

LATVIAN CONSUMERS AND INDUSTRY INSIGHTS ON SUSTAINABLE PACKAGING

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Abstract

Each EU citizen generates an average of 190 kg of packaging waste annually, with projections indicating an increase to 209 kg by 2030. In 2022, the European Commission proposed a regulation to reduce packaging waste, promote reuse, and encourage sustainability across all packaging. This paper explores the perceptions and attitudes of Latvian consumers and packaging industry representatives towards sustainable packaging. Using both qualitative and quantitative methods, it examines current packaging practices, industry trends, regulatory impacts, and consumer willingness to adopt eco-friendly alternatives. A literature review highlighted environmental concerns, while interviews with six industry experts identified barriers such as cost, unclear standards, and regulatory adaptation. To assess consumer perspectives, a survey of 145 participants from various age groups was conducted. Results show that while many consumers understand the environmental impact of non-ecological packaging, a significant portion is not concerned with the issue and unwilling to pay more for sustainable options. The research culminated in the development of a long-term sustainability model tailored to the Latvian packaging sector. The findings emphasize the need for clearer policy frameworks, enhanced consumer education, and incentives for innovation, as well as the importance of industry adaptation to balance sustainability goals with economic feasibility.

Keywords: *sustainable packaging, consumer behaviour, packaging industry, Latvia, sustainability policy*

JEL Classification: Q53, M31, L66

1. INTRODUCTION

Packaging plays a critical role in protecting and transporting goods and represents a significant economic sector within the European Union (EU). However, regulatory inconsistencies among member states, such as differing labelling standards and definitions of recyclable or reusable packaging have fragmented the internal market (European Commission, 2022).

A growing environmental concern is the increasing volume of packaging waste, particularly plastics. Each EU citizen generates approximately 190 kg of packaging waste per year, with projections estimating this could rise to 209 kg by 2030 if no intervention occurs (European Commission, 2022). This problem is intensified by rapid growth in consumption, especially through e-commerce, contrasted by a simultaneous rise in consumer awareness of ecological and sustainability issues.

In response, the EU proposed a comprehensive regulation on packaging and packaging waste in 2022, aiming to reduce waste, minimize over-packaging, and promote reusable and recyclable solutions. By 2030, all packaging placed on the EU market must be recyclable, with specific types (e.g., coffee capsules) required to be compostable within two years of the regulation's adoption. The regulation also introduces design requirements to reduce empty space, mandates clearer labelling, and sets ambitious waste reduction targets: 5% by 2030, 10% by 2035, and 15% by 2040 compared to 2018 levels (Hodgson, 2024; Duarte *et al.*, 2024).

This evolving regulatory environment demands significant adaptation by producers and is driving innovation and investment in sustainable packaging technologies (Turkcu, Tura & Piscicelli, 2023).

As Dobson (2024) puts it, sustainable packaging reduces environmental impact while still fulfilling its purpose. Whether it's recyclable, reusable, or simply uses fewer materials, any type of packaging, used for displaying, protecting, transporting, or storing products, can be sustainable if thoughtfully designed. Sustainable packaging encompasses a variety of materials and methods designed to minimize environmental impact. Key types include recyclable materials like paper and cardboard, compostable options like corn-starch and mushroom packaging, biodegradable alternatives like plant-based plastics, and reusable containers.

From a business perspective, sustainable packaging is not only about eco-friendly materials, but also about the environmental impact of the packaging production process. Companies are striving to increase resource efficiency, reduce energy and water consumption, toxic emissions, waste generation, and packaging size to reduce environmental pollution

Sustainable packaging research continues to expand significantly in scope and depth, integrating insights from environmental science, materials engineering, consumer behaviour, and policy studies. Sustainable packaging has evolved into a major focus of both environmental policy and industrial innovation. The literature categorizes sustainability into three core pillars – environmental, economic, and social. From the environmental viewpoint, sustainability in packaging is often defined by recyclability, reusability, compostability, and minimal resource consumption (Ibrahim *et al.*, 2022).

Material innovation plays a vital role in improving packaging sustainability. Lin *et al.* (2025) explored consumer perceptions of bioplastic packaging, revealing a positive reception yet limited understanding of disposal requirements. Arriaga *et al.* (2025) reviewed how agri-food waste can be converted into volatile fatty acids and then into PHBV bioplastics, highlighting its potential to replace fossil plastics and support a circular bioeconomy. In turn, Morashti *et al.* (2022) analysed sustainable packaging in supply chains using data mining and interviews, revealing limited early research but growing interest since 2013, especially around circular economy and operational management.

Several researchers emphasize the importance of design and material choice in achieving sustainability. Coelho *et al.* (2020) reviewed trends in reusable packaging, highlighting its potential to reduce environmental impacts while noting the need for further research into design and system-level challenges. Using a supply chain lens, Lekesiztürk and Oflaç (2022) proposed a Sustainable Packaging Practices Model (SPPM), identifying nine key practices and highlighting barriers such as high costs, limited demand, and regulatory challenges. Research by Bocken *et al.* (2016) suggests integrating circular economy principles early in product development. Strategies such as 'design for disassembly' and 'product longevity' contribute to reducing environmental impact.

From a design efficiency angle, Georgakoudis *et al.* (2023) explored packaging re-design through a case study, showing that improved shape and space utilization can reduce waste, emissions, and costs, while maintaining product protection and user needs.

Focusing on consumer behaviour, Lu *et al.* (2020) examined overpackaging in Chinese e-commerce, finding strong support for solutions like packaging optimization, recycling systems, and large-scale packaging, while noting lower preference for material-based changes.

Turkcu, Tura and Piscicelli (2023) examined tensions in biobased packaging production, identifying 20 types of sustainability-related challenges and 12 strategies companies use, such as certifications, partnerships, and LCAs to manage high costs, regulatory gaps, and knowledge barriers.

The literature clearly demonstrates that the transition to sustainable packaging requires collaboration across supply chains, clear regulations, investment in innovation, and consumer engagement. While challenges persist,

the combination of scientific research, business strategy, and public policy offers pathways to more sustainable solutions.

The aim of the research is to explore Latvian consumers' and industry representatives' experiences and opinions on sustainable packaging and to create a model to improve sustainability in the packaging manufacturing sector.

This study used a mixed-methods approach. Six semi-structured interviews were conducted with Latvian packaging industry stakeholders, including representatives from the Packaging Association and manufacturing firms. In addition, a quantitative survey involving 145 consumers provided insights into public perceptions of sustainable packaging. Data were analysed using thematic analysis for interviews and descriptive statistics for survey results.

2. METHODOLOGY

To achieve the research goal, a comprehensive mixed-methods approach was employed, combining qualitative and quantitative techniques. Literature review and interviews with industry experts were used to collect qualitative data. A survey was used to collect quantitative data.

Semi-structured interviews were conducted with six experts, including packaging company representatives and the chairperson of the Latvian Packaging Association. The interviews were guided by questions based on the literature review and focused on industry challenges, sustainable materials, anticipated impacts of EU regulations, consumer education, and the economic viability of eco-friendly packaging. The interviews were recorded, transcribed, coded, and thematically analyzed across eight categories, including sustainable criteria, costs, regulatory impact, and market trends.

In parallel, a consumer survey was conducted to assess public attitudes toward sustainable packaging. The questionnaire included demographic questions, multiple-choice items, Likert-scale evaluations, and an open comment section. A total of 145 responses were collected using Google Forms and distributed via social media and email. The survey sought to measure awareness, willingness to pay more for sustainable packaging, and consumer habits like using reusable bags or shopping at zero-waste stores. Quantitative data were visualized using pie and bar charts, while open-ended responses were grouped by keywords and analysed for recurring themes.

The study concludes with the development of a long-term model for sustainable packaging practices in Latvia, built upon the integrated results of the literature, expert insights, and survey data. This model outlines critical components for sustainable transformation in the sector and serves as the foundation for actionable recommendations aimed at businesses, policymakers, and consumers.

3. RESULTS AND DISCUSSION

3.1. Interviews analysis

To explore industry perspectives on sustainable packaging in Latvia, six expert interviews were conducted with representatives from packaging companies and professional associations: designer, leading technologist, general director, 2 sales department specialists of a packaging manufacturing company, and chairwoman of the Board of the Packaging Association. The advantage of expert interviews is the ability to obtain information that is not available from other sources. Expert interviews also allow for responses to be adapted based on the interviewee's answers and for questions to be adjusted in order to gather the necessary information (Brown, 2020). The interviews were conducted in person, with the conversations recorded for future use and analysis. Using the TurboScribe.ai tool, the recordings were transcribed into text, which was then processed by the author for further use. The average length of interviews is 29 minutes and 54 seconds. Experts' insights were grouped into eight thematic categories to identify consensus, differences, and priorities, i.e. sustainable packaging criteria, costs of sustainable packaging, alternative packaging materials, EU packaging regulation impact, challenges in the packaging industry, packaging waste issues, consumer education, market observations and trends.

Table 1. Expert Citations by Category

Category	Experts citation
Sustainable packaging criteria	<i>"Sustainable packaging must be clearly labeled so people know how to sort it."</i> (25.03.2024) <i>"Sustainable (packaging) is very simple - one is that it can be reused, reused. And the other is (using) a material that can be easily recycled."</i> (Interview, 26.03.2024) <i>"We try to reduce the amount of packaging and use simple materials that can be easily recycled."</i> (27.03.2024) <i>"[...] it is important for us to understand how, at the very end, when that packaging ends up in the trash, what we will do with it, whether it can be recycled or not."</i> (Interview, 28.03.2024) <i>"In my understanding, sustainable packaging is one that can be recycled, that is environmentally friendly, and that can be reused."</i> (03.04.2024)
Costs of sustainable packaging	<i>"The problem is that environmentally friendly packaging is always more expensive, and companies are not always willing to pay this price."</i> (25.03.2024) <i>"Very often, a few cents determine whether a person will choose a sustainable option. [...] Up to 5%, some people are still willing to pay, but if it is more, they will not be willing."</i> (Interview, 28.03.2024) <i>"If the customer is not willing to pay more, then we cannot switch to more expensive but greener packaging."</i> (29.03.2024) <i>"Right now, some (manufacturers) would be willing to even slightly compromise on the quality of their packaging to make it cheaper, not to</i>

	<i>mention that they certainly wouldn't be willing to pay extra for a sustainable solution."</i> (Interview, 03.04.2024)
Alternative packaging materials	<i>"This is a good example of how a by-product can be used as a resource for a new material. [...] But if we specifically grow mushrooms or corn, it is no longer sustainable."</i> (Interview, 28.03.2024) <i>"Coated paper is often not recyclable, but customers don't know that. This creates a false sense of eco-friendliness."</i> (26.03.2024) <i>"Bioplastics are a good idea, but they still have issues with compostability and price."</i> (29.03.2024)
EU packaging regulation impact	<i>"Regulation will force changes in production processes, but this will take time and investment."</i> (26.03.2024) <i>"[...] when the regulation comes into force and by raising taxes on those packaging that are not sustainable, there is a possibility that their prices will level out."</i> (Interview, 28.03.2024) <i>"Regulations will help standardize, but many companies are not ready for these changes."</i> (29.03.2024)
Challenges in the packaging industry	<i>"There is no unified system for implementing sustainable solutions – everyone does what they can."</i> (26.03.2024) <i>"Small businesses will find it very difficult to adapt to the new rules."</i> (27.03.2024)
Packaging waste issues	<i>"Many customers are not aware that composite materials are not recyclable, and this is a big obstacle."</i> (25.03.2024) <i>"We still have problems with multiple materials that cannot be recycled."</i> (03.04.2024)
Consumer education	<i>"A big problem is public ignorance. People don't know how to sort, even if the packaging allows it."</i> (25.03.2024) <i>"People need to be explained what sustainable packaging means and why it is important, because not everyone understands it."</i> (Interview, 27.03.2024) <i>"Without education, even the best packaging will not have the expected effect."</i> (29.03.2024)
Market observations and trends	<i>"Interest in sustainable packaging has grown in recent years, especially in the food and cosmetics sectors."</i> (26.03.2024) <i>"There is still a lot of 'greenwashing'. Many use green colors and names, but the substance is missing."</i> (29.03.2024)

Source: (Authors developed based on the interviews, 2024)

1. Sustainable Packaging Criteria. Experts consistently emphasized that sustainability begins with the end-of-life management of packaging. A truly sustainable package is one that can be recycled, is made of eco-friendly materials, and ideally reusable. Experts highlighted minimalistic design, reduced empty space, and the use of mono-materials as key factors contributing to recyclability and resource efficiency.

2. Costs of Sustainable Packaging. Costs emerged as a major barrier. Experts noted that both manufacturers and consumers often hesitate to absorb the additional expenses of sustainable materials. Some producers expressed a willingness to compromise on quality to maintain price competitiveness. However, there was hope that policy instruments, like environmental taxes, might

help balance costs: “When the regulation comes into force and non-sustainable packaging is taxed, prices might equalize.”

3. **Alternative Packaging Materials.** Alternative materials were discussed with cautious optimism. Interviewees agreed that secondary materials or by-products, like mushroom, based or agricultural waste composites and hold promise. However, skepticism was expressed about materials that require dedicated cultivation, such as corn or fungi, due to environmental trade-offs. One expert noted: “Using waste is sustainable, but growing mushrooms or corn just for packaging is not.”

4. **EU Packaging Regulation Impact.** Experts viewed the upcoming EU regulation on packaging and packaging waste as a necessary but disruptive influence. The regulation is expected to raise production standards and drive change, yet some feared that small producers might struggle to comply. One interviewee highlighted that increased taxes on non-sustainable packaging could push the market toward greener alternatives: “When non-sustainable packaging becomes more expensive, sustainable choices will become more attractive.”

5. **Challenges in the Packaging Industry.** Interviewees noted structural challenges in Latvia’s packaging sector, including limited access to sustainable materials, underdeveloped infrastructure for recycling, and a lack of standardized guidelines. These issues hinder rapid transition, particularly for small and medium-sized enterprises. Moreover, the packaging life cycle, from raw material sourcing to post-use processing, was described as insufficiently integrated.

6. **Packaging Waste Issues.** The problem of waste was another critical topic. Experts lamented low recycling rates, especially for composite materials, and called for better sorting systems. They emphasized the importance of packaging designs that allow easy separation of materials. The inability to fully recycle multilayer packaging was viewed as a major sustainability obstacle.

7. **Consumer Education.** Experts unanimously agreed that public awareness is lacking. One respondent explained: “People need to be told what sustainable packaging is and why it matters, because not everyone understands.” They called for campaigns, labeling, and educational materials to foster behavioral change. It was widely accepted that better-informed consumers could generate market demand for sustainable options.

8. **Market Observations and Trends.** Finally, experts noted that the Latvian market is gradually adapting to sustainability trends observed in Western Europe. There is growing interest among producers and retailers, especially in food and cosmetics. However, there are still concerns about greenwashing and superficial compliance. Experts emphasized that genuine commitment requires not just rebranding but restructuring of supply chains and product development.

3.2. Survey results

The authors conducted a survey to understand consumer opinions and experiences regarding sustainable packaging. The survey was created using Google Docs and distributed via social media and email. The main results are presented below.

Of all respondents, 74.5% are women and 24.1% are men, and 2 respondents did not want to disclose their gender.

The survey was conducted with 145 people aged 18 and over (see Fig.1.).

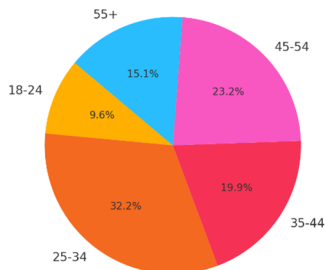


Figure 1. Age distribution of survey respondents
Source: (Authors developed based on the surveys, 2024)

The largest group of respondents (32.4%) is aged 25-34. 23.4% of respondents are aged 45-54. Almost 20% of respondents are aged 35-44. Slightly fewer (15.2%) are 55 and older survey participants. The smallest age group, which makes up only 9.7%, is 18-24 years old.

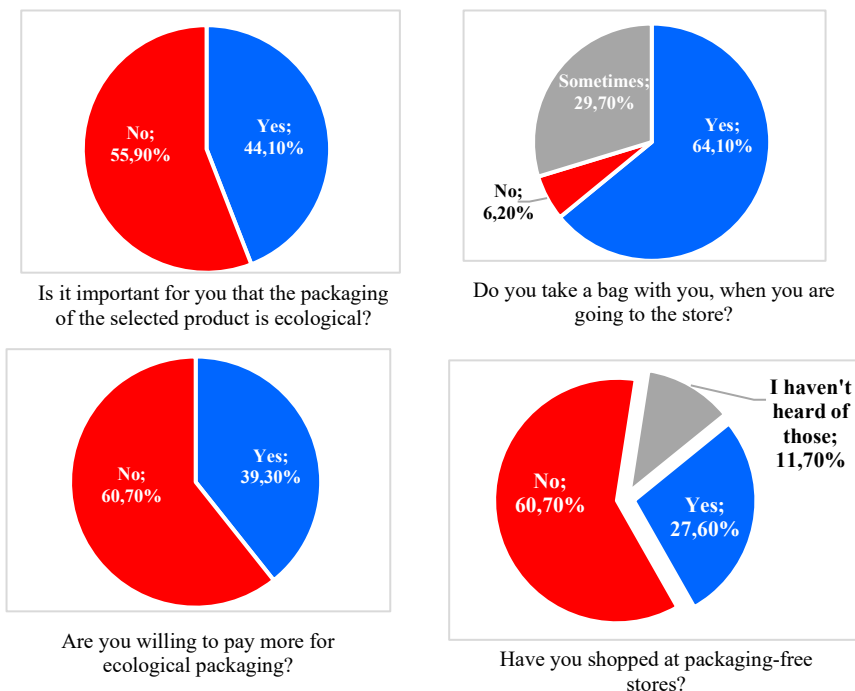


Figure 2. Respondents' answers for survey questions
Source: (Authors developed based on the surveys, 2024)

As presented in Figure 2, almost half of the respondents (44.1%) indicate that it is important for them that the packaging of the selected product is ecological. The rest answer that it is not important for them whether the packaging of the purchased product is ecological. From these results, it can be concluded that the issue of ecological packaging is not popular among consumers, and it is necessary to educate consumers about the impact of non-ecological packaging on the environment.

60.7% of respondents noted that they were not willing to pay more for packaging to be ecological. However, 39.3% of respondents said that they were willing to pay more for ecological packaging, which is slightly less than how many respondents consider the ecological packaging criterion important.

When asked whether respondents take a bag with them when going to the store, the majority, or 64.1%, answered positively. 29.7% noted that they sometimes take a bag with them, and only 9% answered that they do not take a bag with them.

The survey results show that 11.7% of respondents have not heard of packaging-free stores. More than half, or 60.7%, of those surveyed have heard of the existence of such stores, but have never shopped in them. Almost 30% of respondents have experience shopping in packaging-free stores.

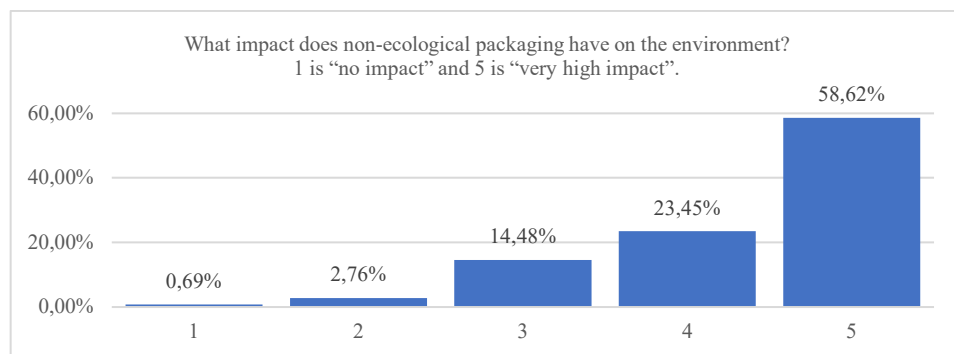


Figure 3. Respondents' views on Packaging Sustainability

Source: (Authors developed based on the surveys, 2024)

More than half of the respondents (58.6%) believe that non-ecological packaging has a very large impact on the environment and 23.4% of the respondents believe that it has a large impact on the environment (Figure 3). Only 1 person from the respondents believes that non-ecological packaging has no impact on the environment, and 4 respondents believe that it has a very minimal impact.

From these results, it can be concluded that consumers understand that packaging has a large impact on the environment, but, taking into account the

answers to the previous questions, the issue of ecological problems is not currently relevant among consumers.

This once again indicates that consumer education is necessary about the impact of non-ecological packaging on the environment.

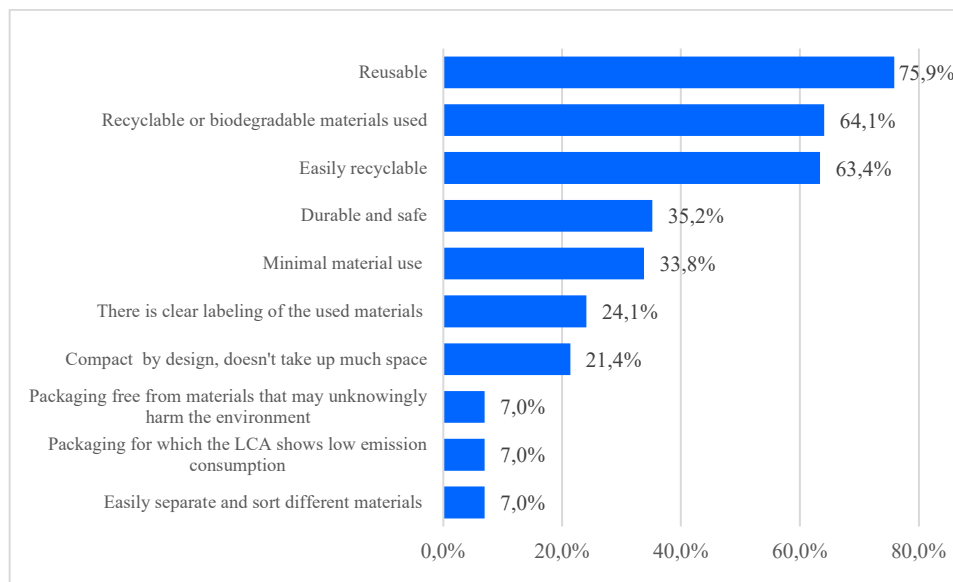


Figure 4. What do you think sustainable packaging is?

Source: (Authors developed based on the surveys, 2024)

Respondents identified several key factors that indicate whether packaging meets the criteria for sustainability (see Fig.4.). A primary indicator is that sustainable packaging avoids unnecessary components that do not serve the core purpose of protecting or containing the product. Minimizing empty space within the packaging is also seen as essential, as it reduces material usage and optimizes transportation efficiency. Another significant criterion is the use of recyclable or compostable materials, ensuring that the packaging can be processed through environmentally friendly waste streams after use. Moreover, all materials used should be easily separable to facilitate effective recycling. Clear labeling is considered crucial, as it informs consumers about the types of materials used and how to dispose of them properly. While reusability is viewed positively and may enhance the overall sustainability of packaging, respondents agreed that it is an optional attribute rather than a mandatory requirement. These criteria reflect a practical and informed consumer understanding of what constitutes sustainable packaging.

3.3. Model development

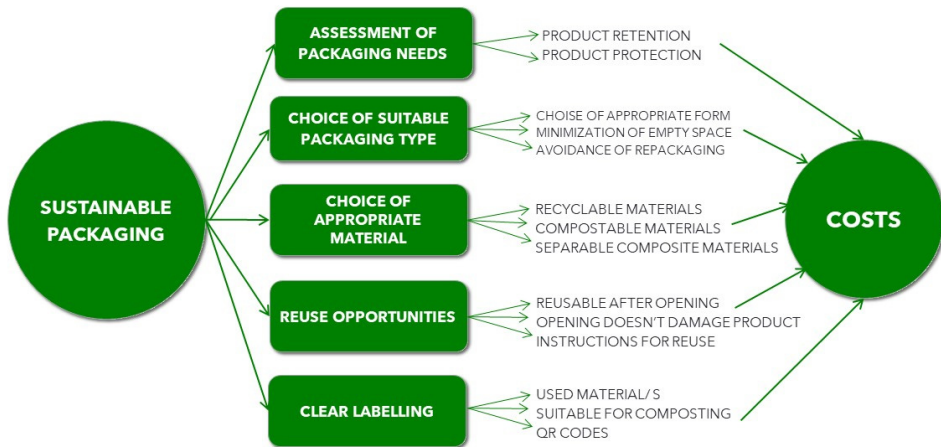


Figure 5. A long-term development model for improving the sustainability of the packaging industry

Source: (Authors developed)

Based on the analysis of the reviewed literature and the data obtained through interviews and surveys, a Long-Term Development Model was developed to improve sustainability in the packaging manufacturing sector (see Fig.5.). The model consists of five stages that must be considered and evaluated when designing new packaging.

The first stage of the model is the assessment of the necessity of packaging. This step is mostly related to primary packaging. Before starting any packaging development process for a new or existing product, it is necessary to understand what function the packaging will serve – whether it is for retaining the product, such as cereals, or for protecting a fragile product from external factors. Some products may not need primary packaging at all, such as reusable bottles.

If it is concluded in the first stage that packaging is necessary, then the appropriate type of packaging must be selected. When designing packaging, a suitable construction for the product must be chosen, minimizing empty space wherever possible. Both the interviews and literature sources often mention repackaging, so the packaging should avoid unnecessary elements to reduce material usage.

The next stage is selecting appropriate materials. According to the proposed EU regulation, all packaging will need to be recyclable, except for plastic, which will have a limited permissible percentage of non-recyclable material per unit. Compostable material use is certainly a sustainable solution. Ideally, packaging should be designed from monomaterials, but if composite materials must be used,

their layers should be separable for further recycling. However, using alternative packaging materials (e.g., packaging made from algae or mushroom mycelium) is currently disproportionately expensive, preventing widespread industrial adoption.

When developing new packaging, it is important to consider the possibilities for reuse, thereby extending the packaging's life cycle. To fulfill this requirement, the packaging and the product must not be damaged during use, and the packaging must continue to serve its function after the product is removed. It must also be clear to the consumer how the packaging can be reused. If this is not obvious, instructions or explanations should be printed on the packaging.

The European Commission plans to introduce a unified labeling system across all EU countries, which will be mandatory on product packaging and corresponding waste bins. To ensure consumers understand what to do with packaging after its life cycle ends, every package must have clear labeling. This should indicate what materials were used so the consumer knows in which bin to place it at end-of-life. It is also important for consumers to know whether the packaging is suitable for household composting.

However, cost must be considered at each stage of development and production, as it affects the final product price. As the survey conducted in this work shows, only about a third of consumers are willing to pay more for sustainable packaging.

The developed model consists of five stages: assessing the need for packaging, selecting an appropriate packaging type, selecting an appropriate material, reusability and clear labelling. Each of these stages should be considered and assessed when designing new packaging. The model can also be used to assess existing packaging for compliance with sustainability criteria. During packaging development, it is necessary to think about how to facilitate the process of sorting and disposing of packaging at the end of its life cycle for the end consumer, so that the packaging can be recycled. The consumer of packaging is the last person who comes into contact with the packaging before its life cycle ends, so packaging manufacturers must do as much as possible to facilitate the process of disposing of packaging for the consumer. As a result, the packaging is designed for recycling. This means that from the first stage of product development, consideration is given to how it will be prepared for recycling and disposal.

4. CONCLUSIONS

Responsibility for packaging waste lies with all participants in the chain, therefore, manufacturers must develop packaging that is easy to sort and recycle, while the end consumer must deliver the packaging waste to appropriate waste bins or compost.

Resources must be invested in educating consumers on waste sorting, as well as on the impact of packaging on the environment.

The expert interviews revealed that sustainable packaging is defined primarily by its recyclability, minimalistic design, and clear labeling. While there is a growing awareness and demand for eco-friendly solutions, cost remains a significant barrier for both producers and consumers. Alternative materials show promise but face limitations in functionality and affordability. The upcoming EU regulation is seen as a critical driver for change, though smaller companies may struggle to adapt. Experts emphasized the need for consumer education, better waste management systems, and cautioned against superficial “greenwashing” trends in the market.

Latvian consumers are becoming more aware of environmental issues, yet economic considerations continue to influence packaging choices. The industry faces structural and economic barriers, but with the right incentives and regulatory support, significant progress is possible. A unified approach involving all stakeholders is essential to drive sustainable innovation in the packaging industry.

Results show that while many consumers understand the environmental impact of non-ecological packaging, a significant portion is not concerned with the issue and unwilling to pay more for sustainable options.

The findings highlight the need for greater consumer awareness and the importance of industry adaptation to balance sustainability goals with economic feasibility.

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