THE BUSINESS CASE FOR TACKLING PLASTIC PACKAGING

Inspiring practices from the food & beverage value chain

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Regional Activity Centre for Sustainable Consumption and Production

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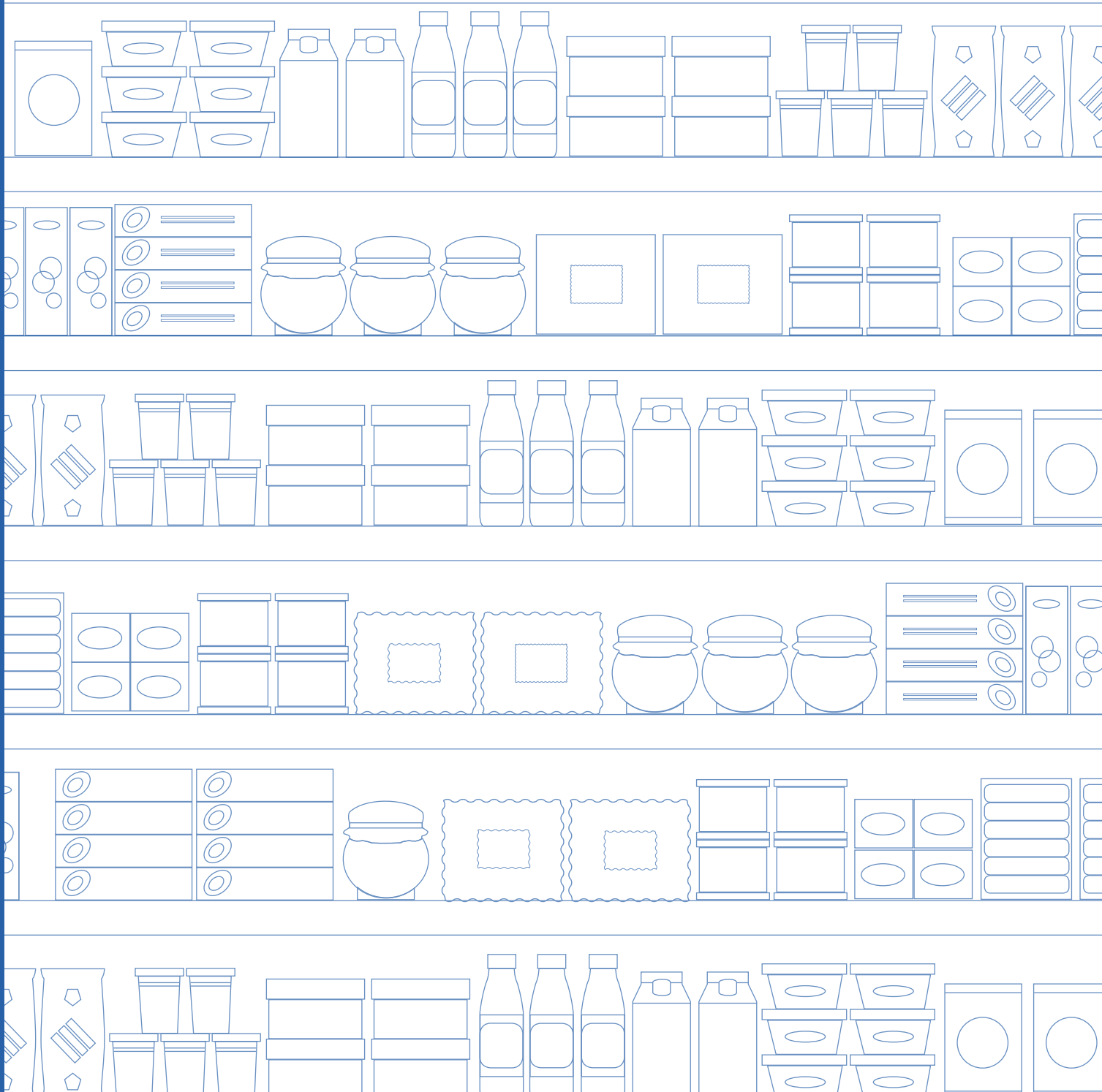

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Foreword

Plastics production has surged over the past 50 years and is expected to double again over the next 20 years.

Packaging is and will remain the largest application: it represents a quarter of the total volume of plastics used. Packaging is crucial to use, protect and distribute products safely and effectively, yet the linear model of *"make - use - dispose"* leads to loss of material value and negative externalities. Each year, at least 8 million tonnes of plastics end up in the ocean. In a business-as-usual-scenario, this means that by 2050 there will be more plastics than fishes in our oceans and seas.[1]

The ***food & beverage industry*** is not only a major user of plastic packaging, it is also a key stakeholder in providing transformational solutions to the problem of plastic waste. It can drive innovations within its own operations, shape the policy set-up within and around their operations, and influence the entire value chain - while exploring different packaging options to reduce plastic usage, to facilitate recycling, and to develop new approaches to eliminate plastic waste.

Within the SCP/RAC mandate in the Mediterranean region, two major strategies converge in this Compendium: the prevention of marine litter and the promotion of green entrepreneurship and circular business models. EBRD has supported this work as part of its mandate to promote transition to green economy in its countries of operation.

We already see companies of all sizes from across the globe develop ***innovative products, services and business models*** centred around re-thinking of their packaging practices, whether is through circular design, choice of new materials, or introduction of resource-efficient technologies and processes within their operations. Such examples are a source of inspiration for others to follow. Companies are also increasingly committing to ambitious plastic pollution reduction targets through global initiatives - to name a few, the European Union Strategy Voluntary Pledge, the Ellen MacArthur New Plastics Economy Global Commitment, and UN Environment's Global Partnership on Marine Litter.

While there is no single, one-size-fits-all, solution to tackle plastic pollution, taking the time to learn the ingredients of successful practices can help companies, small and large alike, try out ideas, navigate difficulties, and minimise the risks of innovation. To assist companies in the food and beverage industry - producers, retailers, and hospitality service providers - this publication offers illustrative examples of success stories about eliminating or reducing the use and waste of plastic in packaging.

The practices collected hereby can be a source of inspiration for entrepreneurs and start-ups, as well as for established businesses. The ***replicability and scalability,*** however, depend on three factors. Firstly, companies need to understand their own plastic footprint, and how its sustainable management can be integrated as part of the broader corporate strategy. A sample of relevant tools for understanding the plastic packaging footprint are included in this publication. Readers can also find a selection of guidelines for the business management perspective – e.g. developing a business-conscious plastics strategy and translating it into an operational action plan.

Secondly, the specific local socio-economic, regulatory and environmental circumstances also play an enabling (or prohibitive) role. The thematic chapters and case studies include relevant analyses of the opportunities and challenges in applying the proposed solutions, so that readers can gain a fuller picture when they assess which practice could be appropriate for their specific purposes.

Last but not least, collaboration within the food & beverage sector and across the value chains is essential. Addressing the plastic issue in isolation is unlikely to drive sustainable change, and companies may even perceive it as a risk to their competitive position unless there is a broader commitment. Pre-competitive initiatives favour knowledge sharing and collective engagement to identify, prioritize and tackle the most meaningful actions on a large scale. That is why some examples of such platforms are included to complement this publication.

This publication is not meant to be an exhaustive manual, but rather ***a source of inspiration and motivation*** to tackle plastic packaging waste through a circular economy perspective. Such approach is now even more needed in the current times of the COVID-19 crisis, which is prompting both consumers and businesses to think of new ways to produce, distribute, purchase and consume things. In the process, companies in the food & beverage sector can discover new pathways to increase their profitability, enter new markets, enhance the skills of their workforce, learn and apply technology more effectively, promote their brand. All in all, grow their business in a sustainable way.

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Acronyms

BSO	Business Support Organisation
BYO	Bring your own
EBRD	European Bank for Reconstruction and Development
EPR	Extended Producer Responsibility
EPS	Expanded polystyrene
EU	European Union
FB	Food and Beverage
GPML	Global Partnership on Marine Litter
HDPE	High-density polyethylene
IoT	Internet of Things
IMELS	Italian Ministry of Environment, Land and Sea
IUCN	International Union for Conservation of Nature
LCA	Life Cycle Assessment
LCT	Life Cycle Thinking
MAP	Mediterranean Action Plan
NIR	Near Infrared technology
PACE	Platform for Accelerating the Circular Economy
PE	Polyethylene
PET	Polyethylene terephthalate
PP	Polypropylene
PRO	Producer Responsibility Organisation
PVC	Polyvinyl chloride
RFID	Radio-frequency identification
ROI	Return on the investment
SCP/RAC	Regional Activity Centre for Sustainable Consumption and Production
SFSC	Short Food Supply Chain
SMEs	Small and Medium Entreprises
UfM	Union for the Mediterranean
UN Environment Programme	United Nations Environment Programme
UNDP	United Nations Development Programme

Introduction

This publication is designed to motivate organisations across the food & beverage value chain to rethink the use of plastic packaging through a circular economy perspective and contribute to the abatement of marine plastic pollution. The proposed case studies show successful examples where businesses have been able to reduce or prevent plastic packaging waste, in line with circular economy principles. By shifting their strategies towards innovative packaging solutions and/or new delivery models, these businesses have also improved their environmental credentials, gained operational efficiencies, unlocked new revenue streams, and created unique competitive advantages.

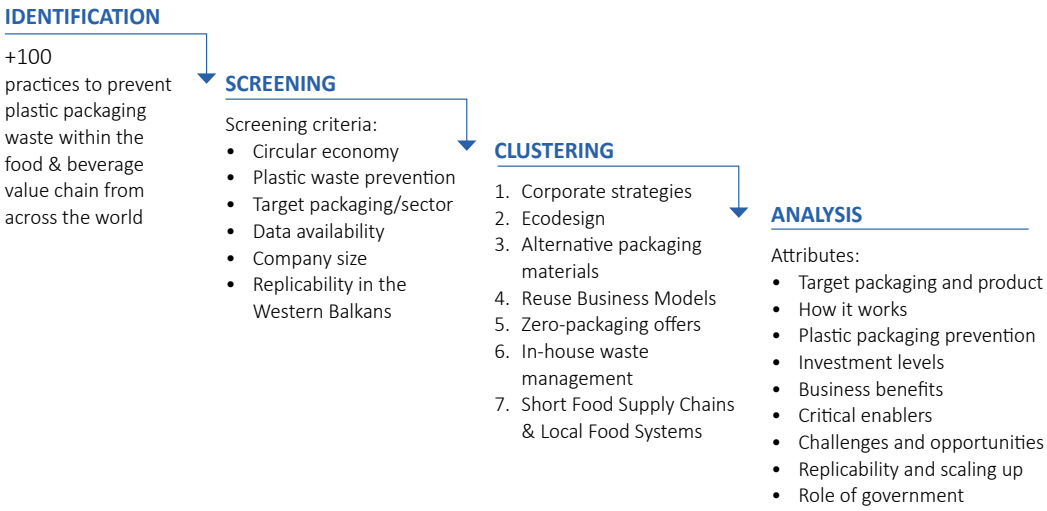
The publication targets the following organisations:

Food and beverage manufacturers/processors and brand owners, retailers
and any intermediate business that makes use of plastic packaging.

Food services/catering industry
that generate waste via the use of (single-use) plastic packaging across their operations (e.g. hotels, restaurants, cafés, delicatessen shops, cafeterias, etc.).

Business support organisations
(e.g., chamber of commerce, etc.) supporting businesses in the transition towards more sustainable plastic packaging solutions.

Four steps were applied to select and describe the business practices included in the publication:



The "Business practices" chapter includes selected business practices covering seven themes:

Corporate strategies	Examples of stand-alone plastic packaging strategies, or of part of broader corporate sustainability policies, developed to address the use of plastics in packaging within a company's operations.
Packaging optimisation through ecodesign	Examples of packaging that has been redesigned by integrating environmental criteria to improve the environmental performance throughout its life cycle, and in particular, to prevent plastic waste generation and littering, while maintaining other necessary functions, including product safety and economic costs.
Alternative packaging materials	Examples of packaging materials alternative to conventional plastics that are considered to perform better in the environment.
Reuse Business Models	Examples of innovative circular reuse business models to deliver food & beverage.
Zero-packaging offers	Examples of organisations that have been successful in designing single-use plastic packaging out of their businesses.
In-house waste management	Examples of in-house packaging waste management to optimise materials use, reuse, recovery, recycling and disposal.
Short food supply chains and local food systems	Examples of systems that have been able to reduce the number of stages between the production and the consumption of food, and thus to reduce the amount of plastic packaging used to safely deliver food & beverage to the consumers.

Each approach is introduced by a brief description of its common features and a set of recommendations on how businesses, particularly Small and Medium Enterprises (SMEs), can replicate and/or scale it up. Examples of successful business practices follow, either summarized in tables or as individual factsheets.

In addition, in the "Resources to get started" chapter, the publication provides a non-exhaustive sample of publicly available resources, including guidelines and tools as well as collaborative initiatives, that can further assist interested businesses in acknowledging and starting to address the plastic packaging issue.

Guidelines & Tools are organized according to the following sets:

- Guidelines for the development of a corporate plastic packaging strategy.
- Packaging audit and Plastic footprint assessment tools.
- Guidelines, reports and tools for packaging optimisation through ecodesign.
- Life Cycle Assessments (LCAs) software tools.
- Supply chain software tools for supply chain networks free from plastic packaging.

As systems thinking and collective efforts can accelerate the transition to a circular economy, new collaborative innovation platform and challenges have been established by innovators, investors and businesses across the globe to drive, sustain and amplify action on plastics and plastic packaging and promote the scaling up of breakthrough innovations. Furthermore, companies across the food & beverage value chain are increasingly acknowledging the importance of NGOs and activist groups as a key constituency in their nonmarket environment. For all these reasons, a sample of ***collaborative innovation platforms and challenges,*** as well as ***NGOs-driven initiatives on plastics and plastic packaging*** is also proposed, in alphabetical order, in the "Resources to get started" chapter.

This publication does not aim to comprehensively capture all relevant business practices, nor rank or rate these in terms of their effectiveness. The practices included in this report only represent a sample of what is available. This report is intended as a starting point in capturing inspiring practices and accompanying resources that can assist food & beverage processors, retailers, hotels, food outlets and their suppliers in moving towards more sustainable use of plastic packaging within their operations, as well as identifying areas that would benefit from further development.

The document is not conceived to be read from beginning to end, but as a working tool for professionals willing to improve the environmental performance of their organisation and who seek inspiration to do so. Different parts of the document will be of interest and will apply to different professionals and at different stages.

This publication was specifically designed to inform and serve as a guide to the Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC) work in support to the food & beverage businesses in three Western Balkans countries: Albania, Montenegro and Bosnia-Herzegovina.
SCP/RAC's intervention develops in the framework of a portfolio of activities, co-funded by the Italian Ministry of Environment, Land and Sea (IMELS) and the European Bank for Reconstruction and Development (EBRD), with the objective of "*Improving the policy framework and engaging with the food & beverage industry in Albania, Bosnia and Herzegovina and Montenegro for tackling plastics packaging value chains in a circular economy*". This set of activities aims at contributing to the identification and prioritization of preventive measures that tackle plastic packaging in the food & beverage industry, by improving the relevant policy framework and strengthening the engagement of businesses and business support organizations (BSOs).

Main definitions

In the framework of this publication, the following definitions apply (in alphabetical order):

Bio-based plastics: Plastics made using polymers derived from plant-based sources such as starch, cellulose, or lignin. Bio-based plastics can be engineered to be biodegradable or they can be made to function exactly like conventional fossil-based plastic (i.e. to have the same durability).[2]

Biodegradable plastics: Plastics that can be broken down into water, biomass, and gasses such as carbon dioxide and methane. Biodegradability depends on environmental conditions such as temperature, humidity, microorganisms present, and oxygen. Biodegradable plastics can be either fossil-based or bio-based.[3]

Compostable packaging: A packaging or packaging component is compostable if it is in compliance with relevant international compostability standards and if its successful post-consumer collection, (sorting), and composting is proven to work in practice and at scale.[4]

Life Cycle Assessment (LCA): Compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle.[5]

Material recycling: Reprocessing, by means of a manufacturing process, of a used material into a product, a component incorporated into a product, or a secondary (recycled) raw material; excluding energy recovery and the use of the product as a fuel.[6]

Packaging: All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. If an item is integrated into packaging and intended to be used and thrown away with it, it is still considered as packaging. An item is not considered to be packaging if it is either: i) part of a product and is necessary to preserve, contain or support the product during its lifespan and use, e.g. tea bags and pots for house plants intended to stay with the plant throughout its life; a disposable item designed to be used at the point of sale which does not fulfil a packaging function, e.g. drinks stirrers and plastic cutlery.[7]

Packaging waste: Any packaging or packaging material covered by the definition of waste in Directive 75/442/EEC, excluding production residues.[8]

Packaging waste management: The management of waste as defined in Directive 75/442/EEC.[9]

Plastic: A material consisting of a polymer as defined in point 5 of Article 3 of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which can function as a main structural component of final products, with the exception of natural polymers that have not been chemically modified.[10]

Polymers: Any of a class of natural or synthetic substances composed of very large molecules, called macromolecules, that are multiples of simpler chemical units called monomers.[11]

Prevention: The reduction of the quantity and of the harmfulness for the environment of: i) materials and substances contained in packaging and packaging waste, ii) packaging and packaging waste at production process level and at the marketing, distribution, utilization and elimination stages, iii) in particular by developing "clean" products and technology.[12]

Recyclable packaging: According to the Global Plastics Outreach Alliance[13], a packaging or a product is considered recyclable if it meets the following conditions:
- The product can be processed and reclaimed/recycled with commercial recycling processes.
- The product must be made with a plastic that is collected for recycling, has market value and/or is supported by a legislatively mandated program.
- The product must be sorted and aggregated into defined streams for recycling processes.
- The recycled plastic becomes a raw material that is used in the production of new products.
In the context of the New Plastics Economy Global Commitment, a packaging or packaging component is considered recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale. A package can be considered recyclable if its main packaging components, together representing >95 per cent of the entire packaging weight, are recyclable according to the above definition, and if the remaining minor components are compatible with the recycling process and do not hinder the recyclability of the main components.[14]

Recycled content: Proportion, by mass, of post-consumer recycled material in a product or packaging.[15]

Repulpable: Suitable for repulping, which is the conversion of paper back into pulp.[16]

Reusable packaging: A packaging which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse.[17]

Single-use plastic packaging or product: A packaging or product that is made wholly or partly from plastic and that is not conceived, designed or placed on the market to accomplish, within its life span, multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived.[18]

Why businesses should address the use of plastic packaging

Plastic is often the material of choice in delivering a safe food & beverage supply, from farm to table, in a cost-effective way that satisfies industry requirements, maintains food safety, and maximises consumers' convenience.

In 2016, it was estimated that plastic packaging volumes will double within 15 years and more than quadruple by 2050, to 318 million tonnes annually [19], almost the volume of the global plastics production in 2018 (estimated to 360 million tonnes [20]). In 2017, flexible and rigid plastic packaging held the first and second largest share of the global packaging market, with 39 and 28 per cent respectively.[21]

While delivering many benefits, plastic packaging also generates negative externalities. The greatest source of marine plastic litter is mismanaged plastic waste - material that is either littered or inadequately disposed.[22] [23] In the Mediterranean, food & beverage packaging and plastic bags (together with cigarette butts) account for over 80 per cent of litter stranded on beaches. This is largely land-based litter from recreational/tourism activities and household-related waste.[24]

As typically designed to be disposed of right after use, often in few minutes, plastic packaging is one of the main plastic waste generation sector accounting for 46 per cent of global plastic waste generated in 2018.[25] Globally, only 2 per cent of plastic packaging is recycled back into packaging.[26] The vast majority of plastic packaging ends up landfilled, incinerated, or in the environment. In a business-as-usual-scenario, it is estimated that by 2050 there will be more plastics than fishes in our oceans and seas (by weight).[27]

In view of the above, as intensive users of plastic packaging, businesses across the food & beverage value chain are likely to face significant business risks [28]:

Legislative risks

Legal and policy measures regulating plastic packaging are rapidly evolving. Businesses are thus called to anticipate regulations to avoid future industry implications. This is especially relevant for Albania, Bosnia and Herzegovina, and Montenegro, considering EU approximation and accession processes. Local companies will have to comply with an increasing number of measures to curb plastics and plastic packaging waste generation and improve plastic packaging end-of-life management. By anticipating the policy reforms, businesses can avoid revenue losses, maintain their market position, and finally gain competitive advantage. Companies that act first are usually the ones to profit the most.

Reputational risks

Consumers worldwide have become more environmentally conscious and have started to hold businesses and their packaging standards to account. Waste with clear branding visible on beaches or in the streets is a direct threat to a company's image, as it could potentially drive consumers away. This phenomenon has been named *"brand trash"* and it is contributing to shifting the general public's perception of plastics. By disclosing their genuine efforts to address plastic packaging and move towards more sustainable solutions, companies can build consumer trust, improve their brand image, increase employees' engagement, and demonstrate they are part of the solution.

Operational costs

If demand for plastics were to shift to alternatives because of increased regulatory and consumer pressure, companies might be confronted with material procurement option limits and price increases. Early actions to innovate and integrate sustainable packaging solutions have proved to increase resource efficiency, thus lower carbon emissions and costs, secured the supply chains, and increased profits.

Investor interest

Core business risks have direct impacts on the financial sustainability of a company. Environmental, Social and Governance (ESG)[29] ratings systems that account for environmental costs of plastic marine debris may further penalise companies that do not consider this risk. For example, in 2018, a group of 25 investors managing more than USD 1 trillion in assets required Nestle SA, PepsiCo Inc., Procter & Gamble Co. and Unilever NV to cut their use of plastic packaging, disclose annual plastic packaging use, set reduction goals, facilitate recycling and transition to recyclable, reusable or compostable packaging as much as possible.[30]

Last but not least, there are emerging global trends that are expected to have a disruptive impact on the packaging industry in the next five to ten years[31], and whose effects are expected to trickle down to the Western Balkans as well:

E-commerce

E-commerce market is expected to double globally by 2022 and is increasingly becoming popular in the Western Balkans. E-commerce requires packaging that can improve consumer's shopping experience, simplify returns and reordering, and ensure robust handling in the supply chain.

Packaging for e-commerce will also have to efficiently meet the needs of advanced/Artificial Intelligence (AI)-enabled or fully automated warehousing and filling technologies.

Digitization/Internet of Things (IoT)

Though still a niche due to high costs, a number of technologies (for example, QR codes, RFID, and NFC) are today available to facilitate the consumer-packaging interaction. The proliferation of such technologies will have an impact on supply chain traceability, optimization of demand planning, and management of inventory, which in turn will influence the choice of packaging.

Introducing and scaling up sustainable packaging solutions can be an opportunity for businesses to address these risks and global trends and, at the same time, use sustainability to reduce costs and operational inefficiencies, develop new products and services, attract new investments, and enhance customer loyalty.

Plastic packaging and consumer perceptions

In recent years, numerous consumer perceptions and behaviours surveys surrounding plastic packaging have shown the following common threads[32]:

- Consumers are increasingly concerned about the negative impacts of plastic packaging to the environment, due to raised awareness and publicity about packaging and plastic waste, news/media coverage, and TV shows/documentaries.
- Consumers are increasingly making the effort to reduce their use and disposal of single-use plastic packaging, and they are more likely to switch to a brand that is more environmentally friendly than their current brand.
- Consumers consider brands as the main responsible for plastic in food packaging and, therefore, as being able to do the most to reduce it.
- Recyclability seems to be the most important attribute consumers would like to see in plastic packaging.
- Locally manufactured products are gaining interest. These "local heroes" give consumers a sense of greater product safety along with additional positive attributes such as a reduced carbon footprint.

Consumers overall seem to genuinely care about the environment, and they seem to expect brands to do more about their use of plastics, more than ever before. However, surveys also show a troubling mismatch between stated desires for sustainability and consumers' willingness to pay for it. When it comes to their day-to-day purchases, for example, price and brand trust are the most important considerations for consumers above all else.[33] The challenge is therefore to find suitable alternatives to plastic packaging at a price that will still appeal to consumers.

The benefits of leveraging sustainable packaging solutions

Leveraging sustainable practices in a company can be challenging when the investments necessary to transition to circular economy approaches are formulated as trade-offs to more pertinent investments. This holds particularly true for SMEs across the Western Balkans, as they face a number of challenges in adopting sustainable practices both due to internal barriers and external factors.[34] SMEs often do not have the required resources, knowledge, expertise and capacities to innovate. Waste reduction practices are simply regarded as a statutory expense in order to meet legislative and regulatory requirements.

Sustainability however defines the ability of a system to remain diverse and productive. For a business, this translates in the ability to sustain itself in a rapidly changing world and market, by balancing economic, social and environmental impacts. Embracing sustainability might become a survival strategy as it allows to differentiate the business from the competition, attract and retain new customers, while motivating employees and enhancing brand image. SMEs should thus understand and consider that efforts to optimize the use of plastic packaging can result in positive outcomes, such as:

Cost savings

By auditing and evaluating the packaging line and process to eliminate materials waste, as well as assessing and optimizing the types of materials utilized, businesses can already achieve significant savings.

Greater access to grants, incentives, and favourable loan rates

Governments and independent bodies, like the Western Balkans Enterprise Development and Innovation Facility (WB EDIF), often offer incentives to invest in energy efficient and green technologies. In addition, collaborative innovation platforms and challenges, such as those proposed in the "Resources to get started" chapter, can be used by entrepreneurs to raise funds for the development and scaling up of innovative packaging solutions.

Opportunities for attracting market share from "green consumers", gaining brand recognition and nurturing customer loyalty

A 2019 survey of 6 000 consumers, conducted by Accenture Chemicals in 11 countries across North America, Europe and Asia, found that 83 per cent of respondents believe *"it is important or extremely important for companies to design products that are meant to be reused or recycled"*. Nearly three-quarters (72 per cent) of respondents said, *"they are currently buying more environmentally friendly products than they were five years ago*', and 81 per cent said, '*they expect to buy more over the next five years."*[35].

Increased competitive advantage

As an increasing number of large retailers and brands put pressure on their supply chain partners to have a sustainability policy in place, SMEs have the chance to be seen as a *"lower risk"* supplier by proactively addressing environmental concerns related to their packaging portfolio.

It is well documented that embracing sustainable practices leads to ***greater employees' engagement and motivation,*** as well as ***improved relationships across the value chain*** and with financial partners, public authorities, and activist groups.[36]

While rethinking the whole business model might be the most effective solution to address the plastic packaging issue, businesses can already make a difference by incorporating small changes to reduce packaging waste and support real positive environmental impacts. No single action will help eliminate the plastic packaging from a business overnight. Most likely, a multi-pronged phased approach will be needed to balance out costs and benefits.

The blueprint for success

Before adopting any specific sustainable packaging practice, organisations selling packaged foods and drinks will benefit from understanding their current use of plastics in packaging and developing a ***business-sound plastic packaging strategy.*** This entails, but it is not restricted to, the following steps:

Undertake a packaging audit and/or a plastic footprint assessment

Packaging audit is a study that identifies and measures all the packaging materials and packaging used by a company. The resulting baseline knowledge helps identify areas of strengths and weaknesses, such as the extent of use of hard-to-recycle or single-use plastic packaging, in which phase of the value chain these are mostly applied, and how current plastic packaging types and formats perform in local recycling context. The audit can be used to assess packaging options and find the best packaging solution that works throughout the value chain – considering functionality, customers' preferences, cost-effectiveness, waste and environmental impact.

Plastic footprint is an analysis of the environmental performance of the plastic usage within a system (industry, company, product or country), showing quantities of plastic used within the system, and emitted into the environment ('*plastic leakage*') during production, transport, use and the end-of-life phase.

Currently, there is no globally-acknowledged standardised methodology to measure *plastic leakage and its impacts.*[37] NGOs, academia, research centres and consulting firms are working to fill this gap.

While waiting for a standardized plastic footprint measurement tool to be developed, organisations might start focusing *on the inventory stage* by applying, for example, the science-based methodology to map, measure and forecast plastic leakage along a value chain released in 2020 by the Plastic Leak Project.[38] Other methodologies can be found in the 2019 IUCN Review of plastic footprint methodologies.

In the meanwhile, several initiatives have been launched to address the *impact assessment stage,* such as the MARILCA (Marine Impacts in LCA) working group, which was formed jointly by the UN Environment Life Cycle Initiative and the Forum for Sustainability through Life Cycle Innovation (FSLCI) to foster and develop methodologies for impact assessment of plastic leakage in Life Cycle Assessment (LCA). The results of the Plastic Leak Project and the MARILCA initiative will provide the building blocks for full integration of plastic leakage impacts among LCA indicators in the future.

Undertake a context analysis[39] to understand the policy and regulatory backdrop, assess consumer expectations and concerns, identify global trends and opportunities, exchange and learn from other disruptive business initiatives.

Based on the findings of the audit and the context analysis, define the company's priorities in terms of plastic packaging reduction or removal and ***develop a packaging strategy.***

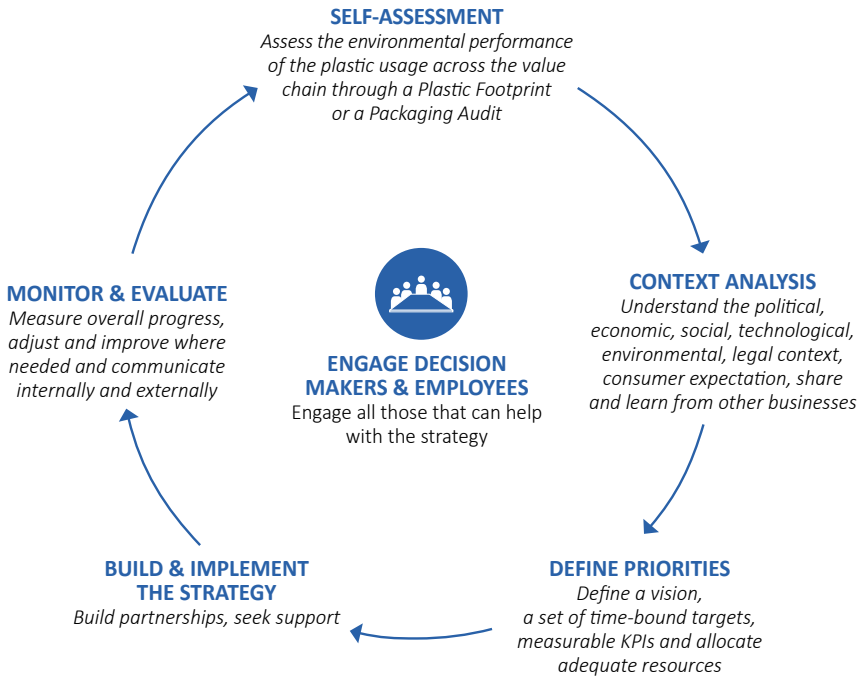
The strategy should include:

- A long-term *vision,*
- Specific, Measurable, Achievable, Realistic, and Timely (SMART) *targets* and scaled *milestones,* translated into measurable *Key Performance Indicators* (KPIs),
- A breakdown of resources, processes and systems needed to deliver the strategy and to meet the targets,
- A *monitoring & evaluation program* to assess progress and performance for continuous improvement and to review periodically the strategy and the targets to ensure they still drive true sustainability,
- An account of the support needed in terms of training, development of systems and tools.

While developing the strategy, *a precautionary approach* should be adopted, and the sustainability issues associated with the alternative solutions assessed.

Continuously engage decision makers and employees within the company and across the supply chain. Raise awareness of and educate staff, investors and shareholders, as well as all external stakeholders (suppliers, consumers and policy makers) about the consequences of their daily choices and practices and work together with them to find sustainable solutions to plastic packaging. To ensure transparency and enhance consumers' trust, companies may consider publicly disclosing their plastic packaging strategies.

Without a well-thought out strategy, any plastic packaging reduction or removal actions could fall at the first obstacle or even have a negative impact further up or down the line.



BUSINESS PRACTICES

CORPORATE STRATEGIES

Corporate strategies

An increasing number of companies are developing plastic packaging strategies in response to various factors, including (i) legislative requirements (such as the enactment of the EU SUP Directive), (ii) public pressure, (iii) external triggers (e.g. China, Indonesia, and Vietnam restricting the receipt of waste materials, including plastics). Such strategies outline a long-term vision, a set of time-bound targets, and a combination of actions spanning from the elimination of unnecessary and/or hard to recycle plastic packaging to rethinking the delivery of goods and services.

A brief description of plastic strategies developed by major food & beverage retailers, brand owners and hotel chains is presented in the ensuing table.

One example of a global initiative promoting the development and implementation of plastic strategies is the New Plastics Economy Global Commitment, promoted by the Ellen MacArthur Foundation and UN Environment Programme. Signatories commit to all or a subset of the following 2025 targets:

- Elimination of problematic or unnecessary plastic packaging through redesign, innovation, and new delivery models is a priority.
- Reuse models are applied where relevant, reducing the need for single-use packaging.
- All plastic packaging is 100 per cent reusable, recyclable, or compostable.
- All plastic packaging is reused, recycled, or composted in practice.
- The use of plastic is fully decoupled from the consumption of finite resources.
- All plastic packaging is free of hazardous chemicals, and the health, safety, and rights of all people involved are respected.

According to the first Global Commitment's progress report, published in 2019, many business signatories have successfully developed holistic plastics strategies and made important progress towards the 2025 targets by enacting tangible plans to eliminate problematic packaging items, piloting new reuse delivery models, optimizing the packaging design to increase recyclability and the recycled content. Thus, this initiative has proved an important impetus for companies to acknowledge (and eventually disclose) their plastic packaging usage, and to translate their concerns into concrete and measurable actions.

When drafting corporate strategies, one issue to be aware of is the trend to promote plastics recycling over reduction and reuse. To achieve a greater impact on reducing plastic waste, operational practices and investments need to focus at least equally on reuse, refill and other product delivery systems in order to avoid and minimize disposable plastic packaging.[40 41]

Replicability and scaling up: Considerations for SMEs

Re-thinking plastic packaging management and alternatives may not necessarily be on the priority agenda for SMEs. Yet, namely such enterprises may practically operate with smaller packaging portfolios, fewer plastics applications, shorter supply chains and smaller geographies. These factors can make strategizing less complex, and SMEs can benefit from the opportunity to formalize their plastic packaging commitments and lead the markets in introducing transformative solutions.

To prepare their business-sound packaging strategies, SMEs might start from:

Ensuring internal buy-in. Top management should acknowledge the urgency to act and understand the full opportunity and value that could be generated by re-thinking the company's packaging portfolio. The engagement of all key decision makers internally is necessary to motivate teams forward, to educate and raise awareness, and to ensure enough resources are allocated to relevant projects.

Seeking technical support. Businesses, particularly SMEs, could seek independent advice from relevant industry associations, consulting firms, civil society, and academia partners to help them define meaningful strategies. In addition, a plethora of resources, such as the guidelines and tools proposed in the "Resources to get started" chapter, are publicly available for organisations to understand their impacts, risks and opportunities, and to develop and implement practical packaging solutions.

Learning from and sharing innovative solutions. Global and regional collaborative initiatives are underway and can be used by businesses to share concerns related to plastic packaging, and find inspiration, funding and new partnerships to move forward. A non-comprehensive sample of collaborative initiatives, innovation platforms and challenges can be found in the "Resources to get started" chapter.

Building partnerships. The scale of the plastic packaging waste problem calls for cross- and inter-industry collaboration and public-private partnerships. To develop sustainable, circular packaging solutions, organisations could benefit by reaching out and collaborating with other actors within and outside their value chains. As SMEs often lack the network, contacts and time required to establish such relations, local support organisations, NGOs, and public institutions can help facilitate cross-sector knowledge exchange and collaboration.

Securing the necessary funding. Bank loans are a common way of financing new investments, but it can be difficult for local banks to finance circular business models, if they do not understand their business benefit, cash flow, and balance sheet (e.g. pay-for-use vs more traditional pay-for-ownership). SMEs might tap into other forms of finance, and raise equity capital, for example through crowdfunding impact investors and venture capital. Multinational development banks also offer a range of products to support transition to green economy.

Last but not least, business support organisations (e.g. chambers of commerce, sector associations) often lack themselves of the expertise to help SMEs make the transition to a more sustainable, circular economy. Local business support organisations, particularly across the Western Balkans, often need training and guidance to establish or improve their programmes in support to their members. National and local authorities do also need the tools and knowledge on how to stimulate SMEs to sustainable strategies and practices or remove barriers for them to do so.

Food & Beverage processors and brand owners

Company	Core commitments	Plastic packaging volume [42]	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Nestlé The world's largest food & beverage manufacturer present in 189 countries around the world. Switzerland	Vision: *"None of our packaging, including plastics, ends up in landfill or as litter, including in seas, oceans and waterways".* Signatory and committed to The New Plastics Economy Global Commitment Targets Progress report 2019	1.5 million metric tonnes	142 000 metric tons of packaging materials avoided by end of 2019, compared to a baseline of 2015. In 2019, 26 per cent of packaging with recycled materials, 2 per cent recycled plastic content in plastic packaging, 37 per cent packaging from renewable materials.	The Institute of Packaging Sciences created in 2019 to develop new sustainable packaging. With Danimer Scientific, developing bio-based resins (NODAX PHA) for water bottles to replace plastic. With PureCycle Technologies, producing food grade recycled PP. In 2019, launched Nestlé YES! snack bars packaged in paper using a high-speed flow wrap technology. Developed and circulated to suppliers a set of 'Golden Rules' for the design and development of packaging.	By 2025, 15 per cent recycled content in all packaging and 35 per cent recycled content in PET water bottles, globally. By 2025 in Europe, bottles, PET layers in laminates, caps on glass jars and tins, trays for meat products and shrink films for display trays will use at least 25-50 per cent recycled material, depending on the packaging type. Massive investment to create market of food grade recycled plastics. Seeking to use recyclable and compostable paper-based materials and biodegradable polymers, especially for use where recycling infrastructure does not exist.	Piloting the MIWA dispenser system in Swiss Nestlé shops to determine the feasibility of this new bulk delivery system. Partnered with TerraCycle to pilot its home delivery service Loop.	Engaging customers to involve them in the recycling process. Investing in and collaborating with Project STOP (Indonesia) to stop plastic leakages in the environment.	In 2016, co-founded the NaturALL Bottle Alliance to scale up the next generation of bio-sourced PET. Launched the Africa Plastics Recycling Alliance to develop the recycling infrastructure across Sub-Saharan Africa Partnership with The Ellen MacArthur Foundation. Massive investment in a sustainable packaging venture fund focusing on start-up companies that are developing innovative packaging, refill systems or recycling solutions.

Food & Beverage processors and brand owners

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Pepsico A multinational food, snack and beverage corporation. U.S.	Vision: *"Circular Future for Packaging"*. Signatory and committed to The New Plastics Economy Global Commitment Targets Progress report 2019	Not disclosed	Globally, in 2019, 88 per cent of packaging was recyclable, 4 per cent of recycled material in packaging.	Designing 100 per cent of the packaging to be recyclable, compostable or biodegradable and reducing virgin plastic use across beverage portfolio by 35 per cent by 2025. "Charge compaction" process rolled out to reduce the plastic for bags while delivering the same volume of snacks. Through the NaturALL Bottle Alliance, developing fully-recyclable, 100 percent renewable plastic bottles. Use of alternative materials (aluminium, glass) for sparkling water and carbonated soft drinks. With Danimer Scientific, developing a next-generation film fully biodegradable in any environment.	A multi-year supply agreement signed with Loop Industries to incorporate Loop PET plastic (100 per cent recycled material produced from low quality recycled PET). Joined a consortium investing in an enzymatic recycling technology, led by French company, Carbios, to produce high quality 100 per cent recycled PET from more forms of used plastic.	Promoting reuse delivery models ("Beyond the bottle program", TerraCycle's Loop). Promoting How2Recycle label. Trialled mobile enabled Hydration Platform to allow people to stay hydrated on-the-go through beverages served in BYO reusable bottles.	Through the Pepsico Foundation, multi-million partnership initiatives to boost recycling (e.g., "All In On Recycling") and educate public to recycle (e.g., "Recycle Rally").	Numerous partnerships and investments: e.g., the Bioplastic Feedstock Alliance, a multi-stakeholder alliance to improve awareness on sources for bioplastics; the Circulate Capital, an impact-investment firm dedicated to financing companies, infrastructure, and innovation that prevent the flow of plastic waste into the world's oceans.

Food & Beverage processors and brand owners

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
The Coca-cola Company A multinational corporation, and manufacturer, retailer, and marketer of non-alcoholic beverage. U.S.	Vision: *"A world without waste."* Signatory and committed to The New Plastics Economy Global Commitment Targets Progress report 2019	3 million metric tonnes	Globally, in 2019, 88 per cent of packaging was recyclable, 20 per cent recycled material in packaging, 10 per cent recycled material in PET plastic packaging. 16 markets offering beverages packaged in 100 per cent recycled PET bottles.	Increasing recycled content, using plant-based resins and reducing overall amounts of plastic used (e.g., the PlantBottle™). In 2019, integrated the Paboco (Paper Bottle Company) Pioneer Community to help develop a first-of-its-kind, fully bio-based, and recyclable paper bottle that aims to be used for everyday consumer products. Together with Indorama Ventures, Ioniqa Technologies and Mares Circulares, produced the first sample bottles using recovered and recycled marine plastics.	Increasing amount of recycled content in materials used.	Coca-Cola Freestyle, a touchscreen soda fountain introduced in 2009, where consumers can refill their own container. Trials of refillable, microchipped cups that interact with Coca-Cola Freestyle, soft drinks dispensers. DASANI PureFill water dispensers, piloted in 2017. Bonaqua flavored waters refill stations rolled out across Hong Kong in 2019. Partnered with TerraCycle on the Loop initiative on refillable containers for beverages in Western Europe.	Community initiatives and education to encourage customers to return packaging for recycling: first in the sector to set up PET plastic buy-back and recycling programmes, invested in new bottle-to-bottle recycling facilities in various countries, launched the "Every Bottle Back" program.	Collaborating with various organizations: e.g. the Ellen MacArthur Foundation, the World Economic Forum Global Plastic Action Partnership, the Ocean Conservancy Trash Free Seas Alliance, and the UN Environment. Invested in the Circulate Capital.

Food & Beverage processors and brand owners

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Danone A multinational food-products corporation. France	Vision: "*To offer nutritious, high-quality food and drinks in packaging that is 100 per cent circular.*" Signatory and committed to The New Plastics Economy Global Commitment Targets Progress report 2019	750 000 metric tonnes	In 2019, 81 per cent of our total packaging is recyclable, reusable or compostable, 16 per cent recycled PET on average in the waters business.	By 2025 every piece of packaging, from bottle caps to yogurt cups, to be reusable, recyclable, or compostable. By 2021, to launch 100 per cent recycled PET bottles in all major water markets. By 2025, to reach 25 per cent of recycled material on average in plastic packaging; 50 per cent on average for water and beverage bottles; and 100 per cent for evian bottles. Aiming to offer consumers bottles made from 100 per cent bio-plastic.	Explore shifting packaging for certain product lines from plastic to materials with higher recycling rates (paper, glass, etc.). Reducing PS packaging. Phasing out all PVC packaging by 2021, since it interferes with the recycling process for PET.	Developing alternative delivery or reuse models by 2025. Developing the evian® (re)new prototype, an in-home appliance providing consumers with evian® natural mineral water, with 66 per cent less plastic than a 1.5L bottle. Developing home and office delivery services of multi-liter refillable jugs in several markets.	By 2025, to have initiated or supported collection and recycling initiatives in each of the top 20 markets representing around 90 per cent of total sales. Education programs on recycling (e.g., How2Recycle in North America, Danone AQUA in Indonesia). Collaborating to develop the first PS packaging recycling streams. Supporting the most effective publicly organized systems, including Extended Producer Responsibility and Deposit-refund schemes.	Partnership with the Closed Loop Fund (U.S.), The Ocean Cleanup, the Danone Ecosystem Fund, the Inter-American Development Bank, the Ellen MacArthur Foundation, governments and local communities.

Retailers

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Tesco PLC The third-largest retailer in the world measured by gross revenues and the ninth-largest retailer in the world measured by revenues. UK	Vision: '*To create a closed loop system for packaging, meaning no packaging will go to waste*'. Strategic priorities integrated in Tesco's 'Little Helps Plan': 1. Simplifying materials and design. 2. Increasing plastics recovery and recycling. 3. Making it easier for customers to do more. Signatories of the UK Plastics Pact.	Not disclosed	In 2019, 83 per cent weight of all own brand packaging is *widely recyclable*[43] in UK, 2 914 tonnes of hard-to-recycle materials removed from own brand packaging, 31 per cent reduction in average own brand pack weight per unit sold, including loose volumes (baseline 2007).	By 2025, own brand packaging fully recyclable and halve packaging weight. Developed an industry-leading "preferred materials list" for own brand packaging in UK and Central Europe, taking into account the local recycling infrastructure, to categorize materials into three levels of recyclability. Trialling the removal of packaged fruit and vegetables wherever a loose alternative exists. '*Thinking outside the box*' challenge: 24 graduates, from across Tesco's business tasked of identifying ways to reduce plastic, including packaging, in the operations. 12 actionable solutions pitched, which will be trialled over the next years.	End the use of hard-to-recycle materials from own brand packaging by the end of 2019. Working with suppliers to explore alternatives to the hardest to recycle materials in the preferred materials list, such as Tesco Finest oils supplier changed the collars on bottles from Polyvinyl Chloride (PVC), which is difficult to recycle, to Polyethylene Terephthalate (PET). PVC removed from cooked meats packaging, moving to PET/Polyethylene (PE) which is made from 80 per cent recycled content.	Facilitate plastic packaging recycling by introducing a new logo on own brand bread bags and bags used for frozen products, for customers to know what they can recycle in the UK. In Thailand, customers are incentivised to decline single-use plastic bags at the checkout, in return for green points. These points can be redeemed for discounts and other benefits such as airline miles and free mobile data usage.	Trailing a reverse vending system for plastic bottles (in 2019, over 100 000 bottles collected). Trailing a collection of hard to recycle soft plastics to be turned into oil and used to produce new plastic, in a closed loop system.	Collaborations with government, suppliers and industry for the creation of an integrated national collection of packaging and investment in innovative recycling facilities.

Retailers

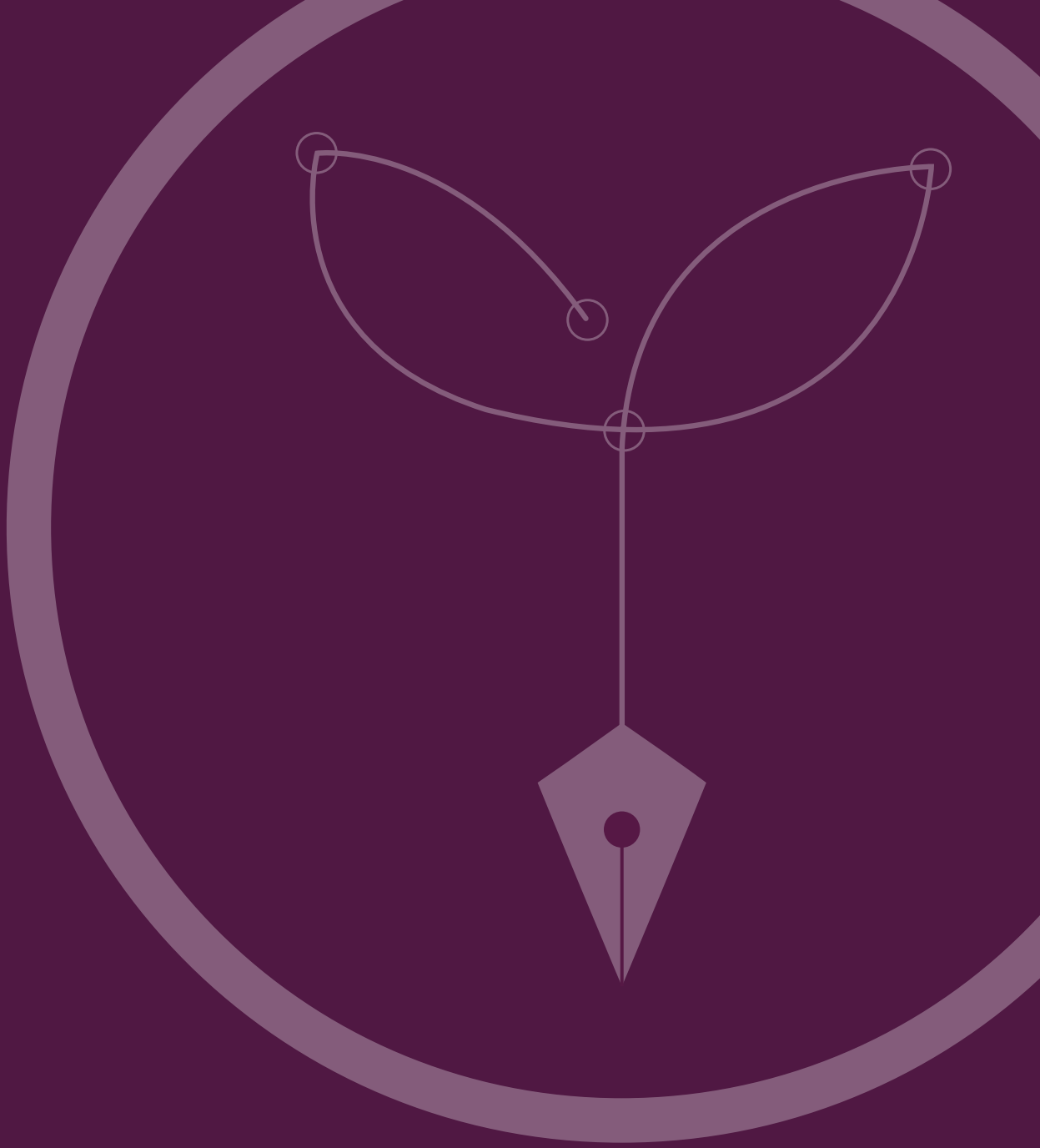
Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Iceland Foods Supermarket chain specialized in the sale of frozen foods. UK	Iceland's sustainable strategy 'Doing It Right' includes plastic packaging-specific actions to help the company achieve the bold commitment made in 2018 to *'become the first major retailer globally to eliminate plastic packaging from all of its own label products by the end of 2023'*. Plastic Annual Report 2019	13 000 tonnes used annually in own brand packaging 100 million black plastic (CPET) trays every year in own label frozen ready meals and exclusive ready meal ranges in 2018	1 500 tonnes of plastic removed annually from own brand packaging. 227 000 non-recyclable and plastic containers saved at head office alone. 91 000 non-recyclable cups and lids a year not sent to landfill from Iceland offices.	Reduced or removed plastic packaging across 81 lines through innovative solutions along the supply chain, such as the introduction of a recycled and recyclable paper band for bananas, of cotton net bags with a paper label for lemons, etc. Non-plastic flow-wrap has been trailed on a number of products.	Replacing the non-recyclable black plastic (CPET) trays with board-based trays, using FSC certified sustainable sources, and evaluating further alternative material options for meal trays, including sugar beet, bagasse and bamboo. Trailing both cellulose films and translucent paper-based alternatives to replace the plastic film used to cover meal trays. Working with paper tub manufacturers on testing alternative surface treatments to eliminate the need for plastic lamination. Over time these will provide potentially viable non-plastic solutions for lines such as cream, yogurt and ice cream.	Removed conventional plastic shopping bags from all Iceland's stores and offered shoppers a reusable *'bag for life'*, made of recycled post-consumer plastic waste, or hessian bags. Encouraging BYO bags to stores through step up customer communication. Removed all secondary plastic packaging waste from Iceland's stores and return it to depot for recycling.	In April 2018, Iceland became the first UK supermarket to install in-store plastic bottles reverse vending machines, in support of the proposed Deposit-refund scheme in England.	Iceland works closely with the UK Government to make food waste collection from home mandatory and to drive investment in composting facilities. The findings of the vending machine trial shared with DEFRA to inform the ongoing consultation for a national scheme in UK. Two year partnership with Surfers Against Sewage (SAS) to grow the 'Plastic Free Communities' movement across the UK, including the first national Plastic Free Community Awards, recognising outstanding achievements that are leading the way in the fight against avoidable single-use plastic.

Retailers

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Mark and Spencer A multinational retailer. UK	Vision *"To achieve a circular economy - where we use less plastic and any we do use, gets reused or recycled."* M&S' Plastics Plan includes three key actions: 1. Reducing the plastic used in the business. 2. Making it easier for consumers to recycle and reuse plastic. 3. Working collaboratively to reform the UK's waste and recycling system. Signatory and committed to The New Plastics Economy Global Commitment Targets and part of the UK Plastics Pact.	Not disclosed	1 000 tonnes of plastic packaging removed in 2018 and another 1 000 tonnes by the end of 2020. 1 700 tonnes of hard-to-recycle black plastic packaging eliminated. Estimated 4 billion plastic shopping bags saved since 2008.	Packaging optimisation through eco design. By 2022, 100 per cent of M&S' packaging will be widely recyclable[44] in UK.	Set of year-on-year 5 per cent reduction targets to reduce M&S' single use plastic footprint (a 10 per cent overall reduction from the 2018 baseline to March 2020). Plastic eliminated from M&S' fruit and veg packaging and ready meals. By 2020, black plastic and polystyrene removed from M&S' packaging. Recyclable terracotta trays replaced black plastic trays for M&S' ready meals. As members of the CEFLEX consortium, M&S has pledged to include at least 30 per cent post-consumer waste in all M&S' plastic packaging by 2025 whilst creating a market and the ongoing need for the recycled materials.	In UK, 76 per cent food is distributed to stores in reusable containers. Refillable solutions for hot drinks and water available in M&S' cafés in UK. Reusable bags, made from 75 per cent Social Plastic--collected and recycled by Plastic Bank, proposed in Haiti and the Philippines. Packaging-free aisles in stores piloted in UK.	M&S' stores, offices and warehouses in the UK and ROI are zero-waste to landfill. Recycling points introduced in M&S' stores where customers can bring back their used packaging, including hard-to-recycled packaging. Initiatives under way on the responsible use and recovery of agri-plastics.	Collaboration and partnership with Dow Chemical to help recycling used packaging and turn them into recycling bins for the UK stores and into school playground equipment. Collaboration with local authorities to improve kerbside recycling. M&S sponsor the Great British clean-up.

Hospitality sector

Company	Core commitments	Plastic packaging volume	Plastic packaging prevention	Strategic targets and actions related to				Key partnerships
				Innovation and product development	Sourcing and manufacturing	Sales and product use	Return chains/ Post-consumer	
Six Senses Hotels Resorts Spas Part of the IHG family of brand. It operates 11 resorts and 29 spas in Asia, the Pacific, Europe, Africa and Middle East.	Plastic Free 2022 strategy Target: to become completely free of plastic in 2022.	Not disclosed	90 per cent towards being plastic free.	Initial inventorying of all plastic items involved in all operations, to be able to measure progress. Eliminating or replacing plastic items identified in the inventory. Hosting an international design competition to find sustainable packaging solutions.	Since 2003, producing and bottling own drinking water (in glass bottles) on site.	Piloted in Thailand: Reusable coolers and crates provided to supplier, Stainless steel containers replace thousands of vacuum sealed bags in the kitchen, Reusable drinking containers provided to all hosts. It also uses refillable dispensers for shampoo, conditioner and shower gel, and recycles or reuses coffee pods.	Piloted in Thailand: Six Senses' Earth Labs offer the Six Senses Bottled Water delivery and return program, waste separation, and upcycling into higher value products. Promoting a de-plasticized lifestyle among costumers.	Global Reporting Initiative (GRI) standards are followed in annual reporting. All of the group's hotels and resorts participate in Cornell University's Hotel Sustainability Benchmarking program, which compares their performance against a global dataset of their peers. Individual Six Senses properties monitor their environmental efforts and contributions to local communities and manage their own Sustainability Funds with sales added directly from house-bottled water.



OPTIMISATION OF PACKAGING THROUGH ECODESIGN

Packaging optimisation through ecodesign

The design stage of a product is considered by the UN Environment Programme as determining 80 per cent of its environmental impacts. It is at this stage that decisions are made, which directly influence the end-of-life management of packaging and products. Design is thus praised by experts as a powerful tool for addressing marine litter from plastic packaging. Design is also at the heart of the circular economy, as it represents the first step to rethink linear business models and "design waste and pollution" out of an economic system.[45]

The European Commission defines *ecodesign* as *"the integration of environmental aspects into product design with the aim of improving the environmental performance of the product throughout its whole life cycle"*.[46] Ecodesign is already extensively practiced for products and is the object of a set of ISO technical reports and standards[47], which provide useful processes in guiding decisions on product design.

When applied to plastic packaging, ecodesign aims to minimise the environmental impacts of plastic packaging and packed goods over their entire life cycle. It usually includes a holistic view of the entire packaging system (primary, secondary, tertiary and service packaging), and ranges from incremental product improvements (e.g. material reduction) to process innovations (e.g. optimised goods logistics and waste recycling).

Integrating cost-efficiently ecodesign practices to optimise packaging can bring companies both financial (e.g., reduced direct and indirect costs and increased sales of existing products) and non-financial benefits (e.g., improved brand image and reputation, increased employee's motivation and pride, improved stakeholders' relationship), and become a competitive advantage.[48] The higher profitability is mainly dependent of the number of life stages considered at the design stage, and the use of professional tools or services to redesign the packaging.[49]

In addition, consumer perceptions analyses are showing that consumers are increasingly making a conscious choice to use less disposable plastic and are putting increasing pressure on companies to optimize their packaging.[50] Despite rising customer awareness, also observed in Albania, Bosnia and Herzegovina, and Montenegro, consumers remain however price-conscious. Packaging designers are thus tasked with overcoming complex trade-offs between the sustainability of a packaging, and other necessary functions, including product safety and economic costs.

The following design approaches can help prevent plastic packaging waste generation and increase circularity:

	MAIN BENEFITS		MAIN BUSINESS RISKS
	ENVIRONMENT	BUSINESS	
Recyclability	Waste reduction	Brand image improved Legal compliance Cost savings	Misleading claims if no proper waste management system in place
Recycled plastic content	Resource efficiency	Brand image improved Legal compliance	Recycled plastics might not reach market standards of hygiene, appearance, qualities such as colours and textures Higher costs

	MAIN BENEFITS		MAIN BUSINESS RISKS
	ENVIRONMENT	BUSINESS	
Additive reduction	Higher recyclability Reduced impacts on water and air	Simpler packaging Higher recyclability Reduced material risks as a result of improper use of packaging waste Legal compliance	None
Light weighting	Resource efficiency Waste reduction	Cost savings Product differentiation	Insufficient resistance and protection
Space optimisation	Lower CO_2 emissions during transportation Waste reduction	Leaner and cheaper logistics	Reduced visibility
To avoid littering	Reduced littering	Legal compliance	Higher costs (e.g., due to new investments in line and in the purchase of dedicated moulds)

Replicability and scaling up

Despite the progressive use of ecodesign in the industrial world, considering environmental constraints remains problematical for SMEs, which seem to remain on the fringe of this movement and miss out on its benefits. Small businesses, being more dynamic and flexible than larger ones, are on the contrary better placed to seize design-related business opportunities. This can be achieved by:

Acknowledging that packaging optimisation is an area in which significant ***business benefits*** can be achieved, such as cost cuts, increased access to the growing market of sustainable/green consumers, overall increased competitiveness.

Proactively anticipating legislation, and eventually going beyond what is legally required today, to turn packaging optimisation into a ***competitive advantage.***

Understanding that packaging optimization does not always need to be the result of a complex, time-consuming and expensive project. By tapping on ***existing know-how and expertise,*** SMEs can more easily than expected rethink their packaging portfolio. A sustainability specialist or team in a company is not necessarily needed: sustainability principles can be embedded to current functions of employees, by engaging them in the process, offering training opportunities and support.

Exploring and making use of the considerable ***expertise on ecodesign, often available online and free of charge,*** as the sample of tools and guidelines proposed in the "Resources to get started" chapter. Though the most common ecodesign tools have been designed for larger organizations and require specific knowledge and capacities to be used, which are generally missing in small businesses, an increasing

number of business support organisations, foundations and NGOs are today developing tools and training programs specifically tailored to the needs of SMEs (e.g., Design for Recycling, a dedicated web platform with free ecodesign guidelines to assess the recyclability of packaging, developed by the Italian National Packaging Consortium (CONAI); BEE and TREE - online software tools for packaging optimisation developed by the French Citeo and Adelphe).

Challenging the suppliers to improve the sustainability of their packaging. Suppliers quite often possess the necessary expertise and practical know-how to go the extra mile.

Building new or strengthening existing relationships with actors along the value chain (from suppliers to local authorities and waste management entities) to rethink together plastic packaging and the way goods are delivered.

Exploring ***new funding opportunities,*** such as the innovation challenges proposed in the "Resources to get started" chapter, to obtain the finance needed for new packaging optimisation projects.

Lightweighting

Latteria Sociale Merano, an Italian company producing yogurt, milk and fresh cream, has reduced the raw material used in its drinking yogurt thanks to the redesign of the primary packaging, replacing the rigid HDPE packaging with an Ecolean® PP / plaster flexible hose, achieving a reduction of over 60 per cent in weight.[51]

Fraser and Neave Limited (F&N Food), a leading Southeast Asia Consumer Group, re-designed their PET bottles for the 500ml and 1.5-litre carbonated drinks. The weight of the 500ml PET bottle was brought down by 17.5 per cent from 27.5g to 22.7g, and the weight of the 1.5-litre PET bottle was brought down by 7.1 per cent from 46g to 42.75g. Through this initiative, F&N Foods estimate that they will be able to save 68.7 tonnes of plastic packaging, as well as achieve USD 126 000 in material cost savings per year. The new bottles won the 3R Packaging Awards (Distinction Award) promoted by The Singapore Packaging Agreement (SPA).

Recyclability

SELECTION OF A PACKAGING MATERIAL COMPATIBLE WITH AN ESTABLISHED RECYCLING STREAM

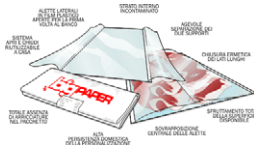
As part of its corporate commitments, the Nestlé's brand Herta France was able to optimise the packaging of all the ham trays through the substitution of PVC / PE with mono-PET, with the integration of recycled PET2 (at least 20 per cent recycled material).

SELECTION OF BIO-BASED PLASTICS THAT CAN BE INTEGRATED TO CONVENTIONAL PLASTIC RECYCLING STREAMS

The PlantBottle™ of the Coca-Cola Company is a bio-PET bottle as strong, durable, refillable and 100 per cent recyclable like traditional PET plastic. It's produced with up to 30 per cent with bio-based plastic from sugar cane residue, which helps reduce the carbon dioxide emissions. The Coca-Cola Company has made the PlantBottle™ technology available to competitors with the goal of helping find a solution to the planet's packaging problem.

INTRODUCE A BARRIER IN REDUCED PERCENTAGES AND ADAPTED TO THE RECYCLING STREAM OF THE MAIN PACKAGING MATERIAL

Perrier Sparkling Natural Mineral Water, owned by the Nestlé Waters North America[52], has developed a plastic bottle with a nylon barrier in quantity low enough to ensure its recycling.[53]



INTRODUCE A BARRIER COMPATIBLE WITH THE RECYCLING STREAM OF THE MAIN PACKAGING MATERIAL

The Italian company Big Paper Italy S.r.l. has developed a food wrapping with 100 per cent recycled kraft paper coupled with a thin layer of mater-bi film, biodegradable and compostable, both of minimum thickness and suitable for contact with all foods. The film has a double surface compared to the base sheet, forming two foldable wings that ensure an airtight closure of the package. By summarizing all the traditional components in a single wrapping and thanks to its ease of use, Big Paper accelerates service delivery. All this is combined with hygiene and domestic reusability. This intervention has led to a 62 per cent reduction in overall weight and positive effects in terms of logistics.[54]

PREFER MONO-MATERIAL PACKAGING

Somapro, a leading French manufacturers of dry food products, has worked with CITEO on the transition from a 3-material to a mono-material packaging. The new packaging features the following competitive advantages: higher recyclability, weight reduction (- 63 per cent), logistical gains (the jars can be stackable empty, unlike the previous ones), improved service to the consumer, as the new box is closed by a dusting lid that partially opens to facilitate the use.

USE A BLACK OR DARK DYE WITHOUT BLACK CARBON, FOR THE PACKAGING TO BE DETECTABLE BY NIR OPTICAL SORTING MACHINES[55]

The French family-owned company Fleury-Michon is testing with the support of CITEO new dark dyes for its packaging.[56]

Space optimisation

Smilesys Spa is an Italian company operating in the field of automatic packaging for re-closable applications. Through the patented Drop & Taste mechanism applied to the packaging of mozzarellas, it was possible to reduce the use of raw materials by eliminating, in particular, the cover and the peelable film and replacing them with the re-closable film only. The new solution proved to be particularly innovative in terms of logistics with a reduction in overall dimensions of around 40 per cent and a saving in the emissions of greenhouse gases and the consumption of resources along the life cycle of the packaging system.[57]

Recycled content

Lewis Road Creamery is the first milk producer to sign the New Zealand Packaging Declaration, thus committing to 100 per cent of the packaging being recyclable, reusable or compostable by 2025 or earlier. Lewis Road Creamery's 750ml & 1.5L white milk & flavoured milk bottles are all made from rPET locally sourced. Lewis' rPET bottles were awarded two gold awards at trans-Tasman 2019 Packaging Innovation and Design Awards, in the Beverage and Sustainability (Circular Economy) categories.

Innocent Drinks, a UK-based drink producer, is committed to have all of its packaging 100 per cent recyclable by 2022. As not all municipalities and councils recycle all type of plastics, Innocent Drinks offers a web app (Recycle Now) to find the nearest recycling bank in UK. Innocent Drinks also launched a new smoothie bottle made up of 50 per cent recycled and 15 per cent plant-based plastic.

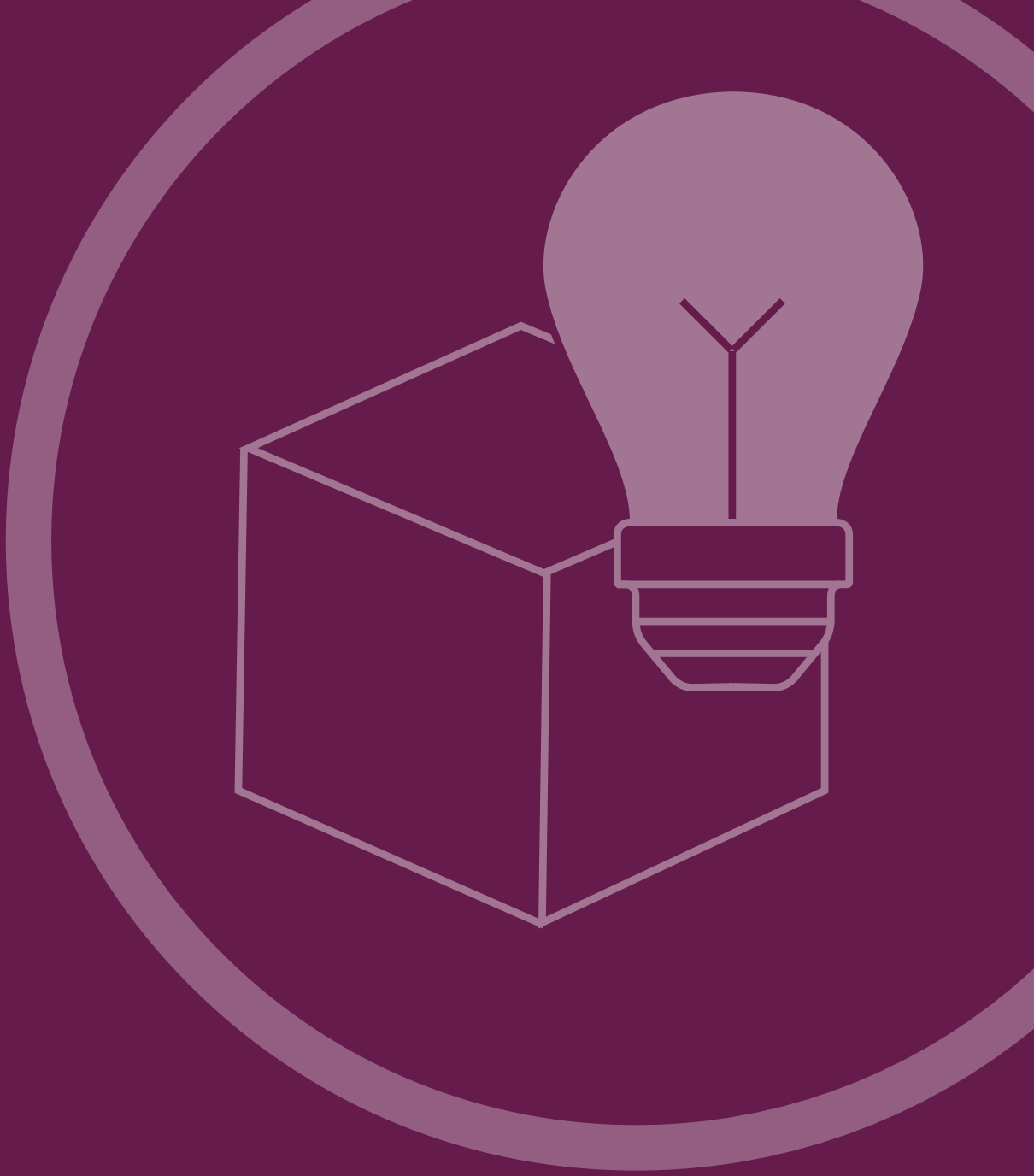
Design to avoid littering

LABELLING FOR MATERIAL SEPARATION

As part of its commitment to the US How2Recylce labelling system, which promotes the spread of clear and simple communication with consumers on recycling product packaging, the Italian Barilla Group has designed and applied specific recycling icons on its product packaging to help consumers sort packaging and dispose of it correctly.

DESIGN TO PREVENT ACCIDENTAL LEAKAGES OF PLASTIC ITEMS INTO THE ENVIRONMENT

BERICAP Group, one of the leading global manufacturers of plastic closures, designed a tethered cap that can be applied to all major neck finishes available on the market. The redesigned caps can be readily manufactured with all technical prerequisites for a tethered version set in place when they will become mandatory in 2024 in the EU.[58] It allows a step-by-step transition of the customers' filling lines towards the use of tethered caps with minimal to no cost implied. In addition to the screw-cap solutions, BERICAP also offers press-on caps for standard necks as well as a premium solution with customized neck finish which offers the highest weight savings on neck and closure.



ALTERNATIVE PACKAGING MATERIALS

Alternative packaging materials

To move away from plastic packaging, often the next best strategy is to substitute the plastic with another material that is considered to perform better in the environment.

Funding, sourcing and implementing viable alternative materials to plastics, while meeting consumer expectations, may be rather complex. Investments in manufacturing and distribution capabilities are such that companies cannot substitute one material for another overnight. Switching plastics with plastic-free materials should be carried out in a way that adds value in a forward progression, and after careful consideration and impacts assessment. For example, after having committed in 2018 to becoming the first major retailer globally to eliminate plastic packaging from all of its own brand products, Iceland Foods had to postpone a plastic-free greengrocer trial and reintroduce plastic packaging for its bananas, equivalent to approximately 10 million plastic bags a year, when it found the replacement paper bag did not meet consumer expectations and it saw a reported 20 per cent drop in sales.[59] This accident raised important questions on why the trial failed despite consumers' demand for higher sustainability.

It is also imperative to provide clarity on the environmental claims surrounding alternative materials to prevent unintended consequences from their adoption. This holds particularly true for food contact materials as they might pose health risks to consumers due to chemical migration or impair the flavour of the product.

At the end, the most suitable packaging and packaging material for a specific business is the one that fulfils the requested function, at a reasonable price, while minimising the total environmental impact per unit of product over its full life cycle. In some cases, plastic may be the most suitable material, if waste is properly managed.

Within a study to assess the potential of replacing conventional plastics with alternative materials in food & beverage applications, as part of a wider strategy of reducing marine plastic litter, the UN Environment Programme identified the following categories[60]:

Material	Occurrence in nature	Common uses	Examples	Pros/Opportunities from using as a substitute for conventional plastics	Cons/Challenges from using as a substitute for conventional plastics
NATURAL MATERIALS					
Cellulose	Cell walls of plants and many algae	Paper, cardboard/ paperboard (Kraft paper), raw material for biopolymers	EarthFilm ClimaCell	Renewable natural resources Potentially carbon-neutral Compostable in a domestic or industrial facility Biodegradable in nature	Limited availability Limited intrinsic proprieties compared to conventional plastics Poor supply chains Scaling up might lead to intensive farming with potential loss of biodiversity and potential impacts on food security
Chitin	Cell walls of fungi Exoskeleton of crustacean and insects	Mycelium-based packaging	Mushroom® Packaging		
Alginic acid	Cell walls of brown seaweeds (Phaeophyceae)	Packaging applications for dry goods, pastes and fluids	Evoware		

Material	Occurrence in nature	Common uses	Examples	Pros/Opportunities from using as a substitute for conventional plastics	Cons/Challenges from using as a substitute for conventional plastics
REUSABLE MATERIALS					
Glass & Stainless-steel		Packaging applications for drinks and food	Tiffin	Well established in certain segments of the food & beverage industry Materials of choice for reuse business models, as they can be easily sanitized and reused	Energy intensive to produce and transport High carbon emissions High transportation costs Limited opportunities for substitution of conventional plastics Limited appeal to wider markets Need to reorganise the supply chain
Bamboo and other reusable materials	Bamboo, other	Packaging applications for drinks and food		It can make use of materials otherwise classified as waste Market potential to expand	Limited by stringent food grade standards Higher initial cost inhibits take-up Need to reorganise the supply chain

Bio-based, synthetic materials

This publication does not include examples of *bio-based synthetic materials* as they are not largely available in Albania, Bosnia and Herzegovina, and Montenegro. Food & beverage producers, retailers, and food service providers should nonetheless be aware of a debate around the sustainability of these materials when looking for alternative packaging materials to conventional plastics.

In recent years there has been a growing interest in the development of packaging made of polymers synthesized from renewable biomass resources, instead of conventional fossil fuels. The demand for bio-based materials in packaging is indeed expected to grow to about 9.45 million tonnes by 2023.[61] Thermoplastic starch, poly(lactic acid) (PLA) and polyhydroxylkanoates (PHA), for example, have been extensively studied as potential replacements for non-degradable fossil-fuel plastics on the basis of their availability, adequate food contact properties and competitive cost. The use of bio-based synthetic materials is believed to contribute to the preservation of natural resources because of their "*carbon offset*" or "*carbon neutral*" nature, in which the atmospheric CO_2 concentration does not increase even after their incineration.[62] As these polymers derive from renewable biomass-based feedstocks that are more readily degraded in the environment, they are also often associated to the terms "*biodegradable*" and/or "*compostable*". However, most synthesised polymers are "*not biodegradable*" under normal environmental conditions, whether derived from fossil fuel or renewable biomass sources.[63] Degradation might occur only under favourable conditions, such as high temperatures, physical abrasion, exposure to oxygen and UV radiation, with the rate dependent on the type of polymer and presence of stabilising compounds. More often than not, degradation leads simply to weakening and fragmentation of the bio-based material.[64] [65]

The term "*compostable*" can also create confusion and mislead consumers in the way they can dispose of these materials. Compostable can

refer to either an industrial or a home/domestic setting, but the difference is critical. In many cases, labelling a material as compostable only applies to the conditions generated within an industrial composting system, where temperatures can be maintained at around 60°C for many weeks. Before bio-based materials, such as PLA and PHA, are introduced into the retail and food sectors, closed-loop systems should be in place to ensure they are kept separate from conventional plastic waste recycling streams, and sent to industrial composting and/or anaerobic digestion facilities.[66] In the absence of internationally agreed biodegradability standards and due to shortcomings in those that do exist, claims about the biodegradability of any plastic packaging cannot be verified. As for compostability, the criteria for the industrial compostability of packaging are set out in the European standard EN 13432, while no international standard specifying the conditions for home composting exist.[67] Consumers are thus confused about the true meaning of "*bio-based*", "*biodegradable*" and/or "*compostable*" plastic packaging and this confusion often leads to plastic packaging waste mismanagement.

Replicability and scaling up

When considering alternative packaging materials to conventional plastics, businesses might benefit from applying a Life Cycle Thinking (LCT) approach to make an informed decision about the wider environmental, social and economic impacts of alternative packaging solutions. The main goals of a *Life Cycle Assessments* (LCA) are indeed to reduce a product's resource use and emissions to the environment as well as improve its socio-economic performance through its life cycle.[68] In recent years, LCA studies have been increasingly performed on food & beverage packaging and the knowledge base is steadily increasing.[69]

However, LCA studies come with several limitations, such as the nature of choices and assumptions is subjective, the accuracy of the analysis might be limited by accessibility or availability of relevant data or by data quality, the economic or social aspects of a product often are not addressed.[70] [71] The findings of an LCA depend largely on the specific circumstances of the individual packaged product, of the supply chain and its logistics, and the actual end-of-life scenarios in the given situation.[72] The suitability of a given material to a specific application is also highly context-dependent and takes into account many factors including functionality, convenience, and safety. The environmental impacts may also be defined by factors outside the material and product design, including but not limited to feedstock choice, supply chain configurations, and transport modes.

When looking for alternative materials to plastics, LCA studies should be performed within a much more comprehensive decision-making process[73] [74] [75], integrating:

The ***product-packaging pair*** to optimise overall environmental performance without shifting environmental impacts to a different life cycle stage.

The end-of-life impacts of the packaging solutions. Most LCAs fail to consider the use and post-use or end-of-life phases, as it is difficult to obtain data of comparable accuracy for these phases. This might lead to misrepresentative LCA results and an underestimate of the whole social, economic and environmental costs of the analysed packaging solutions. LCAs might also lead to the development of complex packaging

design, such as pouches, which are hard to recycle and lead to 'mixed residues destined for landfill' or incineration.

Regional variations to account for the true-to-life waste treatment systems to adequately address marine litter and other forms of pollution.

The knowledge base on ***chemical migration from food contact materials*** into the assessment of packaging design and material choice, and adopting the ***precautionary principle*** in absence of scientific evidence.

Systemic solutions or innovative business models, such as Short Food Supply Chains (SFSCs), reusable and zero-package business models, and not just alternative materials.

In addition, for LCA to be successful in supporting the environmental understanding of alternative packaging solutions, it must maintain its technical credibility while providing flexibility, practicality, and cost-effectiveness of application. A detailed cradle-to-grave LCA may not be required for every type of decision to be made about packaging materials. This holds particularly true for SMEs, as LCA studies might be quite expensive, as well as resource and time-consuming.

How to select the most appropriate Life Cycle Assessment (LCA) tool?

The selection of the most suitable LCA methods largely depends on the questions asked, often defined as goals or priorities, on the position in the packaging value chain and on the available resources of the organization.

Fully executed Life Cycle Assessment (LCA), according to the internationally accepted standards ISO 14040 and ISO 14044.

These assessments are used by companies interested in a range of impacts on the environment by both their products and packages. The results of these studies are the most detailed, reliable, scientific valid and close to the actual impacts on the environment. They are best used during the design phase to make the best possible choices of materials, layouts, messaging and more. A full LCA is also needed when the company wishes to use the results for external communication or for comparative assessment of different products/packaging. However, they can be costly, require extensive data and take longer to complete.

Streamlined (simplified) Life Cycle Assessment (SLCA).

A plethora of ISO-based LCA techniques have been developed to streamline the analysis, reduce the costs, data and timeframes. These options include tools that only analyse packaging life cycles (instead of products, packages and industrial processes all in one) or tools that eliminate certain life-cycle stages, use industry averages or publicly available databases for certain data, and eliminate detailed recommendations or interpretation of results. These tools can be used for a valuable first-time assessment of alternative packaging. With enough transparency about the assumptions used, they can represent a quick and simple way to make certain design decisions. And most importantly, they can be used without extensive training. Many ecodesign tools build on a streamlined LCA approach. However, SLCA comes with an inevitable trade-off between accuracy and user friendliness. While they generally allow to analyse all life-cycle stages of a product, they offer limited possibility to customize and create new Life Cycle Inventory (LCI) datasets, limited number of impact assessment methods and indicators. They also require a good understanding of the assessed product system, but not of the life cycle thinking.

Scorecard.
Scorecards are management tools to measure the achievement of defined goals through a set of indicators and metrics. The complexity of a scorecard depends on the choice of the indicators. Scorecards are usually developed and implemented within large organisations to control internal goals and achievements, and also for communication and control of suppliers (for example, Woolworths Australia developed a scorecard to measure and control the reduction of the environmental impacts of packaging).

Method for packaging assessment	Application field	Advantages	Limitations
Full LCA	A detailed assessment of a product, which can be used for marketing purposes	Robustness, flexibility Can support marketing claims after external peer review Allows for comparative assessment of different products,	More costly Time-consuming Requires specific expertise
SLCA	A supportive tool during the design phase	Rapid Low costs Consistent Does not require specific expertise	Low flexibility No capacity to capture specificities Limited possibility to support environmental claims
Scorecards	Management tool to control the suppliers' compliance to certain sustainability criteria	Allows retailers and large companies to rapidly compare their suppliers based on a number of defined indicators (and associated metric)	Risk of over-simplification Important sustainability aspects might be overlooked if inappropriate indicators have been chosen.

In selecting the most appropriate tool, organisations might rely on the following resources:

- Hosted by UN Environment Programme, the Life Cycle Initiative is a public-private, multi-stakeholder partnership providing a global forum to ensure a science-based, consensus-building process in support to the use of credible life cycle knowledge by private and public decision makers.
- The European Platform of Life Cycle Assessment (LCA) was recently established to provide quality data, life cycle-based information on core products and services as well as consensus on methodologies through facilitated communication, exchanges and enhanced coordination among initiatives involving both ongoing data collection efforts in the EU and existing harmonization initiatives.
- The "Eco-Tool-Seeker" is a collaborative information system developed in 2017 to help companies to choose ecodesign tools for three targets: production, management or communication. The guide can save a company time and money. It promotes the "democratisation of ecodesign" as, for the time being, it is a free-to-use guide.
- The International Standard ISO 14040, together with the complementary International Standards ISO 14041, ISO 14042 and ISO 14043 concerning the various phases of LCA, provide the framework, the principles and some methodological requirements to businesses for conducting LCA studies.

A sample of Full and Streamlined Life Cycle Assessment tools can be found in the "Resources to get started" chapter.

Earthfilm

A packaging film made of paper with a 100 per cent plastic-free heat-sealable coating that can be recycled as part of the paper stream.

FB PROCESSORS, BRAND OWNERS, RETAILERS (OWN BRAND)	FOOD	PRIMARY PACKAGING	SCALED

Plastic packaging prevention

Since 2016, sales of Earthfilm have shown a tenfold increase every year: this shows that an increasing number of brand owners, processors and retailers across the world are using Earthfilm for their products, eventually moving away from conventional plastic films.

"There is no fossil fuel at all involved in our packaging. It is all plant-based. The opportunity for the environment is fantastic."

Simon Balderson
Managing Director

How it works

Building on plastic-free bio-coating technologies developed in Japan and Europe, Sirane Group first trialled Earthfilm in 2016 to offer food brand owners, processors and retailers a sustainable alternative to conventional plastic films.

Earthfilm is manufactured from renewable material sources: wood, sugar cane, corn, cassava. The film is recyclable as part of the paper stream and is suitable for repulping.

Earthfilm can be formed in different shapes, e.g. as a stand-up pouch or a bag. It allows to use natural water-based inks for labelling.

Earthfilm can run on conventional machine, following minor adjustments. Sirane also supplies a pouch-filling machine, which can run with Earthpouch material.

Earthfilm represents a valuable solution for dry and moist foods, such as cereals and granolas, porridge oats, snack foods and more. It can also be used for supplements and protein powders, chocolates, seaweed, and pet food.

Earthfilm offers an interesting alternative to the confectionery sector, which is dominated by plastic wrappers, as plastic films and laminating are deemed to be essential to the product shelf-life. However, mixed material packaging, where the components cannot be separated, are hard to recycle. Companies are thus increasingly replacing them by innovative, 100 per cent paper-based films.

For example, in 2019, gourmet meringue maker Flower & White, which retails in the UK, the U.S., Canada, Germany and Australia, has introduced *Sirane's Earthfilm* in an effort to move the sector forward and win the war on plastic pollution.[76]

Investment levels to uptake the practice

As plastic-free bio-coating technologies are still few and produced in small quantities, Earthfilm packaging solutions are slightly more expensive than conventional plastic films. Yet, price has not proved to be a barrier even for SMEs. Actually, as SMEs often offer premium brands (such as organic foods), they can more easily invest in Earthfilm packaging solutions. In addition, new young ventures tend to be driven

by strong environmental values and are ready to invest to offer their customers truly sustainable packaging solutions.

Business benefits

- Earthfilm is certified Plastic-Free by A Plastic Planet: hence, the adoption of Earthfilm packaging solutions can help companies meet their commitment to curb the use of plastic packaging within their operations and improve their brand image.

Critical enablers

- Technological development has been a key enabler: the appearance of new bio-coating that once associated with paper can be recycled as part of the paper stream sparked the development of Earthfilm packaging solutions.

Opportunities

- The latest developments in the EU legislation related to plastics and plastic packaging are proving to be a major force driving technological developments in the food & beverage packaging sector.
- Mounting pressure on major brand owners from activist groups and consumers asking for more sustainable packaging solutions is also helping increase research in new environmentally-friendly alternatives to plastics.
- Consumers are more likely to buy organic, premium brands if the packaging is "natural-looking", studies have found. Paper-based packaging seems to enhance product attributes such as "organic" and "natural," which in turn helps brands stand out on the retail shelf.[77]

Challenges

- Lack of clear common definitions and standards allows for film coating other than bio-coating to be sold as a "*green*" packaging solution, when in fact they still contain plastic.
- Though many technical challenges have been overcome so far, extensive R&D is still needed to scale and extend the use of Earthfilm to all foods and, particularly, liquids.
- High investments are also required to develop the machines that can run *Earthpouch* in high volumes.

Legal Entity, and Ownership

Earthfilm is owned by Sirane Group, an NPD product and process development company. Sirane Group has manufacturing facilities in the UK and Turkey, and offices/representation in the UK, Turkey, South Africa, the Middle East, the US and Asia/Pacific.

For more information

Official website: https://www.sirane.com/films/earthfilm-resource-plastic-free-flow-wrap-film.html

ClimaCell

A proprietary, scalable alternative to expanded polystyrene (EPS) foam, also known as Styrofoam.[78]

FB PROCESSORS, BRAND OWNERS, RETAILERS	FOOD (PERISHABLES)	SECONDARY PACKAGING	PILOT

Plastic packaging prevention

Since its establishment in 2015, TemperPack has helped divert an estimated 500000 lbs (about 2 232 tonnes) of plastic foam from landfills.

ClimaCell packaging is also estimated to produce 97 per cent less carbon emissions in the manufacturing process.

ClimaCell is tested and certified repulpable and passed Materials Recovery Facilities tests to be reclaimed alongside cardboard (Repulpability & Recyclability OCC-E Certification).

It also features the How2Recycle® "Widely Recyclable" designation.

How it works

TemperPack used bonded polysaccharide particles to create ClimaCell, which was introduced to the market in 2018. The new material offers a scalable alternative to expanded polystyrene (EPS), also known as Styrofoam, a traditional insulation material that is generally incompatible with curbside recycling.

ClimaCell is a paper-based insulator designed with an emphasis on maximizing thermal performance (ClimaCell allows for protection of temperature-sensitive shipments for up to 80 hours) and moisture resistance, while minimizing weight and storage space. To make the insulation, Temperpack uses re-recycle burlap[79], coffee bags, recycled denim, cotton, wool, paper, recycled plastics, and plant oils and starches.

ClimaCell combines the thermal and cushioning properties of EPS while being repulpable[80] alongside cardboard, which is a material that is recycled 93 per cent of the time.

Business benefits

- ClimaCell pricing is equal to (or less than) that of conventional materials such as EPS or polyurethane (PU) foam. When designing a new package, Temperpack takes a holistic approach and tries to see if it can add value in other ways besides delivering a cheaper insulator. Often, Temperpack is able to help customers shrink their box sizes, use less coolant, or achieve longer ship times for better shipping rates, overall lowering their operational costs. In addition, ClimaCell can be fully customized with graphics and messaging to be printed directly on the insulation.[81]

Opportunities

- Growth of the e-commerce for perishable goods. Globally, online sales are expected to make up 15-20 per cent of the food and beverage

industry's overall sales by 2025: 10 times more than it did in 2016, as the industry is adopting alternative methods to meet customer demands.[82]

Challenges

- The main challenge is to remain a convenient option for retailers, groceries and alike.

Legal Entity, and Ownership

ClimaCell is owned by Temperpack. TemperPack was founded in 2015 in the U.S. with the aim to reduce the amount of unsustainable packaging of e-commerce delivery. The founders saw a niche in perishable delivery where innovation had stagnated, and companies were still using insulation products that had been developed over 60 years ago. Today, TemperPack is rapidly expanding its reach in the perishable and cold chain shipping market, all with the goal of reducing the amount of packaging that ends up in landfills.

For more information

Official website: https://www.temperpack.com/climacell/

Mushroom Packaging

A high performing packaging solution made from mycelium, cost competitive with conventional expanded polystyrene (EPS) foams, and 100 per cent home compostable.

FB PROCESSORS, BRAND OWNERS, RETAILERS	BOTTLED BEVERAGES	SECONDARY AND TERTIARY PACKAGING	PILOT

Plastic packaging prevention

100 per cent home compostable.

The Growth Trays are made out of PET plastic, which is reusable and recyclable.

The non-food agricultural waste (the agricultural by-product of hemp) to grow mushroom can be locally sourced.

How it works

The Mushroom® Packaging is grown on PET Growth Trays, created by thermoforming over a solid form (precisely milled by a CNC router[83]) to create the molded shape. The Growth Trays are filled with a mix of substrate (hemp) and nutrition (flour), cellulose/lignin fibre from agricultural waste, and inoculated with a strain of fungus. The trays are then sealed to grow for 6 days total. Mycelia generated by the fungus permeate the organic waste, which acts as an energy source, and 'glue' the fibres together during the incubation period. After 4 days, the grown mycelium is popped out of the mold and let grow for another 2 days to get a velvety layer of overgrowth. The final stage is to dry the parts to prevent future growth.

The resulting packaging is high-performance, cost competitive and 100 per cent home compostable.

Business benefits

- Mushroom® Packaging is cost competitive with conventional EPS foams, as the raw material is at price parity with the styrene and polyethylene that are used in conventional packaging.[84]

Opportunities

- Mushroom® Packaging products do not require the capital, the energy-intensive manufacturing infrastructure, and associated waste streams, of traditional cardboard or bio-plastics.
- Theoretically, the Mushroom® Packaging technology allows retailers to eliminate the need for a packaging manufacturer, transporters, as well as associated emissions and waste at each node, by producing their own packaging materials in-house and supplanting suppliers of paperboard pulp or plastic pellets with local providers of agricultural waste feedstock.

Challenges

- Manufacturing mycelium is a labour- and time-intensive process. This time constraint embedded into the manufacturing process presents a challenge for mycelium to work as packaging for low-cost items.

- To date, no peer-reviewed LCA has been performed comparing the manufacturing process of mycelium to that of EPS. It's possible that EPS has a lower carbon footprint than mycelium, but the carbon footprint of mycelium is expected to go down with further research and economies of scale.[85]

Legal Entity, and Ownership

The Mushroom® Packaging brand and technology are owned by Ecovative Design, a U.S. biotech company with the mission of designing the future of sustainable materials using Mycelium Biofabrication Platform.

For more information

Official website: https://mushroompackaging.com/

Evoware

A seaweed-based packaging that is 100 per cent biodegradable and works as a natural plant fertilizer. It is halal and safety guarantee certified.

FB PROCESSORS, BRAND OWNERS, RETAILERS (OWN BRAND)	FOOD (INSTANT COFFEE, FLAVOURING SACHETS, BURGERS, RICE WRAPS, ETC.)	SERVICE PACKAGING	START-UP

Plastic packaging prevention

Since 2016, it is estimated that Evo & Co.'s products have helped avoid more than 15 million plastic items

How it works

Evoware packaging is made from seaweed without involving any hazardous chemicals. Evoware packaging is sustainable, biodegradable or even edible and healthy for the body. In addition, its production allows to empower seaweed farmers by subcontracting the process partially to them so that their livelihood can be improved.

The seaweed packaging has the following characteristics:

- It dissolves in warm water, making it a zero waste product, 100 per cent biodegradable.
- As a waste, it can be used as a natural fertilizer for plants.
- It has a 2-year shelf life, in a cool and dry place.
- It is halal certified.
- It is safe to eat and produced in compliance with HACCP standards.
- Nutritious, it contains high fiber, vitamins and minerals.
- Tasteless and odourless, it can be customized to give specific taste, color and brand logo.
- It is printable and heat sealable.

It is the only seaweed-based packaging patented in the world at the moment. Evoware comes in two versions:

- As an edible alternative to the commonly used multi-layered plastic sachets for dry foods, including coffee, creamer, sugar, cereal, salt and pepper, and food wraps for burger and sandwiches.
- As a biodegradable small-format packaging for non-food content.

Investment levels to start the business

As one of six winners of the USD 1 million Circular Design Challenge, a contest run by the Ellen MacArthur Foundation and OpenIdeo, Evoware has benefitted from the New Plastics Economy Accelerator Programme, which gave the company the confidence to enter the global market. Evoware was also awarded the 2017 DBS-NUS Social Venture Challenge

(SVC) Asia in the Idea Category. SCV Asia is a regional competition for socially innovative ideas and existing social ventures that have the potential to generate scalable and sustainable social impact. The two winners in the Idea Category earned a USD 3 500 cash prize each, plus mentorship or incubation support.

Business benefits

- Through the partnership with a seaweed farmers association in Makassar, Indonesia, consisting of about 1 200 farmers, the company teaches farmers how to produce high-quality seaweed. The higher seaweed's quality allows farmers to receive a premium on their harvest (up to 178 per cent higher), while contributing to keep the oceans clean.[86]

Opportunities

- Among unaltered natural materials, seaweed has one of the best mechanical properties while still being energy efficient and very economical. Seaweed is naturally nutritious, safe, high in fiber and vitamins, and with no allergy risks; it is also halal, which is an important feature in the Muslim communities.
- Seaweed is abundantly available throughout the year, and it can be grown on almost every coastline across the globe. In addition, its cultivation does not need land acquisition or deforestation, as it is often the case when land-based plants are used to provide bio-sourced packaging materials.[87]
- While seaweed grows, it absorbs CO_2. An area of ocean roughly the size of a baseball field can grow 40 tons of seaweed in a year, absorbing 20.7 tons of greenhouse gases. Seaweeds are grown without fertilizers, water, or other resources. And the waste from seaweed cultivations can be used as fertiliser.[88]

Challenges

- As it is still mainly hand-made, seaweed-based packaging is more expensive to produce than conventional plastic packaging, though costs are expected to come down as the company moves from pilot production to full-scale manufacturing.[89]
- Changing people's mindset, especially in developing countries. Currently, more than 80 per cent of Evoware's clients are from Europe and America where public in general is more aware and concerned about environmental issues.

Legal Entity, and Ownership

Evoware is one of the Evo & Co. brands owned by PT Evogaia Karya Indonesia, a social enterprise based in Indonesia and aimed: i) to utilise seaweed as a renewable resource, in a sustainable manner, as an alternative to plastic packaging; and, ii) to help impoverished seaweed farmers improve their livelihoods. Founded in 2016, Evo & Co. began with the ground-breaking innovation from seaweed called Ello Jello, an edible cup. After winning numerous awards and gaining demands, Evo & Co. determined to expand the business by offering a wider range of solutions- marketed under the brand Evoworld, and by actively promoting sustainable lifestyle through a collaborative movement Rethink Campaign.

For more information

Official website: https://rethink-plastic.com/

Tiffin

Stainless-steel reusable lunch box distributor and community builder.

FOOD OUTLETS (RESTAURANTS, CAFÉS, DELICATESSEN SHOPS) | FOOD ON-THE-GO | SERVICE PACKAGING | START-UP

Plastic packaging prevention

It can be estimated that 1.5 tonnes of single-use plastic packaging can be saved every 1 000 lunch boxes used on a yearly basis. This translates in about EURO 20 000 of single use plastic packaging saved by restaurants and alike.

"We cannot say that I only sell boxes ... I create and animate a network of users where users can go to any partner restaurants and benefit from a discount on the takeaway while contributing to combat plastic pollution. Each user will get used to using his lunchbox in his own eco-system, to set an example, and in this way, the network grows."

Violaine Dupuis, founder of Tiffin

How it works

Tiffin sells stainless-steel reusable lunch boxes to adherent restaurants and delicatessen shops. Restaurants then sell the lunch box to their clients who can use it in any partner restaurants and receive incentives (provided by the restaurants), such as discounts off their meal.

Food is charged by restaurants most commonly based on volume. Customers are responsible for the cleaning of the boxes. Lunch boxes are technically interchangeable: some restaurants accept dirty boxes and give new, cleaned ones to their client.

Tiffin counts today about 100 partner restaurants (60 per cent) and delicatessen shops (40 per cent) and has sold a total of about 4 500 lunch boxes. Tiffin lunch boxes are also currently tested in schools, enterprises, retailers (particularly organic food retailers) and public institutions. The Tiffin community is steadily growing through extensive communication on social media and blogs.

The initial market study revealed that no material was ideal for the production of the lunch boxes. Stainless-steel represents the best trade-off in terms of health and safety concerns, reusability and recyclability. Boxes are produced in South Korea and shipped every three months on average. The production is still too limited to be relocated in Europe.

Strictly speaking, Tiffin is not a circular business model. However, due to their intrinsic high value, it is most likely that the stainless-steel lunch boxes will be recycled at the end of their life. Since 2014, no box has been returned yet.

Investment levels to start the business (USD)

Up to 500 000.
Sources: public grants and private funding.

Investment levels to uptake the practice

The Tiffin lunch box (2 models) sold in restaurants costs clients between EURO 17 to 20 each.

Business benefits

- Community building. The Tiffin lunch box has helped creating a community of like-minded

local restaurants, retailers and delicatessens shops and their clients who want to make an impact in their daily life.

- Savings for restaurants and alike. Through the adoption of Tiffin lunch boxes restaurants and alike can make important savings on the purchase of single use plastic packaging.[90]

Critical enablers

- Governments at all level have an important role to play in easing the upscaling of reuse business models through the design and implementation of conducive regulations, incentives schemes, green public procurement, public grants and business support opportunities. Taxing disposable containers (eco-tax) would have a significant impact on behavioural changes.
- Entrepreneurs venturing new business models highly benefit from exchanging with peers, connecting with investors, mentoring and coaching opportunities. These services can be provided by business incubators for start-ups, or business support organization for more mature enterprises. Attending conferences and networking can also help expand an early concept into a full business opportunity.
- Setting common standards for reuse systems for food on-the-go will greatly benefit all businesses in this sector. These standards should be combined with financial assistance to the food outlet owners who implement them (for example, support to build in-house capacity to wash and sanitize reusable containers).

Opportunities

- Schools are proactively reaching out to integrate Tiffin's lunch boxes in their cafeterias. Schools, universities, as well as public institutions, through green public procurement measures, might represent an interesting market for reusable food containers.
- Digital technologies (such as RFID tags, sensors, and GPS tracking) embedded into the reusable packaging can ease the implementation of the reuse business model, while improving the end-users experience.

Challenges

- Safety and health concerns can be important barriers to the scaling up of reuse business models.
- Sourcing reusable containers locally- to cut on carbon emissions and simplify the supply chain, might prove difficult and often it does not make business sense. This holds particularly true for stainless-steel containers that are on average much more expensive than the plastic ones and allow for much smaller margins.

Legal Entity, and Ownership

The Tiffin Project was originally born in 2008, in Vancouver (Canada), from the idea of the chef Hunter Moyes, who wanted to reduce the food waste and the volume of single-use plastic packaging used in his restaurant. The idea of the Tiffin Project was then picked up in 2014 by Violaine Dupuis who, on a voluntary basis, developed the concept in her hometown Brussels (Belgium).

For more information
Official website: https://tiffin.be/

REUSE BUSINESS MODELS

Reuse business models

In the last 50 years, societies around the world have moved away from reusable packaging for more convenient, single-use disposable solutions, which were better adapted to the increasingly *"on-the-go"* consumption habits of consumers. Disposable packaging allows also companies much higher profit margins associated by selling containers along with their products, rather than having to be in charge of recycling or cleaning and reusing their packaging.

As a response to the resulting plastic pollution crisis, reuse business models are today springing up driven by evolving consumption and production patterns, digital technologies, shifting user preferences and a wider societal acceptance and demand for reusable packaging options. In 2017, the World Economic Forum and the Ellen MacArthur Foundation estimated that replacing 20 per cent of plastic packaging with reusable alternatives offers a business opportunity worth at least USD 10 billion.[91]

Reusable packaging can be applied at different points along the food & beverage supply chain, both as business-to-business (B2B) or business-to-consumers (B2C) solutions, and in different formats as shown in the summary table below.

By sharing reusable packaging across brands or sectors, B2B reuse solution allow to achieve economies of scale for distribution and logistics. Operations might be further optimised through the integration of digital technology in the reusable packaging to collect valuable information on the performance of the system as well as on user preferences. B2C solutions can help companies build brand loyalty and retain customers, for example through subscription programs and/or enhanced user experience as a result of personalized high-end reusable containers. Needless to say that reusable packaging can help cut costs, for example by eliminating the use of single-use packaging (and the resulting waste to be disposed of) or by supplying refills for reusable containers in compact form, such as in concentrates.

While B2B solutions are generally better understood and already adopted at scale, progress in B2C applications is still thin on the ground. The majority of the B2C players are small scale companies or start-ups, struggling with technical and regulatory barriers and constantly facing trade-offs. Traceability of materials, trust in material performance and safety, keeping material cycles clean and respecting stringent health safety regulations, coupled with a less-convenient shopping experience, are key factors often hampering the scaling up of reusable business models. Reuse can prove also challenging for larger companies as it requires the rethinking of their current business operations and corporate culture. This is probably why just few large food processors, brand owners and retailers report reusable initiatives already underway, often limited to niche applications.[92] For example, the proportion of packaging that the signatories to the New Plastics Economy Global Commitment have reported to be reusable, by weight, is currently less than 3 per cent, a small part of the total packaged goods market today.[93]

B2C reuse business models differ mainly in terms of the requirement for the user *to refill and return the packaging,* either at home/office or on-the-go. Circularity is usually ensured through a financial incentive, as in a deposit-refund system, or through the integration of digital technology (such as RFID or other tracking devices) in the reusable containers.[94]

B2C Reuse Business Models	Examples
Consumer returns packaging at store or drop-off point This solution is widely used in many retail outlets for beverages worldwide, including in Albania, Bosnia and Herzegovina, and Montenegro. As it does not require to rethink the entire shopping experience, this business model can be easily introduced to substitute single-use packaging in most food services (e.g., takeaways, coffee shops, etc.)	Straus Family Creamery CupClub™
Packaging is picked up from home by a pickup service As in a sort of '*milkman 2.0*', the product is delivered in reusable packaging to the consumer, and the empty packaging is picked up from the same spot later. Grocery stores are well positioned to benefit from this model, as they are inherently local businesses, mostly selling replenishment products, and typically have returning customers who opt frequently for the same products and brands. If such products are offered in a subscription service that secures their delivery in reusable containers, picked up once empty, washed/sanitized and replenished, the business model can lead to a constant and predictable revenue stream. This system is also particularly suitable for e-commerce as it can optimise the pickup of empty packaging by combining it with the delivery of new products.	Loop
Consumer refills reusable containers at home or office The consumer buys the product with the main reusable container once, and continues to purchase refills only (online delivery, or in store), thus minimizing the need for new packaging. This model works well with refill products that are used on a regular basis, e.g. water/ beverages in offices, home/ personal care products.	Bevi
Consumer refills reusable containers on the go (e.g. store, restaurant) This model suits well traditional retail outlets, restaurants and café shops in urban areas, where consumers can get their drinks and foods on-the-go and drop back the reusable containers there. The main challenge to implement this is the requirement for a physical store or for the refill.	AgainAgain The Milk Station Company
B2B Reuse Business Models	
Food & beverage handling and transportation across the supply chain are today ensured mostly by wood pallets and single-use pallet wraps (e.g., stretch wraps and shrink hoods): hence, an estimated 5 million to 6 million tonnes of pallet wrap film are globally produced every year and largely lost after one use cycle.[95] B2B reusable packaging solutions are increasingly used worldwide to eliminate most single-use primal and transport packaging, while increasing supply chain efficiencies.[96]	Svenska Retursystem

Replicability and scaling up

To scale up, reuse business models, particularly the B2C solutions, will need:

To build trust and convince the customer that reusable solution is legitimate. To this end, having clear health and safety regulations and standards applying to the use of reusable containers in food outlets, canteens or retailers will greatly help.

To ensure a convenient shopping experience to customers. Innovation, and particularly digital technology, can greatly improve the shopping experience, reduce contamination risks and address food safety concerns, while facilitating the integration of reuse systems in traditional business models. If well designed and implemented, reuse business models can also increase the understanding of consumers' behaviour and enhance brand loyalty.

To develop carbon-efficient take-back and washing/sanitation systems for reusable packaging. This is the most critical, energy consuming, and expensive phase of a reuse business model. It also guarantees the food safety standards required by the local/national law. Businesses offering a reusable container service often do not have built-in washing and sanitizing facilities. Delivering reliable, convenient, and carbon-neutral systems to collect and wash, in a closed loop, reusable containers is today the priority for many start-ups venturing innovative reuse business models, such as La Bouteille Lorraine, which was born from the desire to concretely implement the reuse of glass bottles in the Lorraine region, France.

Straus Family Creamery

A deposit-refund system for glass milk bottles, integrating a reverse logistics model to extend the use cycle of the reusable packaging.

FB PROCESSORS, BRAND OWNERS, RETAILERS (OWN BRAND)	DAIRY PRODUCTS	PRIMARY PACKAGING	SCALED

Plastic packaging prevention

A return rate of more than 80 per cent of the bottles and over 99 per cent of the reusable crates.

The reusable glass bottles system prevents approximately 250 tonnes of milk containers and plastic to end in landfills each year.

Other circular solutions introduced to reduce waste include recycling, repurposing, and reusing of 92 per cent of all materials at the Creamery.

How it works

In 1994, Straus has started to bottle the certified organic cream-top milk in reusable glass bottles. Each glass bottle has a USD 2.00 deposit that is refunded when the rinsed bottle is returned to the store. The bottles are then returned to the Creamery, washed, sanitized, and reused an average of five times before re-entering the recycling stream. The bottles are made with up to 30 per cent recycled glass. Straus also relies on system of reusable milk crates.

As the cleaning and sanitation of the returned glass bottles require high quantities of water, the Creamery has devised a system for water reuse. Fresh water and the water filtered from cow's milk, following reverse osmosis, is primarily used for the daily cleaning and sanitizing of the equipment at the Creamery. The wastewater from the Creamery is captured and transported to the Straus Dairy Farm, where it is used for irrigation or as flush water for the barns. The company has seen its water efficiency increase by 30 per cent over the last seven years.

Straus Family Creamery is also working towards the development of a replicable carbon-neutral, zero-impact dairy model (net zero climate emissions) by 2022, as a contribution to the reversing of climate change. This implies eliminating plastics all together from the business.

Business benefits

- Product value. The original flavour of the organic milk and cream products are best preserved in glass (glass does not chemically interact with any ingredients).

- Secured and cost-effective supply of packaging. Glass can be 100 per cent and infinitely recycled in a bottle-to-bottle loop without any loss of quality.

Opportunities

- Environmental programmes, such as the deposit-refund scheme for glass milk bottles, can become a way to share innovation and ideas across the value chain, and improve collaboration with suppliers and customers.
- The deposit-refund scheme can also enhance brand image and customer retention.

Challenges

- The deposit-refund scheme with a '*return on the go*' can be costly and result in a burden to the customers: the scheme has to be designed to incentivise the return of the packaging by fixing the correct price, ensuring easy access to drop-off points, etc.
- The take-back and washing/sanitation system has to remain economically attractive for the company, as well as carbon-neutral and water-efficient.
- The system to keep track of deposits and handle pay-outs might require skills and knowledge that are not readily available at company level.
- Consumers, retailers, distributors, and employees need to be aware and educated about the program and contribute actively to its successful implementation.

Legal Entity, and Ownership

Straus Family Creamery is a U.S.-based, mission-driven, family-owned-and-operated business. Since 1994, the family farm has become the first 100 per cent certified organic creamery in the U.S. and the first pasture-to-bottle infrastructure for organic milk.

For more information

Official website: https://www.strausfamilycreamery.com/

Supporting initiatives

The online platform in the UK, *Find Me A Milkman*, makes it easy for consumers to find local milk and dairy businesses delivering in their neighbourhood. It also provides links to other dairy businesses with online service information, news and special offers.

CupClub™

A smart returnable packaging service for drinks. CupClub™ is a pay-per-use scheme, similar to a city bike rental scheme, where clients 'pay for the drink'.

FOOD SERVICES, RETAILERS AND BRAND OWNERS	COLD AND HOT DRINKS	SERVICE PACKAGING	START-UP

Plastic packaging prevention

In 2019, CupClub™ has served over 200 000 drinks with monthly average service of 50 000 drinks across London corporate customers and is launching across 3 cities in 2020.

CupClub™ tailored end-to-end service can help reduce single-use plastic packaging by up to 47 per cent.

The cups are expected to last 132 uses, with an expected 10 per cent of total cups lost and 90 per cent fully recovered and recycled.

CupClub™'s cups use only half the CO_2 of ceramics and disposables (including PE lined, Styrofoam and compostable PLA), per unit of cup.[97]

How it works

CupClub™ is an innovative returnable packaging service for drinks that utilizes smart systems to allow for complete supply chain traceability, helping retailers reduce single-use plastic packaging and gain customers' loyalty.

Each CupClub™ member will be allocated a membership ID associated with the products assigned for use. Customers can buy their hot or cold drinks *on-the-go* through the CupClub™ app and drop the cup in any of the stackers available in the affiliated shops within 6 months. The cups are backhauled, processed and cleaned at a central hub, before being repatriated back into the market for reuse. If the customer loses one cup, it is charged on his account.

The entire reuse system is optimized: pick-up of used units and drop-off of fresh cups are organized at the same time; the washing process is designed to use water efficiently.

The CupClub™ cup is made from food grade Polypropylene (PP) and the lid from Low Density Polyethylene (LDPE). Both 100 per cent recyclable and injection moulded. The RFID tag is inserted into the cup and lid and moulded over.

Investment levels to start the business (USD)

More than 2 million.
Sources: private equity, grants. CupClub™ was awarded the 2017 Ellen MacArthur Foundation's New Plastics Economy Innovation Prize to fund R&D of its product and service. The company was launched in 2018 with investments from R/GA Ventures and Seedcamp.

Investment levels to uptake the practice

- The minimum investment level for each new site is 250 drinks per day/per site, at £ 0.15-0.17 per drink. These values might vary based on the demand and on the specific needs of the site. To help enable its uptake, CupClub™ have been working to get its mode roughly *price equivalent*

per drink. Orders are directly with the retailer: consumers do not pay any extra. The program is cost-neutral for coffee shops once waste disposal is factored in.[98]

Business benefits

- CupClub™ mode is roughly price equivalent per drink to attract clients. As CupClub™ scales, the cost-per-drink is expected to drop, while increasing the dataflows that will demonstrate the long-term ROI and customer engagement.
- CupClub™ platform can be branded to build a network effect over time.
- CupClub™ platform makes it convenient for consumer to purchasing a coffee *on-the-go* and returning to any other partner food outlets.
- RFID technology embedded in CupClub™ cups enhances credibility and visibility.

Critical enablers

- Education and awareness. Both are key for this system to work effectively and deliver the expected environmental benefits. Café and retailers need to be fully engaged and understand the sharing economy concept. They in turn need to engage their customers at the counter.

Opportunities

- Access to investment capital. Green start-ups with similar purpose are increasingly attracting venture capitalists, socially responsible investors, and benefitting from popular crowdfunding platforms.
- This business model is interesting for large beverage brands, which can help scale it up.

Challenges

- Establishing partnerships with large companies (facilities management providers, retailers and brands) can prove lengthy and burdensome.
- Customers initially have safety concerns in using reusable cups.
- Sourcing of the cups. As no European plastic manufacturer could deliver RFID embedded cups at reasonable cost, CupClub™ cups are today sourced in China.

Legal Entity, and Ownership

cupclub

CupClub™ is an award-winning tech company, originally developed/incubated as an idea of the design agency Studio [D] Tale set-up by Safia Qureshi, before being incorporated separately as a company in 2015.

For more information
Official website: https://cupclub.com/

Loop

Zero-waste innovative online and physical store shopping platform, selling products in premium reusable packaging from well-known brand-owners and operating a reverse logistics, cleaning, sanitation, and redistribution on their behalf.

FB PROCESSORS, BRAND OWNERS, RETAILERS	FOOD AND DRINKS	PRIMARY AND SECONDARY PACKAGING	PILOT

Plastic packaging prevention

An initial Life Cycle Assessment (LCA) showed that Loop has the potential to drastically reduce consumer waste and GHG emissions. The study tracked the operations, use, cleaning, and end-of-life process, showing that Loop has lower environmental impact than traditional in-store retail and e-commerce models with the environmental savings increasing per use of package.[99]

How it works

Loop has been designed to addresses the issue of waste at its source by providing consumers a circular shopping platform, while encouraging manufacturers to own and take responsibility for their packaging on the long term.

SHOP: In the initial phase, products will be available only through Loop's e-commerce sites (www.loopstore.com, www.maboutiqueloop.fr) or Loop partner retailer's websites. Here, consumers can order leading brands by paying a deposit for the packaging. Each package is designed for 100 or more uses and can be recycled by TerraCycle at the end-of-life. Packaging materials are stainless steel, aluminium, glass, and plastics (BPA free). The details of the system at physical stores haven't been finalized yet.

RECEIVE: Consumers receive their durable products in Loop's shipping tote that eliminates the need for single-use shipping materials like cardboard boxes.

LOOP PICK-UP: As consumers finish their products, they place the empty packages into one of their Loop Totes. When the tote is full, it can be picked up at home or directly dropped off at a UPS store. When a package is returned, a customer gets back their deposit or, if they've opted for an automatic "auto-refill when returned", the receipt of the container can trigger a new order.

LOOP CLEAN: Empty packages are hygienically cleaned and sent back to manufacturers for refilling. Loop's cleaning methods are proprietary and comply to U.S. FDA standards. Regular Audits and Quality Assurance inspections occur at all of the Loop facilities.

LOOP REFILL RECYCLE OR REUSE: Loop replenishes products as needed and returns the refilled shipping totes to the consumer. If there is recoverable used product such as diapers, pads, razors or brush parts, they will be recovered to be reused or recycled.

There are no monthly fees. Customers pay only a small fully refundable one-time deposit to borrow the package. Brands pay membership fee determined by the durability, washability, and Life Cycle Assessment (LCA) of their packaging.

Business benefits

- All products come in high-quality durable packaging that enhances the user experience. Packaging becomes an asset for the brand-owners: they have thus the incentive to design a packaging that looks and performs better (e.g., Haagen-Dazs ice cream tub, for example, can keep ice cream frozen for multiple hours).
- The deposit-refund system secures the packaging (i.e., incentivises return or covers costs if packaging is not returned).
- Subscription and pick-up services support creation and maintenance of brand loyalty. It also provides insights to producer about customer needs.
- Businesses can optimise operations through the standardisation of packaging or shared logistics (incl. collection, cleaning) across brands, sectors or wider networks, e.g. in combination with a third-party packaging/service provider.

Opportunities

- Shifting the ownership of a package from the consumer back to a brand creates new business opportunities to enhance consumer loyalty.
- Online food & beverage retail and delivery services are underdeveloped in the Western Balkans countries: as this market begins to grow, reuse models like Loop could be integrated within right from the start.
- A circular shopping platform such as Loop might be particularly adapted to families and people with serious food allergy as it prevents potential contaminations.

Challenges

- The establishment of a local reverse logistics, cleaning, and refilling infrastructure might be economically and environmentally challenging.
- The deposit-refund scheme has to be designed to attract and retain customers and include an efficient system to keep track of deposits and handle pay-outs.
- For the Loop system to maintain competitive prices of the packaged products for customers it needs to quickly scale up.
- Attention should be given to the possibility that the high-value packaging might be subject to theft when sitting on the doorstep upon delivery or return.

Legal Entity, and Ownership

Loop™ is an initiative from TerraCycle, an innovative U.S.-based waste management company whose mission is to '*Eliminate the Idea of Waste®*'. TerraCycle partners with leading consumer product companies, retailers, cities, and facilities to collect and recycle hard-to-recycle waste. TerraCycle operates across 21 countries.
In partnership with major brands and retailers, Loop launched in the Mid-Atlantic and North-eastern U.S. and Paris (France). It is in the process of expanding across the U.S. and internationally, including the UK, Canada, Germany, and Japan.

For more information
Official website: https://loopstore.com/

Bevi

A smart, customised beverage dispenser system for offices, providing still and sparkling flavoured water on demand.

FB SERVICES, HOSPITALITY	DRINKS (WATER AND OTHER BEVERAGES)	PRIMARY PACKAGING	START-UP

Plastic packaging prevention

For the period 2013-2018, Bevi reports that its smart water dispensers have avoided waste that would have been generated by over 45 million plastic bottles.

How it works

Bevi is an all-in-one beverage service that includes the machines, healthy flavours and service. Hooked up to an existing water line, Bevi provides customizable still, sparkling, and flavoured water on demand.
Bevi refill machine is internet-connected and automatically notifies Bevi's technicians when a machine needs servicing.

Investment levels to start the business (USD)

More than 2 million.
Sources: In 2018, Bevi raised USD 16.5 million in a Series B round of financing led by Trinity Ventures, an early investor in Starbucks.

Business benefits

- According to company's estimates, office beverage costs can be reduced by 50 per cent.[100]
- Users can benefit as refills can be cheaper to buy and easier to carry and/or store, compared to products sold in standard packaging.
- Users' individual needs can be accommodated with refill systems that allow them to mix flavours, add a desired fragrance or personalise the main packaging.

- Businesses can improve brand loyalty through refill subscriptions delivered directly to users.
- Users can benefit from higher convenience with automatic reordering.

Opportunities

- Perceived as a healthier alternative to soft drinks, the flavoured and functional waters[101] have gained momentum within the recent past and their global market is set to rapidly expand in the coming years.[102] If the market of flavoured drinks grows, new refill ventures might find their share and business opportunity, offering a viable alternative to single-use plastic bottles to offices and alike.

Challenges

- Ensuring that office refills come in packaging that is either reusable, recyclable or compostable might prove challenging, as it requires full understanding and coordination between Bevi and its suppliers.
- Struggle in identifying the right market to scale up. Bevi experienced an initial setback, which can be an important lesson learned for other ventures.[103]
  The initial Bevi's product prototype was a more traditional vending machine, where customers swipe their credit cards to refill a reusable bottle. This solution did not work as no passer-by wanted to spend money on a vending machine from a then-unknown brand and because the credit card reader was not performing as planned. By talking with offices, Bevi's founders learned that workplaces are always looking for new perks to please employees. In addition, offices offer the following opportunities: i) usually, only one person (the office manager) needs to be convinced to buy the machine; and, ii) as offered by the company, machines do not need to carry a credit card reader.

Legal Entity, and Ownership

Bevi is a U.S.-based start-up bringing customizable, healthy hydration to commercial spaces across the U.S. and Canada. It features over 1 500 machines in the field, almost 70 employees, three offices in the U.S.

For more information
Official website: https://www.bevi.co/

Again Again

Reusable coffee cup lending system based on a deposit-refund scheme.

FOOD SERVICES, RETAILERS AND BRAND OWNERS	COLD AND HOT DRINKS	SERVICE PACKAGING	START-UP

Plastic packaging prevention

In June 2019, it was estimated that the Again Again network is diverting cups from landfill at a rate of 600 000 annually, with a total cost saving of about NZD 151 000 (about USD 95 000).[104]

Again Again has worked extensively with suppliers to reduce the use of secondary-tertiary plastic packaging along their supply chain. No record of these improvements however has been made so far.

The silicon lid and paper sleeve add on waste, but they are needed for consumer safety. The sleeve can be customised and used as marketing tool.

"Being sustainable and profitable means making continuous trade-offs"

"it's a journey"

Nada Piatek
Founder of Again Again

How it works

Again Again provides a fleet of reusable stainless steel cups to the participating café through a deposit-refund scheme.

The partner café is charged a *monthly usage* fee for each cup and lid and when a customer uses a cup, the café will on-charge them for that usage fee. The customer is thus loaning the cup and lid from Again Again and not the café. On balance it has cost the café nothing, as the café has paid the usage fee to Again Again and received it back from the customer.

The *monthly usage* fee is a tiered subscription structure that scales with the volume of takeaway coffees that the café serves. If 20 per cent of the customers use the system, the cost of the fee is likely to be less than the café is currently paying for the single-use cups.

Again Again cups need to return to the café, cleaned and with their lids, within two weeks. Cafés will accept 12 or fewer cups at a time. If lids are returned separately, the refund is smaller. Again Again takes the cup and lids away (and pay the café back for the corresponding fee) in case they are building up. Again Again takes all the risk on the lost cups and takes back all cups and lids to bring their end-of-usable-life journey to a responsible close.

To join the network, partner cafés need to be in a region supported by Again Again, this to ensure a web of cafés in each area that will give customers more access-points to return and reuse cups within the system. Partner cafés must also have the capacity to sanitise utensils in line with national Food Safety Regulations and be licensed for this by the city or regional council.

The 304 stainless-steel cup was selected based on the best scientific evidence available and the following considerations: i) stainless steal is highly valuable and easily recovered; ii) any stainless-steel object has an approximate recycled content of 60 per cent.[105] The cup is completed with a silicon lid and a paper heat sleeve, all manufactured in China.

Investment levels to start the business (USD)

Up to 500 000.
Sources: mainly private funding and in-kind working time.

Business benefits

- Again Again's website allows cafés to calculate the potential savings from single use cups reduction. The annual saving on single-use cups for a café is estimated around NZD 564 (about USD 350).
- Again Again has been able to influence their suppliers in China and have them reducing the use of secondary and tertiary plastic packaging used to ship their cups in New Zealand.
- Customer retention. After an initial inflection, several of the partner cafés have reported that brand new customers have actively come to seek out the Again Again system at their premises. To date, cafés report uptake rates averaging around 20 per cent- with some reporting much higher rates.
- Improved user experience. Compared to a single use plastic cup, Again Again high-end, brandable and reusable stainless-steel cups offers a unique experience to customers.
- Working on purpose. Again Again staff has been living up to their values.

Critical enablers

- Governments play a key role by providing funding opportunities to innovative business practices, developing and enforcing the appropriate legal backdrop and ensuring a level playing field.
- Corporations. As powerful as governments, but much more flexible and rapid, corporations can fast track innovations and allow their rapid scaling up.
- Education. The sustainability of a sharing economy 'access over ownership' cups on-demand network is not yet well understood by the average coffee consumer. Education at the countertop is key for reusable cups to scale and become mainstream. Together with councils, cafés and corporate partners, Again Again is highly invested in educating consumers through the organisation of dedicated 'activation' events and the continuous training of its partner cafés.

Opportunities

- In the near future, it will be socially unacceptable to use single-use disposable cups. Though the population in the Western Balkans has so far proved to be mainly eager to catch up with the Western levels of consumption, the idea of sustainability is picking up faster than expected and influencing consumption and production patterns.[106] New technology might further this shift.

Challenges

- Washing and drying any reusable item is the most critical phase in a reuse business model. This is the most energy intensive and regulated part of the circular model. Providing clients with a sustainable washing/drying system will be key for Again Again and other similar initiatives to scale while remaining environmentally sound.

Legal Entity, and Ownership

Again Again is a for-profit social (limited liability) company, combining purpose with profit, launched in 2018 in New Zealand.

For more information
Official website: https://www.againagain.co/

The Milk Station Company

(Raw) milk vending machines.

DAIRY PRODUCERS | FRESH MILK | PRIMARY PACKAGING | START-UP

Plastic packaging prevention

By supplying and using reusable containers, considerably less plastic packaging waste is produced when compared to buying milk in the usual way. However, no exact amounts have been recorded yet.

How it works

The idea of the Milk Station Company originated from the fact that dairy farmers often do not achieve a price they would consider fair for their product via the established milk supply chain. This has been the main motivator for the appearance of milk vending machines all across Europe.

Milk vending machine consists of an automatic dispenser which dispenses '*raw milk*' to a reusable container/bottle after successful payment from the end-user. Some vending machines also provide the reusable container/bottle with the milk. Raw milk vending machine can dispense milk collected from cows, buffaloes, goats and sheep.

Depending on the model, each machine accommodates 1 to 4 milk tanks of varying capacity housed in a fully insulated stainless steel case. The milk is regularly agitated and kept at a fixed temperature, usually at 3-4 °C, and delivered to the dispensing chamber by means of silicon tubing.

After the machine dispenses the milk into a container of choice, an ultraviolet light then sanitizes all surfaces.

The Station Plus models can be fitted with optional features to monitor milk levels and alert via a real-time cell phone app when the milk reaches a certain volume first, and then if milk runs out. Similarly, a message can inform of a power cut or if electricity later resumes. The machine will not accept further payments in the event of a power cut, and no milk will be dispensed.

The Milk Station Company can help establish a suitable location and installing the milk vending machine. It can provide guidance on its subsequent use, following which ongoing maintenance and running costs are minimal. Milk tanks have to be cleaned prior to refilling, and the machine's internal delivery system needs to be flushed through before full tanks are put in place – a process which only takes around 10 minutes.

Investment levels to start the business (USD)
Up to 500 000.
Cost depends on the type of vending machine, the delivery solutions (from a basic and functional set of instruction stickers which simply aid the customer in purchasing milk, to full livery wrap for the machine to match a specific brand), the bespoke reusable milk bottles and bottle carriers.

Business benefits

- The period in which the initial investment of a Milk Station can be recouped predominantly depends on the exact milk production costs and volume of sales. According to preliminary calculations, however, this should realistically be achieved well before the warranty period of a machine expires, which is two years.
- For milk producers, the benefits are:
  - Cut out the middleman and sell directly to consumers.
  - No fluctuations in price achieved per litre of milk sold.
  - No additional packaging or bottling costs.
- For consumers, the benefits are:
  - A novel and fun way of buying milk, while supporting local producers.
  - Access to local product, fresh with true provenance, low food-miles and carbon footprint.
  - Contribute to saving on single-use plastic packaging by using BYO containers.

Critical enablers

- Governments can ease the regulations pertaining to the sale of raw milk through vending machines.

Opportunities

- As of 2015, the raw milk vending machine market was USD 6.45 million in Europe alone, and it is expected to climb to nearly USD 18 million by 2024.[107]
- Eastern European countries tend to have less strict regulations regarding the consumption and sale of raw milk: this might facilitate the adoption/replication of this practice.

Challenges

- Vending machine are meant to sell raw, unhomogenised milk, which might not be appreciated by local consumers.
- Stringent food safety regulations.

Legal Entity, and Ownership

The Milk Station Company is a start-up owned by the UK-based Horrington Hut Company. The founder is a former dairy farmer who started producing milk vending machines over 16 years ago, now selling around 600 machines per year.

For more information
Official website: https://themilkstationcompany.co.uk/

Svenska Retursystem

A system of reusable plastic pallets and crates that simplifies and improves sustainability throughout the supply chain from producer to wholesaler and finally to consumer in the stores.

FB PROCESSORS, BRAND OWNERS, RETAILERS	FOOD AND BEVERAGE	TERTIARY PACKAGING	SCALED

Plastic packaging prevention

Estimated 50 000 tonnes of waste (including plastic packaging waste) eliminated annually.

In 2019, 150 million reusable crates and 8 million reusable pallets were sent out in the smart cycle.

The reusable crate reduces CO_2 emissions by 74 per cent compared to disposable packaging.

How it works

The idea of the system is that the distribution should take place in reusable units instead of disposable packaging. Svenska Retursystems reusable crates and pallets are made of durable, recyclable plastic and can be used over and over again without compromising quality.

The system entails the following steps:

- Reusable crates and pallets are delivered to the producer. The reusable units are filled and delivered to the wholesaler.
- The wholesaler delivers to the retail.
- The retail empties the crates and pallets of their goods and returns them to the wholesaler.
- Svenska Retursystem brings back the reusable crates and pallets for quality control and washing. Thereafter they are ready to be used again.

When the crates are worn out and cannot be repaired – they are ground down and recycled to produce newly creates.

Users of SRS reusable crates and reusable half-size pallet pay a user fee and deposit; for reusable full-size pallet, they pay a daily rent and user fee.

Business benefits

- By offering the whole food industry the same terms and cost of packaging, the Svenska Retursystems smart system has neutralized packaging as a competitive factor and allowed food producers to focus more on their core business.[108]
- The system allows also for the following benefits:
  - Supply chain efficiency: medium-sized store saves 160 hours of labour every year compared with disposable packaging.
  - Ergonomics: A reusable pallet is 10 kg lighter

than a wooden pallet. The handles on both the reusable pallet and the reusable crate are user-friendly and easy to lift.
- The reusable units do not generate dust or wood chips, are standardised and adapted for automatic handling, are friction-free and works just as well in a freezer environment.
- Fresher goods last longer.

Legal Entity, and Ownership

Svenska Retursystem

Svenska Retursystem is equally owned by the Trade Association for Grocery of Sweden (SvDH – Svensk Dagligvaruhandel) and the Swedish Food & Drinks Retailers Association (DLF, Dagligvaruleverantörers Förbund). In 2018, it had about USD 64.5 million turnover, 1 500 customers, four washing facilities located across Sweden and about 130 employees.

For more information
Official website: http://www.retursystem.se/en/

ZERO-PACKAGING OFFERS

Zero-packaging offers

A number of innovative retailers, groceries and restaurants have based their business model on refusing both food and packaging waste. Their business model often couples with short food supply chains (SFSCs), regional and organic produce, and reuse approaches (e.g., reusable packaging or Bring Your Own (BYO) containers solutions) that further the sustainability of the stores.

Zero-packaging stores have the potential to induce resource-efficient behaviour both upstream, across their supply chain, and downstream, at consumer level, due to the need to reduce the use of packaging at each phase. In addition, zero-packaging stores can bring social benefits to small, regional farmers, higher transparency along the supply chain and provide better information on products to the consumers.[109] However, shorter shelf lives and no use-by-date reminders, more complex traceability, handling, processing and logistics operations of unpackaged goods and the distribution of associated costs and benefits across the food supply chain limit unpacked products to become mainstream in conventional retails.

Zero-packaging offers		Examples
Independent shops, food outlets and chain of stores	An increasing number of restaurants and grocery stores are today focusing on sustainability by adopting zero-packaging and zero-waste approaches and by sourcing (to the extent possible) regional and local organic produce. They directly support short food supply chains (SFSCs) and further lower the risk of food wastage. Most of these stores are run by committed social entrepreneurs, at medium-small scale, with usually limited human capital and financial resources.[110] Few successful examples of franchising exist in Italy, Australia and the UK.	Negozio Leggero Nolla Restaurant
Unpacked offers within conventional food retailers	By recognising that their customers prefer their products unpackaged, an increasing number of conventional food retailers have recently piloted unpacked offers in their stores.[111]	Franprix Crai's ECOPoint Waitrose
Innovative zero-packaging operation systems	The adoption of the zero-packaging concept requires a transformative pathway that conventional supermarkets are still reluctant to fully embrace due to the many barriers and limitations and a reduced shopping convenience for the customers. Start-ups are taking up the challenge by offering integrated zero-packaging solutions for conventional retailers.	MIWA

Replicability and scaling up

A wider adoption of zero-packaging approaches will require:

> ***Rethinking the whole FB supply chain*** to solve the dependency of food and beverage logistic from packaging; inducing suppliers, distributors and retailers to change their packaging practices and develop new handling, processing and

logistics operations; eventually, introducing appropriate certification schemes for zero-packaging supply chains.

Increasing the product variety/selection and improve the service at the store to provide consumers with a shopping experience comparable to conventional supermarkets. Slower shopping operations and limited product variety in today zero-waste stores do indeed reduce consumers' convenience. At least at the beginning, e-commerce has proved successful in increasing the penetration of zero-packaging products in the market by making the shopping experience easier for consumers as they don't need to remember to bring their reusable containers with them. In-store lending system of reusable containers, as part of a deposit-refund scheme or through the integration of RFID technology[112] and cloud-based Internet of Things[113] (IoT) software, can also improve consumers' convenience and make zero-packaging stores accessible to all.

Educating consumers and influencing their behaviour for them to demand more transparency and sustainability. Establishing trust in food safety and rethinking marketing and consumer-brand relationship.

An increasing number of new ventures offers services to conventional retailers to help them deliver an unpacked offer, such as:

Unpackaged is a UK-based company specialised in setting up retail outlets with refill stations and products. Retailers can choose from new 'Unpackaged At' unit where everything is set up and ready to go or let Unpackaged design a refill section bespoke for them. The refill packaging experience covers visual merchandising and product advice on hundreds of bulk products, supply chain solutions, as well as preferential rates with equipment suppliers. Unpackaged provides also bespoke consultancy services to a wide range of businesses and the public sector, designing and implementing zero waste solutions.

JeanBouteille, in France, offers a deposit-refund system of reusable glass bottles that are specially adapted to bulk and designed to be reused as many times as possible without breaking. Consumers can use and reuse their bottles at will and drop them at partners' stores. They are then washed and reinserted in the circuit of the partners' stores.

Finally, the emergence and success of the zero-packaging offers is very much dependent on the local context, in terms of legal backdrop, as well as consumers' wealth, cultural habits and consumption behaviours.

The zero-waste movement

The zero-waste movement can be defined as a lifestyle where people aim to eliminate their waste output completely. Though it's not new, the zero-waste movement is today a large and well-organised movement with plenty of websites, associations, social media accounts, magazines and shops. A shift in social values is indeed occurring. In few years' time, to not care about our ecological footprint will be seen as socially unacceptable and irresponsible.

However, while recognizing that personal decisions can collectively produce change, consumers have accepted individual responsibility for a problem they have little control over. Though inspiring, a zero-waste lifestyle is often impractical or impossible for most of the average consumers within current economic systems.[114] Recycling is also hard to accomplish in most parts of the world, for lack of infrastructure and proper incentives to make it work well.

Consumers' awareness is putting pressure on companies to start tackling the environmental impact of waste. A growing number of businesses are today embracing the zero-waste concept. However, to make a difference, zero-waste business models need to move beyond selling goods, and more towards enacting change in the way goods are sold in the first place.

A zero-waste business strategy should aim to "*redesign the entire cycle of resource extraction, consumption and discard management so no resources are wasted at any point along the way*" rather than to just keep waste out of landfills.[115] Business models that are based on sharing and reuse might have a bigger impact in addressing the waste problem.

Often, such a transformation requires a "*re-regionalization of economies*", away from the low-cost (globalised) production model that makes it cheaper, for example, to buy a new milk plastic bottle, rather than take back, wash and sanitize a reusable glass one.

The market of zero-waste and zero-packaging grocery stores and supermarkets has mainly evolved as a grassroots movement across the globe and is currently facing the challenge of breaking out of its niche form and reach a more mainstream market level. Local initiatives have shown that zero-waste is possible, but to make business sense, get scale and speed of change, they require adequate government intervention and community support.

Examples of zero-waste/packaging apps and platforms are:

- The Rubbish Trip offers a handy regional zero-waste shopping guide in New Zealand and more.
- Abracada-Vrac is a handy app that helps consumers finding zero-waste shops near them in France.
- The Zero Waster offers a list of local zero-packaging shops in UK.
- Useless is an online platform that provides guidance, tips and tools on how to reduce the use of single use disposable plastic packaging in London, including a map locating zero waste shops
- TapIt is a water bottle refilling network of over 750 partners in DC, Maryland, and Virginia (USA). Businesses are partnering with TapIt and the local water utilities to provide the public free access to tap water as a more sustainable and healthier alternative to bottled beverages. The public can locate TapIt locations to refill their reusable water bottle at freetapwater.org. Partners enjoy free advertising, increased visibility and foot traffic.

Negozio Leggero

Packaging-free stores and franchising.

RETAILERS, GROCERIES	FOOD AND BEVERAGE	PRIMARY, SECONDARY, TERTIARY AND SERVICE PLASTIC PACKAGING	SCALED

Plastic packaging prevention

An estimated 200 kg of plastic packaging are saved per capita per year. This estimate has been elaborated by Ecologos based on the shopping patterns of an average household that buys regularly part of its daily needs at Negozio Leggero.

It is to be noted that on certain products (such as oily seeds) some residual plastic films are still used for food safety during transportation across the supply chain.

"A forward-thinking environmental culture is needed for the zero-packaging concept to become mainstream."

Cinzia Vaccaneo
Co-founder of Negozio Leggero

How it works

Negozio Leggero is the first zero-packaging franchising worldwide, with the first shop opened in 2009 in Turin (Italy). Negozio Leggero offers over 1 500 bulk foods (mainly dry foods), to the extent possible organic and locally produced.

To ensure high quality, food safety and zero-packaging, Negozio Leggero has total control over the supply chains. Suppliers are carefully selected following a thoroughly analysis of the production systems: shortlisted products are further assessed against a list of stringent criteria, including quality, price, production practices, social and environmental considerations. Once approved, suppliers are trained and monitored on an annual basis on rigorous quality standards. Suppliers are mostly small-medium producers that share the same values and have a close, direct relationship with Negozio Leggero founders.

Most of the goods are produced in Italy. For the imported products, Negozio Leggero follows international standards for quality, food safety, fair trade and organic productions.

New founders (franchise) are carefully selected based on their business skills and, particularly, on their interest in the zero-packaging concept. An extremely demanding selection process is put in place once a letter of interest is received from a potential candidate.

Employees are also carefully selected based on their potential interest and trained to ensure that they understand the zero-packaging concept, have a good knowledge of the products (e.g., origin, production practices, producers, etc.), convey the correct messages, engage the customers to best assist them and optimise their shopping experience. Employees can be considered '*environmental educators*' who play a pivotal role in building strong emotional connections with the customers.

Products are strictly sold without packaging: customers are encouraged to bring their own refillable bags and bottles (BYO) when shopping in-store. A deposit return system is in place for glass containers. Glass containers are centrally backhauled and cleaned at a washing/sanitation plant owned by Rinova. To simplify the shopping experience, paper bags are also offered for free for when Customers forget their containers.

Both new founders and employees undergo an initial training (8 hours/day for 6 days), followed by refresher training sessions (at least twice per year). A newsletter provides updates and news to the customers.

Investment levels to uptake the practice

Affiliation costs:

- Entry fee: EURO 16 000
- Overall investment: between EURO 110 000 and EURO 130 000 (entry fee, furniture, machineries and equipment, lighting, etc.)
- Royalties: training fund 4 per cent (with minimum EURO 400 per month) + marketing fund 2 per cent of business volume (with minimum EURO 200 per month)
- Contract term (in years): 6 years, renewable without any additional costs
- Staff financial contribution: minimum EURO 20 000.

Business benefits

- The profit margins set by Negozio Leggero are favorable to their suppliers.
- The business model allows for important cost saving: i) on saved packaging, ii) on reduced marketing and communication initiatives, and most importantly ii) by buying products in large-packages. Negozio Leggero thus remains price competitive, especially considering the high-quality of the food sold in their stores.
- Building circular/zero-waste communities. Negozio Leggero has proved successful in pooling together like-minded entrepreneurs and producers. In Turin, the first Negozio Leggero store triggered a positive "spill over effect" by creating a community of reuse, recycling, zero-waste stores and restaurants around it. Moreover, Negozio Leggero, as many other zero-packaging stores, believe in cooperation: when a store does not have a specific product, employees send their customers to other similar shops they trust.
- Raising environmental consciousness. By "educating" their customers, suppliers and employees, Negozio Leggero plays an important societal role. It promotes sustainable consumption and production patterns up and downstream along its value chain.
- Reaching communities at the fringe of the zero-waste movement. Through its online shop, Negozio Leggero has proved extremely effective in reaching areas that do not yet have zero-packaging grocery stores. E-commerce has also proved a powerful tool to open the zero-packaging experience up to a broader public.

Critical enablers

- Environmental consciousness and a good understanding of the real essence of the zero-packaging store. The products and shopping experience offered

by a zero-packaging store cannot be compared to those of mainstream retailers. More than dedicated norms and laws, effective environmental education and a sustainable territorial development system can greatly contribute to the success of the zero-packaging business models.

Opportunities

- As a chain of stores in franchise, Negozio Leggero can more easily overcome the common barriers to expansion, such as poor access to capital, logistic barriers, limited power over suppliers, faced by smaller zero-packaging stores.

Challenges

- Hygiene and food safety regulations often restrain the range of products that a zero-packaging store can sell unpackaged. However, regulations are not perceived as obstacles, but as an element to be attentively considered and monitored.
- Trust in food safety and cross-contamination might be an issue for new customers.
- Despite the rapid growth of zero-packaging stores in the last decade, the environmental culture to sustain this business model might take longer to become mainstream.

Legal Entity, and Ownership

Negozio Leggero brand is owned by Rinova SC in Italy. The concept of Negozio Leggero is the result of extensive research on systemic food production processes of the Research Institute Ecologos and Rinova SC. (Italy). In 2019, there were 10 stores in franchise, 5 stores directly owned by Rinova SC, 1 online shop, for a total of 60 employees in Italy, France and Switzerland.

For more information

Official website: http://www.negozioleggero.it/en/

Nolla restaurant

Zero-packaging,
zero-waste restaurant and bar.

FOOD SERVICES, HOSPITALITY	FOOD AND BEVERAGE	PRIMARY, SECONDARY, TERTIARY AND SERVICE PLASTIC PACKAGING	SCALED

Plastic packaging prevention

The restaurant produces only 5 kg of non-compost waste in a month.

The changes in the restaurant's own practices weren't difficult to make. "After two weeks, it didn't feel like an extra thing. It was a part of our routine".

Founders of Nolla Restaurant

How it works

At Nolla restaurant, there is no waste bin in the kitchen nor any single use plastic. Nolla's chefs work directly with suppliers to rethink, reject and control packaging while at the same time sourcing local and organic produce, which are the core of the menus. Supplies from farmers and wholesalers come in crates that are returned and reused. Suppliers are often eager to adopt reusable containers as they help save them money.

The menu is carefully planned based on what's in season and how every piece of a vegetable or fish can be used. At the end of the night, the food waste that can't be reused in any other way goes in the restaurant's in-house composter to be sent back to farmers or given to customers to take home to their own gardens. The composter is located in the dining room for everyone to see and composts up to 75kg biowaste in 24 hours. The composter is not used as a bin but as a tool to learn what items do end up in the compost despite the efforts of using every part of the ingredients. Before anything is thrown away every item is weighed and then analysed using a waste management software, like larger food-service operations at Google and IKEA do better plan future menus. Data is generated by submitting info such as what is thrown away, why and by whom. This data is then carefully analysed and used to improve Nolla's everyday practices.

The approach to sustainability goes far beyond food and chefs work closely with designers, engineers and architects to rethink any type of waste: staff wear aprons tailored from recycled bed sheets, an in-house brewery turns food waste into craft ales, gift cards are made from compostable paper (embedded with seeds so that diners can grow their own poppies) and drinks are served in repurposed glass bottles. The goal is also to inspire and encourage local community and other restaurants to get involved. It is not by chance that Nolla in Finnish means "zero".

Business benefits

- Nolla's approach is cost effective as it maximizes the use of the products by utilizing every part possible from the ingredients.

Opportunities

- Nolla's business plan combines three circular economy approaches (short food supply, zero-waste and zero-packaging) with the promotion of "*local producers*".

Challenges

- Sourcing produce and planning menus takes longer as it is not always easy to find farmers and suppliers that can deliver the products without packaging. In addition, every single aspect of running a restaurant are thought through the same criteria, such as staff clothing or cleaning products.

Legal Entity, and Ownership

NOLLA

Nolla restaurant is owned by Carlos Henriques, Luka Balac and Albert Franch Sunyer, in Finland.
The idea of a zero-waste restaurant was born out of the desire of the three chefs to make the restaurant industry more sustainable and show that creative and good food can go hand in hand with sustainability.

For more information

Official website: https://www.restaurantnolla.com/eng

Franprix

Name, Legal Entity and Ownership

Franprix is a network of more than 800 grocery stores mainly located in Ile-de-France (France).

How it works

To regain scale and effectively compete in the fast-changing food retail market, in 2019 Franprix launched the Darwin project, which is built around 3 pillars:

In-store food service, including ready-made meals, prepared foods and a kitchen;

Responsibility, by increasing the offer of organic products and the number of small businesses and start-ups delivering directly to the store, as well as by offering unpacked/bulk products (70 dry food and 20 liquids using the 'Qualivrac' innovative system) and a deposit-refund system for reusable containers for the prepared foods. In addition, packaging is completely eliminated in the fruit and vegetables section. Even washed and cut vegetables come in bulk and sold in self-service. Sustainability is further enhanced through the reduction of energy consumption and the increase in the use of renewable energy.

Services: the stores offer services of proximity, such as relay parcels, announcements between neighbours, a manual bicycle pump, etc.

For more information

https://www.franprix.fr/

CRAI's EcoPoint

Ama Crai Est is an Italian cooperative that includes 182 associates with 296 points of sale with about 100 000 daily customers.

Launched in 2009, CRAI's EcoPoints allow customers to buy dry food in bulk through automatic dispensers. The EcoPoint project not only contributes to the reduction of packaging waste, but also brings to the consumer a great advantage in terms of economic savings (goods can cost between 10 to 70 per cent less than packaged ones). In addition, consumers can purchase only the desired quantity, using reusable containers provided by the store, further reducing potential food waste.

The EcoPoint is based on cutting-edge and highly innovative technological contents. The dispensers, made of injection in transparent polycarbonate, are suitable for contact with food, unalterable over time, very solid and resistant to UVA rays, which allows the prolongation of fragrance and freshness.

It is estimated that CRAI's EcoPoint project helps to save 1 million disposable packages every year.

https://www.crai-supermercati.it/

Waitrose

Waitrose & Partners is a chain of UK-based supermarkets, which forms the food retail division of Britain's largest employee-owned retailer.

In 2019, Waitrose has tested in one of its supermarkets in Oxford an '*Unpacked*' scheme, including a set of refillable options for products including wine and beer, rice and cleaning materials, with prices typically 15 per cent cheaper than the packaged alternatives. Here, customers can use their own containers, or they can borrow one through a deposit-refund system.

Waitrose has made an effort to removing hundreds of products from their packaging, although shoppers will still be able to buy the packaged versions if they wish.

Feedback from shoppers so far had been positive and sales had overtaken those of equivalent packaged products. The Oxford store trial has also been extended and rolled out to other stores.

Waitrose is among the UK's supermarkets that have signed up to the UK Plastics Pact, an industry-wide initiative to transform packaging and reduce avoidable plastic waste.

https://www.waitrose.com/

MIWA

A system that simplifies and improves the distribution and sales of packaging-free goods by using smart-powered reusable packaging.

FB PROCESSORS, BRAND OWNERS, RETAILERS	FOOD AND BEVERAGE	PRIMARY, SECONDARY, TERTIARY AND SERVICE PLASTIC PACKAGING	PILOT

Plastic packaging prevention

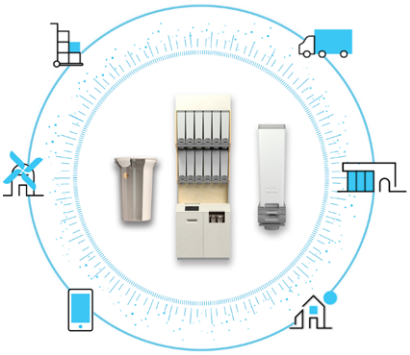
The MIWA system is designed to prevent the creation of packaging waste (pre-cycling) in the whole food delivery chain from producer to household.

MIWA's business plan suggests a cumulative impact in 5 years of 20 000 tonnes of packaging waste prevented.[116]

"It is about understanding how this new shopping experience will be accepted by customers of traditional large retailers."

"We want to make the biggest impact as possible. MIWA can scale bulk sales up and make them attractive for both retailers and consumers."

Mirek Lizec
Co-founder of MIWA



How it works

This is designed to be a full system of distributing and selling goods, based on reuse-loops.

MIWA provides standardised smart reusable capsules to food/ beverage producers and wholesalers. The capsules are filled with product and sent on to the retailers. Once empty the reusable capsules are collected by MIWA for cleaning and redistribution to producers and wholesalers.

The capsules are designed to last 300 cycles. They are in polypropylene (PP), which is easy to recycle and can be used to produce new capsule in a closed loop. The internal packaging (pouches) can be also recycled.

The MIWA capsules can "communicate" with the retailer and send relevant information such as expiration date approaching, or when the capsule is empty. Information about the product is always accessible when scanning the code on the reusable containers.

The next level is to introduce a consumer reuse loop, e.g. by dispensing products into reusable packaging that customers bring home, wash and return to the store for more shopping.

The whole system is managed by a sophisticated information system. Consumers can shop conveniently via an app, and the producers and merchants can receive precise information on the status and movement of all goods in real time. This greatly facilitates the planning of production, the ordering of goods, and ultimately – contributes to minimizing packaging waste.

Investment levels to start the business (USD)

More than 2 million.

Sources: mainly private funding, bank loans and private investors. MIWA solution has been also recognized and awarded by several challenges and quoted in key circular economy papers (e.g., Ellen MacArthur Foundation, SGD Awards, E.ON Energy Globe Awards, European Commission, UN).

Investment levels to uptake the practice

MIWA aims to offer a standard bulk price per meter to the retailers. This price is today estimated to be around EURO 4-5 000 per meter of shelf. Capsules and stands are not sold but rented to producers and retailers. This might require retailers to adjust to the idea of having to rent shelf space in their stores.

Business benefits

- The MIWA system enables retailers to offer reusable packaging options to their customers, while maintaining the convenience of their shopping experience, as well as the required hygiene and product safety standards. MIWA's technology is adaptable and flexible, and can fit in small shops and in large supermarkets.
- MIWA is responsible for the cleaning of the capsules, which makes the cost of logistics greatly contained across the supply chain.
- The MIWA capsules can be easily integrated in existing distribution systems, and thus can offer increased efficiency in handling supply chains, without disrupting the existing operations.
- The bespoke capsules and stands allow brand owners to reduce plastic packaging while meeting their marketing objectives.
- The smart-powered capsules (including RFID/NFC tags and readers) and the shopping app ensure all actors across the value chain get all product information, including about the flow of packaging.

Critical enablers

- Consumer's behaviour. Behaviour change at consumer level is needed for the system to be scaled up. Organic food stores are spearheading this change and might be the first to adopt at larger scale the MIWA system. Organic food stores have on average higher margins that allows for the initial investments costs to be more easily adopted.
- Communication. The right communication to consumers is necessary for them to integrate this new shopping experience in their daily habits. MIWA has a *Minimum Waste life-style* communication platform, and demonstrates its products in showrooms.
- Governments and the European Union can play a crucial role in engaging large retailers in new sustainable plastic packaging-free solutions for their operations, both by putting pressure through stricter regulations on plastic packaging use and disposal, and by supporting the change through economic incentives.

Opportunities

- The MIWA concept points to solutions already in play today: the increasing willingness of consumers to buy foods in bulk. In the near future, it will be socially unacceptable to buy goods wrapped in single-use packaging.
- The increasing pressure on large retailers and brand owners to reduce their plastic packaging footprint from customers, civil society and environmental associations, as well as a rapidly evolving regulatory framework, provide the opportunity for alternative packaging solutions to be more rapidly integrated within traditional business operations.
- Organic food retailers represent the ideal starting point for MIWA system as their customers are already used to buy in bulk, their store staff is already trained to help customers with the shopping experience and their supply chains are more readily adaptable to the delivery of foods in bulk.

Challenges

- Retailers are highly concerned with health and safety issues, as well as the risk of cross-contamination associated to the handling of food in bulk. Industry standards could be established around refillable containers to mitigate the risk of contamination and address concerns of liability.
- Large traditional retailers need to rethink and adapt their supply chains and stores.
- Once scaled, the cleaning and washing of reusable capsules and containers will greatly increase the complexity of the logistics required to run the MIWA system.

Legal Entity, and Ownership

MIWA is a project of MIWA Technologies a.s. based in Czech Republic.

For more information

Official website: https://www.miwa.eu/

IN-HOUSE WASTE MANAGEMENT

In-house waste management

The first step in the process of reducing packaging waste is to assess and map the packaging waste generated within the company and segregate the packaging materials on-site to optimise their use, reuse, recovery, recycling and disposal. Segregating packaging material provides the opportunity to set up and implement an effective recycling program. In turn, recycling and diverting waste from landfill not only have a positive impact on the environment, but they can provide an economic benefit from selling the recyclable waste. As recycling technology continues to make advancements, most of the packaging materials can become valuable resources. Couple that with the fact that consumers are demanding green and sustainable products, getting a material waste recovery/minimization program started within a business might also improve the brand image.

Replicability and scaling up

While the packaging regulations might not necessarily mandate it, an in-house waste minimisation/recovery program makes business sense, and it can prove quite easy and cost-effective to develop and implement, particularly in an SME. The approach might entail the following steps:

Conduct an initial ***waste management audit.*** This can be achieved by simply walking around the business premises and noting down the quantities of any wastes that is produced at each site (e.g., production site, main offices, etc.). It is also important to note the major sources of waste per packaging material, as well as per process and business activity, and discuss with staff and employees and not only rely on business' documentation. Then, all direct and indirect costs of waste should be estimated, including costs related to the efficiency of production processes and waste-disposal costs.

Elaborate a ***waste management action plan.*** Based on the information collected during the waste audit, a waste management action plan should be developed, setting out the priorities for tackling waste. By identifying the areas with highest amount of waste and the highest net costs, it is already possible to define relatively inexpensive and simple waste-reduction measures to begin with. The optimisation of in-house waste management practices allows not only to use resources more efficiently and prevent waste, but also to incentivise the reuse of certain materials, and create new revenues streams through the sale of the recovered packaging material waste.

Inform, train and engage employees. It is important to tap on the knowledge that the staff involved in the activities that produce the waste have: brainstorming sessions with employees might offer the opportunity to already suggest cost-effective ways to reduce or prevent waste, perhaps by replacing or repairing machinery or changing working practices. It is also important to raise awareness of the employees throughout the process and ensure training initiatives to improve the results of the waste-reduction strategy.

Ensure ***top management commitment.*** For the waste management plan to be successful, responsibilities and adequate resources need to be clearly allocated. Hence, decision makers need to be informed, engaged, and fully endorse the process.

Pacific Foods

A data-driven Materials Recovery Programme.

FB PROCESSORS, BRAND OWNERS, RETAILERS, FOOD SERVICES AND HOSPITALITY SECTOR	FOOD AND BEVERAGE	PRIMARY, SECONDARY, TERTIARY AND SERVICE PACKAGING	SCALED

Plastic packaging prevention

Material waste recovery rate increased from 40 per cent in 2006 to 86 per cent in 2016.

Over 6 000 tonnes of waste are diverted from the landfill each year - avoiding 1 200 tonnes of CO_2 emissions.

In addition, further waste prevention was achieved by working with meat suppliers to switch from heavily coated wax boxes to lightly waxed boxes, with the same level of product quality and safety, while being fully recyclable.

How it works

In 2016, the sustainability team at Pacific Foods began using *process mapping* to help identify waste reduction opportunities: they analysed how various inputs were creating different material stream outputs and identified the biggest opportunities laying in common recyclables like cardboard and plastic, but also in more challenging items like packaged product. They also performed a *waste audit* in order to understand what percentage of production and office waste was being directed to landfill that could in reality be diverted to composting, recycling, or re-purposing.

These assessments helped highlight the following:

- Key questions on the end-of-life of packaging, such as the possibility to sell all possible recyclable materials to an end-market. Markets exist indeed for materials other than cardboard, including tetra packs and plastic buckets.
- Several key waste reduction bottlenecks, such as lack of material balers or trained recycling technicians to keep up with the pace at which recycling developed.
- Administrative systems, like robust material tracking systems, standard operating procedures (SOPs), and training systems had not been fully developed and shared with staff.

Following approval from the top management, a *Material Recovery Program* was then developed in cooperation with department leads and executive leadership. Guiding the entire process was the adoption of the Waste Management Hierarchy. Solutions included:

- Pacific Foods borrowed the Oregon Department of Environmental Quality (DEQ)'s model for tracking solid waste and recovery, including type, volume, and location of all material that was recovered or sent to landfill by designated staff in each building across the campus.
- A centralized collection and recycling centre/warehouse was built on campus to consolidate and store the various types of recovered materials until they are picked up by private or municipal recycling and waste partners. Several staff members were hired to maintain the recycling facility, keep documentation of the facility production, and manage pickups with partners.
- Inform, train and engage the staff in the material recovery program. Activities included education around the major events

of the material recovery program, and an overview of recycling protocols. The culture of material recovery was integrated throughout all aspects of the Pacific Foods campus.

- Pacific Foods reached out to its vendors and customers to raise awareness of the efforts they were making. This helped Pacific Foods to increase the accuracy of their materials tracking; recovery partners developed systems with Pacific Foods to accurately report on the quantity of materials picked up. It also created a space to identify ways in which source materials could be reduced - in this case, primarily packaging for raw ingredients.

The process took place over the course of nearly 10 years.

Business benefits

- Annually, Pacific Foods generates over USD 140 000 of profit from the sale of recovered materials, and over USD 600 000 of landfill tipping fees are avoided. This translates in nearly ¾ of a million USD saved each year.
- Informing employees and vendors about the waste recovery program created a cultural shift. Instead of seeing waste as a cost of doing business, it was now perceived as a business opportunity. This led to embedding the program further in the company strategy.
- The success of the Material Recovery Program led in 2016, Pacific Foods to identify a bold goal: to be a zero-waste to landfill facility by 2021. A five-year plan has been developed that identifies specific projects that can address reducing waste for different types of materials.
- Five full time new green jobs created to support the community.

Legal Entity, and Ownership

Pacific Foods is a subsidiary of Campbell Soup, with 500 employees and multiple processing facilities in U.S.

For more information

Official website: https://www.pacificfoods.com/
Case study: http://www.sustainablefoodtrade.org/wp-content/uploads/2017/09/Case-Study-Pacific-Foods-Material-Recovry-Program.pdf

SHORT FOOD SUPPLY CHAINS AND LOCAL FOOD SYSTEMS

Short food supply chains and local food systems

Over the past decades, food supply chains have grown global and with high degree of complexity to better serve consumers' convenience. Plastic packaging has thus become an essential component of these global value chains to support the safe distribution of food over long distances and minimise food waste. Thus, sourcing food locally might ultimately be the most powerful measure to curb plastic packaging waste generation, while offering interesting and profitable business opportunities particularly in countries with a strong agricultural tradition and an increasing domestic demand for traditional local productions.

In the European Union, the following definitions apply[117] [118]:

> ***Local Food Systems*** are systems where *'the production, processing, trade and consumption of food occur in a defined reduced geographical area (depending on the sources and reflections, of about 20 to 100 km radius)'*.
>
> ***Short Food Supply Chains (SFSC)*** are systems where *'the foods involved are identified by, and traceable to a farmer. The number of intermediaries between farmer and consumer should be minimal or ideally nil'*.

The two concepts overlap as both are reorganisations of food supply chains aiming at reconnecting producers and consumers and re-localising agricultural and food production. These systems can develop in rural areas, semi-rural or urban areas and the sales can be done on farm, off farm (either through the commercial or the catering sector), through Community Supported Agriculture (CSA)[119], or at a distance, to customers beyond the immediate locality, either direct from the farm or through a maximum of one intermediary, where the farm of origin is clearly communicated to the end consumer.

Both systems can deliver:

> ***Environmental impacts:*** 'local' and/or 'short' does not necessarily translated in good environmental practices, however, there is evidence that SFSCs favour a higher uptake of environmentally sound practices and help reduce food packaging and waste by connecting consumers to where their food is produced.
>
> ***Social impacts:*** there is evidence that the closer interaction and connection between farmers and consumers promote the development of a sense of community that might even indirectly contribute to behavioural changes (i.e., general shopping habits with more social and environmental awareness, etc.).
>
> ***Economic impacts*** are usually to be found in the economic regeneration of rural or peri-urban areas through, among others, the maintaining of local employment and the development of synergies with the tourism sectors.

However, the small scale, the possible higher costs of production, coupled with market volatility, usually undermine the longevity of these schemes. Often, to build resilience, farmers combine SFSC with longer, more traditional food chains, or complete the range of their products with other producers' ones (in some instances, non-local but produced and traded according to values shared by the scheme, such as organic, artisan or fair-traded).

Replicability and scaling up

Based on the literature, for SFSC to develop, be resilient and also deliver on plastic packaging reduction, it is important that:

There is a positive, ***collective and collaborative action amongst producers, consumers, and local institutions.*** Various governance structures, which have been developed in Europe to create, maintain and grow local food systems and short supply chains, can be used for inspiration[120].

Consumers are educated with information on the added value of the product, provenance, identity and cultural integrity, so that they can make informed purchasing decisions. Ethical, social and environmental concerns, in addition to quality aspects, are the key drivers of consumer interest in SFSC's products. This usually leads to a higher willingness to pay a price premium, which can be significant (up to 20 per cent higher according to certain studies).

Traditional and artisan skills are sustained through training and knowledge sharing to ensure the quality which the SFSC products are built around.

Producers engaged in SFSCs have multiple skills, not only in production but also in processing and marketing. Making the transition from food producer to processor, distributor, marketer and customer relationship manager can be impossible to achieve without adequate support and training. In addition, the lack of an entrepreneurial culture can act as a barrier. ***Knowledge, training and skills are required in business, product development, and marketing,*** and should be provided both for existing initiatives and new entrants, to ensure a learning culture across the sector.

'Social innovators' can play a key role in developing SFSC. Often these are individuals educated to higher levels with professional experience beyond their current places of work.

SMEs, including small retailers, can act as a catalyst ***for promoting environmentally sustainable,*** local economic development and consumption patterns.

Finally, in an increasingly competitive marketplace, ***branding based on shared common values and beliefs*** might offer an opportunity for local products to stand out from their competitors. In Europe, the most successful local food brands have been established within a clearly recognisable geographical boundary, which consumers understand and relate to.[121]

Arvaia

A successful example of Community Supported Agriculture (CSA) in Italy.

FB PRODUCERS, PROCESSORS, RETAILERS	FOOD	PRIMARY, SECONDARY, AND TERTIARY PACKAGING	SCALED

Plastic packaging prevention

Arvaia uses zero plastic packaging to prepare and deliver the vegetables to its members.

In addition, in 2016, an estimated 300 kg of products of chemical synthesis have been spared thanks to its organic production.

"The reduction in the use and consumption of plastic is not Arvaia's main goal, but it is one of its objectives, or rather it is one of the results stemming from the radical change in the way food is produced, delivered and consumed. Arvaia represents a real local solution to a global problem."

Maria Sole Spagoni, Community facilitator, Communication Officer Arvaia

How it works

Arvaia is a CSA which cultivates vegetables and distributes them in equal part to all the its members in the city of Bologna (Italy). Since its inception, the initiative was shaped by the concept of sustainability, from management to production and distribution, including agroecology and environment protection, short-circuits and zero-kilometre approach, deliveries with cargo bikes, and zero-packaging.

No single use plastic is used in stock and delivery process: vegetable crates are reusable (made in plastic). Just for some varieties of juicy vegetables (like tomatoes), a thin recycled paper is used on the bottom. Each member collects vegetables with its own reusable containers.

Every agricultural year the production of vegetables is financed by the beneficiary members with the payment of an annual fee, defined from year to year according to the crop plan. Beneficiary members are entitled to part of the harvest. For 50 weeks a year, Arvaia distributes fresh products through 8 distribution points scattered around the city. The weekly redistribution of fresh vegetables can be completed (for an additional contribution) by processed products, such as cereals, legumes, and bread produced by a local oven with Arvaia's ancient grains. These processed foods come with their own packaging (eventually plastic packaging). However, Arvaia is currently working with their suppliers to have them sold in bulk.

Investment levels to start the business (USD)

Up to 500 000.

The initiative is self-sustaining through members' contributions. In January, members finance the agricultural production of the year that begins. They assume this way the risks of the agricultural enterprise and then benefit from the production throughout the year. To avoid bank loans and still make investments, the partners are urged to invest in the cooperative with a minimum quota of EURO 500, which are returned after 3 years, remunerated at a 2 per cent rate. Members are also requested to offer some volunteer working time and to participate to ongoing activities of the cooperative.

Business benefits

- Arvaia ensures the payment of a fair remuneration to its employees, in a sector in which, notoriously, contractual exploitations and injustices are common. The improvement of working conditions, the reduction of heavy workloads, an adequate remuneration, the increase of training hours for working members are not only monitored, but they are the main indicators of well-being and organizational sustainability from which this experience takes its essential meaning.
- The solidarity logic that underlies the CSA movement welds a link between producer and community which, in sharing risks and benefits, creates a viable example of sharing economy. Even the decision-making and operational processes are acted upon by the shareholders themselves, who meet periodically, agreeing on strategies and defining the crop plan with methodologies and tools based on the relationship and exchange of opinions among peers.
- Enhanced engagement of citizens and institutions in the conservation of the peri-urban culture and landscape. Since 2016, 76 600 m^2 of non-productive public areas and 4.75 km public walkways are maintained by Arvaia.
- Increased number of collaborations with thematic networks and academic institutions to design and experiment solutions for organic farming and short-circuit food distribution.
- Educational activities (157 visitors at the didactic farm and 41 trainees from high school and university in 2016), public events (20 in 2016) and +4 050 hours of vocational training to university, high schools' students and volunteer groups, organized to the benefit of local communities.

Critical Enablers

- In Italy, Bologna and the Emilia-Romagna Region have a rich history of Solidarity Purchasing Groups (GAS in Italian) and of cooperative more in general. However, the following enablers have been identified: national and local government's incentives, such as tax breaks, the acknowledgement on the part of the local government that CSAs can be a virtuous business opportunity, and the formalisation of the CSA movement at national level.

Opportunities

- The growing interest in local and traditional produce provide an opportunity for SFSCs to grow.
- The collaboration between CSAs and the tourism sector has the potential to bring new business opportunities, which until now only few SFSCs have experimented.

Challenges

- Scaling up the membership-base and Arvaia's community has proved quite challenging, as this innovative approach is still poorly understood and recognised in Italy (hence, the recognition needed at local government level).

Legal Entity, and Ownership

Arvaia is a Community Supported Agriculture (CSA), established in 2013 in Bologna (Italy). In 2018, it counted 493 members (230 active members and 9 employees), including consumers, producers, workers, and funders.

For more information
Official website: http://www.arvaia.it/

RESOURCES TO GET STARTED

Corporate strategy – Guidelines and guides

Name	Year	Purpose/goal Brief description	Promoter/Owner	Target audience						
				Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
Packaging in the Sustainability Agenda: A Guide for Corporate Decision Makers	2009	A non-technical guide to illustrate how designers, manufacturers, and users of packaging should collaborate to optimise the performance of packaging while minimising the risks of supply chain inefficiencies.	EUROPEN An industry organization representing the packaging supply chain in Europe on topics related to packaging and the environment.	●	●	●		●	●	●
No plastic in Nature. A Practical Guide for Business Engagement	2019	Based on interviews with seven leading companies from consumer-oriented sectors, the guide identifies four crucial areas companies should focus on to successfully work toward a better-performing plastics cycle.	WWF A global environmental NGO raising awareness about ways to address plastic waste.	●	●	●				
Plastic-free solution for the hospitality sector	2019	The guide provides businesses in the hospitality sector with the tools to eliminate single-use plastics from their operations and to implement responsible waste management practices.	The Ocean Standard A set of free, industry-specific guides for adopting sustainable operating practices that meet both business and environmental needs.					●	●	

Packaging audit and plastic footprint - Tools

Name	Year	Purpose/goal Brief description	Promoter/Owner	Available for free	Target audience						
					Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
The Plastic Leak Project	2020	The "Plastic Leak Project" a pre-competitive multi-stakeholder initiative to deliver the first science-based methodology to map, measure and forecast plastic leakage along a business value chain. Plastic leakage can indeed occur all along the life cycle depending on the industry.	Initiative co-founded by Quantis and ecodesign center EA in partnership with 35 public, private and scientific organizations.	YES	●	●	●	●	●	●	●
Plastic Disclosure Project	2019	Online survey that allows manufacturers and service providers to understand the baseline of their current use, recovery, recycling of plastic packaging as well as use of recycled content, and to gain the knowledge and capacity on how best to develop and implement sustainable packaging solutions. If interested, companies can also disclose their own data on plastic use.	Ocean Recovery Alliance A non-profit organisation operating to reduce plastic pollution on land and water by creating strategic solutions for governments, industry and communities.	YES	●	●	●	●	●	●	
Plastic Soup Footprint methodology	2019	Online survey that enables companies to track their plastic use along their supply chain, to understand how to reduce plastic use, prevent leakage into the environment and increase plastic reuse. By applying this tool companies can also see how their suppliers and customers deal with plastic. The survey can be filled in directly by the user, in about two hours.	Plastic Soup Foundation, Erasmus University Rotterdam and PwC	NO	●	●	●	●	●	●	

Packaging audit and plastic footprint - Tools

Name	Year	Purpose/goal Brief description	Promoter/Owner	Available for free	Target audience						
					Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
Circularity Indicators Project	2015	The Circularity Indicators allows to assess how well a product or company performs in the context of a circular economy. The Material Circularity Indicator measures how restorative the material flows of a product or company are.	The Ellen MacArthur Foundation Non-for-profit working with business, government and academia to build a framework for an economy that is restorative and regenerative by design.	YES							●
The MI:Product Intelligence	2015	This web-based measurement system provides businesses with the tools required to track their progress in delivering a circular economy-based business model.		YES	●	●	●		●	●	
Waste Mapping: Your Route to More Profit	2013	A simple guide for companies to understand where and how waste occurs, and how much it is really costing. The first step towards tackling resource waste and becoming more resource efficient.	WRAP Non-profit promoting sustainable waste management.	YES	●	●	●	●	●	●	
Cost it properly		A simple formula to calculate the true cost of waste.		YES	●	●	●	●	●	●	

Package optimisation through ecodesign – Guidelines and tools

Name	Year	Purpose/goal Brief description	Promoter/Owner	Target audience						
				Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
The Circular Design Guide	2018	A series of free tools, to encourage a new business model based on the circular economy. The tools can be used in product design to select more sustainable raw materials, decrease waste, and design for recyclability. This guide is not specific to plastic packaging but contains methods that are applicable across many products.	The Ellen MacArthur Foundation and IDEO	●	●	●		●	●	●
Management Guidelines for the Ecodesign of Plastic Packaging	2014	Guidelines that explain the role of ecodesign in developing new packaging solutions, describe how choices should be made on how the optimisation of packages is to be verified based on a company's environmental policy and brand strategies, demonstrate how ecodesign can be systematically integrated into the management processes of packaging projects. Practical examples that illustrate the suggested approach are also provided, as well as a toolbox and additional collections of information.	Round Table Ecodesign of Plastic Packaging Launched in 2014, the round table includes experts from businesses operating along the entire plastics packaging supply chain (packaging manufacturers, food and consumer goods sector, retailing) as well as scientific and consumer protection organisations.	●	●	●				
Packaging optimisation for SMEs	2013	Report that explains the basics of packaging optimisation to help companies develop an action plan to save money and the environment's critical resources.	WRAP Non-profit promoting sustainable waste management.	●	●	●				

Package optimisation through ecodesign – Guidelines and tools

Name	Year	Purpose/goal Brief description	Promoter/Owner	Target audience						
				Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
Single Trip or Reusable Packaging - Considering the Right Choice for the Environment	2010	Report that describes the factors which need to be considered when reviewing the environmental performance of single-trip and reusable packaging systems. Based on a review of the findings of Life Cycle Assessments and similar studies comparing the environmental burden of single-trip and reusable packaging systems.	WRAP Non-profit promoting sustainable waste management.	●	●	●				
Secondary packaging benchmarking across the grocery sector	2015	Report that identifies the areas where there is the greatest potential to reduce the carbon impact of secondary packaging in the grocery sector and subsequently produced benchmarks in these areas.		●	●	●				
The Global Protocol on Packaging Sustainability 2.0	2011	The Protocol offer a standardised way to address a range of business questions about packaging sustainability, either within a company or between business partners. The metrics fall into three categories: Environmental, Economic and Social. The Protocol does not include specific litter reduction-related metrics.	Consumer Goods Forum A global CEO-led organisation that brings consumer goods retailers and manufacturers together to collaborate and drive positive change, including greater efficiency.	●	●	●	●	●	●	●
RecyClass		An initiative aiming to help the plastics value chain find the correct way to approach and evaluate the design for recycling of packaging products, with the goal of improving their recyclability.	Plastic Recyclers Europe-PRE A Brussels-based association of European plastics recyclers who reprocess plastic waste into high-quality material destined for the production of new articles.	●	●	●				

Package optimisation through ecodesign – Guidelines and tools

Name	Year	Purpose/goal Brief description	Promoter/Owner	Target audience						
				Processors	Brand owners	Retailers (own brand)	Retailers	Food services	Hospitality	Business support organisations
The Recyclability By Design guidelines	2017	The guidelines help making the packaging more recyclable, examining recyclability from the outset of the production process.	RECOUP RECycling Of Used Plastics Limited is a registered charity and not-for-profit member based organization to promote, develop, stimulate and increase the levels of plastics recycling within the UK.	●	●	●				
Recyclability of plastic packaging: ecodesign for improved recycling	2016	An easy-to-use summary of studies conducted by COTREP and its members. It outlines the main principles of recyclability and also includes more technical material profiles to foster innovation without compromising on packaging recyclability.	COTREP Center of resources and expertise on household plastic packaging recyclability in France.	●	●	●	●	●	●	
EasyD4R		A software tool that evaluates the recyclability of packaging based on its composition and the individual weight proportions of the respective components: basic materials, closures, labels, colours, etc. The results of the tool show the recyclability of each design as a percentage and the material combinations, which can be optimized for recycling.	Henkel Private company operating worldwide in three business areas: Adhesive Technologies, Beauty Care, and Laundry & Home Care.	●	●	●				

Life cycle assessment (LCA) - Software tools

Type	Name	Purpose/goal and Brief description	Promoter/Owner	Available for free
Software tools to run a Full Life Cycle Assessment (LCA)	GaBi	GaBi can help companies develop a sustainable product portfolio to build competitive advantage and increase revenues, build a product sustainability strategy, differentiate products with verifiable sustainability credentials to drive customer preference, use resources more efficiently and optimize processes throughout the value chain to reduce cost and identify supply-chain hotspots including materials and processes of concern to mitigate risk.	GaBi-Software	NO
	SimaPro	A professional tool to collect, analyse and monitor the sustainability performance data of a company's products and services. It used for a variety of applications, such as sustainability reporting, carbon and water footprinting, product design, generating environmental product declarations and determining key performance indicators.	SimaPro	NO
	Umberto	A software tool that allows to create visually appealing presentations with integrated cost analysis.	IFU-Hamburg	NO
	openLCA	The only opensource full LCA tool for sustainability assessment & life cycle modelling, in a standard programming language, using only widely available Open Source software	GreenDelta	YES
Software tools to run a Streamlined Life Cycle Assessment (SLCA)	PackageSmart	A streamlined web-based LCA tool that allows for multiple impact assessment methods (e.g., scenario-based analysis, comparative analysis, cube[122] utilization).	US-based EarthShift Global LLC	NO
	Piqet	Piqet allows for a simplified cradle-to-cradle LCA, addressing primary, secondary and tertiary packaging. There is only one impact assessment method, including 19 indicators, in less than 30 minutes.	Piqet	NO
	COMPASS	The Comparative Packaging Assessment (COMPASS) allows for rapid package design optimization using industry data and internationally accepted environmental performance indicators. It allows also the calculation of so called "non-life-cycle based attributes" such as recycled content, sourcing (percentage of certified raw materials), solid waste and health issues (it checks for materials of concern), and provides the following services: screen new design alternatives – "design out", track recycled content, engage suppliers in the dialogue, track sustainability progress and communicate efforts to internal and external parties, understand solid waste profile, benchmark existing portfolio.	TRAYAK LCC and part of a broad sustainability platform- EcoImpact, that empowers companies to operationalize their corporate sustainability goals.	NO

Supply chain modelling software tool

Supply chain software is a software program or module designed to control end-to-end business processes across the supply chain, perform demand planning and forecasting, and manage supplier relationships. Supply chain modelling software can provide an accurate view of the materials used across the supply chain(s), visualise the problem(s), identify the sources and flows of suppliers, develop and assess alternative scenarios, comparing costs and risks. It can thus help businesses visualise and evaluate the efficiencies of their supply chain network also in terms of plastic packaging.

SAP's "Plastics Cloud"

In 2018, SAP UKI piloted a "Plastics Cloud" to collect existing and live data from across the UK plastics supply chain to help reduce and ultimately eliminate the waste of single-use plastics. The Plastics Cloud uses the power of SAP Leonardo's technology, including machine learning, to compile information that can be used to forecast trends in plastics purchasing and recycling, enabling services to meet demand. Data can also be shared with consumers to help them understand their own plastics impact. In 2019, SAP Ariba, the world's largest business-to-business network, announced the creation of a new marketplace to expand the trade of recycled plastics and plastic alternatives. The Ariba® Network will allow brands to connect more sustainably with new recycled plastics and alternative supply sources via waste picker communities and others certified by organizations such as OceanCycle, a social enterprise focused on creating traceability in plastic supply chains and helping businesses integrate ocean plastics into their products.

The "Plastics Cloud" pilot and its development follow the engagement of SAP in the UK Plastic Pact in 2018 and the collaborative efforts of SAP with global consumer product brands, such as Procter & Gamble, the Coca-Cola Co., and Nestle, to find solutions to scale recyclable procurement.

Several supply chain management and modelling software exist for small and medium food & beverage businesses. Online platforms such as Software AdviceTM can help identifying the best solution for any specific company. However, these software tools do not specifically address plastic packaging.

Collaborative initiatives

Initiative	Promoter	Description	Target audience	Why joining this initiative?
#Breakfreefromplastic	Launched in 2016, accounts today nearly 1 500 organizations from across the world.	A global movement promoting zero waste principles to stop plastic pollution. Main initiative is the Brand audits: clean-ups that name the brands most responsible for marine plastic pollution.	NGOs, civil society organizations	The movement releases reports that can be relevant for the reputation of businesses.
Beyond Plastic Med initiative (BeMed)	The Prince Albert II of Monaco Foundation The Tara Ocean Foundation Surfrider Foundation Europe IUCN The Mava Foundation	A network of Mediterranean stakeholders committed to prevent plastic pollution, develop and implement sustainable solutions, engage stakeholders and the public by raising awareness and disseminating best practices. BeMed has recently launched a call for micro-initiatives targeting actions that strive to curb plastic pollution in the Mediterranean region.	NGOs, territorial authorities, private companies with fewer than 20 employees, scientific institutions, in every country in the Mediterranean region (with a priority to Algeria, Bosnia-Herzegovina, Montenegro, Middle East and North African countries).	BeMed has a focus on the Mediterranean. BeMed offers a call for micro-initiatives with contributions up to a maximum of EURO 10 000. The duration of the micro-initiative is between 12 and 18 months.
Mediterranean Platform on Marine Litter	UN Environment Programme – Mediterranean Action Plan	A forum for consultation, exchange of good practices, and solutions seeking.	Governments, academia, civil societies and private companies	The Platform constitutes an opportunity for the members to supportively and complementarily provide concrete contributions and inputs to the implementation of the Regional Plan on Marine Litter Management in the Mediterranean[123].
Reloop	Reloop	A broad platform bringing together industry, governments, and non-governmental organizations. It works as a network for advances in policy that create enabling system conditions for circularity across the European economy. Reloop publishes reports, position papers and videos on circular economy and the solutions on prevention and reuse, as well as high quality and quantity recycling.	Businesses, civil society organizations, investors and financial institutions and governments	Through Reloop, businesses can contribute to the shaping of a European policy framework that creates enabling system conditions for circularity across the (plastics) economy.

Collaborative initiatives

Initiative	Promoter	Description	Target audience	Why joining this initiative?
Rethink Plastic	An alliance of leading European NGOs, with thousands of active groups, supporters and citizens in every EU Member State.	It brings together policy and technical expertise from a variety of relevant fields. It works with European policy makers to design and deliver policy solutions for a future that is free from plastic pollution.	NGOs, civil society organizations	The Rethink Plastic Alliance's website is a source of reports, position papers and videos on plastic pollutions. It also allows to stay abreast with the latest campaigns in Europe.
The Global Plastic Action Partnership initiative	The World Economic Forum hosts the partnership in collaboration with the World Resources Institute, the Pew Charitable Trusts.	A structured global public-private partnership for action on plastic that enables public, private and civil society sectors and their initiatives to come together.	Businesses, civil society organizations and governments	The partnership fosters exchange, collaboration and scaling of solutions to address plastic pollution.
The Global Tourism Plastics Initiative	Developed by the Sustainable Tourism Programme of the One Planet Network, and led by the UN Environment Programme, the World Tourism Organization and the Ellen MacArthur Foundation.	The Initiative requires tourism organizations to make a set of concrete commitments by 2025, including eliminate problematic or unnecessary plastic packaging and items by 2025, take action to move from single-use to re-use models or reusable alternative by 2025, engage the value chain to move towards 100 per cent of plastic packaging to be reusable, recyclable, or compostable, take action to increase the amount of recycled content across all plastic packaging and items used, commit to collaborate and invest to increase the recycling and composting rates for plastics and Report publicly and annually on progress made towards these targets.	Hospitality sector	The initiative will support tourism organisation achieve the 2025 targets through: • Sharing of solutions • Fostering procurement practices that consider the plastic footprint of products and services and encourage circularity in the use of plastics • Promoting innovation and facilitating the cooperation between governments, local organisations, and businesses • Consolidating the progress reported by all signatories and establishing a performance benchmark • Communicating the actions taken by signatories and showcasing the leadership of the sector.

Collaborative initiatives

Initiative	Promoter	Description	Target audience	Why joining this initiative?
The New Plastics Economy Initiative	The Ellen MacArthur Foundation, the World Economic Forum and McKinsey & Company	The New Plastics Economy is a three-year initiative aimed "*to take a global, cross-sectoral approach to plastic material flows by bringing together organisations from across value chains to re-think and re-design the future of plastics, starting with packaging*". It entails: • Pioneer Projects are projects led and run independently by the participants of the New Plastics Economy with the aim to design and test innovations that could change the way we make, use, and reuse plastics. • The Plastics Pact, a network of initiatives from around the world that bring together key stakeholders at the national or regional level to implement solutions towards a circular economy for plastics. • The Innovation Prize that awards innovators designers, entrepreneurs, academics and scientists who develop systemic solutions that prevent plastic packaging waste. • The New Plastics Economy Global Commitment that calls on businesses, civil society organisations, financial institutions, academia and governments across the globe to rally behind a common vision and a set of 2025 targets to address plastic waste and pollution at its source. It is led by the Ellen MacArthur Foundation in collaboration with UN Environment Programme.	Businesses, civil society organizations, investors, financial institutions and governments	It is a powerful communication opportunity. It creates alignment and puts all of the players on the same page and aiming in the same direction. It acts as funding leverage. It enables exchange and networking. As voluntary agreement, the initiative offers signatories some flexibility on what to focus their efforts on. For many companies, signing on to the commitment is an extension of existing initiatives. It demands transparency for accountability. Launched in October 2018, the Global Commitment counts today more than 400 organisations committed to keeping plastics in the economy and out of the ocean.
Zero Waste Europe	A network of organisations that spans across Europe and the Mediterranean.	Zero Waste Europe works on a wide range of projects and policy areas with the objective of advancing a zero-waste future for Europe. Zero Waste Montenegro is an official member organization.	NGOs, civil society organizations	Zero Waste Montenegro published the first Clean Up and Brand Audit report where international and national brands, whose plastic packaging is most commonly found stranded on the beaches, are publicly exposed. In Albania, Zero Waste Europe has launched a set of activities, such as the Green Line Albania and national clean-up actions, engaging more than 536 000 volunteers and collected more than 20 000 tonnes of waste.

Collaborative innovation platforms

Name	Promoter	Description	Target audience	Why joining this initiative?
NextGen Cup Challenge NextGen Circular Business Accelerator	NextGen Consortium is a multi-year partnership of FB industry leaders to address single-use food packaging waste globally.	NextGen Consortium identifies innovative, alternative drink cup solutions to bring to scale, while simultaneously working to align these new solutions with the broader cup recovery infrastructure. NextGen has a three-stage, multi-year approach: • First, the NextGen Cup Challenge - a global design competition - allows to identify innovative high-potential cup solutions that could work globally. • The NextGen Circular Business Accelerator will test solutions and provide critical resources and industry expertise to accelerate their commercialization. • The NextGen will finally match solutions to value chain partners to provide piloting opportunities to scale the solution.	Food and beverage industry	NextGen focuses on sustainable solutions to single-use disposable drink cups. It provides access to know-how and skills of experts in the FB industry.
OpenIDEO	OpenIDEO is a non-profit spinoff of IDEO, a global design and innovation consultancy.	OpenIDEO is an online open innovation platform that enables innovators worldwide to come together, find support and collectively develop ideas and accelerate social innovation. It offers: • OpenIDEO Challenges are guided idea accelerators that entail a call for ideas and support to participants by guiding them through phases of the design thinking process to advance their projects. Challenges may include events, mentorship, tools, funding and other opportunities to help participants scale and implement their solutions. • OpenIDEO Alliances are curated communities that help people connected by a shared purpose find support, build partnerships and use design to advance solutions. Alliances are hosted on OpenIDEO's online platform and may also connect in person at special events. • OpenIDEO Chapters are an established network of volunteer-driven communities that organize events in cities worldwide, connecting creative problem solvers and designing local solutions for our global efforts. • Events are online and in person opportunities to connect and collaborate with innovators in your city and around the globe.	FB processors, brand owners FB retailers Food services and hospitality	OpenIDEO Challenges expand on the power of crowdsourcing, bringing together diverse, collaborative communities that share insights and build on the ideas of many to accelerate impact. OpenIDEO focuses on designing products and services that improve the lives of people in poor and vulnerable communities. It welcomes all creative thinkers, no matter their background, level of experience or country of origin. Only certain eligibility criteria are requested to be awarded funding or design support within the Challenge or Alliance initiatives.

Collaborative innovation platforms

Name	Promoter	Description	Target audience	Why joining this initiative?
The Circulars	The World Economic Forum and the Forum of Young Global Leaders [124] with Accenture Strategy	The world's premier circular economy award program. The Circulars is open to any individuals or organizations from commerce and civil society that have made a notable contribution to driving circular economy principles. Particularly: • small to medium-sized enterprises (SME), with USD 10 – 100 million in turnover, which are transforming their business towards the circular economy, • early-stage organizations, with USD 1 – 10 million in booked revenue, which are at the forefront of the circular economy, demonstrating innovation and market disruption.	Any individuals or organizations from commerce and civil society that have made a notable contribution to driving circular economy principles.	The Circular award offers recognition to individuals and organizations across the globe that are making notable contributions to the circular economy in the private sector, public sector and society. The annual awards are hosted at the World Economic Forum's Annual Meeting in Davos. The Circulars offers also publications and reports on Circular Economy.
The Launch	NASA, Nike, U.S.ID, the U.S. Department of State, IKEA, eBay, VF Corp., Novozymes, and Kvadrat, along with several regional and national government organizations.	A network of experts and decision-makers to design, develop, and deliver global challenges committed to the Circular Economy and the Future of Food. Members are involved in every step of the Launch process, from challenge framing to reviewing applications to advising our innovators on their journey to scale. Members provide innovators with the resources, investments and procurements necessary to overcome barriers and to successfully advance the innovations into the market, reach scale and ultimately shift global systems.	Food and beverage industry	The Launch entails a cross-sectoral network of people from the industry, academia, governments and civil society with clear decision-making power within their organisations. By connecting these network members with innovators, the Launch makes it easy for them to act upon decisions that directly impact their sustainability and social responsibility goals.
The Switchers Fund	UNEP/MAP - Sustainable Consumption and Production Regional Activity Center (SCP/RAC)	The Switchers Fund includes challenges and awards related to plastic packaging waste, such as the "Unwrap" challenge: Open call for the prevention and reduction of single-use plastic packaging in the food and beverage sector in Albania, Bosnia and Herzegovina and Montenegro. Tailored 4-month incubation process integrating 2 main modules with specific technical assistance and mentorship for Start-Up development and with Circular Economy experts. Seed funding of EURO 3 000 to invest in the selected solution, upon the completion of the incubation process.	Food and beverage businesses in Albania, Bosnia and Herzegovina and Montenegro	One of the very few opportunities for entrepreneurs in the region to accelerate good packaging solutions in the region. Incubation and technical assistance tailored to the awardee. Promotion within the large UNEP/MAP system.

Collaborative innovation platforms

Name	Promoter	Description	Target audience	Why joining this initiative?
Think Beyond Plastic Foundation		A non-profit public charity that promotes innovation and entrepreneurship for a world free of plastic pollution.	FB processors, brand owners For the time being, only available in U.S., Bulgaria and Germany	The Think Beyond Plastic Foundation offers: • Strategic partnerships • Innovation Centres • A network of regional Innovation Hubs • Annual Accelerator Class
Zero Waste Living Lab		A platform to develop the market for zero waste consumption and enable a radically more sustainable consumption paradigm.	SMEs in the FB industry For the time being, only available in Indonesia	The platform allows for: • Incubating existing alternative delivery systems (early stage business models). • Replicating successful business models from abroad. • Ideating new business models to create a strong market movement of alternative delivery solutions.

How governments can help

In Europe, regulations and market-based instruments tend to mainly focus on the end-of-life phases (recycling, energy, waste) of packaging, while ecodesign, consumption and reuse are typically targeted with softer policy instruments, such as awareness raising and voluntary agreements.[125] [126] Policy-makers, however, have the possibility to enhance the openness of the legal and regulatory system to facilitate the uptake of more sustainable, circular packaging solutions.

Examples of government interventions might include:

Knowledge and capacity creation

- *Developing information and knowledge platforms* on good practices and emerging regulatory requirements for various industrial activities.
- Developing and providing *training, organising knowledge sharing platforms and events,* in local languages and easily accessible to local small producers.
- Establishing and supporting *industry associations and business organisations* for them to provide ongoing support to companies on waste reduction practices.
- Developing *free-to-use ecodesign tools, guidelines, and training programs* tailored to SMEs' needs, and ensuring their promotion through local business support organisations.
- Establishing an *inventory of local products and producers* and promoting Short Food Supply Chains within local producers.

Market and non-market incentives

- Including *environmental considerations in public procurements.* Green Public Procurement (GPP) can create economies of scale for the development of sustainable products and services, spoor innovation and make an important contribution to sustainable consumption and production. GPP can also influence the market by providing the industry with real incentives for developing green technologies, products, and services.
- Establishing and/or improving *extended producer responsibility (EPR)* programs to create the right incentives for producers to move towards more sustainable packaging solutions and foster the transition to a circular economy. In this respect, the EU is already working on ecodesign measures on plastics products with the aim to set minimum requirements that take account of circular economy aspects, incentivising the recyclability and reusability of plastics, in line with the objective of ensuring all plastic packaging placed on the EU market to be easily recycled or reusable by 2030.
- Developing *enabling regulations and policy measures* (e.g., the adoption of stricter laws and regulations on the amount of packaging waste generated across the supply chain) to incentivise the adoption of zero-packaging practices also within traditional large retailers.
- Introducing *financial incentives and increasing access to funds* to help SMEs take advantage of the opportunities from emerging green markets.

- Creating *enabling investments environment,* for example by incentivising the use of crowdfunding through taxes reduction or other benefits. Crowdfunding is indeed widely adopted across Europe to open zero-packaging shops.
- Enacting *legal frameworks and incentives* to support short supply chain by, for example, introducing flexibility provisions to hygiene regulations for small production units and retail.
- Facilitating the *purchase and loan of land to local food producers* by public sector or charitable organisations to encourage new entrants in the Short Food Supply Chain and/or Local Food Systems. In particularly, younger farmers, who might be more willing to engage in direct sales, should have access to land in peri-urban areas at reasonable prices, as well as to bank loans.

Promoting innovation

- Establishing *awards and challenges to sustain and boost eco-innovation*, such as the European Commission's Eco-Innovation Initiative, set up to support innovation among SMEs and to improve their competitiveness.
- Promoting *private-public partnerships.* For example, the lack of proper infrastructure set in place for organic waste and compostable packaging alike, hamper the development of many alternative materials to conventional plastics. Collaboration between governments and businesses, coupled with consumer awareness, can help to establish truly sustainable packaging solutions that support a circular economy.

Standards and certifications

- Defining *harmonized standards for bio-based, biodegradable, and/or compostable plastics based on robust evidence backed by scientific theory and direct practical experience.* Standards should include plastics that are biodegradable in any environment, including marine and/or other uncontrolled conditions; consider the relative toxicity and the lasting effects on the environment and human health, as well as the overall sustainability and wider impacts of these alternatives when considering land use and any resources required to produce them. Based on the standards, proper labelling and communication of the right messages should be developed to inform consumers, and avoid confusion and improper packaging disposal or littering.
- Working on *institutional arrangements for eco-branding and third-party certification,* similar to that for organic products, for zero-packaging stores to give consumers assurance and evidence on what benefits they are getting in return for a less convenient shopping experience.
- Establishing *a voluntary labelling scheme* to help protect locally produced food from imitations and provide information to consumers. It would have to be voluntary and easy to handle for producers.

Raise awareness

- Increasing *awareness among consumers* on the environmental consequences derived from their buying behaviour.

SCP/RAC's support to governments to address food & beverage plastic packaging

SCP/RAC's mandate is to support the Contracting Parties to the Barcelona Convention in their progress towards more sustainable consumption and production models. In recent years, SCP/RAC's work has increasingly focused on marine plastic pollution, by helping governments and businesses - particularly the food & beverage industry, address the use and production of plastic packaging to prevent plastic waste. Over the period 2018-2020, SCP/RAC has provided assistance to the governments of Albania, Bosnia and Herzegovina and Montenegro, which resulted in the following:

- A Policy gap and a plastic material flow analysis, which provide a preliminary understanding of the amounts of plastic packaging being placed on the market and in the waste flow in each country, as well as the main policy gaps and challenges to applying the principles of circularity to plastic packaging across the food & beverage industry.
- Three national events gathering key actors of the food & beverage value chain and local business associations, in order to review progress and foster collaboration among stakeholders.
- Guidelines to address single-use plastics through public procurement in two public authorities of Montenegro, including an inventory of local products and producers offering reusable options.
- Technical support to two food & beverage companies in each country to help them rethink their packaging practices to minimize waste across their value chain. This entailed building local capacity to deliver this type of consulting work to companies.
- The "Unwrap award". A restaurant in Albania was awarded 3 000 EURO and benefitted from tailored incubation services to address plastic waste generation within its operations.

Relevant legal and policy frameworks in the Mediterranean and the European Union

Eliminating plastic packaging at source has significant advantages over recycling and other forms of waste management: it prevents plastic packaging from becoming waste (thus prevents material value loss) and, eventually, from ending up in nature due to accidental release or waste mismanagement.

In the Mediterranean region, through the Regional Plan for the Marine Litter Management in the Mediterranean, Contracting Parties to the Barcelona Convention[127] committed to base urban solid waste management on reduction at source, applying the following waste hierarchy: prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery, and environmentally sound disposal. The Regional Plan is the first of its kind to be fully based on the Ecosystem Approach principles and conceived to guide Contracting Parties in the elaboration of national policies and action plans on marine pollution control and prevention. The timetable for the implementation of the Regional Plan measures is between 2016 and 2025, with most of the measures to be implemented by 2020. With this Plan, the Mediterranean region is pioneering the adoption of legally binding measures on marine litter, including plastic litter.

The commitment of the Contracting Parties to address marine pollution at its source was further enhanced by the adoption, in 2017, of the Sustainable Consumption and Production Regional Action Plan. The SCP Regional Action Plan aims at achieving as a first step the shift to sustainable patterns in four priority areas of consumption and production, namely Food, Fisheries, and Agriculture; Goods manufacturing; Tourism and Housing/construction. The Action Plan calls on representatives of the public and private sector, as well as on consumers and civil society organisations, to rally behind a more sustainable approach to economic growth, based on a circular economy, a more environmentally-friendly consumption, and greener production method.

In the European Union (EU), waste prevention is regarded as the highest priority according to the Waste Hierarchy established in the Waste Framework Directive (Article 4). It is also recognised as a priority in the EU Roadmap to a resource-efficient Europe, which includes the reduction of waste generation as an "aspirational target" for waste management to be achieved by 2020, and in the 7th Environment Action Programme 'Living well, within the limits of our planet'.

The European Union has indeed one of the most advanced legally binding approaches to promote a circular plastic economy and address marine plastic pollution. The acquis is rapidly evolving and since 2015 there has been an acceleration in the initiatives promoted by the EU.

"Closing the loop - An EU action plan for the Circular Economy", adopted in 2015 and including 54 actions, is considered fully completed. According to the findings of March 2019 report, implementing the Circular Economy Action Plan has accelerated the transition towards a circular economy in Europe, which in turn has helped to create new jobs, opening up new business opportunities, developing new business models and new markets, domestically and outside the EU.

The "European Strategy for Plastics in a Circular Economy" (Plastics Strategy), one of the main pillars of the Circular Economy Action Plan, was adopted in January 2018. It promotes measures that have the potential to affect EU businesses as follows:

- *Drive investment and innovation* – perhaps the most important change introduced is a focus on transforming the way products are designed, produced, used, and recycled in the EU. Businesses will be able to access guidance and an extra

EURO 100 million in finance from the EU to help minimize plastic waste at source and develop smarter and more recyclable plastics materials.

- *Making recycling profitable for business* – new rules on packaging are set to improve the recyclability of plastics and increase demand for recycled, rather than virgin, plastic. This is a big step towards the key target of making all EU plastic recyclable by 2030. And it also recognizes that waste management industries need to be profitable to succeed. Some of the measures are:

  - speeding up the authorization decisions on recycling processes and hopes to issue about 140 authorization decisions in 2019. This will allow articles that contain recycled plastic obtained from an authorized recycling process to be marketed in the EU for food-contact (according to the EC Regulation No 282/2008),

  - financing research and innovation projects on better identification of contaminants and on decontamination of plastic waste to eliminate or reduce chemicals of concern, in addition to improving the ability to track such substances in both produces and waste,

  - working with the European Committee for Standardization (CEN) and industry to develop quality standards for sorted plastic waste and recycled plastics, and possibly implement economic incentives to reward the use of recycled content in the packaging sector,

  - promoting the development of international standards to boost industry confidence in the quality of recyclable and recycled plastics.

- *Curbing plastic waste* – measures will be brought in to improve the recyclability of biodegradable and compostable plastics, for example, by changing labels attached to bottles. The EC will also work to reduce microplastic use in products. Both of these measures mean a fundamental change in many businesses ' products and processes.

- The revised EU Waste package was also voted in early 2018 by the European Parliament and the Council, and is *"aimed, as a priority, at preventing the production of packaging waste and, as additional fundamental principles, at reusing packaging, at recycling and other forms of recovering packaging waste and, hence, at reducing the final disposal of such waste to contribute to the transition towards a circular economy"*. It includes stricter rules for calculating recycling rates, new recycling targets for municipal waste and packaging, a new landfill reduction target, new separate collection rules and promotes the use of economic instruments, such as Extended Producer Responsibility (EPR) schemes.

The Single-Use Plastics Directive, adopted by the European Parliament in March 2019, is the most comprehensive strategy in the world adopting a material-specific lifecycle approach with the vision and objectives to have all plastic packaging placed on the EU market as reusable or recyclable by 2030. It represents an essential pillar of the European Commission's Circular Economy Action Plan as it provides for a set of

ambitious measures address to extend the Extended Producer Responsibility schemes to cover the cost to clean-up litter on specific products, to boost the separate collection for plastic bottles by 2029 and the use of recycled plastic in plastic bottles. It also bans selected single-use products made of plastic for which alternatives exist on the market and restricts the consumption of food containers and beverage cups made of plastic and specific marking and labelling of certain products. The Directive argues that retaining product and material value for longer and generating less will result in a more competitive and resilient economy and reduce pressure on precious resources. The Directive follows a similar approach to the successful 2015 Plastic Bags Directive, which brought about a rapid shift in consumer behaviour related to the use of plastic carrier bags.

Methodology

More than a hundred business models and practices to prevent or reduce plastic packaging waste along the food & beverage value chain were identified from across the world through *literature and web searches,* as well as stakeholders' and experts' recommendations.

The following *screening criteria* were applied to select business practices for inclusion in this publication:

SCREENING CRITERIA	
Circular economy objective	Business practice explicitly designed to reduce or prevent plastic packaging waste, in line with circular economy principles.
Target packaging/sector	Business practice addressing primary, secondary and tertiary plastic packaging, as well as service packaging, used in the food & beverage and the hospitality sectors.
Data availability	Business practice with enough reliable publicly available data on their performances.
Company size	Business practice from companies of all sizes have been considered. Priority was given to practices developed and implemented by SMEs.
Replicability	Application of the business practice is deemed possible in market conditions and policy contexts comparable to Albania, Montenegro and Bosnia and Herzegovina.

Selected business practices were then organized in seven broad clusters (Corporate strategies, Packaging optimisation through ecodesign, Alternative Packaging Materials, Reuse business models, Zero-packaging offers, In-house waste management, Short Food Supply Chains and Local Food Systems), which represent *the main approaches to reduce or prevent plastic packaging waste, in line with circular economy principles.*

Business practices were then described, to the extent possible, through a common set of *attributes,* using publicly available information and data sourced through the literature review. This information was then complemented and ground-truthed - to the extent possible - via semi-structured interviews. Interviews covered about fifty per cent of the selected practices. Attributes were omitted from the description when no reliable information was found.

Attribute	
What is it	A brief outline of the business practice.
Target packaging	*Sales packaging or primary packaging*, i. e. packaging conceived to constitute a sales unit to the final user or consumer at the point of purchase; *Grouped packaging or secondary packaging*, i. e. packaging conceived to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics; *Transport packaging or tertiary packaging*, i. e. packaging conceived to facilitate handling and transport of a number of sales units or grouped packaging to prevent physical handling and transport damage. *Service packaging*: any type of primary, secondary or tertiary packaging used to prepare the product or service for the consumer at the point of sale.
Target products	Products concerned by the business practice (packaged foods and beverages).
Target audience	Organisations that might be interested in implementing the business practice and/or eventually scaling it up.
Scale	• *Pilot*: An initial small-scale implementation that is used to prove the viability of a project idea. • *Start-up*: A company in the early stages of its development. • *Scaled*: Practices that have reached a certain scale and maturity, based on various indicators, such as n. of end-users, n. of participating businesses, n. of countries reached.
How it works	Detailed description of the business practice.
Plastic packaging prevention	Estimated amount(s) of plastic packaging saved, usually expressed as tonnes per year.
Investment levels	Investment levels needed to either adopt the practice or start the business.
Business benefits	Such as net profit, new markets, product and service performance characteristics with market recognition and differentiation, as well as efficiency improvements, enhanced brand reputation, greater employees' engagement, sustainable community creation, etc.
Critical enablers	Key factors that should be in place for the practices to be successful.
Challenges and opportunities	Major challenges faced or expected in starting and scaling up the practices, as well as key opportunities.
Name, Legal Entity, Ownership	Name, legal entity, and ownership of the organisation(s) owning or promoting the business practice.
Country	Country or countries where the business practice is currently implemented.
For more information	Official website(s).
Supporting initiatives	Existing initiatives, companies and programmes that support the proposed business practices.

Guidelines, tools, collaborative initiatives and innovation platforms were identified to support organisations in addressing their use of plastic packaging. These resources were identified through literature and web searches, as well as stakeholders' and experts' recommendations. The following criteria were used in selecting the resources for inclusion in the publication:

Relevance	Guidelines, tools and initiatives must address plastic packaging and target organisations providing packaged foods & drinks.
Credibility	Resources must be initiated, promoted or owned by trustworthy and renown organisations.
Accessibility	Priority is given to tools and guidelines free to use and to initiatives accessible to the organisations targeted by the publication.

Resources were described by using publicly accessible information, such as official websites, reports, and methodology documentation. The analysis provided in this report is not based on directly using or applying the tools and guidelines, nor on an in-depth assessment of their usability and functionality.

Main limitations of the publication relate to:

- Availability of and access to data and information on the business practices, particularly for SME enterprises that communicate less on their successes and good practices.
- Interest of companies: while, most of the companies interviewed have shown a genuine interest in participating and sharing their experience, many lamented a lack of time for the impossibility to give proper follow up to the request of an interview.
- Clustering of the business practices: the wide variety of business practices, with many overlapping features, limited the possibility to categorize them effectively. The final organization around seven main clusters was made following no specific order of important. As no one-fits-all solution to marine plastic pollution exists, many of the proposed business practices are more likely to be part of a multipronged approach to tackle plastic packaging.

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55 NIR is an optical sorting technology that enables plastic packaging and other plastic wastes to be separated by

polymer type. NIR technology allows the production of high quality materials, which can substitute virgin polymers in the manufacture of new items. Source: http://www.wrap.org.uk/sites/files/wrap/NIR%20Good%20practice%20guidance%20for%20existing%20NIR%20users%20Final.pdf

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57 CONAI's case studies available at: http://www.conai.org/prevenzione/pensare-al-futuro/casi-di-successo/confezione-per-mozzarelle/

58 According to the EU Single-Use Plastic (SUP) Directive, plastic closures must remain attached to the bottle during consumption by July 2024 at the latest. Source: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN

59 https://www.retailgazette.co.uk/blog/2019/07/iceland-returns-plastic-packaging-failed-trial/

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65 A recent study conducted by Plymouth University showed that some biodegradable plastic shopping bags remained intact up to three years after entering the soil or the marine environment. The study demonstrated that the biodegradable plastic packaging tested "did not present any consistent, reliable and relevant advantage in the context of marine litter". Findings of the study can be found at: https://www.plymouth.ac.uk/news/biodegradable-bags-can-hold-a-full-load-of-shopping-three-years-after-being-discarded-in-the-environment

66 UNEP (2017). Exploring the potential for adopting alternative materials to reduce marine plastic litter. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/25485/plastic_alternative.pdf

67 https://www.european-bioplastics.org/faq-items/what-are-the-required-circumstances-for-a-compostable-product-to-compost/

68 The Life Cycle Initiative is a public-private, multi-stakeholder partnership, hosted by UN Environment Programme, enabling the global use of credible life cycle knowledge by private and public decision makers. More information at: https://www.lifecycleinitiative.org/about/about-lci/

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75 Wohner, B., Pauer, E., Krauter, V. and Tacker, M. (2019). Packaging-Related Food Losses and Waste: An Overview of Drivers and Issues. Sustainability. 11. 264. 10.3390/su11010264. Available at: https://www.researchgate.net/publication/330201392_Packaging-Related_Food_Losses_and_Waste_An_Overview_of_Drivers_and_Issues

76 https://www.packaginginsights.com/news/earthfilm-meringue-maker-claims-plastic-free-confectionery-packaging-industry-first.html

77 https://www.packaginginsights.com/news/natural-looking-packaging-influences-consumer-behavior-sonoco-study-finds.html

78 Styrofoam, a trademarked brand of insulation by the Dow Chemical Company, is the term commonly used to refer to the material used in disposable coffee cups, take-out containers, packing peanuts and insulated packaging. Though it cannot be recycled and requires up to 500 years to decompose, it has long been the industry standard for thermal packaging.

79 Burlap, also known as hessian, is a woven, rough cloth, made from jute, hemp, or other fibre.

80 Determined by the fiber-on-fiber yield when processing paper and corrugated products in accordance with standard set forth by the Fibre Box Association and the American Forest & Paper Association (AF&PA). Fiber-on-fiber is the amount of fiber that remains after the processing action, expressed as a percentage of the fiber present in the material to be tested. Greater than 80 per cent is considered as passing. http://corrugated.org/upload/CPA/Documents/Vol_Std_Protocol_2013.pdf

81 https://www.prnewswire.com/news-releases/temperpack-launches-climacell-a-certified-recyclable-packaging-solution-for-perishable-shipments-300646443.html

82 https://www.sana-commerce.com/blog/shorten-time-market-e-commerce-food-beverage-industry/

83 CNC, founded in 1953 by Dutch mushroom growers, is Europe's largest supplier of substrates for mushroom growing. CNC is the world technology leader in producing reliable and top-quality mushroom substrates. CNC Exotic Mushrooms is the operating company that produces exotic mushroom substrates, which production method is very comparable to mycelium materials. CNC Exotic Mushrooms is partnering with US-based Ecovative Design to exclusively produce and distribute the Ecovative patented raw materials in Europe, supporting a growing ecosystem of mycelium-based companies and products throughout the European Union.

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86 https://www.prestigeonline.com/id/people-events/evoware-co-founder-david-christian-taking-wisdom-sea/

87 https://www.newplasticseconomy.org/innovation-prize/winners/evoware

88 https://www.fastcompany.com/40477587/instead-of-throwing-out-this-plastic-wrapper-you-eat-it?cid=search

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91 World Economic Forum and Ellen MacArthur Foundation (2017). The New Plastics Economy- Catalysing action. Available at: https://www.ellenmacarthurfoundation.org/assets/downloads/New-Plastics-Economy_Catalysing-Action_13-1-17.pdf

92 Greenpeace and Environmental Investigation Agency (2019). Checking out on plastics. A survey of UK supermarkets' plastic habits. Available at: https://checkingoutonplastics.org/wp-content/uploads/sites/5/2019/04/Checking-out-on-plastics.pdf

93 The New Plastics Economy Global Commitment, Progress report 2019. https://www.newplasticseconomy.org/assets/doc/Global-Commitment-2019-Progress-Report.pdf

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95 World Economic Forum and Ellen MacArthur Foundation (2017). The New Plastics Economy- Catalysing action. Available at: https://www.ellenmacarthurfoundation.org/assets/downloads/New-Plastics-Economy_Catalysing-Action_13-1-17.pdf

96 https://packagingrevolution.net/reusable-packaging-financial-alternatives-and-outsourcing-options/

97 An LCA study was conducted in 2018 to calculate the comparative lifecycle impacts (Green House Gas emissions–GHG expressed as CO2eq and other environmental factors) of the CupClub's product and enabling technology (RFID) against various alternative coffee cup designs. This includes the embodied carbon emissions of materials used in the cup and lid along with the supporting system (backhauling/washing). A sensitivity analysis was modelled across different operational scenarios. Findings of the study are available at: https://cupclub.com/news/sustainability-report

98 https://www.fastcompany.com/90399753/this-coffee-cup-can-be-reused-132-times-heres-how-to-try-one

99 A 3rd party-verified Life Cycle Assessment (LCA), conducted by Long Trail Sustainability, shows that Loop breaks even with traditional supply chains in as few as 3 uses of the durable packaging. And by 10 use cycles, Loop has nearly 35 per cent lower environmental impacts compared to regular e-commerce. And in retail settings, Loop has nearly 20 per cent lower environmental impacts than regular retail (at ten uses of the durable packaging). The more the packaging is reused, the higher the reduction in environmental impacts. Available at: https://loopstore.com/sustainability

100 https://www.americaninno.com/boston/funding-boston/bessemer-ventures-pours-35m-in-smart-water-dispenser-startup-bevi/

101 Flavoured and functional waters belong to the category of beverages that are marketed similarly to water. They just contain additional elements, such as artificial or natural flavours, vitamins and sweeteners.

102 https://www.ift.org/news-and-publications/food-technology-magazine/issues/2019/september/features/riding-the-wave-of-flavored-waters

103 https://www.americaninno.com/boston/failure-week/a-tale-of-two-failures-how-bevi-finally-fixed-its-smart-water-machines/

104 Again Again is a system designed to maximise cafes' convenience: cafés are thus not obliged to collect and report data. As such, data on plastic packaging savings are estimated by extrapolating information from the whole Again Again network

105 https://www.bssa.org.uk/sectors.php?id=99

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111 https://www.mckinsey.com/industries/retail/our-insights/reviving-grocery-retail-six-imperatives

112 RFID is an acronym for "radio-frequency identification" and refers to a technology whereby digital data encoded in RFID tags or smart labels are captured by a reader via radio waves. RFID is similar to barcoding in that data from a tag or label are captured by a device that stores the data in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. The most notable is that RFID tag data can be read outside the line-of-sight, whereas barcodes must be aligned with an optical scanner. RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention. RFID methods utilize radio waves to accomplish this.

113 The Internet of Things (IoT) connects dumb devices, like cups, to the internet and uses software to connect them to our daily lives. For more information: https://www.quora.com/What-exactly-is-Internet-of-Things-IoT?redirected_qid=7001614

114 https://blogs.scientificamerican.com/observations/more-recycling-wont-solve-plastic-pollution/

115 https://www.waste360.com/waste-reduction/difference-between-zero-waste-landfill-and-zero-waste?NL=WST-03&Issue=WST-03_20160712_WST-

116 A Life cycle assessment (LCA) study was conducted to compare the environmental impacts of the life cycle of packaging and distributing foodstuffs and other commodities by the MIWA system with the environmental impacts of conventional single-use packaging made from plastic, paper and glass. In the study, the plastic packaging waste generated have been factored in.
The findings of LCA show that the MIWA system reduces the overall environmental impacts of the standard system of distributing commodities by as much as 71 per cent for the selected consumer basked (a MIWA-designed reusable silicone container). The MIWA system significantly reduces the production of waste, this to values of 10 % (silicone container), 12 % (PP box), 17 % (PE bag) or 32 % (paper bag).

117 http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/586650/EPRS_BRI(2016)586650_EN.pdf

118 Kneafsey, M. , Venn, L. , Schmutz, U. , Balázs, B. , Trenchard, L. , Eyden-Wood, P. , Bos, E. , Sutton, G. and Blackett, M. (2013). Short food supply chains and local food systems in the EU: A state of play of their socio-economic characteristics. European Commission. DOI: 10.2791/88784. Available at: https://pureportal.coventry.ac.uk/en/publications/short-food-supply-chains-and-local-food-systems-in-the-eu-a-state-2

119 Community Supported Agriculture (CSA) is a partnership in which consumers (usually called members) are associated with the producers' decisions and work and share part of the risks and rewards of production. Consumers are therefore directly linked to the farm and production of food.
Source : http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/586650/EPRS_BRI(2016)586650_EN.pdf

120 For example, the RURURBAL project: https://www.programmemed.eu/en/the-projects-em/project-database/results.html?no_cache=1&tx_bullprojmed_pi1%5Btri%5D=0&tx_bullprojmed_pi1%5Bview%5D=single&tx_

bullprojmed_pi1%5Bnbpp%5D=10&tx_bullprojmed_pi1%5Bpointer%5D=12&tx_bullprojmed_pi1%5BidProject%5D=284

121 Ibid.

122 The cube efficiency is the percent of volume in a transport unit occupied by the product.

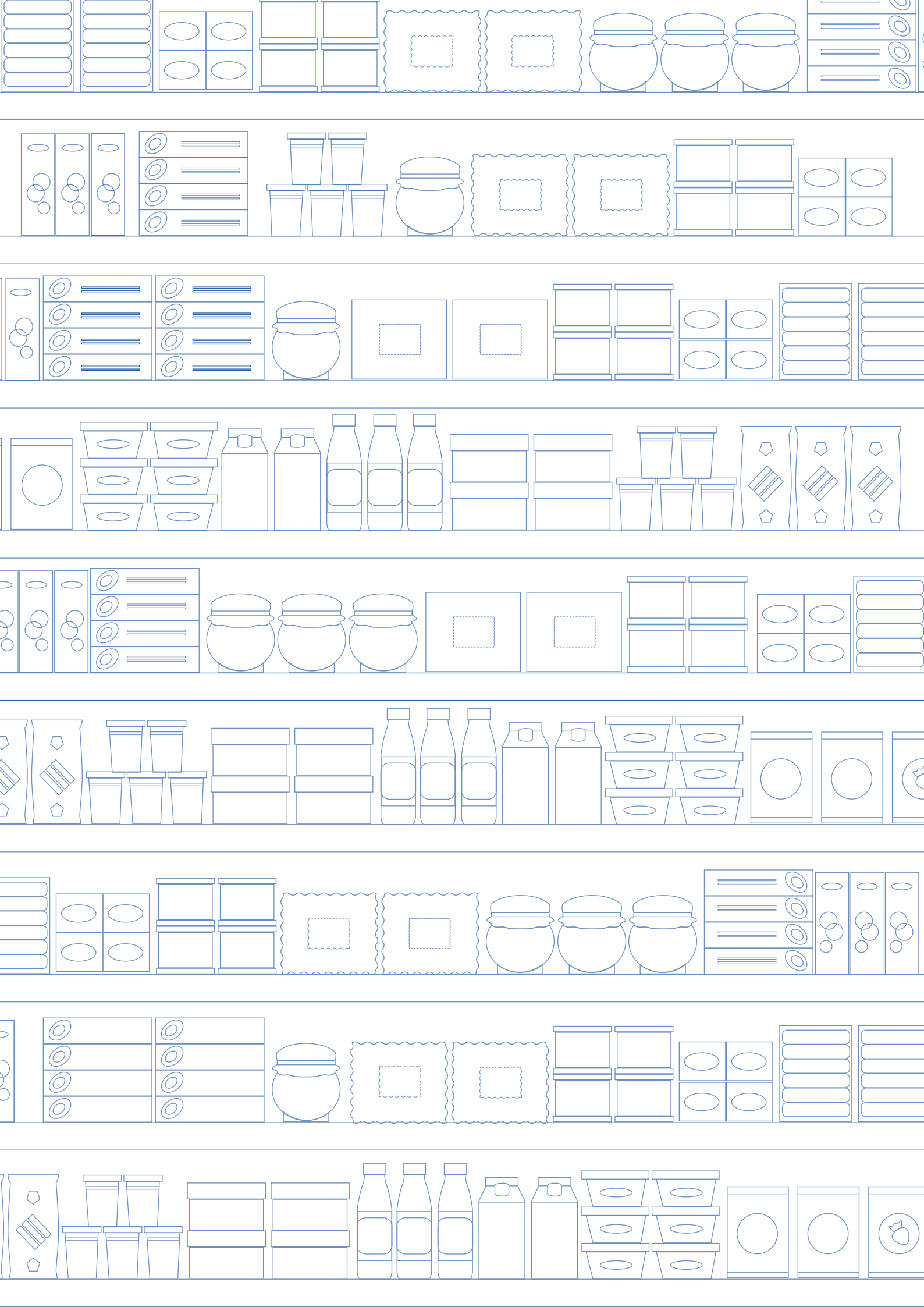
123 The Regional Plan on Marine Litter was approved by the contracting parties of the Barcelona Convention. It contains a package of legally binding programmes of measures and implementation timetables to prevent and reduce the adverse effects of marine litter on the marine and coastal environment in the Mediterranean. Available at: https://www.cbd.int/doc/meetings/mar/mcbem-2014-03/other/mcbem-2014-03-120-en.pdf

124 The Young Global Leaders Circular Economy Taskforce is a World Economic Forum, Young Global Leaders (YGL) initiative. The vision of the taskforce is to create a socially and environmentally prosperous world where profitable businesses provide smart goods and services within the resource limits of the planet. The mission of the taskforce has evolved, building on previous success by heightening its focus on enabling an understanding of the circular economy among business leaders, policymakers and political leaders, allowing the circular economy to be fully appreciated as a viable response to the global resource challenge. The YGL Circular Economy Taskforce Co-Chairs lead the awards program.

125 European Environment Agency (2019) A report reviewing waste prevention policies in Europe with a focus on how these policies approach the issue of plastics and plastic waste. Report No 2/2019 Available at: https://www.eea.europa.eu//publications/preventing-plastic-waste-in-europe

126 European Environment Agency (2019) Paving the way for a circular economy: insights on status and potentials. EEA Report No 11/2019. Available at: https://www.eea.europa.eu/publications/circular-economy-in-europe-insights/file

127 The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) was adopted in 1995 and replaced the Mediterranean Action Plan, the first-ever Regional Seas Programme under the UN Environment's umbrella signed by 16 Mediterranean countries and the European Community in 1975.



Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC)
UN Environment/Mediterranean Action Plan – Barcelona Convention for the protection of the Mediterranean Sea

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