4Recycling – Summary of the interviews' outcomes

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Background and objectives

4Recycling is an innovation ecosystem activity led by CLIC Innovation Oy. It is related to the ‘plastic challenge’. The aim of the ecosystem is to lead and coordinate e.g. R&D& I activities, to develop competencies and to address regulatory challenges.

Expert interviews were conducted to support the design of the innovation ecosystem. The interviewees represented companies for which packaging or package material handling is in a key role in the business. The purpose of the interviews was to help to identify the research and development needs of this sector. A special emphasis was in the packaging solutions of grocery sector.

Company goal-setting

What are the overall goals of your packaging development?

All interviewed companies have set targets for packaging and system development. Many have set percentage-based targets with the time span varying from 2022 to 2035. The various kind of goals has been set: from carbon neutrality and material efficiency to increased use of renewable and recycled materials as well as reusability and recyclability of used packages.

Which of the above objectives is the most important one?

Many interviewees considered all the mentioned goals to be equally important. Recyclability and compostablity related goals were mentioned more often than the goals for increasing the use of recycled materials in packaging.

In general, the commitments made by the company were mentioned as drivers of research and development.

Are the goals published or communicated outside the company?

Basically, all companies have communicated their goals outside via their webpages and various other channels.

Stakeholders and their impact

Which of the stakeholders are posing requirements for your operation?

Almost all the respondents considered customers and authorities or legal bodies as their most important stakeholder.

The company's "customer" is depending on the position of the company it has in the value chain. This means that the customers may be a wholesaler / distributor, retailer, product or service provider (e.g. restaurant) or end customer.

In addition, vendors and own employees were considered important. Some respondents also included industrial federations and public opinion into their list of stakeholders. Companies buying recycled raw materials were also mentioned. Logistics with its demands and systems were mentioned many times.

In principle, the respondents stated that the customers set pressures. Legislation is often coming later than customer demands, but from a historical point of view, legislation was considered to have played a significant role in the development of existing systems.

Transition to bio-based materials (1)

Bio-based packaging:

a) What is your opinion about bio-based packaging in general, and

b) Is bio-based packaging one of your future goals?

For most companies, increasing the share of bio-based packaging was a clear goal since it replaces material of fossil origin.

The bio-based package can be a fibre-package or a plastic package. Fibre-based bio-packaging (cardboard) is already widely used, so there is not much potential to increase the share.

The bio-based packaging is not yet everyone's goal. The reasons for this are sector-specific, but in all cases, there must be an absolute certainty that the package is "suitable" for the purpose. In some applications, ensuring suitability is a long process. The key is to make sure that the product and the packaging do not react with each other. This is measured by a variety of criteria.

Bio-based packaging is in a clear revolution and industry needs a lot of fact-based information and standards based on it, such as standards related to biodegradability or compostability. Some of the existing recycling systems are developed for fossil-based materials (material specifications critical) and those systems need time to adapt.

Data and standards are also needed to compare packaging materials.

Transition to bio-based materials (2)

Bioplastics:

a) What is your opinion about bioplastics,

b) Are they a better or a worse alternative than fossil-based plastics?

In general, companies think that biopolymers represent a positive alternative to fossil-based materials. However, there are clear challenges related the use of the term “bioplastics”. For example, the term does not describe the properties of the material or the recyclability of it. There are still a lot of information needs related to biopolymers.

Transition to bio-based materials (3.1)

Biodegradability as a produce property:

a) **In which products biodegradability is/ will be a desirable product property?**

b) **In which products biodegradability is NOT/ will NOT be a desirable product property?**

Operators avoid the use of the term “biodegradability”. The main reason for this is that the term is considered inaccurate, and in some cases even misleading since biodegradable products may disintegrate into microplastics. The term “compostable” is generally preferred over the term “biodegradable” and there are also standards for it (e.g. EN 13432 or EN 14995).

Interest in the compostability feature depends on the industry and customer needs. Biodegradable materials are not currently considered suitable for e.g. packaging of medicines, chemicals, liquids, products requiring long shelf life and products requiring high product safety. The compostability property, is a desirable property in the case of products where the packaging gets easily transported (or justified to be combined) into the biowaste stream. But there are very many areas where there is no knowledge of suitability like most of the food packaging in different use-cases (e.g. take-away).

Transition to bio-based materials (3.2)

One key uncertainty factor is the recyclability of compostable materials. Some respondents believe that compostable materials are recyclable like fossil materials. For others, uncertainty about that property is a reason not to promote the use of these materials. Opinions also differ as to whether or not composting is considered a recycling method.

An absolute challenge is the fact that different countries and regions have different waste collection and treatment systems that affect operators widely.

Transition to bio-based materials (4.1)

Expected benefits:

a) **Which products would bring most business benefits when being bio-based, are you then meaning fiber-based products or bioplastics?**

b) **Which products would gain the most customer approval when being bio-based?**

From the point of view of companies, the “business benefit” is an entity that must be assessed in terms of the company's various functions and various criteria. In principle, bio-based product property is a business benefit when it improves the whole. Customer acceptance and brand development usually leads to business benefits.

The business benefit or customer acceptance that a company can achieve depends on who their customer or customer’s end customer is. The responses highlight clear differences between the actors. What matters is what is inside the package. Packaging manufacturers are segmented e.g. by customer groups. In this respect, the consumer market has its own special challenges. One challenge is terminology that is immature and unknown or difficult for consumers.

Transition to bio-based materials (4.2)

At its narrowest, the business benefits or customer approvals from the use of bio-based materials can be assessed by whether they lead to additional sales. This can be expected perhaps in case of premium or branded products.

Drivers for development.

What are the main drivers of your development, i.e. the main facilitator for a change?

With a few exceptions, the responses were very similar, but the drivers had different priorities. The key drivers include market and customer trends, legislation and standards, owners' policy and the strategy, in-house expertise and an internal will to improve. The other drivers include price, new material innovations, availability and suitability of new and recycled materials, recycling methods, and consumer expertise.

Enhanced recycling (1)

What do you think about material recycling; what are your goals related to recycling?

Recyclability of packaging materials and increasing recycling rate are major goals for all respondents.

Many have set ambitious numeric targets and some aim to circulate all packaging materials. At the moment, recycling rate of plastic is significantly lower compared to other packaging materials although it is increasing all the time.

What would be needed to improve the recycling of the packaging materials you use/produce?

This is a chicken & egg situation: in addition to recyclable products, proper waste collection and handling systems and markets for recycled materials are needed.

The work requires the development of entire value chain.

Most of the packaging materials from industries and services are ending up as waste and better recycling systems are needed to get domestic raw material into circulation.

Enhanced recycling (2)

Does your thinking concerning recycling differ between renewable and non-renewable materials?

Most of the respondents answered that in principle there is no difference: all materials, including renewable materials should be circulated, and the circular economy of non-renewables should be further developed.

Are there any special challenges, such as multi-layer materials?

Combination / multilayer materials that have been developed for protecting the product are difficult to recycle. The problem is that currently there are no other suitable options available.

Lack of knowledge was also mentioned. This means that sometimes successful recycling requires operators to be familiar with the system.

Co-operation in research and development (1)

Are there any packaging-related development or research projects going on / under planning in your company?

All companies reported they are doing development work and most of them are also involved in the research work. Research activity is affected by the company's size and position in the packaging value chain

Is there any specific a) research needs in this field and b) what kind of networking would this require)?

A very wide range of research topics were listed. Facts-based information is urgently needed to support legislation. There are huge information needs related to biobased materials, in general.

In general, the companies are looking to network with a range of independent bodies and other companies. The whole value chain covering companies from each stage should be represented. Other important participants include researchers, authorities and other relevant institutions. Additionally, one’s own industry should be represented, and an international focus is preferred.

Co-operation in research and development (2)

Would your company be more interested in participating in Finnish R&D?

In principle, all companies are interested to participate but the final answer will depend on many aspects, like the project objectives including results scalability, consortium, costs effectiveness, etc. A big variation is in expectations about how “far” the project should look. This aspect (difference) should be discussed already in the project preparation phase. In addition, international R&D cooperation was expected especially in the case of exporting companies.

For more information on 4Recycling, CLIC Innovation or survey results, please contact

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