Pilot Progress Report

Pilot's name: **ESM – Efficient and Sustainable Manufacturing**

1. Introduction

Manufacturing is the engine of multi-sectorial innovation, of social, environmental and economic progress of economies. Current weaknesses of European Manufacturing are labour cost, energy dependence, limited capacity to transform knowledge into industrial practices, fragmentation of available research results and the difficult access to them experienced by companies, especially SMEs.

External threats are price of energy, price of raw materials and the critical access to raw materials. On the other hand, European manufacturing can count on a long manufacturing tradition which generated a diffused know-how, an extensive production of knowledge in advanced manufacturing through outstanding research, a global leadership in the machinery and automation, an advanced environmental culture and complementary capabilities of European Regions. Levering on these strengths, the Vanguard ESM Pilot initiative addresses the development of a European network of pilot plants in the area of manufacturing efficiency and sustainability. Such pilot plants will contribute to face the above mentioned weaknesses and threats in order to catch the opportunities offered by the new middle class and the emerging markets for societal challenges.

The ESM initiative addresses at the same time and in a synergic way the two domains of Manufacturing efficiency, with the goal of increasing throughput, quality and reducing costs, and environmental and social sustainability of Manufacturing, with the goal of reducing energy, materials consumption, emissions and increasing the inclusion of humans in the factories. Targeted enabling technologies are mechatronics; ICT and other technologies/processes for high-efficiency; modeling for the optimization of production systems performance; technologies to increase employees efficiency; technologies for new materials increasing systems efficiency; technologies for optimization of energy and materials consumption; technologies for re-manufacturing and recycling; modeling and simulation techniques for sustainability; mechatronics and digital factory for human-centered manufacturing; strategies and management for sustainable manufacturing.

2. Common vision and objectives

The vision of the future ESM Pilot Plants is below summarized:

- Their **TRL** should be **higher than 7**.
- They should be **clearly focused on applicative domains in terms of industry and technology in order to satisfy industrial and societal needs**. "Efficient and Sustainable Manufacturing" is a too-wide concept for a pilot plant.
- They should address **ambitious industrial applications**: the pilot plants will have to enable at industrial scale **applications that are currently not diffused or existing**.
- They should be **motivated and supported by the demand of the industry**.
- They should be able to **absorb newest technologies**.

- They should be developed according to a "**modular approach**" where the different elements are linked in a system. Different technologies and pilot should be connected and combined.
- They should be **open to companies** and should constitute a **neutral environment in which companies can setup and test new products, processes and technologies** before implementing them for own commercial purpose.
- They should constitute a potential **playground for cross-sectorial collaboration**.
- Companies, also SMEs, should **find in the pilot plants the ingredients they usually lack for implementing innovation**: highly innovative testing and process development facilities, but also multi-disciplinary competences and know how. In this sense, pilot plants should **be more than facilities**. They should create an innovative ecosystem for the valorisation of research and improve industrial competitiveness. Pilot plants should act as the framework where new value chains are created.
- They should **not be a "one time experiment"**, but they should **operate in the medium-long term** in order to generate several results over time for a multitude of different customers.
- The **ownership** up to a single company (or to a restricted group of companies) should be considered taking into account the need to guarantee openness and access rights to a wide number of users.
- They should involve a **significant number of companies as founders and users** in order to have wide industrial impacts.
- They should be **grounded on the already available knowledge, including research and innovation infrastructure**, which is currently not widely accessible.
- They should find a **clear and complementary identity with respect to the other pilot initiatives** that are currently on-going in Vanguard, in Spire and in other relevant European initiatives.

3. Approach / methodology

The methodology of the Vanguard ESM Pilot Initiative consists in three main phases:

1. <u>ESM Pilots concepts definition</u>:
   Under the main umbrella of "Efficient and Sustainable Manufacturing", focused concepts of pilot plants are defined with the characteristics described above.
2. <u>Business planning</u>:
   A business plan is elaborated for pilot concepts that are significant with respect to ESM and that fulfil the set strategic requirements. The business plan indicates the expected benefits and impacts of the pilot concepts, as well as their implementation steps.
3. <u>Pilots funding and implementation</u>:
   Based on business plans, funds will be mobilised and pilot plants will be realized.

The described process is selective. Only the most promising concepts proposed by the Regions will be followed by the business plan and only promising business plans will undergo implementation.

The Vanguard ESM organization will be the generator of pilot ideas and will act as a coach/facilitator in order to support the promising pilots to reach the market. In every phase of the process, Vanguard ESM will coordinate the activities under the overall pilot framework and will offer Regions services based on structured methods and tools for facilitating the cooperation and to support the production of high-quality outputs.

4. Main activities

Since its start-up, ESM pilot has defined a structured methodology and governance for the definition and selection of projects for the set-up of a European network of pilot plants. The methodology consists in a mixed bottom-up and top-down process in which regional actors are called to express their priorities in terms of pilot plants in a structured format which guarantees alignment with regional smart specialization and the involvement of companies. Regional proposals are clustered considering their synergies and complementarities and inter-regional teams of European experts in charge of collaboratively develop pilot plants projects with a European added value are established. The methodology was applied to launch the first set of ESM pilot projects in 2014-2015. A steering Committee composed of members of Vanguard Regions was established to coordinate all the necessary activities.

5. Results achieved & expected impact

Out of about sixty regional proposals, five pilot plants projects emerged from in the following areas: de- and re-manufacturing; smart and adaptive manufacturing; manufacturing of smart components and materials; digital and virtual factory; energy and environmental efficiency in manufacturing. Some projects are quite advanced in terms of conceptual definition and business planning, while some others are in the exploratory phase and are currently reinforcing interregional industrial participation.

6. Key conclusions and necessary actions

The ESM pilot generated a committed community of Regions, Clusters, RTOs and industrial companies engaged in the design and implementation of projects finalized to the realization of a European network of pilot plants supporting efficient and sustainable manufacturing. Current projects are the result of the proactive activity of a group of Regions that have set the ground for the implementation of pilot plants. Future necessary actions consist in the reinforcement of industrial interregional participation to the projects through the identification of regional focuses based on smart specialization strategies. For those projects that are at more advanced definition level, resources should be identified to move towards the implementation phase in order to keep the momentum.

7. Next steps

Based on the level of advancement of projects, next steps in the ESM pilot will consist in the improvement of the conceptual definition of explorative projects, in the reinforcement of industrial participation of projects that lack of significant European dimension and in the mobilization of resources for projects that are in a more advanced definition phase.
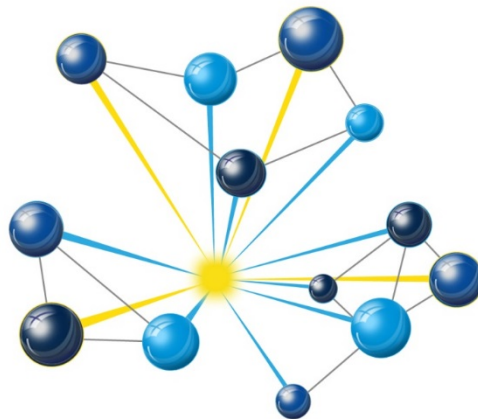
Furthermore, Regions will be involved to identify new eventual thematic areas for pilot plants that are not currently covered within the running projects.

Appendix: demo cases concept notes

- De- and Re-Manufacturing
- Smart and Adaptive Manufacturing
- Energy and Environmental Efficiency in Manufacturing
- Manufacturing of Smart Materials and Components
- Digital and Virtual Manufacturing

Pilot Initiative

"ESM – Efficient and Sustainable Manufacturing"

Coordinating Regions: Lombardy and Catalonia

ACTION PLAN 2017

Index

1. Long term goal of ESM pilot

In the frame of the initiative "Vanguard – New Growth Through Smart Specialization", the Regions Lombardy and Catalonia proposed the "ESM – Efficient and Sustainable Manufacturing" pilot project with the intent of conceiving and developing a European networked infrastructure of pilot plants in key-areas of manufacturing.

By leveraging on available research results, ESM European pilot plants will support companies' innovation in breakthrough technologies and applications that require manufacturing efficiency and sustainability. This approach will boost the competitiveness of European value chains exploiting synergies and complementarities of different regional specializations.

At the moment, the areas that emerged as of high interest in the ESM pilot are:

- De- and remanufacturing (Circular Economy)
- Adaptive and intelligent assembly and manufacturing systems
- Advanced Sustainable Surface and Coating Manufacturing Technologies on Polymers
- Digital and Virtual Factory integrating planning and simulation into operative environments
- Energy and Environmentally-efficient Manufacturing Processes

The vision of the future ESM Pilot Plants is below summarized:

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- Companies, also SMEs, should **find in the pilot plants the ingredients they usually lack for implementing innovation**: highly innovative testing and process development facilities, but also multi-disciplinary competences and know how. In this sense, pilot plants should **be more than facilities**. They should create an innovative ecosystem for the valorisation of research and improve industrial competitiveness. Pilot plants should act as the framework where new value chains are created.
- They should **not be a "one time experiment"**, but they should **operate in the medium-long term** in order to generate several results over time for a multitude of different customers.

☐ The **ownership** up to a single company (or to a restricted group of companies) should be considered taking into account the need to guarantee openness and access rights to a wide number of users, especially SMEs.

☐ They should mobilise a **significant number of companies as founders and users** in order to have wide industrial impacts.

☐ They should be **grounded on the already available knowledge, including research and innovation infrastructure** which is not currently widely accessible.

☐ They should find a **clear and complementary identity with respect to the other pilot initiatives** that are on-going in Vanguard, in Spire and in other relevant European initiatives.

The Vanguard EMS Pilot acts as a platform to generate challenging ideas of pilot projects aggregating the interest of multiple Regions and accompanying Regions in the structured definition, funding, implementation and operation of pilot plant projects. This is done in line with the smart specialization paradigm and in synergy with the multiple initiatives that are promoted by the European Commission, as well as by National and Regional governments.

2. Objectives

At the moment, the demo-cases that emerged in the ESM pilot are:

- De- and remanufacturing (Circular Economy)
- Adaptive and intelligent assembly and manufacturing systems
- Advanced Sustainable Surface and Coating Manufacturing Technologies on Polymers
- Digital and Virtual Factory integrating planning and simulation into operative environments
- Energy and Environmentally-efficient Manufacturing Processes

One of these demo-cases, the De- and Re-Manufacturing one, is quite advanced compared to the overall Vanguard Initiative progress, while the others are more at the conceptual phase. The heterogeneity of the ESM demo-cases and their different progress level allow to identify successful practices for the development of demo-cases that can be adopted in the governance of the ESM pilot. This is the basis to fix 2017 objectives.

Objectives can be classified in three categories:

- Improve governance and organization of demo-cases to guarantee continuity

- Boost the progress of demo-case projects

- Address strategic priorities that are transversal to all Vanguard pilots and demo-cases

These macro-objectives are discussed below and split in sub-objectives.

2.1 Governance and Organization

Major needs in this area consist in the re-confirmation or eventual re-discussion of demo-case governance and partners' responsibilities, in the improvement of regional commitment in demo-cases and in the increase of industrial stakeholders' involvement in projects. The governance of demo-cases should become more structured and should guarantee continuity of activities as well as the continuous monitoring of the achievement of targetes. The organizational mechanism of creating regional stable working groups that organize and

govern the regional participation to demo-case activities in a structured way should be shared as a good practice in all the ESM demo-cases. More in general, a higher communication and cross-fertilization among ESM demo-cases should be promoted.

Based on these needs, the following goals in terms of governance and organization are set for 2017:

- Re-discuss and confirm demo-cases coordination and leadership. In particular, each demo-case should have at least two committed coordinating Regions able to support each others in order to avoid temporary lack of coordination.

- Increase the number of Regions participating to demo-cases in order to achieve higher critical mass and to benefit from the complementarity of European specializations.

- Increase the number of industrial stakeholders committed in the demo-cases.

- Establish regional stakeholders working groups in all demo-cases.

- Introduce a robust system of Key Performance Indicators (KPIs) to fix targets and to monitor progress.

- Improve communication internal to demo-cases –within the Regions and among the various participating Regions- mainly through demo-case meetings and internal events.

- Improve external demo-case communication and diffusion through a structured demo-case communication plan and dedicated communication tools.

2.2 Demo-case progress

In order to achieve significant progress, the following objectives are set for the demo-cases that are currently at the conceptual phase:

- Achieve a better focus in terms of specific industrial applications of the addressed enabling technologies.

- Better prove the market potential by identifying and involving more directly potential prospects and by collecting letters of intent.

- Identify and solve potential overlappings among regional focuses to properly implement smart specialization concepts by establishing synergies among activities of single Regions.

- Move from the conceptual to the business planning phase

For the De- and Re-manufacturing demo-case, which is in the business planning phase already, the following objectives are set:

- Achieve business plan bankability, by continuing the dialogue with the EIB and other financial organizations.

- Enter the engineering phase (i.e. the phase of detailed design of processes and technologies). This will be possible if dedicated financial sources will be available for this purpose.

Overall, at ESM level, the links and synergies among the five existing demo-cases should be more clearly identified and potential overlapping/duplications should be solved through the achievement of a more clear focus of the initiatives and/or decisions to merge some of them.

Finally, the existence of new demo-case ideas that did not emerge in the first ESM action phase will be verified in order to open the field to new eventual strategic applications.

2.3 Strategic transversal issues

The following goals are strategic for the development of ESM pilot and demo-cases:

- Define a reference model of Vanguard pilot plant and business model. This will contribute to clarify the goals and the business sense of pilot plants among the Vanguard Community and it will be useful for new partners that enter the network.

- Design detailed business processes for future operation of ESM demo-cases. Robust business processes (such as order management, invoicing, service provision, etc.) will be important to prove the future sustainability of pilots to industrialists and investors, giving a concrete business dimension to the initiative. They will also serve to demo-cases as business implementation guidelines.

- Address IPR and legal issues for future pilots' operations. A set of general administrative governance models, contractual formats and IPR arrangements suitable to Vanguard pilots should be defined by specialists and offered to demo-cases as a toolkit to address the implementation and operations phase.

- Define funding models and clear perspectives for the implementation of demo-cases.

These objectives are common to all the Vanguard pilots and demo-cases. Thus, it is proposed that they are pursued in the frame of a joint effort at Vanguard level (activities common to all Vanguard Pilots).

The overall objectives and sub-objectives for 2017 are summarized in Figure 1.

The introduction of a structured KPI system will guarantee that these objectives will be measurable and that their achievement can be evaluated in-progress and at the end of the planning period.

Figure 1. ESM 2017 Objectives summary
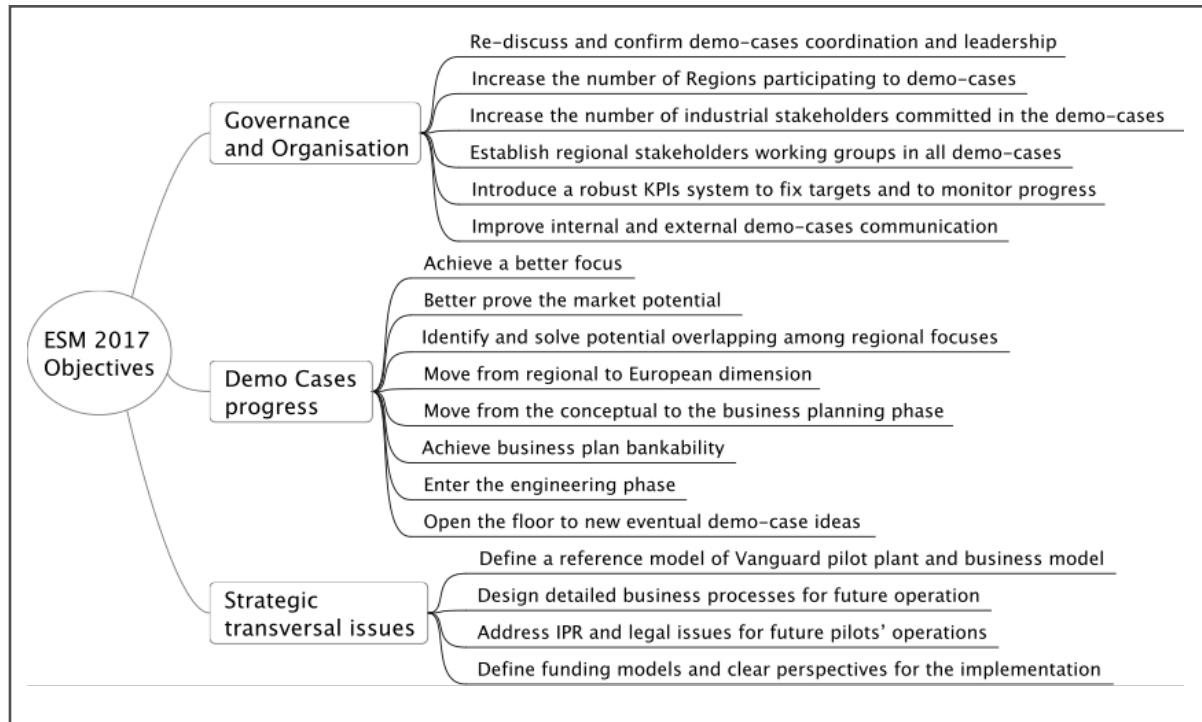
2.4 Target and constraints

In 2017 workplan, a preliminary activity of detailed target-setting based on a detailed common KPI system will be carried out at the beginning of the year, both at ESM pilot level and single demo-case level.

For the purpose of elaborating the present Action plan, demo-cases were already involved in a general target-setting process at the end of 2016. Results allow to propose the following average targets demo-case that are still in the conceptual phase:

- Confirm or propose 2/3 committed demo-case leaders, also including representatives from industry
- Include 2-3 additional Vanguard Regions as partners in each demo-case
- Double the number of industrial stakeholders (end-users and technology providers)
- Establish one stable working group per demo-case in each participating Region
- Include at least one additional Cluster in the Regional working groups
- Include at least two additional industrial associations in the Regional working groups
- Include at least two additional Universities/Research Centres in the Regional working groups
- Double the number of industrial processes addressed in demo-cases
- Include at least two additional sectors in demo-case impact
- Draft a first version of business plan

Main constraints for the achievement of the objectives are *time*, *resources* and *competencies*.

Regarding time, one year is a limited period to achieve such objectives, since some of them require a longer time perspective. However, it is a reasonable period to start implementing stable actions towards their achievement and to measure results at the end of the planning period.

Resources are obviously another constraint, both in term of human and financial resources needed to coordinate the processes at pilot level and to mobilize demo-case coordinators and partners in demo-case development. Under this light, even considering a direct investment of demo-cases coordinators and partners to cover their professional time, a serious limitation appeared to be the possibility to cover direct travel costs and the cost for the organization of international meetings. For this reason, particular attention will be dedicated to this point while planning the use of resources.

Finally, there are constraints in terms of specific competences that are needed to achieve the planned objectives, in particular regarding cross-pilot strategic objectives. They are specific competences dealing with legal issues, IPR, finance for complex investments within multi-regional projects and business process engineering.

Figure 2. Summary of action plan structure
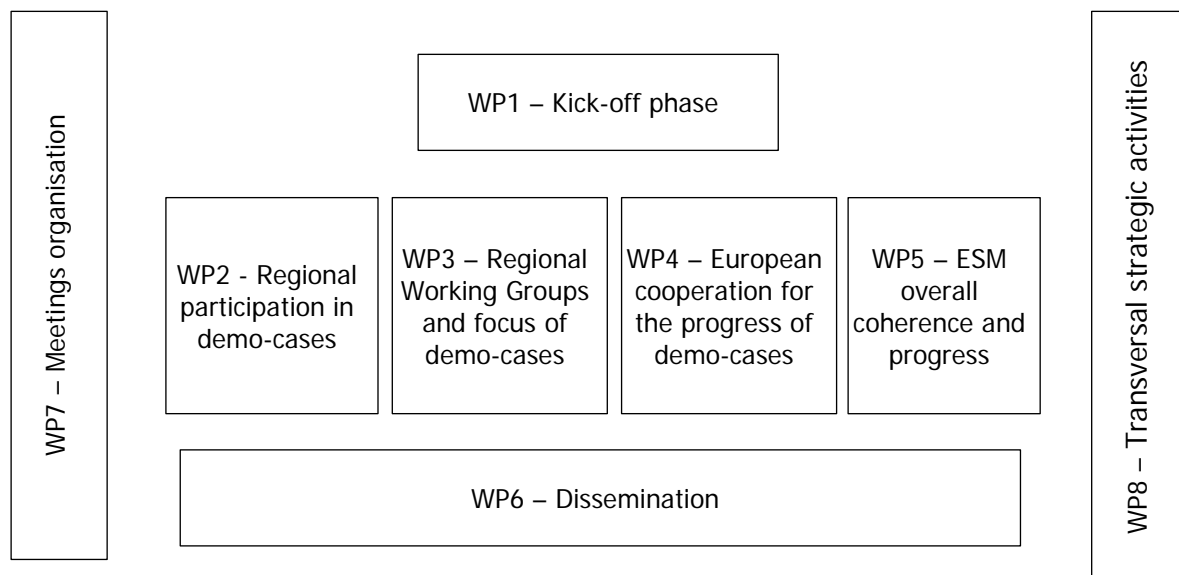
3. List of actions

With the aim to achieve the objectives reported in the previous section, specific actions are envisaged in the year 2017. They are below presented in a structure of Work Packages and Tasks.

WP1 – Kick-off phase (M1-2)

This Work Package is aimed at setting and sharing a robust methodological and governance framework to manage the pilot activities in a homogeneous way among the demo-cases and to guarantee quality.

Task 1.1 - Confirm ESM Steering Committee, rules and meetings (M1-3)

Responsible: ESM Pilot coordinators

Deliverable: Communication on ESM Steering Committee (M3)

The membership of the current ESM Steering Committee will be confirmed. Eventually, the membership of the Steering Committee will be modified and enlarged to additional regional members. The confirmed Steering Committee will agree on general rules for decisions and will fix a meeting calendar.

Task 1.2 - Fix demo-cases governance (M1-3)

Responsible: Demo-case coordinators

Deliverable: Communication on demo-cases governance structure (M3)

Demo-cases will confirm the coordinating Regions for 2017 and will appoint or re-confirm the experts in charge of coordination activities. If necessary, current leaderships at demo-case level will be re-discussed and eventually modified. Demo-cases will be invited to indicate at least two coordinators (from two different Regions) in order to guarantee the continuity of activities and to be able to alternate efforts during the year. Demo-case coordinators will have the responsibility to coordinate and push activities for the development of the demo-case. Demo-cases will be suggested to indicate coordinators that are already active in the European research and innovation community with reference to the topics of the demo-cases they are participating to. In particular, they should count on projects running in 2017 that, besides demonstrating expertise in the area of the demo-cases, can guarantee a certain budget to cover part of the travel costs that they will have to sustain to participate to the coordination activities. Pilot leads will contact all current demo-cases coordinators and partners and will provide indications in terms of role, responsibility and requirements for demo-case coordinators. After that, demo-case partners will start internal discussions to re-confirm the role of current coordinators or to elect new ones.

Task 1.3 - Detailed design of the KPI system and demo-cases development process guidelines (M1-3)

Responsible: ESM Pilot coordinators

Deliverable: Report on KPI system and demo-case development guidelines (M3)

A draft system of Key Performance Indicators (KPI) allowing to fix targets and to monitor their achievement was already developed by pilot leads in 2016 and was presented during the ESM 2016 Plenary meeting that took place on December 12th. This draft system will be revised and improved considering also the feedbacks that were received when it was presented to demo-cases and to the attendants of the ESM 2016 Plenary event. In addition, basic targets common to all demo-cases will be defined, together with guidelines and document formats that will have to be adopted by demo-cases in the yearly development activities.

Task 1.4 - Critical assessment and target setting by demo-cases (M1-3)

Responsible: Demo-case coordinators

Deliverable: Report on demo-case assessment and targets (M3)

Demo-cases will be asked to perform an assessment of their demo-case project with the intent of critically identifying and sharing in the partnership the main problems and obstacles to be overcome during 2017. This will help demo-cases to focus priorities in the frame of a joint collaborative strategic exercise. Consequently, demo-cases will be asked to set detailed 2017 targets complying with the KPI system that will be designed in the previous task.

Task 1.5 - Identification of possible funding/development opportunities in 2017 (M1-3)

Responsible: Demo-case coordinators

Deliverable: Report on demo-case funding opportunities (M3)

Based on the opportunities at European, National and Regional level, demo-cases will be requested to identify possible calls for proposals and other opportunities that can be addressed by the demo-case partnership to support the development of the demo-case. This activity will help demo-cases to plan the application to such calls by due time. In addition, it will also allow a better coordination of the participation to calls at pilot ESM level and also at Vanguard level, with the intent to increase potential synergies and to achieve higher success probability.

These tasks will be preliminary to the 2017 ESM Kick-off meeting attended by the ESM Pilot coordinators and the demo-case coordinators (see WP7). In this meeting this preparatory work will be discussed and will constitute the basis for 2017 overall developments.

WP2 – Regional participation in demo-cases (M1-12)

This Work Package is aimed at increasing the participation of Vanguard Regions to ESM demo-cases, as well as at re-confirming and strengthening the participation of Regions that are already involved.

Task 2.1 - Invitation of new Regions in ESM demo-cases (M1-3)

Responsible: ESM Pilot coordinators

Deliverable: Invitations to Vanguard Regions (M3)

A message will be sent to all Vanguard Regions to present the ESM vision, the current demo-cases and their progress. Vanguard Regions will be invited to express their eventual interest to join the demo-cases and to indicate a contact that can be approached to manage their introduction in the activities. Regions that are already involved in ESM will be required to re-confirm their interest and the contact persons.

Task 2.2 - Contacts with new Regions and Regions that already expressed interest (M1-3)

Responsible: Demo-case coordinators

Deliverable: Report on contacts with new Regions (M3)

Regions that will respond to the invitation to participate to the ESM pilot will be approached by demo-case coordinators in order to exchange information on demo-cases at more detailed level and to plan the process of involvement. Regions that already expressed their willingness to join ESM in the last months, for example during the recent ESM Plenary meeting and the S3 Conferences on Industrial Modernisation Platform, will be contacted by demo-case leaders immediately at the beginning of the year.

Task 2.3 - Introduction of new Regions into demo-case projects (M2-12)

Responsible: Demo-case coordinators

Deliverable: Reports on the introduction of new Regions in demo-cases (M6, M12)

New Regions that will join ESM will be supported by demo-case coordinators in the process of designing and starting their activities in the demo-cases. Such Regions will follow the steps that Regions currently involved in ESM followed at the beginning of Vanguard Pilot activities according to the shared methodology. In particular, they will have to find a complementary and synergic focus with respect to the specialisations that other Regions are already offering in the demo-cases. With this goal, supported by the available mapping tools and process, they will have to: i) extensively map regional competences, assets and innovation ecosystem; ii.) organise a regional process in order to allow suitable ideas of pilot plants aggregating wide regional interest to emerge; iii) establish regional groups of stakeholders able to define and represent regional participation and interests in demo-cases (according to WP3).

WP3 – Regional Working Groups and focus of demo-cases (M1-12)

This Work Package addresses intra-Regional activities to achieve significant progress in the development of projects of pilot nodes in each Region participating to demo-cases. To define strong projects exploiting regional specialisations, in fact, it is necessary that such specialisations are very well defined and supported by stakeholders at Regional level before starting the inter-regional cooperation.

Task 3.1 - Establishment/empowerment of regional working group (M1-12)

Responsible: Demo-case coordinators

Deliverable: Reports of Regional WGs establishment/empowering activities (M6, M12)

Past experience shows that the establishment of stable groups of stakeholders in the Regions that jointly generate the contents necessary to manage the participation to demo-cases is a key-success factors for demo-cases. Such groups should be coordinated and governed by demo-cases regional representatives. They will be responsible for the organisation of periodic meetings, the constant update of participants concerning Vanguard developments, the stimulation of discussions aimed at the progress of the regional participation to demo-cases and the overall animation of the groups with the intent of keeping strong the interest of participants. ESM pilot coordinators will suggest guidelines for the establishment/empowerment of regional working groups, based on positive experiences of some demo-cases. It will be responsibility of the participating Regions to implement and report the necessary activities.

Task 3.2 - Achieve regional focus and progress in the project of local node (M2-12)

Responsible: Demo-case coordinators

Deliverable: Detailed pilot plant concept at Regional level (M6, M12)

Each Region, organised in stable stakeholders' working groups, will progress in the definition of the regional project of pilot node in the frame of the demo-cases to which the Region is participating. Such a project should be grounded on the industrial specialisation of the Region and should aggregate the interest of regional stakeholders from industry and academia. Compared to the current general situation, significant efforts will be made in order to: i) define a clear focus aligned with regional specialisation; ii) clearly define enabling technologies, industrial applications and sectors that are at the basis of the regional pilot node project. It will be particularly relevant for many Regions to move from the level of general enabling technologies up to their instantiation into industrial applications and sectors that can directly mobilise the interest of potential users and future pilot customers (increase the TRL level of regional pilot nodes projects).

WP4 – European cooperation for the progress of demo-cases (M1-12)

Based on the regional focus and on the project of regional pilot nodes defined in WP3, this Work Package addresses the cooperation of Regions (inter-regional cooperation) aimed at establishing synergies and complementarities among specialisations and demo-cases regional nodes. This will be necessary for demo-cases to embrace a wider European dimension and to generate added value in extended value chains.

Task 4.1 – Improve European cooperation in ESM pilot to address synergies and complementarities with other European initiatives and projects (M1-12)

Responsible: ESM pilot coordinators

Deliverable: Reports on synergies with EU initiatives and projects (M6, M12)

Pilot coordinators will manage the relationships with other European networks exploiting the benefits of synergic initiatives. During 2016, ESM was presented as a thematic area in Smart Specialisation Platform for Industrial Modernisation (S3P-Industrial Modernisation), with the intent to receive form the EC additional support for developing ESM pilot projects. In parallel, the procedure for the submission of an EoI for European Strategic Cluster Partnership started and it will be finalized by the end of march. Accordingly, during 2017 ESM pilot coordinators will continue these activities toward the identification of opportunities for boosting the development of the ESM pilot offered at European level. In this framework a key actor is represented the European Platform (Manufuture, ...) with their research and innovation agendas and roadmaps.

In addition, the participation to European projects (INNOSUP, TREC, INTERREG,...) focused on Vanguard ESM topics is another important opportunity that will be exploited by the ESM pilot through a continuous activity of identifying possible links. Indeed, several projects are currently running and they will continue during 2017 representing a relevant opportunity in term of empowering the network, sharing and discussing Regional policy for pilot development, deepen the knowledge on specific topic and enlarge the stakeholders' base.

Task 4.2 - Improve European cooperation in demo-cases to address synergies and complementarities (M3-12)

Responsible: Demo-case coordinators

Deliverable: Reports on EU cooperation activities in demo-case (M6, M12)

Regional representatives participating in demo-cases will strengthen the cooperation with representatives of other Regions in order to overcome the limits of the pure regional view and interests. Single regional projects, in fact, will have to find a coherent place in the frame of a European project of network of regional pilot plants. With this goal, activities to stimulate and facilitate the communication, the exchange of information and the joint discussion among representative of Regions will be promoted. Periodic conference calls will be organised and, in particular, European meetings at the level of demo-cases partnerships will be organised according to the meeting schedule presented in WP7.

Task 4.3 - Progress in overall EU concept and business plan of demo-case (M4-12)

Responsible: Demo-case coordinators

Deliverable: Updated concept and business plan of demo-case (M6, M12)

The increased inter-regional cooperation, grounded on a more robust definition of each Regional specialisation (WP3), will be the basis to significantly progress in the development of the project contents of demo-cases. In particular, the following activities will be addressed: i) identification and solutions to eventual overlapping of activities proposed by the Regions; ii) clear identification of links and synergies among the pilot nodes in order to generate European added value in a logic of extended value chains. This will allow to propose a more robust European demo-case concept compared to the current state of the art; iii) enter the business planning phase embracing a demo-case European dimension. This will permit to overcome the current limitation of demo-case where the business planning phase did not start yet or where the demo-case business plan is centered only on one or on a very limited number of Regions, whose critical mass is not sufficient to propose ambitious projects with a strong European multi-regional impact; IV) start the detailed engineering phase for the most advanced demo-cases that already drafted a first version of business plan. This will be particularly important to enter the implementation phase of demo-cases and to start generating first concrete achievements in the overall Vanguard community. However, it has to be outlined that design engineering activities will only be possible if demo-cases will be in the position to access dedicated available funds at Regional, National and European level.

WP5 – ESM overall coherence and progress (M1-12)

This Work Package aims at achieving coherence at ESM pilot level by considering the focus, synergy and complementarity of all the demo-cases running under ESM.

Task 5.1 - Identification of overlapping and potential synergies among demo-case (M1-3)

Responsible: ESM Pilot coordinators

Deliverable: Report on potential demo-cases overlapping and synergies (M3)

ESM demo-cases were generated with a bottom-up approach in which Regions expressed priorities for pilot plants that were aggregated in common project tracks. The development of demo-cases in the last two years with the consequent declination of project contents led to situations where potential content overlapping might exist among demo-cases. In these cases, the differences between different demo-cases is not always clear and doubts about duplication of activities or uniqueness of demo-cases focus might arise. On the other hand, until now, potential synergies and links among running demo-cases were not addressed explicitly and demo-case projects run independently. Looking at the five ESM demo-cases with an integrated view, current and potential overlapping and synergies will be critically identified.

Task 5.2 - Address synergies and complementarities among different ESM demo-case (M4-12)

Responsible: ESM Pilot coordinators

Deliverable: ESM Pilot report (M6, M12)

Overlapping and synergies identified in the previous task will be shared in the ESM partnership and a joint discussion among demo-cases will be promoted in order to find solutions for overlapping on the one hand, and to plan actions to exploit synergies at pilot level on the other hand. Possible solutions to overlapping might be the merging of some demo-cases with similar contents (which might also contribute to reach a higher critical mass) or a better definition of demo-cases focus so that their uniqueness and complementarity is clear. About potential synergies, it will be important that each demo-case project takes into account the necessary actions (and costs) to establish links with other demo-cases and, consequently, to consider the benefit of synergies in their business plan. For this purpose, the "inter demo-case" communication will be stimulated and supported through the organisation of specific workshops in which demo-case representatives can meet, according to the meeting plan proposed in WP7.

Task 5.3 - Improve communication and exchange of experience among ESM demo-case (M2-12)

Responsible: ESM Pilot coordinators

Deliverable: Reports on demo-cases cooperation activities at pilot level (M6, M12)

Besides the communication finalised to achieve overall content coherence at ESM level, a specific effort will be made at organisational level to allow demo-cases to exchange experiences, difficulties and best practices. This will contribute to create a more participative and positive ESM environment to speed-up the development of demo-cases and also to contribute creating "ESM identity" and a collaborative open working framework.

WP6 – Dissemination (M1-12)

In this Work Package external dissemination activities will be addressed. Dissemination will regard contents both at single demo-cases level and integrated ESM pilot level. In order to facilitate the implementation of these actions, pilot coordinators and demo-case coordinators will exploit the Intranet tools available on Vanguard website. The repository will serve as a channel to share documents and information related to the pilot and the demo-cases ensuring the complete diffusion of updated versions. Accordingly, pilot coordinators will be in charge of initiating this process and making sure that all the key collaborators have access to specific folders.

Task 6.1 - Elaboration and improvement of communication tools at demo-case level (M1-12)

Responsible: Demo-case coordinators

Deliverable: Brochures, updated web pages (M5, M11)

Starting from the available material and considering eventual communication guidelines that will be diffused by the Vanguard Board, proper updated contents and communication tools will be elaborated by each demo-case to present goals, activities and progress of the different initiatives. In particular, a flyer, a detailed brochure and updated web content will be elaborated by each demo-case under the responsibility of demo-case coordinators. Updated communication tools and contents will be uploaded in the Vanguard website and in the websites of partners participating to the demo-cases. Two releases of communication tools and contents are planned: in the middle and at the end of the 2017 planning period, in advance respect the plenary events of M6 and M12, in order to use the updated materials for the organization and follow-up of such events.

Task 6.2 - Elaboration and improvement of communication tools at pilot level (M1-12)

Responsible: ESM Pilot coordinators

Deliverable: Brochures, updated web pages (M5, M11)

Updated communication tools and contents will be elaborated also at ESM pilot level. For this purpose, ESM Pilot coordinators will interact with demo-case leaders in order to collect updated communication contents at demo-case level and to summarise them at a more general level in the pilot communication tools.

Task 6.3 - Dissemination at demo-case and pilot level (M1-12)

Responsible: Demo-case coordinators, ESM Pilot coordinators

Deliverable: Dissemination plan (M2), Dissemination reports (M6, M12)

A dissemination plan will be elaborated at the beginning of the 2017 planning period. Such a plan will indicate the type of dissemination actions that will be addressed in 2017 by the demo-cases and at overall ESM pilot level. Demo-case coordinators will be requested to propose a demo-case dissemination plan and ESM Pilot coordinators will aggregate demo-case dissemination plans into a unique ESM Pilot dissemination plan. In this activity, the eventual joint participation of demo-cases to common dissemination events will be considered in order to exploit synergies and to coordinate dissemination messages along the yearly events. Than, dissemination activities will be carried out according to the defined planning and they will be monitored through an intermediate and final reporting action. Dissemination activities will include presentations of ESM pilot and demo-cases in conferences, events and industrial/policy meetings, papers in academic and industrial journals, distribution of brochures and communication material, etc. Similarly to the organisation of meetings, a special effort will be spent to exploit all possible opportunities to fund dissemination activities: the participation of partners to running projects that include a budget that can be used for dissemination, the existence of Vanguard-related projects (such as Innosup, Interreg, etc.) that can cover the costs of participation of ESM Vanguard representatives in their dissemination events, etc.. Pilot coordinators will offer support to demo-case coordinators for the identification of possible funding sources for the

dissemination events they will propose. In case external funding can not be obtained, the possibility to offer funding support from the available yearly Vanguard budget will be evaluated with respect to the relevance and effectiveness of the proposed dissemination meetings (according with the financial plan discussed below).

Main dissemination targets, aims and channels are summarized in the following table.

Table 1. Dissemination target groups

Target groups	Aims for dissemination	Benefits offered	Main dissemination channels and methods
European manufacturing industry	Involvement Awareness Exploitation	For technology providers, possibility to integrate their innovative technologies and demonstrate them to potential industrial users. For end users, possibility to address specific businesses before implementation.	Direct proactive communications. Banners at industrial exhibitions. Industrial clusters.
ICT companies	Involvement Awareness Exploitation	New markets potentials related to in-use product monitoring and value-chain integration cloud-based solutions.	Direct proactive communications. Flyers.
Research community	Involvement Awareness	Possibility to expand R&I actions.	Direct proactive communications. Regular meetings. International communities and journals.
Society/General	Awareness Understanding	Evidence of benefits of Efficient and Sustainable manufacturing at large scale.	Social media and news.
Standardisation, certification bodies	Awareness Understanding	New guidelines for services and standards.	Direct Proactive communication. Participation to working groups.
European Entrepreneurs	Involvement	Inspiration and best practices for the development of new businesses.	Social media. Direct Proactive communication.
Regional authorities, Industrial associations and financial institutions	Awareness Involvement Foundraising	Recommendations for legislation guidelines. Support to the industrial stakeholders in launching new businesses. Support to the implementation of RIS3.	Clusters mediation, face-to-face meeting.

WP7 – Meetings organisation (M1-12)

Meeting planning and organisation will be a key-activity in the 2017 ESM work plan, since meetings and event will be crucial to improve internal and external communication, to introduce new Regions in ESM and to increase industrial involvement in demo-cases. A draft meeting plan was elaborated and will be proposed to demo-cases and Regions at the beginning of 2017 activities.

With the scope of increasing the professionality and impact of meetings, increasing the industrial audience, offering to participants potential services and additional opportunities for the development of pilot plants projects, as well as of co-funding meeting organisation, a particular effort will be made to organise key-meetings in collaboration with other initiatives such as "Watify", "Re-confirm" and "Enterprise Europe Network". Representatives of both initiatives were pre-contacted in order to explore this opportunity and a positive feedback was registered. It was agreed that the ESM pilot will communicate the type and the expected format of the meetings at the beginning of the year in order to start planning joint initiatives.

Task 7.1 - 2017 Kick-off meeting with demo-case coordinators (M1-3)

Responsible: ESM Pilot coordinators

Deliverable: Report of meeting (M3)

This meeting will be organised to launch 2017 ESM development activities after some preliminary preparatory work to define common tools and guidelines to be adopted by demo-cases, as well as to identify criticalities both at demo-cases (WP1) and at pilot (Task 5.1) level. The scope of the meeting will be: i) to share tools and guidelines for the demo-cases development and quality management; ii) to share main demo-cases targets for 2017; iii) to focus main criticalities to be addressed in 2017 at demo-case and pilot level; iv) to agree the overall ESM development plan at Regional and European level. The meeting will be attended by ESM pilot coordinators and demo-case coordinators, with the eventual participation of other key demo-case partners (15-20 participants). It will be in the form of a collaborative workshop.

Task 7.2 - Demo-cases regional meetings (M1-12)

Responsible: Demo-case regional representatives

Deliverable: Report of meetings (M3, M6, M9, M12)

These meetings will be organised under the responsibility of demo-case regional representatives with the scope of first creating and consolidating regional working groups of stakeholders committed in ESM demo-cases and, second, of developing the regional contents to contribute to the progress of ESM demo-case projects. Every Region participating to ESM demo-cases should organise such meetings according to internal needs and stakeholders' commitment. Consequently, the number of regional meetings may vary from Region to Region. However, it will be recommended to organise and report at least two meetings of this type during the year: one to organise intra-regional development activities after the 2017 kick-off meeting and another one to progress in regional contents development after the intermediate ESM progress meeting in the second part of the year. Obviously, the more these meetings will be frequent and attended by regional stakeholders, the more Regions

will demonstrate to be able to commit industry and innovation actors in a participative process for the definition of ESM pilot plants. Demo-case coordinators will stimulate regional participants to organise meetings in order to address locally the development of demo-cases and to increase industrial participation. They will collect the information about regional meeting reports and include them in the demo-case reporting documents that will be delivered in M6 and M12.

Task 7.3 - Demo-cases European meetings (M3-11)

Responsible: Demo-case coordinators

Deliverable: Report of meetings (M5, M11)

These meetings will be organised to support European cooperation in demo-case development and to allow representatives of different Regions to collaboratively work at the development of demo-cases in a European perspective, based on the contents developed regionally. This type of meetings will be particularly relevant for ESM progress, since it was recognised that one of the main limits to demo-cases development is the possibility to meet other regional representatives for the synergic definition of demo-cases contents. Attendants will be demo-case coordinators and key-representatives of the Regions participating to the demo-cases (15-20 participants). Two meetings of this type are recommended to all demo-cases: the first after the 2017 kick off meeting, with the goal to discuss and plan at European level the demo-case development activities after having shared main targets and development tools at ESM pilot level; the second after the ESM progress meeting, in which a session will be organised to monitor the progress of activities at ESM pilot level. Ideally, results of these demo-cases European meetings should trigger activities at Regional level that require the organisation of demo-cases Regional meetings (discussed in Task 7.2). These meetings will be proactively organised by demo-case coordinators, that might require the support of ESM pilot coordinators. The latter will work to obtain the eventual support of external initiatives (such as Watify, Re-confirm, EEN, etc.) and will evaluate the possibility to offer funding support from the available Vanguard budget with respect to the relevance and effectiveness of the proposed meetings for the development of demo-cases (see the financial plan discussed below).

Task 7.4 - ESM progress meeting and Industrial matchmaking (M4-7)

Responsible: ESM Pilot coordinators

Deliverable: Report of meeting (M8)

This intermediate meeting will be organised in the middle of the activity period with the following scopes: i) to present in a plenary the intermediate progress of ESM pilot and of its demo-cases; ii) to organise an industrial matchmaking aimed at increasing industrial participation on the basis of a better progress and clarity of the activities that will be possible after having started to address criticalities in the first year working period; iii) to have a follow-up of the activities aimed at achieving overall coherence and synergy among running demo-cases, launched in the 2017 kick-off meeting; iv) to consolidate links with other initiatives that can complement and support the development of ESM pilots. With this scope a specific workshop session attended by ESM pilot coordinators and demo-case coordinators will be organised. This plenary meeting will be organised with the support of external initiatives (such as EEN, Watify, etc.) that will contribute to increase the impact of the industrial matchmaking.

Task 7.5 - ESM final meeting (M9-12)

Responsible: ESM Pilot coordinators

Deliverable: Report of meeting (M12)

This plenary meeting will be organised as final event of 2017 ESM activities. It will have the main scope of showing the final progress of ESM pilot and of discussing future perspectives with stakeholders in order to launch 2018 activities. More space compared to the first plenary event will be dedicated to the presentation and discussion of results of the strategic activities transversal to all pilots, such as the definition of a common reference model and business processes of Vanguard demo-cases, funding guidelines, IPR and legal issues, etc. (according to WP8). The opportunity to organise a second matchmaking event will be evaluated on the basis of the situation of the industrial participation to the ESM pilot at the end of the planning period. Also for this second plenary event, the availability of support offered by external initiatives will be investigated.

WP8 – Transversal strategic activities (M3-12)

This Work Package will address activities that are strategic for the development of ESM demo-cases and Pilot. Such activities are in fact transversal to all Vanguard Pilots and demo-cases, since they will contribute to clarify the concept of Vanguard pilot plants and to bring it closer to business implementation, which will be particularly important to attract industry. Thus, it is expected that the tasks below described are not managed in isolation by ESM partners, but that they are included in the Vanguard transversal activities that will be funded under the "common pot budget". For this reason, these task represent a proposal for the Vanguard Board.

Task 8.1 - Definition of a Vanguard pilot plant reference business model (M3-12)

Responsible: Vanguard cross-pilot team, eventually assisted by external experts

Deliverable: Report on Vanguard pilot plant reference business model (M12)

In order to share a common understanding of Vanguard pilot plants and of their future business model, it is necessary to design and share a structured model for the future pilot plants' business. Currently such a business model for future Vanguard pilot plants is hypothesised by some advanced demo-cases or is in the mind of participants, but still in quite general terms. It is thus necessary to engage a deeper joint strategic discussion in the Vanguard community on the future pilot plants' business model that can lead to the detailed design of a business model framework indicating a possible value proposition to companies, the value chain architecture allowing pilot plants to provide services to customers and the revenue model guaranteeing their long-term sustainability. This formalisation will be important to align the -sometimes- contrasting understandings of current actors, to fast introduce new partners into Vanguard demo-cases, to provide demo-cases with a pre-designed robust proposal of business model that they can immediately adopt to elaborate their business plan, as well as to convince potential investors on the robustness of Vanguard pilot pants' future business. It will also contribute to consolidate a unique mission for Vanguard pilot plants and to stimulate a wider Vanguard network cooperation for the development of strategic contents in cooperation with representatives of the demo-cases.

Task 8.2 - Pilot plants business process guideline (M7-12)

Responsible: Vanguard cross-pilot team, eventually assisted by external experts

Deliverable: Report on Vanguard pilot plants business processes guidelines (M12)

Based on the reference business model defined in Task 8.1, detailed business processes indicating how pilot plants' operations will be managed should be designed. Such business processes, eventually mapped using classical business tools adopted by companies (such as business process maps), will indicate what will be the organisation, the concrete activities and the supporting instruments through which future pilot plants will manage orders in a multi-country logic, the delivery of services, payments, marketing and commercials, the budgeting process, etc.. Business process detailed design will be very important to move from the conceptual design of demo-cases to their business implementation, since it will address future business operations of pilot plants. Furthermore, it will show to industry and to potential investors that projects of pilot plants, which moved mainly from a research and innovation dimension, reached a concrete business design dimension.

Task 8.3 - Guidelines and formats for IPR and legal issue (M3-12)

Responsible: Vanguard cross-pilot team, assisted by external experts

Deliverable: IPR and legal issues guidelines and formats for demo-cases (M12)

IPR and legal issues are particularly complicated considering the multi-regional dimension and the scope of future Vanguard pilot plants. This requires specialised consulting and advice by IPR and legal experts. It will be necessary to reach a quite detailed level of IPR and legal design, in order to provide demo-cases with operative tools and guidelines to support business processes and operations as defined in Task 8.2. IPR and legal guidelines will offer suitable pre-designed options for the development of demo-cases, that can be further customised by demo-cases themselves considering their peculiarities.

Task 8.4 - Guidelines on demo-cases funding model (M3-12)

Responsible: Vanguard cross-pilot team, assisted by external experts

Deliverable: Guidelines and tools for demo-cases financials (M12)

Funding is probably the main barrier limiting the implementation of demo-cases, especially of the ones that require high investment for the start-up. Since Vanguard implies a multi-level mixed funding model whose conceptualisation and implementation is not completely in the range of demo-cases and pilots, it is necessary that the activities aimed at the definition of a Vanguard funding model provide clear guidelines and immediate opportunities to demo-cases. In this task, an effort is envisaged to move from the strategic conceptualisation of the Vanguard funding model towards more concrete funding opportunities and support for demo-cases, including especially the implementation phase. The support of financial experts with the background to properly interpret the needs of the Vanguard pilots will be needed. This activity is necessary to support the elaboration of more detailed investment plans in the frame of demo-case business plans.

The presented work plan represents a master for ESM activities in 2017. However, since the effective implementation of activities will depend on the commitment and engagement of demo-case partners, it can not be guaranteed that all activities will be performed by all demo-cases. The effective performance of demo-cases will be monitored on-going using the developed KPI system and through intermediate reports. ESM pilot coordinators will carry out activities to stimulate and support all demo-cases in order to perform envisaged tasks in the frame of the planning schedule.

In addition, in case that the need for additional activities not included in the work plan will emerge, their possible introduction in 2017 will be evaluated according to their relevance and the availability of resources.

4. Timeframe and milestones

Timeframe, deliverables and responsible for the workplan activities are summarised in the following figure and tables.

Table 2. List of deliverables

Deliverable	Deadline	Responsible
D1.1 - Communication on ESM Steering Committee	M3	ESM Pilot coordinators
D1.2 - Communication on demo-cases governance structure	M3	Demo-case coordinators
D1.3 - Report on KPI system and demo-case development guidelines	M3	Demo-case coordinators
D1.4 - Report on demo-case assessment and targets	M3	Demo-case coordinators
D1.5 - Report on demo-case funding opportunities	M3	Demo-case coordinators
D2.1 - Invitations to Vanguard Regions	M3	ESM Pilot coordinators
D2.2 - Report on contacts with new Regions	M3	Demo-case coordinators
D2.3.1 - Reports on the introduction of new Regions in demo-cases	M6	Demo-case coordinators
D2.3.2 - Reports on the introduction of new Regions in demo-cases	M12	Demo-case coordinators
D3.1.1 - Reports of Regional WGs establishment/empowering activities	M6	Demo-case coordinators
D3.1.2 - Reports of Regional WGs establishment/empowering activities	M12	Demo-case coordinators
D3.2.1 - Detailed pilot plant concept at Regional level	M6	Demo-case coordinators
D3.2.2 - Detailed pilot plant concept at Regional level	M12	Demo-case coordinators
D4.1.1 - Reports on EU cooperation activities in demo-case	M6	Demo-case coordinators
D4.1.2 - Reports on EU cooperation activities in demo-case	M12	Demo-case coordinators

D4.2.1 - Updated concept and business plan of demo-case	M6	Demo-case coordinators
D4.2.2 - Updated concept and business plan of demo-case	M12	Demo-case coordinators
D5.1 - Report on potential demo-cases overlappings and synergies	M3	ESM Pilot coordinators
D5.2.1 – ESM Pilot report	M6	ESM Pilot coordinators
D5.2.2 - ESM Pilot report	M12	ESM Pilot coordinators
D.5.3.1 - Reports on demo-cases cooperation activities at pilot level	M6	ESM Pilot coordinators
D5.3.2 - Reports on demo-cases cooperation activities at pilot level	M12	ESM Pilot coordinators
D6.1.1 - Brochures, updated web pages	M5	Demo-case coordinators
D6.1.2 - Brochures, updated web pages	M11	Demo-case coordinators
D6.2.1 - Brochures, updated web pages	M5	ESM Pilot coordinators
D6.2.2 - Brochures, updated web pages	M11	ESM Pilot coordinators
D6.3.1 - Dissemination plan	M2	Demo-case coordinators
D6.3.2 – Dissemination report	M5	ESM Pilot coordinators
D6.3.3 - Dissemination report	M12	ESM Pilot coordinators
D7.1 - Report of meeting	M3	ESM Pilot coordinators
D7.2.1 - Report of regional meetings	M3	Demo-case regional representatives
D7.2.2 - Report of regional meetings	M6	Demo-case regional representatives
D7.2.3 - Report of regional meetings	M9	Demo-case regional representatives
D7.2.4 - Report of regional meetings	M12	Demo-case regional representatives
D7.3.1 - Report of European meetings	M5	Demo-case coordinators
D7.3.2 - Report of European meetings	M11	Demo-case coordinators
D7.4 - Report of meeting	M8	ESM Pilot coordinators
D7.5 - Report of meeting	M12	ESM Pilot coordinators
D8.1 - Report on Vanguard pilot plant reference business model	M12	Vanguard cross-pilot team

D8.2 - Report on Vanguard pilot plants business processes guidelines	M12	Vanguard cross-pilot team
D8.3 - IPR and legal issues guidelines and formats for demo-cases	M12	Vanguard cross-pilot team
D8.4 - Guidelines and tools for demo-cases financials	M12	Vanguard cross-pilot team

Deliverables will be transmitted to the Regions involved in the ESM pilot as soon as they will be available.

The milestones of the proposed work plan are summarised in the following table. Considering the critical aspects affecting ESM Pilot development and 2017 priorities, they are associated to the achievement of the following objectives:
- the introduction of new Regions in demo-cases
- the progress of demo-case concept and business plans
- the organisation of meetings at regional level, demo-case level and pilot level
- the realisation and update of demo-case and pilot communication tools, necessary to improve dissemination activities

Table 3. List of milestones

Milestone	Period	Associated Task
Milestone 1 - ESM 2017 Kick-off meeting	M3	Task 2.2
Milestone 2 - New Regions contacted and introduced in demo-cases	M3	Task 7.1
Milestone 3 – First version of communication tools	M5	Task 6.1 – Task 6.2
Milestone 4 – First demo-cases Regional meetings	M5	Task 7.2
Milestone 5 – First demo-cases EU meetings	M5	Task 7.3
Milestone 6 – Intermediate Regional nodes progress report	M7	Task 3.2
Milestone 7 – Intermediate demo-case progress report	M7	Task 4.2 – Task 4.3
Milestone 8 – Intermediate ESM Pilot progress report	M7	Task 5.1 – Task 5.2
Milestone 9 - ESM progress meeting and matchmaking	M7	Task 7.4
Milestone 10 – Final version of communication tools	M11	Task 6.1 – Task 6.2

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Milestone 11 – Second demo-cases Regional meetings	M11	Task 7.2
Milestone 12 – Second demo-cases EU meeting	M11	Task 7.3
Milestone 13 – Demo-cases Regional nodes progress report	M12	Task 3.2
Milestone 14 – Demo-cases progress report	M12	Task 4.2 – Task 4.3
Milestone 15 – ESM Pilot progress report	M12	Task 5.1 – Task 5.2
Milestone 16 – ESM final meeting	M12	Task 7.5

Finally, the overall time-framework of ESM 2017 activities is summarised in the following Gantt, with the indication of the milestones.

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Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Milestones
WP1 - Kick off phase													
1.1 - Confirm ESM Steering Committee, rules and meetings	█	█	█										
1.2 - Fix demo-cases governance	█	█	█										
1.3 - Detailed design of the KPI system and demo-cases development process guidelines	█	█	█										
1.4 - Critical assessment and targets setting by demo-cases	█	█	█										
1.5 - Identification of possible funding/development opportunities in 2017	█	█	█										
WP2 - Regional participation in demo-cases													
2.1 - Invitation of new Regions in ESM demo-cases	█	█	█										
2.2 - Contacts with new Regions and Regions that already expressed interest		█	█	◆									◆ New Regions contacted and introduced in demo-cases
2.3 - Introduction of new Regions into demo-case projects			█	█	█	█	█	█	█	█	█	█	
WP3 - Regional Working Groups and focus of demo-cases													
3.1 - Establishment/empowerment of regional working groups	█	█	█	█	█	█	█	█	█	█	█	█	
3.2 - Achieve regional focus and progress in the project of local nodes			█	█	█	█	█	◆	█	█	█	◆	◆ Intermediate demo-cases Regional nodes progress report; ◆ Demo-cases Regional nodes progress report
WP 4 - European cooperation for the progress of demo-cases													
4.1 - Improve EU cooperation in ESM pilot to address synergies with other EU initiatives and projects	█	█	█	█	█	█	█	█	█	█	█	█	
4.2 - Improve European cooperation in demo-cases to address synergies and complementarities			█	█	█	█	█	█	█	█	█	█	
4.3 - Progress in overall EU concept and business plan of demo-cases				█	█	█	█	◆	█	█	█	◆	◆ Intermediate Demo-cases progress report; ◆ Demo-cases progress report
WP 5 - ESM overall coherence and progress													
5.1 - Identification of overlapping and potential synergies among demo-cases	█	█	█					◆				◆	◆ Intermediate ESM Pilot progress report; ◆ ESM Pilot progress report
5.2 - Address synergies and complementarities among different ESM demo-cases				█	█	█	█	█	█	█	█	█	
5.3 - Improve communication and exchange of experience among ESM demo-cases			█	█	█	█	█	█	█	█	█	█	
WP 6 - Dissemination													
6.1 - Elaboration and improvement of communication tools at demo-case level	█	█	█	█	█	◆	█	█	█	█	█	◆	◆ First version of commication tools; ◆ Final version of commication tools
6.2 - Elaboration and improvement of communication tools at pilot level	█	█	█	█	█	◆	█	█	█	█	█	◆	◆ First version of commication tools; ◆ Final version of commication tools
6.3 - Dissemination at demo-case and pilot level	█	█	█	█	█	█	█	█	█	█	█	█	
WP7 - Meetings organisation													
7.1 - 2017 Kick-off meeting with demo-case coordinators	█	█		◆									◆ ESM 2017 kick off meeting
7.2 - Demo-cases regional meetings	█	█	█	█	█	◆	█	█	█	█	█	◆	◆ First demo-cases Regional meetings; ◆ Second demo-cases Regional meetings
7.3 - Demo-cases European meetings		█	█	█	█	◆	█	█	█	█	█	◆	◆ First demo-cases EU meetings; ◆ Second demo-cases EU meetings
7.4 - ESM progress meeting and Industrial matchmaking				█	█	█	█	◆	█	█	█	█	◆ ESM progress meeting and matchmaking
7.5 - ESM final meeting										█	█	◆	◆ ESM final meeting
WP 8 - Transversal strategic activities													
8.1 - Definition of a Vanguard pilot plant reference business model			█	█	█	█	█	█	█	█	█	█	
8.2 - Pilot plants business process guideline							█	█	█	█	█	█	
8.3 - Guidelines and formats for IPR and legal issues			█	█	█	█	█	█	█	█	█	█	
8.4 - Guidelines on demo-cases funding model			█	█	█	█	█	█	█	█	█	█	

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5. Resources

5.1 Human Resources

Human resources for the implementation of ESM 2017 Action Plan at technical pilot level are:

- **ESM Pilot coordinators**

  They are currently Giacomo Copani (AFIL-Lombardy) and Joan Guasch (Eurecat-Catalonia).

- **Supporting staff** at ESM Pilot level for the implementation of 2017 Action Plan.

  The are currently Roberta Curiazzi, Marzia Morgantini, Federico Albé (AFIL-Lombardy) and Jordi Romero (Eurecat-Catalonia)

Technical resources will be coordinated and assisted by Regional representatives of the ESM coordinating Regions.

In addition, human resources for the implementation of ESM 2017 Action Plan at technical demo-case level are:

- **Demo-case coordinators** are currently**:**

  - **De- and Re-Manufacturing**: Marcello Colledani (Politecnico di Milano)
  - **Adaptive and intelligent manufacturing and assembly for personalized products and components**: Fabiana Pirola (Università degli Studi di Bergamo) – Rik van Hevel (Sirris)
  - **Advanced Sustainable Surface and Coating Manufacturing Technologies on Polymer materials**: Jordi Romero (EURECAT)
  - **Digital and Virtual Factory integrating planning and simulation into operative environment**: Sergio Gusmeroli (Politecnico di Milano) – Minna Lanz (Technology University of Tampere)
  - **Energy and Environmentally efficient Manufacturing processes and solutions**: Katja Haferburg and Michael Kuhl (Fraunhofer - IWU) – Antonio Baptista (INEGI)

- **Demo-case partners**

  They are representatives of the Regions participating to demo-cases, both at technical and political level.

Since the governance and partnership of the demo-cases is in evolution, demo-case coordinators might change according to the considerations that will be made each demo-case partners at the beginning of the planning period.

Figure 3. ESM organisational chart
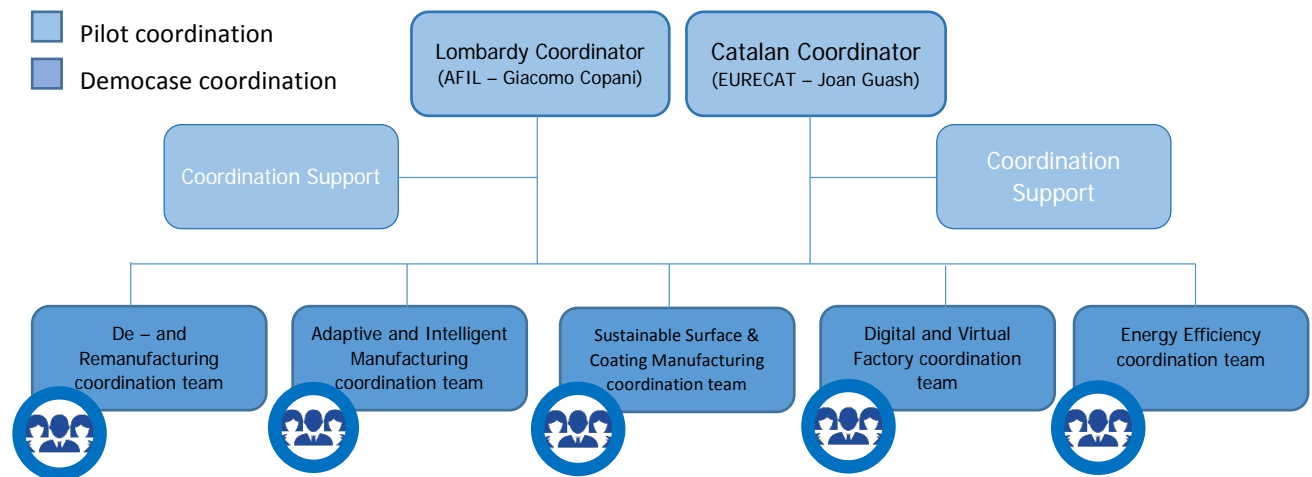
5.2 Financial Resources

The allocation of financial resources will respond to the development needs of the ESM pilot and demo-cases. Such needs consist mainly in:

1) a strong and stable governance of the ESM pilot,

2) the establishment of a better European cooperation for demo-cases development

3) a more effective external communication and diffusion of ESM pilot results and activities.

Accordingly, the two main budget streams are:

- pilot coordination
- organisation of meetings/events aimed at internal cooperation and external communication.

To guarantee the pilot governance, part of the budget will be allocated to the ESM coordinating Regions in order to partly fund the pilot coordination effort in charge to the deputed technical organisations.

To allow a better European cooperation for the development of demo-cases, part of the budget will be allocated to the coverage of costs necessary to organise and attend demo-case events/workshops at European level where representatives of different Regions can meet and discuss. Since the available Vanguard budget is limited compared to the number of potential meetings that the current five ESM demo-cases might organise (in the workplan it is suggested to organise at least 10 European demo-case meetings), alternative sources to complement Vanguard budget are envisaged:

- External initiatives (such as EEN, Watify, etc.), whose scope is synergic to Vanguard ESM. Representatives of such initiatives were already pre-contacted by ESM Pilot coordinators to explore this opportunity and the response was positive. In particular, it was discussed that if demo-cases European workshops would be organised with a session open to external companies and if external initiatives will have a space to promote their services to Vanguard participants, there will be the conditions for co-funding these events. External funding might cover mainly logistics and marketing costs.

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- ESM demo-case participants' own funds, in a logic of strategic investment. In particular, it will be requested that in the phase of re-considering or confirming demo-case leadership, demo-cases appoint coordinators that can demonstrate to have funds available in 2017 to cover part of the costs that will be necessary to attend Vanguard meetings. Such funds could derive from projects and other initiatives running in 2017 that are synergic to Vanguard. Besides guaranteeing some autonomous financial capacity necessary to attend meetings to coordinate demo-cases, this will also guarantee that demo-case coordinators are already part of the European network doing research and innovation in the areas of their demo-cases and, thus, have autonomous capacity to establish links and dissemination opportunities in the frame of other European and national projects.

In such a combined funding models, the decision on the allocation of part of the Vanguard budget to European demo-case meetings will be taken on-going based on the relevance and effectiveness of the meetings that will be proposed by demo-case, and also on the performance and perspectives that demo-cases will demonstrate in their yearly planning and tasks execution. The Steering Committee will be deputed to discuss the proposals and to take the decisions in terms of funds allocation.

Also the two Plenary ESM events (at M7 and M12) will be organised in cooperation with external initiatives such as EEN, Watify, etc.. Their scope and industrial impact well fits with the intent of such initiatives, as already pre-discussed in some preliminary contacts established for the preparation of the present 2017 Action plan.

Considering the principles above described, the following table indicates a preliminary split for 2017 budget:

	Indicative Vanguard funds budget allocation
Pilot Coordination	31.200 €
Demo-case Eu meetings	15.000 €
ESM Plenary meetings	5.000 €
Shared Actions (20%)	12.800 €
Total Budget	*64.000 €*

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Indicative Vanguard funds budget allocation

- Pilot Coordination
- Demo-case Eu meetings
- ESM Plenary meetings
- Shared Actions (20%)
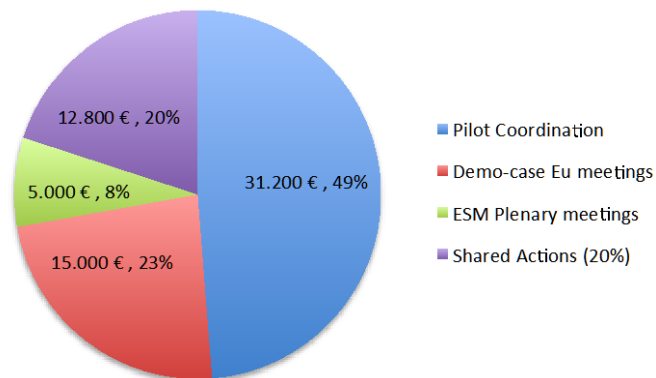
Based on this preliminary budget planning, the effective distribution of funds to pilot coordinators (for the coordination task at ESM pilot level), to demo-case coordinators and partners (for the travels/meeting costs for European cooperation) and for the organisation of plenary and other events, will be decided on-going during the year. This will be done on the basis of the effective efforts, relevance and impact of activities, as well as of unpredictable circumstances that may affect ESM financial management (such as the availability or non-availability of external funds for meetings, decisions to merge or close some demo-cases, etc.). Periodic reporting of ESM Pilot coordinators and demo-case coordinators, based on the formats and KPI system that will be introduced, will allow to monitor such efforts and events affecting final funds allocation. The ESM steering Committee will be responsible to decide about final funds allocation when necessary, based on the content of periodic reporting.

6. Monitoring and Evaluation

The monitoring and evaluation of ESM 2017 activities will be based on the reports that will be delivered by ESM pilot coordinators and demo-case coordinators (see the deliverable list in Table 1), as well as of the KPI system that will be adopted. A draft version of performance indicators was already designed and shared with demo-case coordinators in 2016. It includes indicators in the areas of demo-cases partnership, governance and output:

Partnership

- Total Number of potential/target Vanguard Regions identified in the partnership
- Total Number of potential/target non-Vanguard Regions identified in the partnership
- Total Number of Vanguard Regions currently involved in the Demo-Case
- Total Number of non-Vanguard Regions currently involved in the Demo-Case
- Total Number of technology suppliers identified as potential partners of the demo-case
- Total Number of technology suppliers committed as current partners of the demo-case
- Regional split of committed technology suppliers
- Total Number of end-users identified as potential partners of the demo-case
- Total Number of end-users committed as current partners of the demo-case
- Regional split of committed end-users

- Total Number of Industrial Associations identified as potential partners of the demo-case
- Total Number of Industrial Associations committed as current partners of the demo-case
- Regional split of committed Industrial Associations
- Total Number of RTOs/Universities identified as potential partners of the demo-case
- Total Number of RTOs/Universities committed as current partners of the demo-case
- Regional split of committed RTOs/Universities
- Total Number of Clusters/intermediaries identified as potential partners of the demo-case
- Total Number of Clusters/intermediaries committed as current partners of the demo-case
- Regional split of committed Clusters/intermediaries

Governance
- Number of demo-case leaders committed
- Affiliation of demo-case leaders
- Number of structured regional working groups
- Total Number of physical regional meetings organised in 2016 involving demo-case stakeholders
- Total Number of virtual regional meetings organised in 2016 involving demo-case stakeholders
- Total Number of physical meetings organised in 2016 involving demo-case stakeholders at European level
- Total Number of virtual meetings organised in 2016 involving demo-case stakeholders at European level

Output
- Concept defining the enabling technologies on which Regions want to focus
- Concept defining industrial application processes supported by the identified enabling technologies
- Number of addressed industrial processes
- List of addressed industrial processes
- Concept defining industrial sectors in which identified processes are applied
- Number of addressed industrial sectors
- List of addressed industrial sectors
- Relevant pilot infrastructure indentified in the Regions as a starting point
- Value added compared to the existing pilot infrastructure identified in the concept
- Multi-regional cooperation identified in the concept
- Business plan elaborated at regional level
- Business plan elaborated at european level
- Business plan presented to financial Institutions
- Number of submitted project proposals derived from the demo-case network
- Number of funded project proposals derived from the demo-case network

According to 2017 work plan, such a system of performance indicators will be further detailed and confirmed at the beginning of the year.