l-ecosistema-dell-innovazione
[10] https://fesr.regione.emilia-romagna.it/erdf/priorities/research-innovation-competitiveness
[11] https://fesr.regione.emilia-romagna.it/erdf/priorities/sustainability-decarbonisation-biodiversity-and-resilience
[12] https://www.regione.emilia-romagna.it/pattolavoroeclima/ese-patto-per-il-lavoro-17x24cm_en_web.pdf
[13] https://fesr.regione.emilia-romagna.it/erdf/priorities/green-mobility-and-air-quality

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Promoting sustainable multimodal urban mobility as part of the transition to a carbon-neutral economy is the key objective which will distribute 40 million € (4% of the ERDF fund)

4. Attractiveness, cohesion and local development[14]
   Inspired by the final goal of inequality-free society promoting its territorial specificities, this strand tackle territorial inequalities and promote the attractiveness and sustainability of territories. Specifically, the funded projects will actively contribute the fight against climate change, counteract territorial imbalances (demographic, social and economic) and strengthen the territorial attractiveness for citizens.
   A total of 120 mission euros (12% of total) will be available.

In addition to that, the European Social Fund Plus (ESF+)[15] planned 4 priorities:

- Employment
- Education and training
- Social Inclusion
- Youth Employment

The strand for research, innovation, and competitiveness[16] is focussed on supporting industries in the development of innovations in product or services in order to foster the economic strength of the region. This strand counts for more than 50% of the entire fund, and the Emilia-Romagna region event published a first calendar with the planning of the announcement of the multiple calls for the 2022[17].

Among all the calls, the most relevant ones for SMEs count about 50 million euros available for innovative projects. Specifically:

- Action 1.3.1 Supporting innovation projet for companies, supply chains and professionals, fostering strenght and growth *(Azione 1.3.1 Sostegno ai progetti di innovazione delle imprese, delle filiere e delle attività professionali, incentivandone il rafforzamento e la crescita)* – with the specific goal of reinforcing the sustainable growth and the competitiveness of SMEs and the creation of new jobs in SMEs - 20 milion €
- Action 1.1.1. Sustaining research, experimental reserach and innovation in companies (*Azione 1.1.1 Sostegno a progetti di ricerca, sviluppo sperimentale e innovazione delle imprese*) - with the specific goal to develop and reinforce the competences in research, innovation and application of advanced technologies in companies – 25 milion €
- Action 1.1.5 Sustaining innovative start-ups (*Azione 1.1.5 Sostegno alle start up innovative)* – with the specific goal to develop and reinforce the competences in research, innovation and application of advanced technologies in start-ups - 5 milion €

[14] https://fesr.regione.emilia-romagna.it/erdf/priorities/attractiveness-cohesion-and-local-development
[15] https://formazionelavoro.regione.emilia-romagna.it/sito-fse/programmazione-2021-2027/programma
[16] https://fesr.regione.emilia-romagna.it/erdf/priorities/research-innovation-competitiveness
[17] https://fesr.regione.emilia-romagna.it/2021-2027/documenti/calendario_bandi_pr_fesr.pdf/@@download/file/Calendario_bandi_PR_FESR.pdf

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4. Italy – Campania

Taking up the mission-oriented approach with respect to the open inclusive and attractive vision in Campania Region for widespread well-being, the strategic structure deriving from the RIS3 update for the period 2021-2027, is articulated on the basis of three main objectives:

1. strengthen and enhance the research and innovation system for green and digital transitions;
2. stimulate the diffusion of innovation in the regional industrial and service sector
3. promote openness and exchange towards national and international partnerships and collaborations (open innovation).

The strategic lines relating to each objective are organized in the action plan according to the three strategic drivers: Human Capital, Technology Transfer and Research & Innovation.

With the RIS3 2014-2020 Strategy the Campania Region has launched an impressive investment program with the aim of intervening primarily:

- to enhance and enhance research infrastructures in the areas
- support business investment in innovation and the creation of new businesses associated with research spin-offs, start-ups and innovative micro-enterprises;
- strengthen the links between research and the productive world through the strengthening of the Regional Innovation Network;
- develop new markets pertaining to sectors of social importance and strengthen regional production chains in sectors with a high knowledge intensity.

This has allowed the creation and development of a real regional innovation ecosystem, made up of academies, technology districts, certified business incubators, business incubators and accelerators, innovative start-ups and SMEs, research spin-offs, transfer offices technology of universities, research centers, public-private associations, university departments. An Open Innovation environment capable of facilitating interaction and mutual enrichment, activating the construction of long-term stable and cooperative research networks at European and international level in order to ensure the presence of Campania innovation actors in supranational areas.

8 are the identified Innovation Ecosystems as a result of the analysis carried out by Campania Region and the correlation with industrial ecosystems identified by the Commission: Aerospace; Biotechnology and human health; Agritech; Cultural heritage, Tourism and creative industries; Energy, Environment, Sustainable Building; Transport and Logistics; New Materials and enabling technologies; Fashion; Blue Growth.

The update of the Region Campania RIS for the period 2021-2027 has identified specific issues relating to the materials for lightweight, which are listed in the thematic position papers attached to the RIS document. In particular, the technological line identified by RIS3 Campania for this item are:

“Advanced Materials and Nanotechnologies”

Coating with functional properties:

- New composite materials and adhesives with high fire performance

Materials for sustainable energy production and its storage:

- materials for photovoltaic cells and for fuel cell-powered fuel

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101005435

- materials for storage and hydrogen production, for improvement of lithium-ion batteries, materials for “post lithium-ion”

Materials of new concept in terms of structures and properties

- advanced lightweight multi-function materials at high-performance and related components planned for assembly and disassembly

Materials for applications in transport

- sustainable, high performance, recyclable, structural thermoplastic-based composites,

Additive Manufacturing Technologies

- innovative methods for advanced, smart and eco-friendly manufacturing of materials with improved properties and best production performance

Processes with increased sustainability

- industrial processes connected to the production of *Growing Materials* and conversion of polymers/ *biobased* materials

Biodegradable, biocompatible, sustainable and natural origin materials

- polymeric materials and biodegradable, sustainable and natural origin composites,

Materials for environment protection

- eco-friendly materials and technologies for the catch of CO2, micropollutants detection, bioremediation of waste water.

“Aerospace”

Advanced manufacturing methodologies and technologies

- Methods of additive manufacturing and advanced recovery techniques; precision machining, thermic treatment and protective coatings for aerospace; processes and technologies for the production by lost wax casting.

Advanced interiors

- Collaborative methods of co-creation of value with customers and digital technologies for the planning, simulation and implementation of advanced and multi-functionalized interiors

Advanced materials and low environmental transformation processes

- Advanced materials and transformation processes, included lightweight materials, surface protection treatments and advanced protection systems, in a “green” view.

“Energy, Environment and Sustainable Building”

Smart buildings: sustainability, resilience, security and life quality

- Insulating, multifunctional and reversible technologies and solutions, for the optimization of primary energy consumption, efficient use of natural resources
- Methodologies, methods, materials and information systems for seismic protection, structural health monitoring, management (participative) and the increase in the resilience of the building system

Environment and circular economy

- Materials and components from circular systemic solutions for the green cities

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“Advanced Transport and Logistic”

New Configurations, New Materials and New Processes for the decrease of weight and the improvement of the transportation

- Development of production processes and integrated design for structural products and not based on materials with reduced environmental impact and/or high recycling.
- Technologies for the development of materials for the growth of Fuel Cell

In the Campania ERDF approved by the EC for the newly period 2021-2027, it is foreseen a total allocation of:

- *514 million Euro* for *Research and Innovation*
- *643 million Euro for Promoting Competitiveness SMEs*

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5. Germany - Chemnitz/ Saxony

Saxony economy presents an important automotive sector, with five production sites as well as about 780 branch suppliers, equipment and service providers, the so-called "Autoland Saxony" is one of Germany's major producers. The automobile industry with its more than 95,000 employees is Saxony's branch with the highest turnover. It contributes over one quarter of the industrial turnover and more than one third of foreign sales. As the automotive sector is quickly moving towards new technologies and standards – as, for instance, hybrid and electric mobility solutions, developments for autonomous driving, lightweight construction in an efficient material mix – many important actors directed activities, initiatives, and resources towards research in this sector.

In addition to the priorities identified in the Smart Specialization Strategy document, Saxony is heavily working on some topics defined in the Vanguard Initiative:

1. Efficient and Sustainable Manufacturing

Advanced Manufacturing is a key sub-area proposed for cooperation in the framework of the Industrial Modernisation Platform. The Specific topic is "EFFICIENT AND SUSTAINABLE MANUFACTURING" (ESM), a pilot born in the framework of the Vanguard Initiative and promoted by the regions Lombardy and Catalonia.

The focus is on technologies, methods and tools which aim at:

- Increasing throughput, quality, environmental and social sustainability of manufacturing activities while reducing costs;
- Reducing emissions, energy, resources and materials consumption,
- Increasing the inclusion of humans in factories - Vision: Manufacturing should become efficient and sustainable to enable European reindustrialization and to preserve the environment and the planet's resources. Manufacturing efficiency and sustainability are two challenges to be addressed in a synergic way and systemic view.

The main objective is providing industry with innovative solutions from research and exploiting the potential of smart specialisation to promote new efficient supply chains with added high value.

The idea is to conceive and develop a European network of infrastructure and pilot plants in key-manufacturing areas, where companies can test innovative solutions before the industrial uptake.

By exploiting and valorising available research results, ESM European pilot plants have the potential to support innovation of companies in breakthrough technologies and applications that require manufacturing efficiency and sustainability. This approach will increase the competitiveness and development of European value chains, exploiting synergies and complementarities of different regional specialisation.

The ESM Vanguard pilot is aimed at overcoming the barriers limiting innovation and transfer of research results to the European industry through the development of a European synergic network

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of pilot plants accessible to companies in a logic of Smart Specialisation. Each Region will develop and operate pilot plant nodes coherent to regional industry and competences, offering European companies a “one-stop shop” for the industrial uptake of new technologies and innovative business model.

Among all the thematic working areas, Saxony leads – together with Norte (PT) – the one on Energy-flexible and resource-efficient factory operation.

2. High Performance Production through 3D-Printing

The area concerns the implementation of synergies in new 3DP value chains across regions based on smart specialisations of the regions. The key objective is to identify opportunities for joint-demonstration between regions, based on a solid mapping exercise and the detected complementarities between existing demonstration facilities and company needs. The proposed area, which is one of Vanguard Initiative's Pilot Projects, targets the accelerated deployment of new 3DP applications. The focus lies on applications at post-prototyping level (> TRL5).

Among the most innovative manufacturing solutions of the last decade, additive manufacturing (AM) technologies have been identified as one of the most promising production technologies at global level. They are considered to empower the transition from mass production to mass customization in several leading sectors. AM Technologies are mainly concerned with “High performance manufacturing” and were identified as a segment with “particular high growth potential” and a global market volume of 2.2 billion dollars in 2012 that is expected to grow to 11 billion dollars in 2021. The potential for Smart production and efficient processes opens new perspectives, which has very often been associated to a possible new “Industrial Revolution”.

AM Technologies correspond to relative high levels of technology maturity or even market maturity already: some applications have reached TRL 9 and are broadly deployed, but many more are at post-prototyping level and should be fully deployed soon, i.e., in a time, window of 3 to 5 years.

Saxony manages different instrument supporting R&D and competitiveness:

1. Saxon State Ministry for Science, Culture and Tourism (SMWK)
2. EuProNet – SMWK European and international research networking
3. Biotechnologies – ERA CoBioTech
4. Personalised Medicine – ERA PerMed
5. Material science and engineering – M-ERA.Net
6. Sächsische Aufbaubank SAB (EU project and network funding
3. Expansion of the internationalisation of Saxony's higher education and research landscape)
4. European Regional Development Fund (ERDF) and the European Social Fund (ESF plus)

The most relevant funding instrument are the funding in M-ERA.Net and SMWK.

In addition, there are regular calls from the SMWK for calls, but these mostly relate to Horizon Europe projects. EuPro Net provides initial funding for this purpose to prepare the applications for Horizon Europe projects.

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6. Spain – Catalonia

In Catalonia, the Autonomous Community where the project is being developed, the RIS policy is implemented through RIS3CAT[18], which has four strategic objectives:

1. To enhance the competitiveness of the business fabric.
2. To promote new emerging economic activities through research, creativity, and innovation.
3. To consolidate Catalonia as a European knowledge hub and connect the country's technological and creative capabilities with both sectors that already exist in the territory and any that may emerge.
4. To make global improvements to the Catalan system of innovation, enhancing the competitiveness of companies.

In other to achieve these objectives, 4 implementation pillars have been described:

1. Promoting the seven leading sectoral areas; food and drink; chemicals, energy, and resources; industrial systems; design-based industries; industries related to sustainable mobility; health industries, and cultural and experience-based industries.
2. Identifying and promoting new economic opportunities in emerging sectors, based on technological capabilities and synergies between different but related sectors.
3. A commitment to cross-cutting enabling technologies as the main instrument for transforming the production system and generating new scientific, technological, and economic opportunities. The six priorities cross-cutting enabling technologies in the RIS3CAT strategy are: ICTs, **nanotechnology**, **advanced materials**, photonics, biotechnology, and **advanced manufacturing**.
4. Improving the innovation environment through public policies implemented by the Government that affect the research and innovation system. These policies concern the digital agenda, entrepreneurship, eco-innovation, non-technological innovation, and training and talent.

Cluster MAV in AMULET project is aligned with implementation pilar 3, gathering representative Catalonia companies devoted to Energy, Construction, Transport (Automotive, aerospace, etc), a RIS3CAT strategic objective (the strengthening of the competitiveness of the business fabric). Such companies apply transversal technologies such as Information and Communications Technologies (ICT), Nanotechnology, Advanced Materials, Photonics, Biotechnology and Advanced Manufacturing enabling the production of lighter materials, which is the main AMULET objective.

RIS3CAT document do not classifies in relation on the previously detailed options but can be found a classification between public sector (mainly research centres, universities, and public administrations) and private sector (companies, technology centres and other private stakeholders in the R&D&I system). The total investment has been divided as follows: 57 % corresponds to the public sector and the remaining 43 % corresponds to private entities.
Research centres and companies account for 55 % of the total investment. Technology centres account for 4,63 % of the total. The public administration receives 14 % of total investment.

By sector, the fields of health and chemistry, energy and resources account for the largest proportion of investment, with 27.86 % of the total and 13.85 %, respectively. They are followed by industrial systems, with 12.16 %; sustainable mobility and food and drink, with 11.81 %; Industries related to sustainable mobility, food and drink, cultural and experience-based industries and design industries account for the lowest proportion, 11.46% of total investment. Some 22.86% of the investment is not

[18] http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents/angles/fitxers/informe-seguiment-ris3cat-2020-en.pdf

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classified in any sectorial area. This percentage corresponds mainly to projects selected in calls for specialisation and territorial competitiveness projects (hereafter, PECT) R&D&I infrastructure and clusters of emerging technologies

Regarding the enabling technologies, ICTs account for the most investment, with 42,13 % of the budget, followed by biotechnology, with 26,57 %. Advanced materials account for 7,41 % of total investment, and advanced manufacturing, 6,56 %. Nanotechnology and photonics are the technologies with the lowest investment (4,12% and 2,73 %, respectively). Finally, the 10,49 % of the total investment does not correspond to any particular enabling technology.

Moreover, Operative program European Regional Development Fund (OP-ERDF) is divided in different communities at Catalonia region, coordinated each one by an institution expert in the field (technological centre, University, or company) as follow:

1. Energy
2. Health, safe, sustainable food and chain.
3. Eco-mobility.
4. Applied technology to health.
5. Multidisciplinary solutions for the next health challenges.
6. Smart, autonomous connected mobility.
7. Digital transformation and Living services.
8. Industries of the future.
9. Agri-food production technologies.
10. Water.
11. Additive manufacturing and 3D printing.
12. Cultural and creative industries.
13. Smart specialisation in the fashion and habitat industries.

The support instruments are:

Territorial specialisation and competitiveness projects (**PECT**) are initiatives launched by players in the territory and led by local public entities to promote actions that can contribute to the economic transformation of the territory and include a strong component of innovation (91.23MEUR), 60 % invested in ICTs followed by biotechnology, 12 %; advanced manufacturing 10,2%, being advanced materials only 0,4%.

Emerging Technologies Programme promotes the development of new emerging activities in Catalonia based on innovative, disruptive technologies or processes and aimed at opening up new markets or transforming existing ones. This program focuses on graphene, the human brain, and ICTs. The investment (35 MEUR) is particularly hight in ICTs with the 49% of the resources, followed by nanotechnology and Photonics, 22%; and advanced manufacturing with 9,68%.

R&D cooperation projects are formed by companies that work with R&D&I system actors on projects involving technological innovation. Here can be fund technology cluster (local and international). The total investment (70m EUR) is divided in biotechnology, 31.26%; ICT 30.47%; advanced manufacturing 16.22%; advanced materials, 13.50%; photonics, 3.84% and nanotechnology,3.61%.

Knowledge transfer provides financial support for actions that increase and optimise processes of knowledge valorisation, technology transfer and protection of the knowledge generated, as well as

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support and guidance for creation of businesses and public-private cooperation. It is divided in grants for university knowledge valorisation and transfer (18.7 MEUR) and R+D+I network (9.71 MEUR).

Knowledge Industry Programme finances projects that support the valorisation and transfer of the results from research conducted at universities, research centres and technology centres. This program promotes two actions depending on the TRL of the technology, Seed (TRL 1-2, 3.02 MEUR; the technologies inversions are biotechnology, 30.72%; ICT, 24.35% and advanced materials 14.45%) and Product (TRL 3-7, 11 MEUR, Biotechnology is the leading enabling technology, 35.21%; followed by ICTs, 26.78%; nanobiotechnology, 9.26%; Advanced manufacturing, 8% and advanced materials, 6.65%.

Public procurement of innovation (PPI) program enables the Administration of the Government of Catalonia and its public sector to plan and implement purchases that promote innovation and transformation. Technology investment is divided in ICT, 89%; to biotechnology, 2.84% and advanced materials 2.45%.

R&D&I infrastructure are aimed at financing investment in the development of research and innovation infrastructures to make them more competitive from the point of view of science, innovation and technology transfer. Priority is given to projects with the greatest potential to generate competitive advantages and impact on the socioeconomic development of the country.

Any of the regional programs are specific for lightweight, but advanced material for lightweight in different industries as automotive, aerospace, construction and Energy can be included in several of the programs listed below

- Territorial specialisation and competitiveness projects (PECT)
- Emerging Technologies
- R&D cooperation projects
- Knowledge Industry Programme Product action.
- Public procurement of innovation (PPI)

Moreover, some regional initiatives supporting sector potentially impacted by lightweight are:

For Automotive, two regional clusters are involved in automotive lightweight promotion - CIAC Automotive Industry Cluster of Catalonia (CIAC) and Advanced Materials Cluster of Catalonia (Cluster MAV).

Sustainable mobility Industrial Hub (HubIMS) also related with CO_2 fingerprint emission, emission reduction, Life Cycle assessment (LCA) and Life cycle Cost (LCC).

For Aerospace and Aeronautics: R+D+I Next generation EU. Advanced technologies for the exploration of the universe[19]

For Energy: R+D+I Next generation EU: There is two cluster focused on energy; Efficient Energy Cluster of Catalonia (CEEC) which aims to promote the field of efficient energy management and Advanced

[19] https://govern.cat/salapremsa/notes-premsa/398842/el-govern-proposa-8-programes-de-recerca-per-valor-de-120-milions-d-euros-al-pla-estatal-d-r-d-i-dels-fons-europeus-next-generation-eu

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Materials Cluster of Catalonia (Cluster MAV) which is devoted to novel materials applied in energy and energy storage

XRE4S, which is a transversal and interdisciplinary network that has the objective of promoting the transfer of technology in the field of energy and promoting the energy transition at a Catalan and international level.

Principal work in weight materials in Catalonia is related with metals (high alloy steels), polymers (foamed and engineering polymers) and composites (polymer matrix composites). As a result of work performed during last years, five materials for lightweight are commercial:

- BounCell-X™ TPU Foam and Glass Reinforced produced by Lubrizol
- Composites for railway produced by Refisa.
- Carbon SMC produced by Menzolit.
- Cupra carbon fiber produced by Composites ATE.

It was not found policies directly related to lightweight/advanced materials at Catalonia; there are policies for characteristic materials as nanomaterials (use, safety and definitions based on EU policies) or composites. However, and due to its close relation with green energy and CO_2 fingerprint, there are transversal relations with these policies. It was not found policies directly related to lightweight/advanced materials at Catalonia; there are policies for characteristic materials as nanomaterials (use, safety and definitions based on EU policies) or composites. However, and due to its close relation with green energy and CO2 fingerprint, there are transversal relations with these policies. It is important to mention that there are advanced materials directly involved in removable energy activities (for example, advanced materials and nanomaterials for solar cells, energy storage and hydrogen production for greener energy[20]) That are indirectly associated to energy policies such as **Llei 16/2017**[21] and **PROENCAT2050**[22].

On the other hand, reduction in CO2 emissions in Catalonia is mainly addressed to transport and industry because they are responsible for the half of the greenhouse gas emissions in Catalonia. The policies followed by Catalan government are based on **Directive 2008/101/CE**[23] and **Directive 2009/29/CE**[24] which are European directives and regional ones.

7. Poland – Kujawsko-Pomorskie

In the Kujawsko-Pomorskie region, one of the implementing documents of the Acceleration Strategy 2030 + is the Regional Smart Specialization Strategy (RIS 3) and it aims to formulate assumptions and determine conditions for economic development. RIS3 2021+ is included in the so-called regional

[20] https://web.gencat.cat/en/actualitat/detall/Estrategies-per-culminar-la-transicio-energetica-lany-2050
[21] https://portaljuridic.gencat.cat/eli/es-ct/l/2017/08/01/16
[22] https://icaen.gencat.cat/ca/l_icaen/prospectiva_planificacio/
[23] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0101
[24] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0029

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programming documents – indicated in the "Development Strategy of the Kujawsko-Pomorskie Voivodeship until 2030 – Acceleration Strategy 2030+".

The RIS strategy defines the main objective as Strengthening the competitiveness of the Kujawsko-Pomorskie region. It also sets out 5 main objectives to be achieved as a result of its implementation:

1. *shaping a regional economy based on knowledge and innovation*
2. shaping innovative and creative attitudes of society
3. shaping the science sector as a base for innovative economy
4. increasing the level of innovation in the region through digitization
5. raising competences in the field of managing the development of an innovative economy

For each strategic objective, a number of operational objectives are specified.

The Lightweight sector is not directly written for any purpose, but indirectly companies will participate in the following purposes:

1. *shaping a regional economy based on knowledge and innovation*
2. shaping innovative and creative attitudes of society
3. shaping the science sector as a base for innovative economy

As a result of detailed analysis and their verification, the following Regional Smart Specializations were established:

1. *Healthy and safe food* - innovative production, food processing, as well as innovative packaging, certification/quality control methods, and modern and concretized consumer education. The idea of this specialization is related to the spatial-temporal system – the system "from field to table" with all related production and service aspects. Healthy and safe food is closely related to the individual stages and processes associated with production, processing, distribution, storage (handling of food from stage of production for consumption). The specialization covers related industries, such as: production of fertilizers and packaging and logistics processes (e.g., distribution, storage).
2. *Health and health tourism* - innovative and personalized diagnostics and a wide range of a range of care and prevention, also through advanced and modern tourism (rehabilitation, sanatoriums, recreation, etc.), development and implementation of innovative solutions in the field of telemedicine and telecare. The specialization is based on strong scientific potential in the field of medical sciences and resources, experience and infrastructure, in the field of sanatorium and hospital treatment, medical and rehabilitation services that can be supported by psychology and refers to the resources, experience and infrastructure present in the voivodship, strictly related to the subject of specialization, the further development and use of which constitute maybe one of the pillars of pro-innovative development of the region.
3. *Advanced materials and tools* - innovative materials, materials, equipment and tools (with particular emphasis on robots) that are used for innovative production of objects (machines, tools, packaging, etc. including products of polymer plastics). The specialization is mainly based on a significant number of SMEs specializing in production of chemical components, tools for the production of plastic products and metals and the production of final plastic products. Field of manufacturers plastic tools and products bring together small and medium-sized enterprises characterized by high flexibility and high competitiveness. In the production area components operate large chemical concerns with a wide range of products and significant production capacity.

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4. *Transport and mobility* - potential that can be used in processes moving, efficient communication and using the resources it has for this region (waterways, land, production potential of transport equipment). Specialization is based on the development of economic functions related to the use of land and waterway transport routes (inland waterway), logistics, activities economic in the field of transport and trade. Specialization is based on the potential of the region resulting from the value of the location and the natural resources possessed for the purpose of logistic and transport – waterways, as well as resulting from the shaped and developed system and infrastructure for the needs of land transport – land routes. Manufacture of road and rail transport equipment including the manufacture of parts and components and production of industrial automation. The field of transport devices and industrial automation is based on the region's long-standing tradition in the field of manufacturing car parts, repair of rail and road transport equipment, manufacturing of measuring and switchgear systems, as well as the existing research facilities in the field of mechanics, machine and vehicle construction and automation industrial.
5. *Cultural heritage and creative industries* - the basis for the formation of this SS is the region's enormous resource, which is the "living laboratory", which itself is great potential for the development of innovative and novel methods, techniques and technologies conservation, presentation of resources, protection. Moreover, the region was noted as a developing area of design (industrial, utility, cultural) and industries creative (e.g. games). The specialization is based on the use of regional values in the field of culture and art, as factors of development and shaping pro-innovative attitudes of society, as well development of creative industries based on intellectual capital resources, cultural potential and art. Serving research is an important element of the specialization developing and using techniques and technologies for the conservation of monuments based on the latest achievements of science (physics, chemistry and other sciences). Dynamic development of creative activities, creativity related to the effective use of regional cultural and art resources and historical heritage and their commercialization.
6. *ICT* - the specialization is based on the knowledge and research results in the area computer science, multimedia, programming and information processing, requirements formulated in the Digital Agenda for Europe, a wealth of research background, and constantly developing economic potential in this area. ICT does the job supporting and supplementing each of the smart specializations with innovative solutions based on values, incl. by: building applications, IT systems and high advanced software, delivery of multimedia products, processing information, provision of ICT services based on new generation internet, provision of services and the development of IoT-based tools.
7. *Eco-innovations* - specialization consists in supporting other specializations of the region by developing and implementing innovations to reduce energy consumption, material consumption and the level of harmful emissions of processes and products in all SS areas. The potential supports new business models of the circular economy, using technologies that reduce waste production, as well as striving for more efficient use and management of waste. The potential also includes introducing innovative equipment and technologies for the production of renewable energy with use of natural resources (e.g. solar, wind, hydropower).
8. *Industrial automation* - intelligent specialization based on the existing potential and tradition of the region in the field of machine parts manufacturing, repair devices, manufacturing of measuring and switchgear systems and sensors, and the existing scientific background in the field of mechanics and machine construction and automation industrial. The purpose of the potential is to support and supplement any service activities for effective work and implementation of each SS based on values, incl. through application automation in production processes.

Due to the ongoing negotiations and arrangements, it is not possible to present financial issues of the above objectives or specialization.

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The region can support innovative projects with two main strands of funding:

- European funds for Kuyavian and Pomerania Region
- Regional economic development program

According to the Regional development strategy a support program for tool and plastics processing sector is to be prepared.

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8. Hungary – Baranya County

In Baranya County where the project is being developed, the RIS policy is implemented through national RIS (exists only at national level), which has the following strategic fields and objectives.

- CUTTING-EDGE TECHNOLOGIES: Developing cutting edge technologies e.g. 5G mobile networks, space technology, quantum technology.
- HEALTH: The priority covers the entire field of health innovation, from better understanding of diseases to health promotion and disease detection to cures.
- DIGITALISATION OF THE ECONOMY: The priority covers the automation of production and service processes and the use of digital business solutions by enterprises.
- ENERGY, CLIMATE: The main objective is to fight climate change and promote the transition to a carbon neutral economy.
- SERVICES: Strengthening R&D and innovation in service sector enterprises.
- RESOURCE-EFFICIENT ECONOMY: Aiming to make the most efficient use of available resources by exploiting the potential for resource-efficient use and optimisation of technological processes.
- AGRICULTURE, FOOD INDUSTRY: Encourage the widespread dissemination of innovative solutions and innovative agricultural technologies to move towards a sustainable agriculture and bio-based economy.
- CREATIVE INDUSTRY: Increase the leverage of the creative and cultural sectors to stimulate innovation in Hungary.
- TRAINING, EDUCATION: strengthen the skills and competences needed to implement R&D developments.
- INNOVATION IN THE PUBLIC SECTOR AND UNIVERSITIES: Strengthen innovation capacities in public administrations.

Baranya County offers opportunities for supporting R&D and collaborative projects (not directly to light weighting) between industry and academia through:

- National Research Development and Innovation Office tenders
- Regional Innovation Platform

National business development tenders:

- Economic Development and Innovation Operational Program
- Tenders supporting the strengthening and expansion of employment
- Tenders of the National Employment Service
- Tenders of the National Employment Public Benefit Nonprofit Limited Liability Company

Tenders at the regional level:

- Tenders from employment centers: to support employment
- Regional development programs: Hungarian Village Program - regional development programs

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Currently, there are no specific instruments/tools addressed for lightweight technologies at national level nor at the region and furthermore in Hungary doesn't exist policies directly related to lightweight/advanced materials.

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9. Cech Republic – Moravian Silesian Region

The Moravian-Silesian Region is a dynamically developing region on the east part of the Czech Republic. It is the first region in the country to have decided to involve not only dozens of experts in the planning process, but also representatives of municipalities, major companies, organizations and non-profits, but the region's inhabitants.
The specific feature of our region is its **diversity** which is reflected in its Smart Specialization Strategy. The Moravian-Silesian Region is **evolving from a region of heavy industry into an important technology center**, taking concrete steps in the field of the environment, developing healthcare and social care, strengthening communities, and connecting generations.

The architecture of the **transformation plan is designed** in the form of thematically oriented "programs". In designing these programs, based on regional priorities in strategic documents of the region, the main effort has been to be consistent with the themes that will be eligible for funding from the Mechanism for Equitable Transition Mechanism.
The Transformation Plan is composed of 8 thematic focused programs, which are interlinked, partly naturally overlap, complement and create synergies. The proposed programs are aligned with

- Development Strategy of the Moravian-Silesian Region 2019-2027
- the RIS3 MSK Strategy 2021-2027 and
- the pillars of the Mechanism for Equity Transformation.

The programs also list complementary activities of other OPs and the types of operations planned. The individual programs are supplemented by a summary table of strategic projects and other types of operations that these programs implement. As input to the preparation of the proposal Transformation Plan, the following were used as inputs documents:

- Development Strategy of the Moravian-Silesian Region 2019-2027
- Strategic Framework RE:START
- Smart Region Development Strategy for the Smart Region of the Moravian-Silesian Region 2017-2023
- Regional Innovation Strategy of the Moravian-Silesian Region
- collection of intentions and absorption survey of capacity implemented by the Moravian-Silesian Region for the needs of the Fund for Fair Transformation and other relevant documents

EU COHESION POLICY 2021-2027
In the programming period 2021-2027 for the Czech Republic from the European Structural and investment funds are allocating an amount of approximately **EUR 214 billion** through 9 thematic national operational programs:

- **OP Technology and Applications for Competitiveness (OP TAK)**
- **Integrated Regional Operational Integrated Regional Operational Program (IROP)**
- OP Jan Amos Komenský (OP JAK)
- OP Employment+ (OP Z+)
- **OP Environment (OP Environment)**
- OP Transport (OP D)
- OP Fisheries (OP R)
- OP Technical Assistance (OP TA)
- **OP Fair Transformation (OP ST)**

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as well as 5 cross-border cooperation programs Interreg VI-A:

- Czech Republic - Poland
- Czech Republic - Free State of Saxony
- Czech Republic - Free State of Bavaria
- Czech Republic - Austria
- Czech Republic - Slovak Republic

Total allocation for policy priorities Cohesion priorities for the period 2021-2027 is set under 5 main objectives:

- Smarter Europe
- A greener, carbon-free Europe
- A more connected Europe
- A more social Europe
- A Europe closer to citizens

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10. France – Auvergne-Rhône-Alpes and Nouvelle-Aquitaine

In Auvergne-Rhône-Alpes, the S3 policy is implemented through SRDEII, which has four strategic objectives:

- **Strengthen industrial and technological sovereignty and know-how:**

The Region confirms its desire to strengthen the development of key regional sectors with a view to preserving industrial and technological sovereignty, while mobilizing the levers of transitions, mainly digitalization and decarbonization, which are essential for maintaining the competitiveness of companies in a context of necessary reduction of their environmental impact.
In order to promote projects for the relocation and development of strategic activities, particular attention must be paid to mobilizing the skills that will enable companies to develop, especially internationally.

- **Supporting the development of an innovative regional ecosystem:**

More than ever, innovation is a key lever for the development of the regional economy. In order to guarantee a strong and differentiating positioning of the regional territory internationally, the Region wishes to consolidate its assets by specifically supporting four sectors of excellence, emblematic given the concentration of actors and successes in the fields of innovation, training and economy. Through their impact on other key industrial sectors, they contribute fully to establishing the industrial sovereignty of our region and reducing the environmental impact of our industry.
Thus, the Region will mobilize all actors around these sectors to widely disseminate innovation for the benefit of all regional industry.

- **Strengthen the attractiveness and a balanced development of the territory:**

As the 2nd largest host region for international projects in France, the Auvergne-Rhône-Alpes Region wants to maintain the dynamic economic attractiveness of the territory that is at work. It will rely in particular on an ambitious tourism policy by supporting structuring projects and accompanying the essential transitions in the regional tourism economy.
The quality of the region's living environment and natural heritage, and the digital and transport infrastructure on offer, are also key factors of attractiveness to which the Region will be attentive.
Given the specific challenges in this area, specific work on industrial land is underway since the vote on the Strategic Relocation Plan. In addition, the Region, which is concerned about maintaining a balance, will continue its action in favour of the local economy and crafts, the social and solidarity economy and business creation in the territories.

- **Deploy a comprehensive, simplified, personalized and visible business support offer:**

The regional economic policy will focus on meeting the needs of businesses in the most appropriate and simple way possible, giving priority to the search for efficiency in its implementation methods.
Thus, the financial engineering policy will be adjusted to cover the challenges of industrial and technological sovereignty in the region and improve its readability.
As it did during the health crisis, the Region wishes to rely on a strong partnership with territories to implement, in complementarity with them, the orientations in terms of economic development, tourism and agricultural policy.

The Auvergne-Rhône-Alpes Region intends to prioritize the development of the following key sectors:

- ENERGY: including hydrogen, nuclear, renewable energy, electric batteries including their re-cycling;

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- MOBILITY: including automotive, industrial vehicles, guided air transport, rail, active mobility, waterways, automated mobility, autonomous shuttles, electric vehicles, systemic approach to tomorrow's mobility solutions;
- AERONAUTICS: including advanced embedded systems, innovative materials and processes, maintenance solutions;
- BUILDING: including high-performance buildings, public works, road/energy infrastructures, lighting, new materials;
- DIGITAL and ELECTRONICS;
- HEALTH;
- CHEMISTRY: including biofuels, batteries, advanced/high performance materials, materials recycling;
- AGRICULTURE AGRO-FOOD FORESTRY;
- SPORT MONTAIN TOURISM;
- MECANIC METALLURGIE MACHINES ROBOTIC;
- PLASTURGY;
- LUXURY;
- TEXTILE;

The SRDEII of the Nouvelle Aquitaine Region is based on three main priorities:

- accelerating transitions for economic competitiveness and employment,
- strengthening our sovereignty through responsible innovation,
- placing people and the balance of our territories at the heart of development.

These 3 priorities will be implemented according to the guiding principles that will guide the interventions under the SRDEII:

- a strong focus on the development and relocation of industrial activities,
- innovation as a key lever for responding to transitions,
- strong support for the everyday economy and employment,
- actions and interventions for the benefit of all companies, whatever their status, size and field of activity, and for the benefit of all territories,
- territorialization and cooperation between all the players in the ecosystem to serve the performance of the SRDEII.

Within these objectives, the "France 2030 " program has been created. It’s a 54 billion plan, including 34 billion euros in new funding. These funds will be invested so that companies, universities and research organizations in France can successfully make the transition in strategic sectors. Designed in consultation with economic, academic, local and European players, the plan provides the means to meet the ecological, demographic, economic, industrial and social challenges of a constantly changing world.

In this part, 0,5 billion will be dedicated in the France 2030 by region declined in four parts:

- Transforming SMEs through innovation: support for the design of innovations, in the feasibility study or development phase.
- Improving and transforming industries: support for the structuring of key regional industries by financing shared investment and R&D expenses.

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- Collaborative R&D projects (I-Demo Regionalized): support for collaborative research and development projects conducted by a consortium of at least two industrial or service partners, including one SME or ETI and one research partner, with disseminating and integrating effects within a sector.
- Innovative training: support for the engineering of partnership projects in professional training and innovative support services.

The calls to participate will be open during the year until the end of 2025.

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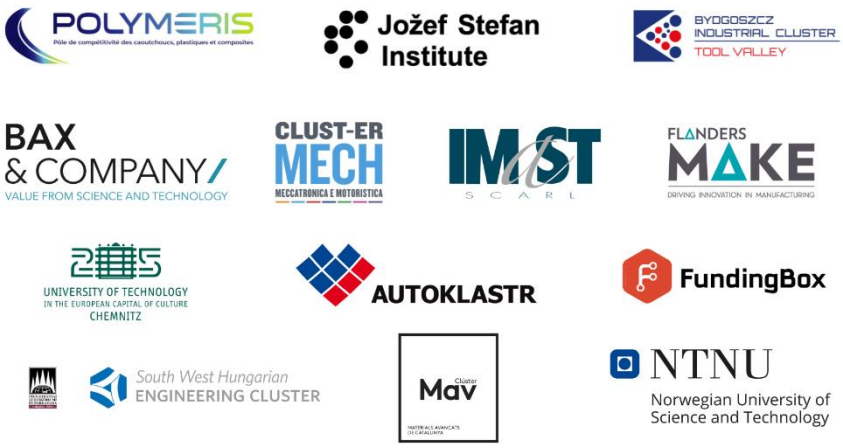

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