

Appendix C – Draft Call Texts

NMBP-xx-20xx: Promoting alternatives to problematic chemicals used in formulated products

Main AceForm4.0 Recommendations addressed:

1: *Prioritise CR&D call themes aligned to ‘formulation-centred Key Market Growth Opportunities’*

6: *Promote and explore innovative ways to stimulate investment into disruptive Circular Economy businesses*

Specific Challenge:

Complex formulated products such as pharmaceuticals, medicines, cosmetic creams and gels, detergent powders, processed foods, paints, adhesives, lubricants and pesticides are ubiquitous in everyday life. The design and manufacture of formulated products is a highly significant value-adding step, with a value multiplier ranging from around 3 to 100. There is an estimated emerging global market of around € 1400 bn.

The formulation industries span across a variety of industrial sectors. Despite each of these sectors have their own specific market growth opportunities, their gradual shift towards a more Circular Economy is, in the short term perspective, collectively and effectively driven by regulations and the banning of the use of problematic chemicals. Typically consisting of at least 10 ingredients, inherently unstable and designed to balance properties through different stages of its life-cycle, formulated products are very challenging when it comes to substitution of specific ingredients. Joining efforts across industrial sectors to identify and test alternative chemicals will not only enable time and cost savings, but will help build stronger cases and enable a smoother transition towards products with a more “circular” profiles.

Scope:

Proposals should focus on the reduction or elimination of the use of problematic chemicals in formulated products. Problematic chemicals or ingredients may include those that are on their way of being banned by e.g. REACH normatives.

Appart from the identification and screening of alternative chemicals, the proposals should also promote and enable the use of formulated products free of problematic chemicals by actively engaging regulatory bodies as well as increasing consumer producer awareness.

Expected Impact:

- Earlier, smoother and more cost effective transition to alternative, non-problematic ingredients in formulations.
- Shorter product development cycle for formulated products with a more “Circular” profile.
- Mobilisation of European industries to achieve global leadership in producing formulated products within the context of Circular Economy.

Type of Action: Innovation

Alignment to Horizon Europe (draft themes):

- Natural Resources – Resource efficient and circular systems with zero pollution

NMBP-XX-20XX: Industry 4.0 for Radical Formulated Product Design

Main AceForm4.0 Recommendations addressed:

9: Prioritise CR&D calls that promote the application of i4.0 technologies to enable Radical Product & Process Design

Specific Challenge:

Formulated products are typically produced in very large volumes, have very fast innovation cycles (often months) with high levels of product differentiation, and generally do their job by deforming (changing structure) at just the right time, under just the right conditions e.g. chocolate melting on your tongue; paint spreading on a wall. They are also produced from chemical feedstocks that can be highly variable in their composition from batch to batch. As such, formulated products are generally designed and delivered to an average user case and environment, and with limitations on access to relevant data to inform design decisions. Therefore innovations are often constrained and scenarios where product quality is compromised can be unpredictable e.g. regional differences in water hardness can effective detergent performance, or an unseasonable rainstorm can wash away and negate the effect of a fungicide on a farmer's field. However, the promise of industry 4.0 and in particular horizontal integration, presents a radical opportunity for formulated product design, development, manufacture and delivery to be a fully integrated, data-rich and autonomous process, connecting all parts of the product life-cycle. By harnessing Industry 4.0 technologies, product and process designers can deliver better effects, predictable performance and resource efficient processes by leveraging more insights and value from data, knowledge and know-how relating materials science / chemistry / physical processes to final product applications and associated target physical attributes.

Scope:

Proposals should focus on the development and integration of industry 4.0 technologies to enable radical approaches to formulated product design, moving beyond 'business as usual'.

Proposals must address applications in the Formulating Industries; advanced materials are in scope where the focus is on the mastery of an intermediate formulation step.

Research to understand underpinning mechanistic behaviour is in scope; but applicants must demonstrate how this activity will be additive to the primary objectives.

The commission considers that proposals requesting a contribution from the EC between € 4 and 10m would allow this specific challenge to be addressed appropriately.

There is no prescribed number of partners, but the commission would typically expect broad involvement from across the relevant value chains / cycles.

Expected Impact:

- Demonstration of technologies in near real-world context.
- Radical acceleration of development cycles. >50% faster.

Type of Action: Innovation

Alignment to Horizon Europe (draft themes):

- Health – Data-driven digital transformation of Health and care
- Digitising and Transforming Industry and Services

- Natural Resources – Resource efficient and circular systems with zero pollution

NMBP-xx-20xx: Value Chain Digitalisation for Complex Formulated Products: From Concept to Market

Main AceForm4.0 Recommendations addressed:

3: Prioritise CR&D calls that promote extended value chain/cycle collaboration

9: Prioritise CR&D calls that promote the application of i4.0 technologies to enable Radical Product & Process Design

Specific Challenge:

Nowadays, the world is in full digital transformation. The implementation of Industry 4.0 technology is growing. Fast moving and attractive market like finance and security already implemented advanced technology such as smart sensor, artificial intelligence or big data models. Formulated product industry is still a step behind. Along the value chain, the connectivity and information collection is not sufficient to accelerate and improve the performance of the product. However, almost all technologies are now available (sensors/smart packaging/automation/AI/big data) and could be apply to connect the formulated product value chain.

Scope:

Proposals should focus on initiatives implementing Industry 4.0 technologies in the formulated product value chain. Collaboration from partners with “know-how” in formulation technologies and/or Industry4.0 technologies will benefit the innovative potential and capabilities of diverse industrial sectors, relevant in both SMEs and large corporations in the following domains:

- Extensive data collection on product development along the value chain to accelerate product design and improve robustness and performances of formulated product.
- Connection of value chain actors through digital technologies to optimize formulated product value chain and minimize ecological impact of product design, scale-up and supply chain.
- Application of Industry4.0 technologies on value chain to generate case studies and attract I4.0 actors on the formulated products market.

The consortium should be at least composed by one internationally known research center, two SME's and two companies producing formulated products coming from a different sectors.

Activities may include the identification of the common scientific and industrial cross sectorial research and innovation challenges and propose and implement direct solution coming the combination of partners know-how.

Priority will be given to proposals involving at least three sectors, such as Chemical, Pharmaceutical, Agrochemical, Food Science and Medical Technology, consumer goods etc.

Involvement from at least three internationally recognized research establishments within the European Union is encouraged.

The Commission considers that proposals requesting a contribution from the EC between EUR 500 000 to 1 000 000 would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Rational development of sustainable developed products and processes;
- Structuring and integration of value chains in the field of design and manufacturing of formulated products as a significant value added step leading to reduction of costs and time to market;
- Increase the interest of European I4.0 actors for formulated product market, and facilitate the access to technology to formulated product companies.

Type of Action: Research and Innovation

Alignment to Horizon Europe (draft themes):

- Digitising and Transforming Industry and Services

ICT-xx-20xx: Zero-defect production in the field of formulated products

Main AceForm4.0 Recommendations addressed:

9: Prioritise CR&D calls that promote the application of i4.0 technologies to enable Radical Product & Process Design

10: Influence wider Industry 4.0/digitalisation calls; maximising relevance to Formulation industries.

Specific Challenge:

Complex formulated products such as pharmaceuticals, medicines, cosmetic creams and gels, detergent powders, processed foods, paints, adhesives, lubricants and pesticides are ubiquitous in everyday life. The design and manufacture of formulated products is a highly significant value-adding step, with a value multiplier ranging from around 3 – 100. There is an estimated emerging global market of around € 1400 bn and currently EU has a strong and competitive advantage in formulation.

In order for Europe to maintain a global leader, there is a need to further improve the production, based on the progress within digitalisation and Industry4.0, and move towards zero-defect production. Zero-defect production means that no output or products outside of specifications will reach customers or the next step in the value chain. Thus, the production process and equipment need to be monitored, the input to as well as output from production process steps should be measured, and process parameters monitored. This continuous quality control and process monitoring is in contrast to batch quality control, and will detect out of specification output almost immediately instead of at the end of the production process where quality control commonly is enacted.

Scope:

Proposals should focus on and facilitate zero-defect production in the context of formulated products:

- Technologies for zero-defect production in terms of software, hardware, and sensors (i.e. various types of cyber-physical systems combined with scalable software solutions). Cybersecurity is an important aspect of the technologies and should be part of the design to not open up the production process for cyberattacks as being further digitalised;
- Approaches, methods and best practices to improve the production processes and enable new enhancing technology to be implemented and adopted;
- Integration of production- and product information along the value-chain. Information from previous production steps in a value-chain should be collected and made available together with the output and made available for the next step in the values chain. Scalable and secure cloud services and block-chain technologies should be considered for management of the information.

Activities may include the identification of the common scientific and industrial cross sectorial research and innovation challenges through the development of a shared vision and common roadmap.

Priority will be given to proposals involving a value-chain from one the three sectors, such as Chemical, Pharmaceutical, Agrochemical, Food, Pulp & Paper, Packaging, etc.

Involvement from at least three internationally recognized research establishments within the European Union is encouraged.

The Commission considers that proposals requesting a contribution from the EC between EUR 4-6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Rational development of sustainable developed products and processes;
- Energy savings of at least 10%;
- Less wasted raw materials of at least 10%
- Structuring and integration of output related information along value chains in the field of production of formulated products
- Mobilisation of European industries to achieve global leadership in producing formulated products within the context of Industry 4.0 and the Circular Economy.

Type of Action:

RIA (TRL 3-5) or IA (TRL 5-7)

Alignment to Horizon Europe (draft themes):

- Digitising and Transforming Industry and Services

NMP-xx-20xx: De-risking shift of Formulation Industries to Circular Economy through the use of tools to model the impact in case studies.**Recommendations addressed:**

6: Promote and explore innovative ways to stimulate investment into disruptive Circular Economy businesses

7: De-risk shift to Circular Economy by improving access to relevant collaborative tools to model impact

Specific Challenge:

Complex formulated products are ubiquitous in everyday life. The design and manufacture of formulated products is a highly significant value-adding step, with a value multiplier ranging from around 3 to 100. There is an estimated emerging global market of around € 1400 bn. The formulation industries span across a variety of industrial sectors. The formulation community had a good appreciation of the Circular Economy and how it might be relevant to them. However, beyond this awareness, the evidence suggests that the practical application of Circular Economy principles is more limited. Overall, there is an absence in assessing and approaching challenges from a holistic, whole-life cycle approach that is true to circular economy principles.

One of main barriers identified towards the implementation of the Circular Economy is the lack of access to relevant collaborative tools for modelling different types of impacts, namely i) Value Chains/Cycles modelling, ii) Environmental Impact, iii) Societal Impact and iv) Business Models. Many of the tools that meet these descriptions do exist. As such, in the first instance, much progress should be made simply through better awareness and sharing of available tools. It should however also be noted that there is still an expectation that future development work will be required. In particular, to address issues including: making tools cost effective, making tools user-friendly for non-experts, enabling clear communication on trade-offs made, enabling multi-partner collaboration and data-sharing.

Scope:

Proposals should focus on bridging the gap between formulators and sustainability/Circular Economy experts by involving the latter in the project consortium.

Proposals should address the selection of case studies generic enough to be of relevance to at least three industrial sectors.

The proposals should include the devising of a communication strategy aiming at the dissemination of project results (open access database for formulators)

Expected Impact:

Mobilisation of European industries to achieve global leadership in producing formulated products within the context of Circular Economy.

Type of Action: Innovation

Alignment to Horizon Europe (draft themes):

- Natural Resources – Resource efficient and circular systems with zero pollution

NMP-xx-20xx: Development and/or reformulation of products to enhance sustainability and help drive Europe towards a Circular Economy.**Recommendations addressed:**

1: Prioritise CR&D call themes aligned to ‘formulation-centred Key Market Growth Opportunities’

6: Promote and explore innovative ways to stimulate investment into disruptive Circular Economy businesses

7: De-risk shift to Circular Economy by improving access to relevant collaborative tools to model impact

Specific Challenge:

Complex formulated products are ubiquitous in everyday life. The design and manufacture of formulated products is a highly significant value-adding step, with a value multiplier ranging from around 3 to 100. There is an estimated emerging global market of around € 1400 bn. The formulation industries span across a variety of industrial sectors. There are growing number of businesses in Europe focusing on the development of formulated products that are increasingly more sustainable. These businesses can face significant challenges in attracting investment for new product development and further challenges in adoption of the products by downstream industrial users and consumers.

As such there is a need to encourage innovation and adoption in this space by in particular by small medium –sized enterprises and mid-cap enterprises for the development and commercialisation of highly sustainable products, in particular in application areas where ingredients can readily find their way into the environment and compromise the ecosystem, biodiversity and/or human health such as personal care products, detergents and coatings.

Scope:

Proposals should focus on new formulated product development along with detailed economic viability and sustainability analysis. This may include the development of new sustainable and/or bio-degradable ingredients, address issues related to packaging, development of new product formats that will aid sustainability of the product and address issues relating to the adoption of the product by downstream industrial users and/or consumers.

Expected Impact:

Mobilisation of European industries to achieve global leadership in producing formulated products within the context of Circular Economy.

Development of sustainable formulated products and their manufacturing processes

Type of Action: Research, Development and innovation

Alignment to Horizon Europe (draft themes):

- Natural Resources – Resource efficient and circular systems with zero pollution