PACKALL

PackAlliance:
European alliance for innovation training
& collaboration towards future packaging

R3.3 – List of challenges for collaborative projects

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Glossary of terms, abbreviations and acronyms

Abbreviation / Acronym / Term	Description
CE	Circular Economy
CHAINs	CHAllenges INnovation teams. Collaborative teams of students of the PackAlliance postgraduate programme to work on a specific industry challenge
EACEA	Education, Audiovisual and Culture Executive Agency
HEI	Higher Education Institution
PackAlliance Hubs	Physical places where the academia-industry collaboration within the project will take place
WP	Work Package

Partner shortname	
P1-Campus Iberus	Partner 1 - Campus Iberus (Spain)
P2-Ecoembes	Partner 2 - Ecoembes (Spain)
P3-AGH	Partner 3 - AGH University of Science and Technology (Poland)
P4-Synthos	Partner 4 - Synthos Group (Poland)
P5-TAMK	Partner 5 - TAMK Tampere University of Applied Sciences (Finland)
P6-Pyroll	Partner 6 - Pyroll Group (Finland)
P7-Proplast	Partner 7 - Consorzio per la promozione della cultura plastica - Proplast (Italy)
P8-UNISA	Partner 8 - Università degli Studi di Salerno (Italy)

1. Introduction

This document will provide the list of collaborative challenges that all partners have proposed. This document gathers the challenges that will be established in order to implement collaborative projects (CHAINS) within the final training module of the pilot postgraduate programme.

The PackAlliance project (funded by Erasmus+ Knowledge Alliance programme in 2020-2022) intends to contribute to modernising the Higher Education curricula by enhancing its alignment with the labour market needs of plastics packaging. The Knowledge Alliance project brings together academic and industry partners from Spain, Poland, Finland, and Italy, in order to foster academia-industry collaboration for innovation and competence building in innovative and sustainable packaging. This is seen as a key element for the transition to the circular economy (CE) within the plastic packaging industry.

2. List of challenges for collaborative projects

This document contains the list of challenges that the partners have defined in order to solve by the CHAINS in the final stage of the postgraduate programme. CHAINS will allow students to apply the knowledge acquired into real cases that will be proposed by businesses related to plastics packaging.

All students of the postgraduate course will be grouped into CHAINS, which will be tutored collaborative teams of students to work on the specific industry challenge for a period of 2 months. These teams will be integrated into the PackAlliance hubs (WP4- Implementation of PackAlliance Hubs networking and innovation actions): challenges will be launched by the hubs industry members and each team will be assigned academic & industry tutors from the hubs.

The following challenges are proposed by the partners.

2.1 Spain (Ecoembes & Campus Iberus)

Industry Mentor: Ecoembes
Academy Mentor: Campus Iberus

Challenge 1

How might we show effective environmental information for citizens in the packaging labelling?

Challenge motivation

Currently, the citizen does not have enough information to make decisions taking into account environmental criteria of plastic packaging. We must look for what information would be relevant to the citizen and would influence their buying habits.

Expected outcomes

Design guide for implementing a label with environmental factors that citizens understand and influence their buying habits.

Challenge 2

How might we improve design of multimaterial packaging making it easier to separate it after its use at home?

Challenge motivation

Currently, multilayer and multimaterial packaging are used for packaging products, the use of different materials makes their recyclability difficult.

We seek to generate a guide so that the packaging industry can improve the eco-design of its packaging and increase the flow of recycled materials available in the market.

Based on an analysis of the current situation and with the technical knowledge acquired during the program, a series of good practices will be proposed. For example, how to avoid packaging that mixes paper and plastic and that it is not possible to separate them at source.

How to propose new designs that make the citizen separate the different materials to be able to consume the product, facilitating its correct triage.

Expected outcomes

Eco-design good practice guide to facilitate the separation of packaging components.

Prototypes and renders of new solutions developed following this guide with respect to current cases.

Challenge 3

How might we induce citizens to separate cans and plastic bottles at home, separately from other packaging?

Challenge motivation

Identify those key factors that can make it easier and more attractive for citizens to separate into different bags depending on the packaging type (at home). Depending on the sorting needs of each country.

Expected outcomes

Report with key data and hypothesis validation with a proof of concept.

Challenge 4

How might we recirculate self-adhesive label's production waste into new uses?

Challenge motivation

Tons of self-adhesive label's production waste are generated every year; this plastic is not being reintroduced in high added value products even if its pureness is elevated and its production is localized in factories.

It is the aim of this challenge to find new possibilities, ideate new solutions and test the potential of them.

Expected outcomes

Different alternatives for its reintroduction based on the technical limitations, production quantities and market trends.

Proof of concepts and reports about its potential.

2.2 Italy (Università di Salerno & Proplast)

Industry Mentor: Proplast
Academy Mentor: University of Salerno

Challenge 1

Is it possible to produce high barrier solutions for packaging films with improved sustainability?

Challenge motivation

Nowadays most of the polymeric films for high barrier packaging are produced using multilayer laminated systems often containing incompatible polymers and difficult to recycle. We therefore want to look for a new solution that uses new materials, including biodegradable ones, capable of ensuring adequate performance for oxygen-sensitive products.

Expected outcomes

Identification of single-layer systems based on polymers, on polymer blends or on blends of polymers and organic or inorganic fillers potentially usable in the field of food packaging.

Challenge 2

How a proper eco design strategy could induce consumers to be actively part of the packaging waste management?

Challenge motivation

Consumers deserve to know more about how they can unlock hidden value for themselves, and for the environment. Our policies will help consumers identify and access more sustainable products characterized by a specific packaging. Consumers should be helped in the management of packaging end-of-life. Thus, there is the need for a proper packaging design, although in the case of multimaterial packaging, which allows to easily separate the materials and to properly dispose of them.

Expected outcomes

Improve a multi material packaging characterized by a clear distinction of the materials used also having parts produced by different technologies, such as:

- Multi-material cap or dispenser (moulded by injection) + bottle
- Chocolate box having 3 level of packaging (primary, secondary and tertiary) propose a solution more environmental friendly able to “speak to the customer”

Challenge 3

Is it possible to produce frozen food packaging using more sustainable materials?

Challenge motivation

Currently packaging for frozen foods must be characterized by good mechanical resistance at low temperatures. Therefore polyolefin-based polymers produced from non-renewable sources are used.

The challenge is represented by the analysis of alternative solutions using materials characterized by a more favourable carbon footprint for the environment.

Expected outcomes

Proposal for rigid or flexible packaging systems with a demonstrated greater sustainability respect to the systems currently used for frozen foods.

Challenge 4

Are there eco-friendly alternatives to the materials used for ready-to-cook products?

Challenge motivation

Packaging systems for products to be cooked in a microwave or standard oven must withstand temperatures reaching and exceeding 100 °C. This is achieved by using aluminium (for the oven) or different kinds of polymers in the case of microwaveable systems.

But is it possible to produce cooking-compatible food packaging systems using alternative materials?

Expected outcomes

Identification and evaluation of alternative packaging systems to the current ones.

Evaluation and demonstration of greater sustainability of the selected systems.

Challenge 5

What is the best strategy to increase the amount of plastic collection and recyclability?

Challenge motivation

EU proposals aim to boost recycling targets, create jobs in the green industries and tackle food waste in order to transform the current linear economy into a circular economy and promote sustainable growth.

Among the stated goals: increased packaging recycling (60% by 2020, 70% by 2025, 80% by 2030). Other stated targets include 90% recycling for paper and 60% for packaging made of plastic by 2025 as well as 80% for packaging made of wood by 2030.

Expected outcomes

Create a new model for recycling with the aim to facilitate consumer attitude to recycling and help the waste management system to reach the 2030 objectives.

2.3 Finland (TAMK & Pyroll)

Industry Mentor: Pyroll
Academy Mentor: TAMK

Challenge 1

How might we improve the recyclability of a multilayer packaging material without losing the barrier properties or reducing its self life?

Challenge motivation

Entire packaging industry is seeking solutions for improved material efficiency. Options like monomaterials, increasing fiber content and further are considered.
How will the SUP directive impact?
How will country specific legislation impact?

Expected outcomes

Come up with alternative improved solutions for selected example packages that are currently made of multilayer materials
Justify the solutions from many angles.
Groups can select example packages e.g . from store depending on their interests and explore their materials, their properties and requirements.

Challenge 2

How might we improve the energy efficiency of the packaging producing process?

Challenge motivation

Currently the assessment of environmental impacts of packaging are focused on the materials selection and final product. However, there may be a need for additional process steps in making a new packaging from sustainable materials.

There may be room for simplifying and streamlining to the production process itself and thus improve the energy efficiency and sustainability. Reducing materials pathway is approaching the limits.

Expected outcomes

New quantified energy saving possibilities in the process.

You may arrange for example excursions, expert interviews etc.

Challenge 3

How might we reduce the environmental impacts of packaging printing?

Challenge motivation

There are several alternatives for the printing of packaging. A lot has developed in colour separation techniques and printing inks recently.
Volatile organic compound (emissions are created as packagings are printed with inks containing organic solvents). As customers desire visual packages, the amount of ink used may be significant and thus also the VOC emissions from the printed packages. It is desirable to minimised the VOC emissions due to safety reasons and stricting regulations.

Expected outcomes

Mapping of printing methods and comparison of their environmental impacts.
Analysis of a case products printing and find improvement possibilities.

Challenge 4

How might we find clever ways to comply with SUP directive's goal of decreasing the amount of packages?

Challenge motivation

What all impacts the multitude of different packaging sizes?
What potential is there to reduce their amount?
What problems may arise?
What differences are there between countries?
Who is the decision maker of packaging sizes in the value chain and how to effectively communicate in the value chain?
What is the impact of reducing the amount of food waste?

Expected outcomes

Clarify the potential impacts of reducing the amount of packages and ideate ways to realise the reduction in a clever way.
Could we find best practices by exploring trends in different countries? Eg. Take minced meat packaging in different countries as an example case.

2.4 Poland (AGH University of Science and Technology & Synthos)

Industry Mentor: Synthos
Academy Mentor: AGH

Challenge 1

How might we increase the share of bio-based polymers as alternatives of synthetic plastics in production of eco-packaging materials?

Challenge motivation

According to the latest market data compiled by European Bioplastics in cooperation with the Nova-Institute, global bioplastics production capacities are set to increase from around 2.11 million tonnes in 2020 to approximately 2.87 million tonnes in 2025. The bioplastics market still has a niche character. Therefore, there is a need to define factors directly influencing the increase in the share of bioplastics in the packaging segment.

Expected outcomes

- Assess the opportunities, benefits and challenges of the bioplastics as replacements for plastics for single-use and re-use packages.

- Surveys and interviews with producers and suppliers of bioplastics, packaging producers, consumers and organizations representing the packaging industry

Challenge 2

How we might implement innovative technologies for chemical recycling of plastics on an industrial scale?

Challenge motivation

The development of the packaging segment in the circular economy is closely related to the improvement of plastics recycling technology in the direction of improving the properties of recyclates and increasing the number of circularity.

One of the recycling methods that meets the above requirements is chemical recycling of plastics consisting in depolymerization of post-consumer plastic to monomeric structures that can be used, among others in the process of producing a new polymer. This type of recycling is still in the development stage, which prompts the analysis of the possibilities of entering the stage of mass application.

Expected outcomes

- Estimation of technological, economic and environmental benefits of increasing the scale of chemical recycling of plastics

- State of the art of technological innovations in the processes of chemical recycling of plastics

Challenge 3

How can we maximize circularity of high-quality recycled plastics for production of food-grade packaging materials?

Challenge motivation

Packaging made of recycled materials is an important element of the circular economy. It seems important to estimate the possibility of using recycled plastic in packaging for contact with food. Standardization and certification of such packaging is related to technological innovations in the field of manufacturing packaging materials, including microplastic-free.

Expected outcomes

- Identify quality requirements for recycled plastic for food packages
- Assess the availability of recyclates with functional and processing properties for the production of food-grade packaging materials.
- Discernment of EU legislation in the field of the use of recyclates in food packaging.

Challenge 4

How we might affect on an improvement of the marketplace of biodegradable packaging in connection with the green transformation of enterprises?

Challenge motivation

The packaging industry is the main recipient of biodegradable plastics, with a share of nearly 60%. According to the Allied Market Research report, the biodegradable plastics market is growing, predicting that its market value will increase several times by 2026. However, it is still dominated by Asian countries. What are the opportunities for increasing the value of the European market?

Expected outcomes

- Estimate the domestic and European market demand for biodegradable packaging.
- Find out for which packaging segments biodegradability is an added value.
- Build examples of circular cooperative value-chain for biodegradable packaging

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PROJECT CONSORTIUM

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