PACKALL

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

R7.6 – Policy Recommendations Report

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1 Introduction

Currently, Europe as well as the whole world, face many major challenges which require fast and concrete actions at all levels of society. These missions include topics related to circular economy in general and plastic packaging in particular. In the case of plastic packaging sector, solving the challenges require engagement of all stakeholders of the value chain. However, for effective engagement and successful dialogue, efficient ways to upscale and upgrade the knowledge base are needed.

Summary of the main policy recommendations:

- Mainstream circular economy and sustainability in the pedagogical choices, teaching and learning, and encourage adopting versatile teaching methods to adapt the training contents to the HEI curricula
- Promote the soft skills together with substance to build the educational offer
- Equip new criteria for validation of the customised education
- Intensify dialogue between triple helix stakeholders (universities, industry and policy makers) for identification of new needs

1.1 PackAlliance project and its objectives

The European alliance for innovation training & collaboration towards future packaging (PackAlliance) project, funded by Erasmus+ Knowledge Alliances, has effectively responded to the needs to renew the educational offer of universities across Europe in the packaging sector. The built-in collaboration of academic and industry partners across four different European countries, namely Spain, Italy, Poland, and Finland, has highly contributed to the education landscape of future packaging professionals.

The main deliverables of the PackAlliance project, namely the new curriculum modules, PackAlliance Hubs and the CHAINS Programme, provide extensive addition to this landscape and are publicly available on the project webpage to be scaled up European-wide: https://www.packall.eu/.

The recommendations of the report pay reference to the work, outputs, and experiences of the PackAlliance project, and more specifically compiling the work of project partners while performing the analysis of the most relevant EU and national policies and strategies as well as their considerations regarding the sustainability of the project results. In addition, the Roadmap to HEIs also serves as an important, more detailed reference (Dryglas 2022). Additionally, a dedicated questionnaire was prepared and shared among all partners to collect their input regarding the four policy recommendations of this report.

1.2 Aim of the Policy Recommendations report

This Policy Recommendation report will summarise the outcomes of the project with specific emphasis on policy-level recommendations at the European level. The report will also highlight some important topics and considerations in the national policy levels of Spain, Italy, Poland, and Finland.

With our recommendations, we want to address the decision makers at all levels responsible for education, research, and sustainability policies. The report will be publicly available as pdf and disseminated among the stakeholder networks of the partners to raise awareness on the future policies and their implementation.

2 Relevant policies at EU and national levels

Reflecting the results and experiences of the PackAlliance against the most relevant policy framework at European and national levels is of utmost importance in making the change happen in practical settings. Therefore, the most relevant policies and strategies related to both education and circular economy, especially for the plastic industry in the countries of the participating partners, were identified. In addition, the inclusion of the CE and education related to CE, especially in the context of plastic industry, in Smart Specialization Strategies (RIS3) must be emphasized to ensure that the policymakers at all levels are aware of the skill needs of the future.

2.1 Policies related to education

One of the cornerstones of the **European Union** is to address common challenges with a genuine value base, building on excellence and inclusion. The higher education sector is in a unique position in building the bridge between education, research, and innovation for greater impact for society, economy, and environment

The main educational policy framework at the European level consists of the European Education Area (EEA) and the European Research Area (ERA), in synergy with the European Higher Education Area. Additionally, the most relevant policy documents include e.g. “A New Skills Agenda for Europe” for strengthening sustainable competitiveness, social fairness, and resilience. The main objective of the “Renewed EU agenda for higher education”, besides providing highly skilled Europeans with excellent prospects for employment, is to increase the quality, connect the education to the community, and foster innovation and competitiveness towards the Twin Transitions goals of the EU.

At national **EU Member State (MS)** level, the education policy owners mainly consist of ministries responsible for higher education and research (Italy: Ministry of Education, University and Research; Spain: Ministry of Education and Research: Poland: The Ministry of Science

and Higher Education; Finland: Ministry of Education and Culture). In addition to the governmentally guided ministries, there are various organizations and networks responsible for individual policy implementations such as quality and accreditation. Additionally, in some Member States, regional stakeholders and even individual research centres are also involved in designing the delivery of education.

2.2 Policies related to the packaging sector within circular economy

The **European Green Deal,** designed and accepted by the European Union, sets the framework for all European policies targeting the ultimate climate neutrality objectives and sustainable growth. Within it, as important building blocks of the Green Deal, the most relevant policy documents adopted by the EU for the circular economy (CE) in general and plastic packaging sector in particular include the Circular Economy Action Plan (2020) and the European Strategy for Plastics in a Circular Economy (2018).

In **EU Member States**, the CE policies and guidelines for their implementation are either concentrated under the jurisdiction of one single ministry, or the policy decisions are a joint effort of several ministries (Italy: Ministry of the Environment and Energy Security & Ministry of Economy and Finance; Spain: Ministry of Ecological Transition and Demographic Challenge of the Government of Spain; Poland: The Ministry of Economic Development and Technology and The Ministry of Climate and Environment; Finland: Ministry of the Environment). In addition, in many MSs, regional stakeholders such as regional councils and initiatives also play an active role in defining circular economy and environmental policies, e.g. in Regional Specialization Strategies (RIS).

As the topics envisaged by the policies related to the climate change and circular economy are constantly increasing in both importance and emergency, the traditional governmental structures of ministries are often struggling with the complexity and cross-disciplinarity of these topics. Additionally, in many countries, the political and governmental programmes are in constant change due to democratic election processes, which cause discontinuities and even controversies in setting the common long-term goals and the roadmaps for their shorter-term implementation.

3 Policy recommendations by the PackAlliance project

The following policy recommendations expressed by the project partners attempt to describe a set of recommendations for academic staff and decision makers from higher education institutions (HEI). The focus is on the adaptation of the higher education (HE) curricula with tailored training content for acquisition of competences and skills relevant for the CE transition within the plastics packaging sector. The recommendations also address proposals of new criteria for validation of training programmes and integration of such curricula in the HEIs'

educational offer. The policy recommendations are based on the analysis of the results of the development and implementation of the PackAlliance pilot training programme. The overall objective is to provide the policymakers an action framework to transform the pilot programme results to concrete actions for updated education offer, upskilling professionals' competences, and industrial collaboration in the plastic packaging circularity.

3.1 Adaptation of the HEI curricula with tailored training content

- *Take a holistic perspective. Consider the whole value chain when adapting the tailored training programme to the HEI curricula with the aim to support the transition towards CE of plastic packaging*

Packaging was one of the first sectors of EU to focus on the shift towards circular economy with concrete measures to stimulate the transition. In addition to legislative and policy motivation, there are other trends and drivers to consider, such as initiatives from companies and associations, which are stimulating the transition towards more sustainable and circular food packaging at national, EU and global level, as well as increased consumer awareness and demand for more sustainable packaging.

- *Mainstream circular economy and sustainability in the pedagogical choices, teaching. and learning, and encourage adopting versatile teaching methods to adapt the training contents to the HEI curricula*

Based on the development of the pilot training, the need for suitable pedagogical choices, and generation the unified view of conception of learning, teaching, evaluation, and addressing competences was observed. To support the systemic circular transformation across the whole plastic packaging value chain, incorporating novel teaching methodologies such as blended learning and dual training is recommended for deep learning. The adaptation of the training contents to dual learning systems, the implementation of problem-based methodologies, as well as problem-solving in multidisciplinary work groups in real environments, should also be considered to fill the gap between academia and companies and facilitate the development of the students' competences.

- *Engage multidisciplinary stakeholders and collaborators from the industry and encourage transversal competence*

Integration of a practical and theoretical curriculum, with instructors from both business and academic field is recommended. The training as such should focus on industry needs and include practical work and innovation alongside the theoretical parts. Collaboration between students with different professional backgrounds should also be encouraged. Practical issues, such as unifying the learning modules to show a unique format and promotion of teacher collaboration and peer support in implementing the teaching modules should also be considered.

- *Support the educators' training and resources*

The use of multidisciplinary learning modules and learner-centred methodologies sets different requirements for researchers and professionals from different institutions. Educators may also need support and resources for example, in digitalisation, upskilling digital and pedagogical tools, as well as helping them in learning and adopting new teaching methods. Resources and funding should be available for higher education institutions and academic staff to acquire circular competences and to enable the transition to a circular mindset.

- *Develop clear procedures for adopting versatile ways of lifelong learning and visibility of achieved competences: micro-credentials and open badges*

Higher education has traditionally been grounded in structured curricula and ECTS, formal learning. Lifelong learning, however, often means upgrading one's skills and competences without curricula-based studies leading to a formal qualification and a degree. This holds true especially for people from working life who often do not have possibilities for long-time studies. Additionally, rapid changes and deviations in the operational environment and global situation requires resilience and quick responses, and often requires versatile and agile ways of upskilling one's knowledge and competences.

One way to increase agility and flexibility in lifelong learning are micro-credentials, the "certified small volumes of learning" (MICROBOL 2022). They are small entities of education where a learner is provided with specific competences or knowledge that addresses the working life needs. Due to its modularity, PackAlliance training could serve as an interesting candidate for micro-credentials, if it could be divided into even smaller parts within the modules. However, unaddressed aspects concerning micro-credentials remain and more work needs to be done before they can be implemented in European higher education. In this respect, good examples and practices of micro-credentials and their frameworks developed e.g. in New Zealand and Ireland should be identified and reflected.

Another consideration is how skills and competences are recognized and made visible. Open badges are an interesting and quite novel approach for identifying and promoting competences (Korhonen et al 2020). They are tools to recognize competences achieved in many different situations and enable the recognition independently on how the competence was achieved. Open badges have criteria for learning objectives, assessment, and skills demonstration. The assessment of customized short-time training required by the industry and working life suits well for assessment with open badges and should be considered.

3.2 Validation and integration of new curricula in educational offer

- *Promote the soft skills together with substance to build the educational offer*

The key for the sustainable and circular transformation is in training qualified professionals equipped with specific skills, such as ability to innovate, to adapt current solutions and/or to

create new ones by implementing circular approach along the entire packaging value chain. The plastic packaging industry suffers from a shortage of professionals with appropriate skills in sustainable packaging and there is a clear need for market-oriented education and training. The critical themes recognised create the proposed foundation of the HEIs' educational offer: Circular Economy and Packaging, Recyclability of Materials, Packaging Eco-Design, Biodegradable and Compostable Packaging, Regulatory Aspects, New Technologies in Food Packaging, and Citizen and Consumer Engagement.

In the circular economy of plastics, public funding for the research, development and innovation activities of higher education institutions should be focused. In addition, building networks and ecosystems with stakeholders from both the private and the public sector should be emphasised. The type of a new curricula and educational offer developed during PackAlliance project cannot be implemented as such in the HEI curricula as the EQF (European Qualification Framework) 5 level was adopted for the pilot training. National EQFs do not currently support the EQF 5 level training.

- *Increase the visibility of the competences obtained*

To identify the skills and competences achieved, the procedure for obtaining an international diploma following the certification of the partners should be developed. As mentioned previously, it may also be relevant to consider of recognizing the learning achievements by digital open badges, if they are clearly defined and granted through a competency-based evaluation process based on certain criteria following e.g. the recommendation on joint degrees based on Council Recommendation on building bridges for effective European HEI's cooperation (2022).

3.3 New criteria for validation of training programmes and their integration in the educational offer of HEIs

- *Equip new criteria for validation of the customised education*

New criteria for validation of the training programme might be assessed by the extent these programmes are able to equip students with new competencies for the circular economy, such as:

- systems thinking, which is the ability to collectively analyse complex systems across different domains (society, environment, economy, etc.) and across different scales (local to global)
- strategic competency, which is the ability to collectively design and implement interventions, transitions, and transformative governance strategies toward sustainability
- anticipatory competency, which is the ability to collectively analyse, evaluate, and craft rich 'pictures' of the future related to sustainability issues and sustainability problem-solving frameworks.

In addition, different stakeholders involved (education and training, industry, public sector) should be appointed to provide a critical judgement on new training programmes. The academic collaboration between various university faculties, public, and private stakeholders can be considered as a quality standard for validation. A cost-benefit analysis of the implementation of training programmes might be considered. The new criteria for validation of the training programme might also include recognising the minimum knowledge requirements for participants prior to participating in a program and the evaluation of the teachers' background.

3.4 Inclusion of competence and skills needs identified by the industry

- *Intensify dialogue between triple helix stakeholders (universities, industry and policy makers) for identification of new needs*

The main challenge for the transition of the plastic packaging sector towards circular economy concerns the lack of high qualified professionals, oriented towards innovation, and equipped with multidisciplinary skills, capable of managing the changes required by the transition to more sustainable packaging models in the near future. The most critical training needs can be summarised as follows:

- need to fill the competence gaps on performance and processability characteristics of bioplastics, currently not yet comparable with those of traditional plastics, especially as regards high barrier and high temperature applications, and full compatibility with conventional converting technologies
- need to be able to correctly evaluate the overall environmental impact of packaging, considering its entire lifecycle "from cradle to grave," and to develop effectively environmentally sustainable packaging
- need to know how to communicate the degree of sustainability and the real environmental impact of a packaging in a clear and effective way to allow the consumers a more conscious choice
- need to have appropriate guidelines, to be harmonized throughout the country, relating to the management of the end of life of packaging, which constitute an address for eco-sustainable design of packaging
- need to have to knowledge of digital modelling, simulation and screening of materials properties, materials development and production processes
- need to have knowledge of good design principles combined with synergy between advanced materials, circularity, digital technologies and technological innovations
- need to be able utilize digitalization of manufacturing methods for designing safe and sustainable plastic-based packages
- need to have competence of the product's uses throughout its entire LCA process
- need to have competence for ability to create a mass and energy balance of installations in order to find places that can optimize the consumption of raw materials, energy, water and reduce emissions.

More research should be conducted on the demand for skills for a lifelong learning framework for upskilling and reskilling. Knowing which skills and competences will be needed in the future by the industry will help preventing skills mismatch. Competences and skills need by the industries must be assessed by the industries through their active participation in the university council when new training contents are decided.

All triple helix stakeholders should be engaged and active in constant dialogue on transversal skills in packaging solutions. These stakeholders should also possess sufficient capacity to understand the value chain, the complex interdependencies and have the ability for critical thinking about the new packaging solutions.

- *Improve collaboration and dialogue between ministries for larger societal, economic environmental, and climate-neutral impact*

On both EU level and nationally in most member States, the policies regarding skills, education, and research on the one hand and those related to green transition, circular economy and plastic packaging circularity are discussed and decided in various institutions such as Directorate Generals and ministries. The expertise and decision-making powers are distributed in various instances who are not always aware of the current status, needs, and interdependencies in their complexity. Therefore, more communication channels and direct dialogue between these instances would greatly pave the way for unified understanding of the challenges as well as the solutions needed to reach them in both short and long-term (Bianchi et al. 2022).

4 Conclusions

These practical policy recommendations are intended to provide support and advice to decision-makers at all levels, including policy makers, public administrators, and leaders of education institutions. The aim is to facilitate evidence-based policies leading to actionable, cost-effective, and acceptable changes in current educational policies.

The value chain of plastic packaging needs a deep transformation in the perspective of sustainability and of the Circular Economy principles to stop the environmental pollution caused by the huge quantities of waste produced by this sector all over the world. A key aspect for this transformation is training qualified professionals with specific skills able to innovate, adapt current solutions, and/or create new ones by implementing circular economy approaches along the entire packaging supply chain. Nevertheless, the plastic packaging industry is affected by a shortage of professionals with appropriate skills in sustainable packaging technologies and processes. Hence, it is crucial to provide with market-oriented high education and training for students and professionals in the area of sustainable plastic packaging.

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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 short name	
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 - Univeristà degli Studi di Salerno (Italy)

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