

"DEFINING THE CONVENING QUESTIONS"

The first stage of the SIMBIO project 'Defining the convening questions' (Figure 1) was aimed at identifying key activators, drivers and barriers to the application and co-creation of packaging eco-innovations. It also focused on bio-packaging supply chain management as well as the life cycle management of packaging produced from bio-based and biodegradable polymers, taking into account the circular economy principles. To meet all these goals, extensive dialogue with the key stakeholders of food bio-packaging supply chains in Poland was carefully designed and conducted.

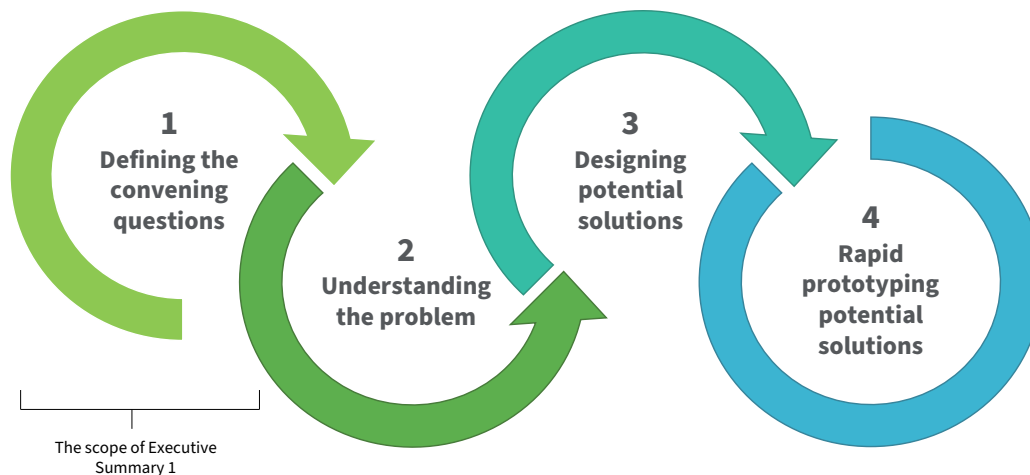


Figure 1. The four stages of the SIMBIO project

In the 1st stage of the project SIMBIO several tasks were performed which are all presented in Figure 2. The starting point for the research and development activities was a systematic literature review concerning the supply chains of bio-packaging. The review took into account the following international scientific databases: Web of Science, Springer Link, Scopus, Proquest, Ebsco, Wiley, Science Direct. Two keywords were used ('compostable packaging' and 'supply chain'), which resulted in the collection of 98 scientific publications. The analysis allowed the identification of the current state of knowledge on the supply chains of bioplastics packaging and on the understanding of such terms as: bioplastic, biodegradable packaging, compostable packaging. The key conclusions are as follows:

- the terms 'bioplastic' and 'biodegradable packaging' are differently defined in the literature, while 'compostable packaging' is defined clearly based on technical standards.
- most scientific articles are published in technical sciences, only a few papers are published in social sciences and present the issue of managing supply chains of bio-packaging.
- the dominant view in the literature is that bio-packaging is mainly used in the food and medical sectors. There are no references to the role of bio-packaging and its environmental, social and economic impact on supply chain management.

Subsequently, steps were taken to conduct a broad dialogue with the project's stakeholders. After a detailed market analysis, invitations to participate in extensive dialogue were sent to both internal and external stakeholders of bio-packaging supply chains. The qualitative research covered two meetings. The first meeting was mainly informative and aimed at making a joint decision on starting a partnership relationship with the stakeholders in the project. The second meeting was a unique discussion focused on identifying the current and future conditions for the development of the bio-packaging market in Poland. Consequently, 29 individual in-depth interviews (IDIs) were conducted with such stakeholders as: the suppliers of raw materials and bioplastics, packaging manufacturers, packaging distributors, consumers, organisations for standardisation and certification

of materials and packaging, waste management entities, public administration institutions at central and local levels, non-governmental entities as well as scientific and research institutions. The stakeholder representatives were mainly company owners, directors, managers, specialists and clients. All tasks included in the 1st stage of the SIMBIO project were completed between 01/09/2020 - 30/04/2021.



Figure 2. Tasks completed in the 1st stage of the SIMBIO project

Key research findings

Based on the in-depth analysis of the collected qualitative research data, key futures of the bio-packaging market and the conditions of its development in Poland were identified:

- The market demand for food bio-packaging is systematically growing in Poland. Its scale and nature are mainly determined by economic, legal, social and environmental factors. Stakeholders estimated that there will be an increase in demand for biodegradable and bio-based food packaging in the future. These stakeholders are aware of the opportunities and threats related to the development of the food bio-packaging market.
- The compostable packaging sector is a segment of the food bio-packaging market with significant potential for future development in the light of the circular economy principles. Compostable packaging is both biodegradable and bio-based, and its important feature is the possibility to recycle organically to close the life cycle in the most environmentally friendly way. However, this sector is currently a niche in the food packaging industry in Poland.
- Building relationships between internal and external stakeholders of bio-packaging supply chains is the foundation for the development of the bio-packaging market in line with the circular economy principles. The group of main internal stakeholders include suppliers of raw materials and bioplastics, packaging manufacturers and distributors, business clients, individual clients (customers) and waste management entities. The group of key external stakeholders is formed by public administration institutions at central and local levels, non-governmental entities (different types of associations and NGOs), standardisation and certification organisations for materials and packaging as well as scientific and research institutions.
- The main barriers to increasing the market share and to managing the circular life cycle of bio-packaging are as follows: the properties of bio-packaging (especially compostable packaging) limiting its usefulness and destiny for food as well as competitiveness in relation to plastic packaging, economic, social and legal barriers, the lack of a well-developed waste management infrastructure to close the bio-packaging life cycle and the limited environmental responsibility of enterprises.
- It is worth highlighting the key activators and factors supporting the development of the bio-packaging market (including compostable packaging) in Poland, which are: creating and implementing various types of social innovations (product, process, technological, organisational or marketing innovations), educating society about the different types of packaging and the benefits of separate packaging waste collection, increasing

social environmental responsibility, developing the system of legal regulations and technical standards for the certification of packaging, supporting the development of responsible entrepreneurship as well as developing a sustainable waste management system.

Main conclusions and recommendations

According to the results of the literature review and empirical research, conclusions and recommendations were formulated from the multi-stakeholder perspective.

1.

There is an urgent need to pay more attention to the management of the entire life cycle of food bio-packaging towards circularity. The ecological function of food packaging is becoming increasingly important, and eco-design is a significant approach to its future development.

2.

In order to achieve efficiency in the use and closure of the food bio-packaging life cycle, it is necessary to educate consumers and provide them with reliable and clear information by packaging and food suppliers, producers or distributors. External stakeholders of bio-packaging supply chains e.g., schools, universities, public administration institutions or NGOs can also play an important role in educating society across all generations.

3.

On the Polish market, it is necessary to standardise and disseminate product terminology in order to clarify the definitions and the specificity of both biodegradable and compostable packaging, and to effectively reduce and counteract market greenwashing in the middle and long-term perspective.

4.

There is a need to change from a dominant reactive attitude to a proactive approach of stakeholders to taking action towards packaging circularity. The implementation of more pro-development instruments is crucial for the proactive exploration of opportunities. The investment incentive system should effectively encourage enterprises to invest, among other areas, in the research and development of eco-innovations, to increase the share of composting packaging in the market offers and to conduct business in the field of packaging waste management.

5.

A holistic and integrated approach both at the level of strategies and decisions of the central government administration as well as regional and local government authorities is of strategic importance for the development of the circular economy model. The foundation is the introduction of clear and consistent legal regulations concerning the circular packaging economy. The effective implementation of the circular economy principles requires a network and relational approach to building the responsibility of internal and external stakeholders of bio-packaging supply chains.

After the diagnosis of the bio-packaging market, the second stage of the SIMBIO project 'Understanding the problem' was planned to analyse the problems for the use of bio-packaging in Poland.

PROJECT OVERVIEW

Title: New Frontiers in Social Innovation Research: Social Innovation Management for BIOPlastics

Acronym: SIMBIO

Keywords: social innovation, circular economy, bioplastic, packaging, supply chain

Project aim: to develop social innovation to address the challenges in applying bioplastic packaging in food supply chains, for a circular economy

PROGRAM

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PROJECT WEBSITE

www.simbioresearch.com

