Industrial Vision Statement

Σ advanced manufacturing

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1 Executive summary

This Industrial Vision Statement establishes the basis for SMART, a new Eureka Cluster in Advanced Manufacturing. It describes the rationale and vision, the strategy and the implementation outline as prepared by the industry-driven team, made up of Cluster participants in close cooperation with national agencies dealing with research and innovation in the field of Advanced Manufacturing. The mission of SMART is to boost competitiveness, growth and attractiveness of the European manufacturing industries through the promotion of R&D&I in an open community of large industries, SMEs, RTOs, academia and user organizations.

Manufacturing is a vital sector in Europe, whose role is increasingly seen as fundamental towards European recovery and sustainable growth. It is an enabler for the current shift towards a 'Competitive Sustainable Globalization', addressing major Socio-Economic and Environmental challenges of our times. Advanced manufacturing is strongly addressed in most political agendas, not only in Europe, but all over the world. In fact, advanced manufacturing is one of the six Key Enabling Technologies (KET) defined within the strategy Europe-2020, in order to lead European society towards a higher industrial competitiveness, sustainable growth and job creation.

There are a number of initiatives running all over Europe dealing with Research, Development and Innovation in Advanced manufacturing. Within this context, the new SMART Cluster will enrich the Advanced Manufacturing ecosystem providing complementary tools for the development of industry-driven, close-to-market research and innovation projects, in a flexible and adaptable way, while at the same time it is able to permanently adapt to the rapid changing market needs and the dynamic strategic movements that European companies must address to remain competitive and stay at the cutting edge of technological development.

SMART has identified 6 Research and Innovation domains, which will lead the implementation in a specific way according to the particular needs and priorities of the different application sectors. The 6 Research and Innovation domains form the backbone of the Cluster technology roadmap. These 6 domains are in line with those of the Factories of the Future 2020: research roadmap¹, which will facilitate the complementarity and coordination with other European initiatives.

The implementation strategy of the Cluster will be based on the following premises:

- **Close-to-market** Research and Development projects.
- **Complementarity** and coordination with other European initiatives, at different levels.
- **Maximum inclusivity** incorporating all actors that form the European Manufacturing ecosystem: Industry, Academia and Research and Technology Organizations.
- **SME involvement** and engagement, taking into account the importance of SMEs in Manufacturing in Europe

¹ Factories of the Future, Multi-annual Roadmap for the contractual PPP under Horizon 2020. ISBN 978-92-79-31238-0



- **Open and living roadmap**, to adapt it to fast changing technologies.
- **Best in class evaluation and management** methodologies, to ensure that transparency, ethics, liability, conflict of interests and confidentiality rules are adequately addressed.
- Active role in promoting the advanced manufacturing vision and agenda and in the preparation of ambitious, well-resourced projects formed by well-balanced consortia.

Building on the experience of previous Eureka Clusters and other Public Private Partnerships, SMART will implement best practices all over the Cluster management, with a fresh and transparent approach. Accordingly, SMART governance structure will be based on:

- A **General Assembly** of Members of the "SMART EUREKA Cluster International Association" as the supreme body.
- A **Cluster Board**, responsible for the Cluster strategy, Cluster Office and relationships with National Funding Agencies.
- A **Cluster Office** for day to day operation of the Cluster
- A **Public Authorities Board** to ensure the coordination and alignment of the Cluster with the priorities and strategies of the National Public Authorities.
- A **Technical Committee** to deal with the evaluation and other technical aspects of projects and technologies.
- Ad-hoc created working groups to assess the Board. For example: An SME engagement committee and potential national nodes, to promote the participation of national industry in the cluster.

Finally, in order to monitor the impact of the Cluster and the performance of the projects, several Key performance indicators will be established and monitored, ensuring that the projects run according to specifications and that the Cluster has the expected impact on the European manufacturing industry.



2 Rationale and Vision

Manufacturing is a vital sector, whose role is increasingly seen as fundamental towards European recovery and sustainable growth. It is a relevant Key Enabling Technology for the current shift towards a 'Competitive Sustainable Globalization', addressing major Socio-Economic and Environmental challenges of our times.

Manufacturing is the most important source of economic development and growth and its economic importance goes far beyond its contribution to GDP. Around 1 in 10 (9.8 %) of all enterprises, in the EU-27's non-financial business economy, were classified as manufacturing in 2010, a total of 2.1 million enterprises. Manufacturing accounts for 80% of the total EU exports and the EU in 2012 had a trade surplus of 365 billion € in manufactured products. The manufacturing sector employed 30 million **people** in 2012 and generated 1.760 billion € of value added. Of these two indicators, manufacturing was the second largest of the NACE sections within the EU-27's non-financial business ("real") economy in terms of its contribution to employment (22.6 %) and the largest contributor to non-financial business economy added value, accounting for more than one quarter of the total (26.8 %). Additionally, there are many peripheral services dependants from manufacturing which trigger additional occupation. Moreover, the manufacturing industry accounts for 80 % of private Research & Development expenditure and European industry is a world leader in several manufacturing sectors, e.g. mechanical engineering, with a 37 % global market share.

In the current economic and social worldwide context, European manufacturing companies are confronted with their competitors in developed as well as emerging and developing economies. **Manufacturing enterprises must deal with** increasing globalization and cost pressures while achieving at the same time high quality, short time-to-market, more energy and resource efficiency, higher manufacturing flexibility and product enhancement and customization. Beside this, manufacturing is required to increasingly take a **human centric approach** in which the person must be considered as a fundamental element at all levels whose knowledge and skills must continuously be updated. Moreover, manufacturing is required to be not only **competitive** but also **sustainable** from an environmental, economic and social point of view. These systems must evolve in parallel with markets and enabling technologies, using technology as a competitive lever to achieve these goals.

The necessity to achieve substantial transformations of European manufacturing ecosystems to overcome the analysed trends, e.g., in GDP share, employment and applications, requires coordinated research, innovation and diffusion efforts deploying key technologies and enablers. The most urgent management challenge of our time is to combine innovation and market needs into one unified system. EU is a major producer of knowledge in advanced manufacturing. Thus, SMART shall attend a strong need for exploiting research outputs and enabling technologies to reach the market faster and successfully.

Currently, the manufacturing industry is characterized by a large number of actors, mostly SMEs which are to a large extent uncoordinated; these SMEs find difficulties in getting financial resources in order to improve their product development and manufacturing systems. Consequently, SMEs are struggling in bringing their developments to the market in an efficient way.

SMART



SMART is aimed at promoting **close-to-market innovative projects**, led by **industry** and aiming at levelling the European industry in terms of innovative products, processes and services.

Mission:

SMART mission is to boost the competitiveness, growth and attractiveness of the European discrete manufacturing industries through the promotion of R&D&I in an open community of large industries, SMEs, RTOs, academia and user organizations.

Vision:

SMART vision is to become the preferred Cluster for international close-to-market R&D Advanced Manufacturing projects in Aeronautics, Automotive, Railways, Capital Goods, Consumer Goods and other discrete manufacturing sectors.

We foresee a Europe that bases its industrial strength on cost-efficient, secure, sustainable business models with innovative manufacturing processes paving the way for solutions to future societal challenges (i.e. energy and raw material consumption, environmental footprint, circular economy, aged society, customization) gathered under the Europe 2020 objectives.

This vision requires the development of a systemic link between the optimal use of innovative manufacturing technologies with a new generation of skilled people entering industry, universities and research. This development will build on the current strengths of the EU discrete manufacturing sector with its leading capabilities and technologies in simulation, modelling, automation, processing and servitizing.



3 Competitive and technological challenges

SMART is focused on core product manufacturing, advanced services and innovative manufacturing processes of both discrete part and batch manufacturing industries.

Although open to any manufacturing sector, priority application sectors targeted by SMART include Aerospace, Automotive, Railway, Capital goods, and Consumer goods sectors.

- Aerospace sector: The European aerospace industry is a world leader in the manufacturing of civil aircrafts, helicopters, drones, aero-engines and other systems and equipment. This industry provides more than 500,000 jobs and generated a turnover of close to 140 billion € in 2013, being one of the EU's key high-tech sectors on the global market. Main challenges of the aerospace sector in advanced manufacturing include: integrated design and manufacturing development processes, composite and metal material processing, simulation and automation, digital transformation, monitoring and control, flexible manufacturing and assembly, and supply chain integration.
- Automotive sector: The European Union is among the world's biggest producers of motor vehicles; this industry accounts for 4% of the EU's GDP and it represents the largest private investor in R&D. Manufacturing related to the automotive industry employs 3 million jobs in the EU. The automotive sector landscape is rapidly changing, and must address the following global challenges: higher market and cost pressure, rise of product complexity by new mobility patterns and connectivity, and increasingly restrictive emissions and fuel-consumption requirements. In terms of manufacturing, this implies developing systems capable of processing new advanced materials, as well as walking the path towards flexible, digital and sustainable production.
- Railway sector: The rail supply industry is a flagship of the European manufacturing industry, employing 400,000 people, accounting for nearly half of the world market for rail products, with a total turnover of 47 billion €, and investing 2.7% of its annual turnover in R&D Programs. The manufacturing of rolling stock, namely trains and locomotives, represents the largest part of the turnover. The main challenges of the railway sector in the field of advanced manufacturing are in line with the objective of achieving intelligent, efficient and sustainable transport, and they focus on 5 areas: integration of modular systems, interoperability of equipment, efficiency in the use of resources, processing of lighter materials and use of ICTs and electronics to add intelligence to the processes
- Capital goods sector: This sector comprises the manufacturing of equipment enabling industry to produce their final consumer goods and services. This sector includes the manufacturing of machine tools, textile machinery, heavy electrical equipment, earthmoving and mining machinery, plastic machinery, process plant equipment and their parts and components. The Capital Goods sector faces 3 major challenges with respect to manufacturing: reduce the lead time from design to delivery with higher requirements for safety, sustainability and zero defects, produce sustainably green manufacturing systems and ensure the connectivity of the machines to form highly complex cyber-physical manufacturing systems.

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• Consumer goods sector: The consumer goods production in Europe represents 7.5% of the total manufacturing industry, with a total turnover of 500 billion €, 5 million jobs and more than 500,000 companies involved, largely SMEs. The challenges of the consumer goods sector related to advanced manufacturing technologies focus on the following points: high rate production of customised products, incorporation of intelligence into the product chain by means of information management, implementation of user-guided creativity and innovation, integration of new materials and nano-intelligence, and green production chains for sustainable products.

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4 Cluster Scope

SMART is a bottom-up, industry-driven initiative that responds to the needs and challenges of the European manufacturing industry. However, since one of its key goals is to help industry access public funding to reduce risks in innovative projects, the Cluster will promote projects aligned with the priorities set by Public Authorities of the participating countries. Priority application sectors targeted by SMART include Aeronautics & Aerospace, Automotive, Railway, Capital goods, and Consumer goods sectors. Maintaining the right balance between the bottom-up approach and these priority application sectors is achieved through regular interaction with the Public Authorities of these countries

SMART is focused on core product manufacturing, advanced services and innovative manufacturing processes of both discrete part and batch manufacturing industries.

In accordance to the rationale, vision and challenges aforementioned in this document, the scope of SMART is centred on four areas: application sectors, research and innovation domains, R&D cooperation and high TRLs.

4.1 Application sectors

As explained earlier in this document, SMART will prioritize specific application sectors that are critical to European competitiveness:

- Aeronautics
- Automotive
- Railway
- Capital goods
- Consumer goods

These priority application sectors have been subjected to intensive analysis and have form the backbone of SMART Technology Roadmap. However, the cluster will consider projects in any manufacturing application sectors as long as they adhere to the Technology Roadmap. Application sector focus is subject to assessment and revision in planned review sessions with the participation of both industry and public authorities as the cluster evolves.



4.2 Research and Innovation domains

To build the SMART Technology Roadmap we have identified the **manufacturing challenges** faced by industries and the **enabling technologies** driving innovative solutions in manufacturing, resulting in the following six **Research and Innovation Domains**

- 1. Advanced Manufacturing Processes including innovative processing for either new and current materials or products.
- 2. Intelligent and Adaptive Manufacturing Systems including Innovative Manufacturing equipment relative to components and systems. Including mechatronics, control and monitoring systems.
- 3. Digital, Virtual and Efficient Companies including Factory design, data collection and management, operation and planning, from real time to long-term optimization approaches.
- 4. **Person-Machine Collaboration** including the enhancement of people's role in manufacturing
- 5. **Sustainable Manufacturing** including innovative processes and systems for sustainability in terms of energy and resource consumption and impact on the environment.
- 6. **Customer-based Manufacturing** including customers' involvement in the manufacturing value chain, from product and process design to manufacturing associated innovative services.

This is intended as an illustrative, non-exhaustive list of technology domains and the activities they cover. Indeed, the manufacturing industry will evolve based on many different factors (technology, economics, user acceptance, public policies...) and the respective timings of various evolutions cannot be predicted easily.

4.3 R&D cooperation

SMART will foster collaboration in the European Research Area, promoting transnational cooperation, augmenting the circulation and transfer of knowledge within the European Manufacturing ecosystems. The targeted combination of industrial companies, RTOs and Universities will push forward the innovation in manufacturing companies in Europe, by incorporating the latest technology advances and new ideas that arise creatively within the manufacturing ecosystem.

The Cluster will coordinate its vision and activities with the Public Authorities and the European Advanced Manufacturing research and development ecosystem as explained in chapter 11.



4.4 High TRL projects

SMART will focus on achieving strong proximity with end market needs and opportunities. Therefore, SMART projects will be close-to-market R&D projects i.e. with high TRLs (TRLs 5-8). It will support R&D projects at the junction between innovation, product development, and production, the critical zone where many technical solutions die and never reach the market.

1	2	3	4	5	6	7	8	9
Basic Principles Observed	Techno- logy Concept Formu- lated	Experi- mental Proof of Concept	Techno- logy Valida- tion In lab	Tech valid. In relevant envi- ronment	Demons- tration In relevant envi- ronment	Demons- tration In opera- tional envi- ronment	System com- plete and qualified	Success- ful mission opera- tions
Funda- mental research Source: Euro	Pillar 1: Te	chnological r	esearch).	Pillar SI adva	2: Product de	emonstration R1 nanufac	Σ Ω turing	Pillar 3: Competitive manufacturin

Figure: Technology Readiness Levels and SMART focus

SMART will provide enough flexibility to adapt to rapidly changing market needs, designing and implementing flexible Programs that will provide adequate support to the rapid evolution of the market and consequent strategic changes in companies' development plans.



5 Strategies

SMART proposes a series of strategies to become another successful EUREKA Cluster. First and foremost, SMART will focus on precompetitive high Technology Readiness Level research and development projects led by industrial partners. The Cluster's vision and Technology Roadmap will be aligned to complement existing European Programs (Horizon 2020 and forthcoming FP9) already dealing with manufacturing. In order to achieve critical mass, SMART will promote maximum inclusivity, with a special accent on involving SMEs into the projects. SMART will keep the Technological Roadmap as a living document in order to better respond to the evolution of the manufacturing ecosystem: markets, technologies, etc., and will be open to the participation of relevant partners.

5.1 Close-to-market R&D projects

SMART is focused on transnational close-to-market and precompetitive R&D projects with high Technology Readiness Levels. Projects will include proof of concept or demonstration activities in order to maximise technology transfer into the industry. The focus will be on projects that will not require additional public support to bring the results to the market.

5.2 Complementarity

SMART projects will complement the efforts of other European R&D instruments to build up the European advanced manufacturing capabilities. In the same EUREKA framework, it will be possible to find symbiosis with other clusters, such as ITEA3, PENTA, EUROGIA2020, Metallurgy Europe and EURIPIDES. SMART will complement EFFRA "Factories of the Future 2020" strategic research roadmap. It will also be possible to find interesting cooperation and complementarities with other instruments, such as MANUNET, the ERA-NET network devoted to manufacturing research and development projects.

5.3 Maximum inclusivity

The Cluster seeks to include a maximum number of European actors in manufacturing, including large companies, SMEs, Research Centres and Academia in order to create a critical mass. Technology based start-ups will also be welcomed into SMART projects since they provide a big push in technology-based market innovation. The involvement of new partners in SMART projects will be secured through networking activities and events organised in close cooperation with leading European regional competitiveness clusters and other national and European organisations. These organisations have already identified the most dynamic organisations in their geographic area. Specific actions will be taken to augment SME participation, since they have a significant role in the competitiveness and employment of the European manufacturing industry.



5.4 SME involvement

SMART will implement a major initiative to ensure that SMEs have the best possible opportunity to participate in SMART projects. Public and private bodies will be asked to help in identifying suitably qualified SMEs to apply for participation in SMART projects, potentially with a funding incentive to do so (e.g. specific budget for SMEs participation in the national budget to support the new Cluster). Several areas will be considered to boost SME participation:

• To understand that SMEs have different needs dependent on their size and development level and that these different needs must be taken into account at all levels in the funding Programs;

• To establish a two-way dialogue with SMEs across Europe to understand SME needs and provide appropriate information that will allow SME participation;

• To facilitate networking between SMEs and larger companies through an SME matching activity at local, national and European events;

• To provide mentoring and guidance to SMEs throughout the process in partnership with public and private bodies, such as the regional competence clusters;

• To actively initiate and develop cooperation involving SMEs by using dedicated tools and events available in the regional competence clusters.

5.5 Open and living EUREKA cluster

SMART will be a living entity, ready to update its Technology Roadmap according to industry needs and technology evolution. SMART will be open to all relevant participants throughout its lifetime. This includes companies who choose to "self-fund" project participation. The openness of SMART will be guaranteed by the following:

• All European organisations that participate in the manufacturing value chain will have the possibility to participate;

• Maximum flexibility will be granted in the project consortia definition, and in the execution of selected projects (inclusion of new partners, change requests justified by technical or market evolutions);

• The Cluster will offer opportunities to all types of participants, in particular to take a seat in its executive bodies, open to large and small companies as well as to RTOs;

• Communication processes will be put in place to make this openness widely visible; for example, by working with regional competitiveness clusters who are in ideal position to identify the dynamism of their ecosystems.



6 Objectives, Targets & Impacts

6.1 Objectives

The overall objective is to become the preferred instrument for international close-to-market R&D Advanced Manufacturing projects, to improve the present strong position of the European manufacturing industry, increasing its competitiveness and attractiveness in order to maintain or even increase the manufacturing activity and jobs.

The expected impact from a successful implementation of SMART will be extensive and cover several areas. The overarching target is to ensure that the number of European companies having leading positions in high priority manufacturing market segments will increase over the duration of the new Cluster and beyond, thereby positioning Europe for improved economic and societal development. The expected impact of the Cluster activities will consider, the following aspects:

- Economic aspects
- Social aspects
- Innovation/Technology
- Ecosystems
- Success stories

Additionally, connected objectives include:

• To understand, document and prioritise current and developing market (value chain) segments, thereby allowing appropriate, targeted activity to maintain and develop the position of European-based companies in prioritised sectors;

• To establish a community of manufacturing technology organizations across Europe, from different sectors that can be nurtured and supported through funding and mentoring, thereby enabling the opportunity for market leadership;

• To develop and implement agile best practice Cluster operation with project submission, evaluation and approval process currently in place in similar collaboration instruments.

6.2 Targets and impact

In order to achieve the broad objectives and impacts stated above, the cluster will develop and monitor a set of indicators to ensure it is developing correctly in terms of:

- Nº of projects: proposed and labelled
- R&D investment and public funding
- Participating countries: members and associated
- Participating Organisations: large companies, SMEs and research organisations
- Diversity of technologies and sectors

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The implementation of SMART will also spin off other positive effects:

- Increased visibility and position of European industry as a reference point in advanced manufacturing;
- Cross-sectorial fertilisation of advanced manufacturing ideas among the different manufacturing sectors and applications;
- Better understanding of emerging market opportunities in the manufacturing eco-system;
- Accelerated time to market technology development in key value chain segments;
- Cooperation between, manufacturing companies and technology organisations across Europe, increasing knowledge flow and exchange
- High potential of "spin-in" and "spin-off" activities between the participants in a consortium;
- Additional activity stimulated by the establishment of a "market place", sharing experience, best practices and project results, which will enhance the development of European technology and enable subsequent competitive exploitation.

6.3 Key Performance Indicators (KPIs)

Measuring and Monitoring of SMART is of major importance to demonstrate its performance and the impact on the European Manufacturing Industry.

SMART will define a concise and coherent package of specific, measurable, attractive, realistic and timely Key Performance Indicators (KPI's) to monitor the cluster performance itself and the impact of the Cluster activities on European industry competitiveness. These KPIs, following the EUREKA rules, will be used to support and facilitate the objectives and direction of SMART and to attract new interest from industry, experts, national funding agencies and other stakeholders.

Regarding SMART performance KPIs, they will ensure that project proposals are handled within the agreed cycle times, that projects are evaluated and approved according to the high-quality standards of the Cluster, that projects are completed according to the agreed goals, and that the Cluster performs as expected. These set of indicators will consider the participating organisations and countries, overall budget, etc. KPI will include indicators required for the Cluster Annual Reporting shall be included, which are:

- PO (Project Outlines)
- FPP (Full Project Proposals)
- Running Projects
- Finished Projects
- Withdrawn Projects
- Individual Cluster KPI's

Regarding the impact of SMART on the European industry, the ultimate goal of the Cluster, it will be based on assessment and benchmarks, using qualitative techniques (via surveys and interviews) to complement quantitative measures when necessary, to provide a richer a

SMART



meaningful analysis and insight. It will be checked annually in conjunction with a review of the Cluster achievements in the previous year. Impact KPIs to be considered:

- Economic aspects:
 - o Increase in revenue catalysed by innovation funding,
 - New markets accessed, etc.
 - o New Start-Ups
 - o New Supply Chain Partnerships
 - M&A IP or Company sale
 - Funding success rate at PO and FPP phases

• Social aspects:

- o Employment,
- o Education/new Skills
- o Gender distribution
- Contribution to societal challenges
- Age distribution in projects

• Innovation/Technology:

- New products, Services or Processes
- o Patents,
- Pilots and Demonstrators, etc.
- Manufacturing in participating countries
- Ecosystems:
 - Value chain participants
 - o Cross-border cooperation
 - o SME participation
- Success stories: to demonstrates the specific impact of particular projects, like reducing manufacturing costs, increasing productivity/quality/flexibility, reduction of defects and scraps, and so on.



7 Cluster Plan. Overall Cluster Architecture and Timing.

7.1 Cluster overall architecture

SMART plan will cover a period of seven years, which is a suitable timeframe to fully impact the Manufacturing European industry, based on the technologies and innovations developed within SMART.

Several reviews of the Cluster progress and overall direction will be performed, and periodic reports will be issued containing the status of the Cluster and Cluster projects. Additionally, a full mid-term assessment will be made in order to evaluate the Cluster direction and strategy, and also the results and progress achieved so far.

Optionally, according to the evolution of SMART's results and their impact on the European industry, the new Cluster may be extended beyond the seven-year period initially envisaged.

Periodic calls for project proposals will be launched. Additionally, to improve flexibility and adaptability to national support schemes, specific, high interest "unsolicited project proposals" may be accepted throughout the calendar year.

SMART will encourage to set up industry-driven, market-oriented, international research, development and innovation (R&D&I) projects. SMART will develop a promotion strategy based on: web information, mailing to community members, clustering events, etc. to foster and facilitate the preparation of project proposals.

Information on the Cluster working scheme will be transparently provided with clear communication channels to all public and private stakeholders. A SMART web page has been developed to aid in the communication and management of the Cluster and projects. Information provided on the website will contain, at least, project evaluation procedures and criteria, the implementation of ethics, liability, conflict of interest and confidentiality rules.

In order to maximize the opportunity for project success, the following process is foreseen:

- Facilitate networking to stimulate the creation of potential consortia
- Launching Flagship initiatives to provide focus and guidance
- Effective guidance to maximise the success rate for proposals. If appropriate, projects with a similar focus should be encouraged to cooperate/merge and to ensure the best return on investment;
- Mentoring for less experienced/under-resourced participants in preparing the proposals



7.2 Flagship initiatives

Enhanced visibility for specific topics, or for specific opportunities for both project proposers and public authorities, will be brought by defining large scale Flagship initiatives, which will promote project development within a specific scope in terms of technology, application sectors and/or geographic areas. The launching of such Flagship initiatives help to focus the attention of project proposers on topics that are priorities for a subset of national governments and where good complementarity between countries can be anticipated.

Flagship initiatives will be launched within SMART as appropriate, based on industry and public authorities' interest.

7.3 SMART projects: two step approach

SMART projects are defined and prepared by consortia, formed freely by industry, universities and research organisations (not limited to Member or organizations that participated actively in the Cluster's definition).

Project selection will be carried out in SMART, following the EUREKA Project Assessment Methodology (PAM) and proven evaluation processes. The project selection will consider criteria such as: 1) the quality and efficiency of the implementation: project quality and consortium quality, 2) the expected impact, market and commercialisation issues, 3) the excellence and innovation and R&D level.

The SMART project management will focus on overall process efficiency, focusing on low cycle time, streamlining every step until project completion, thereby minimising the time it takes to turn "project ideas" into "project goal achievement". High predictability of processes and feedback to project applicants will also be provided.

A two-step process is foreseen, featuring a Project Outline and a Full Project Proposal phase. Typically, project execution should start less than nine months after Project Outline submission.

In the first step, the project outline will be reviewed by the SMART mechanisms together with the national agencies, to ensure the projects fit with the SMART criteria and the national priorities and funding schemes. SMART will provide specific feedback and recommendations to project proposers to prepare a high quality Full Project Proposal.

In the second step, after successfully completing the first step, the full project proposal will be developed based on the feedback provided, either from the Expert Reviewers, Cluster Office or from the national funding agencies.



8 Governance

The governance of SMART will build on the experience of previous Clusters, so the proposed structure is based on the best practices that have proven effective in the past. Additionally, it will incorporate some fresh and transparent ideas regarding management, participation and financing.

The overall Governance will be based on the Framework Agreement signed by participating partners, and will consider the structure shown in the following figure:



SMART Overall Governance

8.1 Framework Agreement

A Framework Agreement has been established to regulate the relationship among stakeholders and the Cluster governance. This agreement will define the relationship among SMART stakeholders and the functions of each of the cluster bodies including the organisation and election of their members, the financing of the new Cluster activities through contributions from project participants, and the evaluation, labelling and review of projects.

The Framework Agreement has been initiated by the "Core Group" members and has been agreed and undersigned by all Cluster members. This Framework Agreement will also define the rules to allow new participants to enter the Cluster and also current participants to leave, having fulfilled their obligations.



The frame agreement, that includes the creation of a non-profit association, will regulate and ensure the openness, confidentiality and transparency of the Cluster operation.

8.2 General Assembly

The non-profit association created to run SMART has a General Assembly of SMART members, that has the broadest powers within the limits defined by law. In particular, will be in charge of validating the overall management of the association carried out by the Cluster Board and the election of its members.

8.3 Cluster Board

The Cluster Board is the executive body of the cluster organisation. A cluster board of high-level manufacturing ecosystem representatives is entrusted with the overall management of the new Cluster, being responsible for the strategy and coherence of the cluster initiative. The Board is industry driven, with Large Companies and SME holding the majority of voting rights. The board also includes RTOs and Academia to balance the presence of the relevant actors in the manufacturing ecosystem actors. The cluster board elects the board chairperson.

The Cluster Board will initiate and maintain very close and systematic relationships with the Public Authorities Board of the member countries. This provides a forum for information exchange about the strategies of the different countries and how they connect with the cluster activities.

The Cluster Board will be open to new members and will be periodically renovated by the General Assembly.

8.4 Technical Committee

The Cluster Board sets up a Technical Committee as an operational support group with selected experts from industry and the academic world to run, together with an external network of experts, the evaluation and monitoring progress of projects. Its technical strengths and integrity are the basis for recognition of the SMART quality label. SMART will conform to the current best practices within EUREKA, in particular openness, transparency and effective avoidance of conflicts of interests.

8.5 Other Working groups and Committees

The Cluster Board will set up ad-hoc working groups and committees to handle specifics issues relevant to the SMART community. The Cluster Board will set and supervise these committees and working groups with specific tasks and timing.



From the very beginning, an SME engagement Committee is foreseen, as explained in section 5.4. As the cluster progresses, new working groups and committees will be set up according to identified specific needs.

For example, considering the specific characteristics of national manufacturing industries and existing organisations, national nodes can be created when convenient. These national nodes will benefit from existing national structures to coordinate the participation of national industry in SMART Cluster. National nodes could have, among others, the following basic characteristics:

- Promote SMART at a national level;
- Coordinate the participation of national industry in SMART;
- Liaison with National Authorities for country specific needs and priorities;
- Propose Board Member candidates.

8.6 Public Authorities Board (PAB)

A Public Authorities Board (PAB) has been created, composed of representatives of the countries supporting the Cluster. For each country, the EUREKA Representatives and/or National Funding Bodies will nominate their representative.

The Public Authorities Board is responsible for informing the Cluster Board on the present and future national public priorities in Advanced Manufacturing and the national funding prospects. The Public Authorities Board shall also coordinate the funding of Cluster projects among themselves and inform the Cluster Office about the funding granted to each project. This implementation will include the periodic call process and monitoring progress in realizing the Cluster objectives.

The Public Authorities Board supports the Cluster in project generation, evaluation, funding and monitoring.

8.7 Cluster Office

A Cluster Office has been created to manage the day-to-day operations of the Cluster. This Office is located within AFM, the Spanish association of advanced manufacturing. It is a lean office, benefiting from existing AFM infrastructure and incorporate best practices and IT platforms from other organisations (Other EUREKA Clusters, EUREKA secretariat, etc.).

The Cluster Office assists the Board in the coordination, administration and organisation of the Cluster. It is a central contact point and a meeting place for the whole Cluster organisation. The Cluster Office is responsible for the promotion of SMART at a general level, the management of the Cluster calls for Projects, reporting to the Eureka Network and especially the Eureka Secretariat. It should gather all the information regarding public funding granted to SMART projects in close cooperation with the Public Authorities and make it available to the Eureka Network.

The Cluster Office operates under the supervision of the Cluster Board, which determines the services and missions and ensures its financial capacities to implement them. The operational



costs of the Office will be paid through fees from Board Members, Association Members and/or project participants.

8.8 Annual SMART Forum

The new SMART Cluster will organise an annual Forum, together with the General Assembly of SMART Members, where project progress will be demonstrated and where strategies and policies will be shared with the whole pan-European ecosystem of public and private stakeholders in advanced manufacturing.

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9 Synergies with the ERA

Advanced manufacturing is strongly addressed in all political agendas as well as in the regional development Programs all over Europe. In fact, advanced manufacturing is one of the six Key Enabling Technologies (KET) defined within the strategy Europe-2020, outlined by the European Commission (EC) in order to lead European society towards a higher industrial competitiveness, sustainable growth and job creation.



At this specific moment, the European R&D landscape has become extremely complex and dynamic. Multi-KET approaches (combination of several KETs) are increasingly common in innovative products, processes and services. New public-private partnerships are shaping Horizon-2020, the 8th European Research & Innovation Framework, promoted jointly by DG Research y DG Connect.

The new strategy for digitisation of EU industry (published by Commissioner Oettinger in April 2016) as well as the different national initiatives to boost the industrial revolution, are putting together traditional manufacturing with ICT capabilities and pave the way towards the smart industry paradigm.



SMART





Within Horizon-2020 and the framework of DG Research/DG Connect, the different Public-Private Partnerships (PPP, JTI) as well as ETPs (European Technology Platforms) are clearly addressing advanced manufacturing:

- "Factories of the Future" (FoF), coordinated by private association EFFRA (European FoF Research Association), together with its related ETP Manufuture and its national mirror platforms (such as the Spanish Manu-KET), as well Manufuture sub-platforms (AM, AgriTech, Joining, Clean Production, Foot Wear, Micro-Nano Manufacturing, Tooling, Zerodefects Manufacturing)
- Other Public-Private Partnerships (PPP) such as Robotics, Photonics, Bigdata, Spire as well as Joint Undertakings (JU) such as CleanSky, Shift2Rail or ECSEL (especially within ARTEMIS).



PPPs in Horizon 2020

Joint Technology Initiatives	Contractual PPPs				
Innovative Medicines (IMI)	Factory of the Future (FoF)				
Clean Sky	• Energy-efficient Buildings (EeB)				
Single European Sky ATM	Green Vehicles (EGVI)				
Research (SESAR)	Future internet (5G)				
 Fuel Cells and Hydrogen (FCH) 	New: Sustainable Process Industry (SPIRE)				
Electronic Components and Systems (ECSEL - old					
ARTEMIS + ENIAC)	Robotics				
New:	Photonics				
Bio-based Industries (BBI)	High Performance Computing				
Shift2Rail	📦 Big Data				

- AIOTI (Alliance for Internet of Things Innovation) and its "Smart manufacturing" working group.
- ETPs and platforms related to industrial sectors targeted by Manufacturing, such as Railways (ERRAC), Aeronautics (ACARE), Automotive (EARPA, ERTICO, ERTRAC), WindPower (TPWIND) or Nuclear (SNETP)
- ETPs and platforms related to advanced materials technologies for manufacturing: EuMaT (advanced engineering materials), its national mirror platforms (like the Spanish MATERPLAT), SMR (minerals), ESTEP (steel), EMIRI (energy materials) or their joint collaboration in specific projects such as <u>A4M</u> and <u>MATCH</u>.



Additionally, advanced manufacturing has clear interactions with several initiatives promoted by other DGs:

• DG Education: new proposal for KIC on Added-Value Manufacturing (KIC-AVM), which after a first public contest declared null in 2016, has been launched again in 2017. Likewise, the runnings KICs Innoenergy, Digital, RawMatters are also pretty related to the manufacturing landscape.



- DG Enterprise: task force for advanced manufacturing on clean production
- DG Regio: nanotechnology and Advanced Manufacturing working group within ERRIN (European Regions Research and Innovation Network). Apart from that, advanced manufacturing has become one of the pillars of the pilot initiatives within Vanguard and the respective RIS3 national strategies. In fact, one of the pilot initiatives defined within Vanguard is focused on Efficient and Sustainable Manufacturing (ESM pilot)
- ERANET framework also addresses manufacturing under its MANUNET, strongly oriented towards manufacturing SMEs.



To sum-up, SMART will interact and complement with all the initiatives mentioned above, being aware that it will focus on industry-driven, high TRLs (Technology Readiness Level) and close-to-market scenarios.

Among all these initiatives, very strong cooperation with EFFRA (European Factories of the Future Research Association) and the future, if finally created, KIC on Added Value Manufacturing and MANUNET will be developed in order to coordinate efforts and strategies, since the SMART Cluster, EFFRA, the KIC and MANUNET share the very same global goal and focus on the same manufacturing areas, with a complementary approach. There are several collaboration areas that will be addressed, among them:

- Complementary strategies of the calls for projects: thematic areas and call dates;
- Joint Info-days and brokerage events.
- Cross participation in advisory committees of different initiatives, to foster coordination and mutual understanding

The SMART EUREKA Cluster on Advanced Manufacturing is well aware of the Research ecosystem and initiatives running in Europe in the field of Advanced Manufacturing and related areas. SMART will perfectly fit within this ecosystem, being well connected with the rest of the related initiatives, and provide the industry with an additional, complementary mechanism that will focus on providing support and funding for industry-driven, close-to-market, international R&D projects in a very flexible, bottom-up way, getting adapted to the rapid changing needs of the European manufacturing industry.

SMART