



LEEDS BECKETT UNIVERSITY
LEEDS BUSINESS SCHOOL

FUTURE OF PACKAGING REPORT

COLLABORATIVE INDUSTRY GROUP

REPORT BY DR BEN MITCHELL &
OLGA MUNROE

THE RETAIL INSTITUTE

SEPTEMBER 2020



Contents

The Foreword.....	2
Executive Summary.....	3
Thematic Icons.....	4
Thematic Overview.....	5
Academic Team.....	11
Industry Contributors.....	12
Methods and Approach.....	15
The Plastic Problem.....	16
Consumer Behaviour and Communications.....	17
Environmental Measures.....	23
Waste Infrastructure and Collection Systems.....	27
Materials	33
Legislation.....	38
Organisational Change.....	41
Conclusions & Recommendations.....	45
The Future of Packaging: Our Calls for Action.....	46
Collective Statement.....	47
Appendices and references.....	48



FOREWORD

The Collaborative Industry Group on the Future of Packaging was born out of a need and ambition to tackle one of the most complex problems that the retail industry has been facing in recent decades. Increasing public demands for government and industry to tackle global plastic pollution inspired a lively debate about the role of packaging and its end-of-life environmental impact.

Finding a solution to such a complex issue has many facets, from innovating while preserving packaging's primary role in protecting produce, to gaining understanding of how retailers and legislation can support both industry and consumers' in their sustainable-living efforts.

Despite some existing voluntary initiatives on a national level, it was felt among our industry colleagues that there is a strong need for a scientifically driven approach that dives deeper into this multifaceted problem and helps businesses plan for long-term 'green' and circular solutions.

Therefore, to support our network we facilitated the group using an academic technique called Futures & Foresight, led by expert in this field Professor Jeff Gold. This method allowed us to provide a collaboration platform grounded on an academic toolkit for the group to jointly generate new knowledge, and to prepare their businesses to develop resilience and capacity for possible and preferable future scenarios.

This report summaries our collaborative efforts and provides guidance for future work on the circular economy & FMCG packaging.

Olga Munroe,
Head of the Retail Institute

EXECUTIVE SUMMARY

Introduction

Intense scrutiny of the retail packaging supply chain has led to calls from consumers, campaigners and government for better, more radical solutions for reducing waste, pollution, littering and energy consumption.

Despite years of pro-environmental innovation in packaging, retailers and manufacturers are coming to terms with a new level of attention and expectation to change.

This report presents the findings of a collaborative group of experts from the retail packaging supply chain, which met six times over 12 months to share problems and identify strategic priorities for the future of packaging.

While anti-plastic campaigners call for radical change such as a massive reduction in the use of plastics, people in the packaging industry feel frustrated that the media tends to ignore the environmental benefits of plastic, such as reducing food waste and the smaller carbon footprint of production and distribution compared with other materials.

Solutions to the problems generated by packaging are likely to be multiple, context-dependent, complex and require actions by manufacturers, retailers, government, consumers and campaign groups.

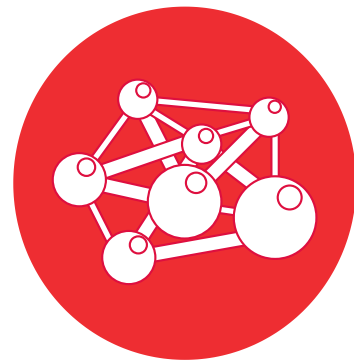


SUMMARY

THEMATIC ICONS



**CONSUMER BEHAVIOUR
&
COMMUNICATIONS**



MATERIALS



**ENVIRONMENTAL
MEASURES**



LEGISLATION



**WASTE
MANAGEMENT**



**ORGANISATIONAL
CHANGE**

THEMATIC OVERVIEW



Consumer Behaviour & Communications

Communicating with consumers is vital to solving plastic pollution and packaging's contribution to climate change. There is a sense within the retail packaging supply chain that businesses have failed in the past to communicate why they use particular packaging formats and materials.

The public criticism of plastics suggests that any sustainable packaging improvements are often unrecognised or dismissed as businesses merely acting in self-interest. Any solutions to the packaging problem must be easy to understand and, when action by the consumer is required, it must be easy to implement, both during and at the end of the life of the product.

While we agree that communication has to improve, we also recognise that businesses, government and consumers can all do much more to reduce the environmental impact of our products. New products and processes must be financially viable and that may require consumers to change their behaviour.

Surveys suggest people would buy environmentally friendly products if they were available and affordable. However, such attitudes do not always convert into behaviour due to costs, inconvenience or negative perceptions of the functionality of pro-environmental products.

Standardised measures of sustainability should be central to any communication strategy. However, establishing a common definition for environmental measures is very difficult because of conflicting interests of multiple stakeholders and the constant evolution of methods and terminology.

We need more evidence of what works in changing consumer behaviour, through either public policy intervention or the introduction of alternative products and packaging materials. The simple principle to guide an effective change is to make the correct behaviour easy and convenient for people to follow, and socially unacceptable to disregard.

Our collaborative group calls to action for the development of a consistent communications framework across the sector. It's purpose would be to raise awareness on the role of plastic in providing safe products with clear and consistent instructions for separating and recycling to help consumers with correct disposal of their products at the end of life. Businesses must create a level playing field in terms of price, convenience and functionality to encourage people to buy eco-friendly alternatives. We also call for independent charitable organisations to play a role in educating consumers on food waste reduction and non-littering behaviours.

THEMATIC OVERVIEW



Environmental Measures

The discrepancy between consumer and industry perceptions of what is environmentally friendly suggests a need for clear, universally understood definitions and metrics. For each packaged product, there is a different trade-off between carbon footprint, material recyclability and likely consumer behaviour. Blanket approaches that ignore the technicalities of packaging solutions could mean that measurement or regulation could produce unintended consequences that actually increase environmental impact.

The circular economy is a key principle for defining environmental impact. This means ensuring that individual businesses and the supply chain in which they operate have the mind-set, skills and opportunity to transform products, collaborate and implement circular projects.

While recycling is a familiar and comfortable environmentally friendly activity, the challenge is how to shift away from recycling to reducing the amount of waste produced. To find a definitive answer to the question of what is environmentally friendly, action is needed from legislators to agree on necessary criteria for green innovation.

Therefore, our group agrees that industry needs the legislators to create a shared definition of environmental impact, underpinned by the principles and clearly defined metrics of the circular economy. We call for a unified approach based on holistic scientific practices, utilising tools such as life cycle analysis, to define carbon footprint measures for all products. This will aid analysis of the trade-offs between packaged products, including life cycle stages such as recycling. Such an approach would enhance understanding of wider environmental issues among people in the industry and the public. We also call for businesses to embed eco-design strategies, such as implementing design for recycling as a standard industry practice.

THEMATIC OVERVIEW



Waste Infrastructure & Collection Systems

If industry justifies the use of plastic packaging through its recyclability, the current recycling rates in the UK and elsewhere are far too low. Greater effort is required to improve the systems for collecting and recycling waste. Variation in recycling systems may be due to, for example, diverse housing and demographic profiles, differing local spending priorities and localised long-term contracts.

Different approaches work better in different circumstances and research to map those situations can help waste collectors and recyclers to learn the best practice for their local area.

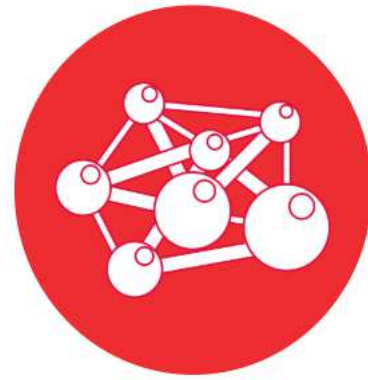
All plastics are recyclable but there is not the infrastructure for all. For flexible plastics, collection is a key challenge. Improving collection rates would produce the tonnage of flexible plastics to make recycling commercially viable.

As innovation continues with the objective to make packaging more sustainable, industry needs government assistance to determine the right paths and support confident investment to make new techniques scalable. The journey requires the use of evidence and claims made based on a model of argument. That might consist of a 'circularity of improvement' argument that stipulates making changes in small, transparent steps, revisiting outcomes and adjusting again in a continuous learning process.

Chemical recycling is a potential solution for materials that are currently difficult to recycle such as flexible plastics and offers the ability to produce virgin material from waste.

Government investment is essential to develop new waste infrastructure solutions and enable dynamic end-of-life innovation. A UK-wide strategy is required to standardise recycling waste collections and recycling practices across the country, aiming to develop specialised and scalable potential solutions for difficult-to-recycle materials. Local authorities could encourage social enterprising for specialised waste processors to help develop single-stream capabilities and new solutions to process valuable packaging material. Our group calls for a new national anti-littering campaign to raise public awareness of the negative environmental impacts of littering and fly tipping.

THEMATIC OVERVIEW



Materials

The choice of materials is at the heart of sustainable packaging. While, plastic's ubiquity comes from its usefulness, ocean pollution leads to calls to move away from plastics to other materials such as paper, metal, glass or plastic alternatives.

Most existing plastic materials are manufactured from fossil fuel feedstock, a substance that is exploited by humans at much higher rate than it can naturally form. Our reliance on carbon-based fuels has to shift to meet the objectives of the UN Sustainable Development Goals, therefore materials innovation, such as bioplastic or compostables as alternatives for existing packaging, are being explored by industry players. Those alternative materials present their own challenges, which we will briefly explore in the chapter.

The plastics debate brought dynamic innovation to the retail and packaging industry. Companies developed approaches for reduction of plastic material (light weighting), increasing pack recyclability, or explored how other existing materials, like cardboard or paper, could provide the functionality of plastics.

Some projects looked at addressing multiple issues, for example how food waste could become a feedstock for packaging materials. As with any innovations, mass production and scalability of these concepts requires further efforts to make them also cost effective.

Continuous innovation in materials might just be the answer to addressing two critical environmental challenges – limiting our reliance on fossil fuels and managing the end of life of our products. It is worth noting that this element of the debate is closely linked to the waste management conversation, as any leakage of packaging into the marine or land environment, whether materials are compostable, bio-based or otherwise, should be completely eliminated. Designing for recyclability with considerations for the end of life are becoming the new industry standard, but fragmented waste management practices in the UK and different standards in EU countries add further complexity to this dimension.

Creating value for post-consumer waste remains one of the big challenges for recyclable materials. While companies will be soon keen to incorporate recycled content into their packs, the market is not quite ready to collect, sort and provide high quality post-consumer plastics back to manufacturers. This might not be a problem for already well recycled materials (PET, HDPE) that form our drink or milk bottles, but remains unresolved for other types of polymers.

This thematic area generates many new questions for our transition into circular economy, many of which require all stakeholders, particularly legislators, to enable meaningful change. The group advocates that the retail supply chain should continue the innovation efforts in developing recyclable or re-usable packaging formats with considerations for reduction or simplification of materials, with no compromise on shelf-life. Understanding trade-offs between materials and their complete journey from feedstock to end of life is critical to developing better, holistic approaches to environmental product development.

Collaborative, design led approaches to materials strategy must ensure that principles of Circular Economy and carbon measures form the basis of a coordinated pro-environmental market strategy. This should involve the packaging industry, brand owners and retailers supported by government, and must be communicated effectively to consumers.

THEMATIC OVERVIEW



Organisational Change

As businesses move into new areas of operation, they are likely to face a range of challenges and barriers to change. These include costs, investment risks and diverse customer demands. Some problems, such as meeting safety regulations, are specific to organisations but need external assistance to resolve them. To achieve unity within organisations, the culture must change from the bottom upwards as well as top-down. Improving the sustainability of internal systems can enable that change. Individual organisations must build sustainable practices into their business strategies to enhance commercial viability and decision-making. If more businesses do this, it becomes easier for them to make connections with each other.

Identifying the right environmental priorities might sound like a straightforward process. However, the definition of what is sustainable and what criteria we use to measure environmental impact of our products is not yet widely standardised. This leaves an unhelpful ambiguity that can lead to some businesses manipulating environmental data to show better eco-performance or worse, companies prioritising product attributes that further damage the environment despite good intentions.

Therefore, as a result of Future of Packaging work, the group advocates a holistic approach to supporting organisations to embed circular economy principles. The basis of this should be a unified approach underpinned by multidisciplinary scientific practices, utilising tools such as life cycle analysis, to define carbon footprint measures for all products to unpick trade-offs between packaged products, including life cycle stages such as recycling. This approach would support organisations and employees in generating new knowledge, practices and strategic business approaches. Educational programmes for all staff and 'environmental champions' across organisations provide some excellent examples of best practice techniques that can be easily adapted by businesses. Our group believes that implementing some of the existing approaches to innovation, such as 'design for recycling' should become a widely adopted standard across the sector.

The Collaborative group recommends that organisations must build sustainable practices into their core business strategies to enhance commercial viability and decision-making and enable positive change. They should share these good practices across the sector. Improved connections within the retail supply chain is essential for building collective leadership towards a positive environmental future.

THEMATIC OVERVIEW



Legislation

For government to be effective in what activities it chooses to support, or control depends on strong evidence of what works and what produces the optimum sustainable results.

At its 2018 Budget , the HM Treasury announced its intention to introduce a new tax on businesses that produce or import plastic packaging which uses insufficient recycled content. The tax will take effect from April 2022 and is said to provide a clear economic incentive for businesses to use recycled material in the production of plastic packaging, which will create greater demand for this material and in turn stimulate increased levels of recycling and collection of plastic waste, diverting it away from landfill or incineration. With access to high quality, or food grade recycled material still presenting a challenge for businesses, there is not much time to develop a better recycles market on a scale required.

Another intervention which is coming into life in England and Wales from 2023, is the Deposit Return Scheme (DRS) which was set out by Resources and Waste Strategy for England, Wales and Northern Ireland. The objective of the system is to collect 77% of single-use plastic bottles placed on the market by weight by 2025, and 90% by 2029.

The DRS is introduced to support material collection targets set out in the Single Use Plastics Directive.

The ongoing consultation process for the reform of extended producer responsibility is part of the Environmental Bill seeking to introduce policy proposal this year and introduce the scheme for packaging in 2023. Correct legislation can influence multiple aspects of sustainable packaging, including decisions on innovation and investment. A coordinated industry message would be most practical while government should also use independent sources to inform final policy proposal.

Strong evidence of what works and what produces the best sustainable results should be the basis of policy and legislation. A coordinated industry message from all packaging trade associations is needed to provide government with the right information to make effective policy - leading to legislation based on independently verified evidence. Climate change and pollution are global issues, which means that policies to address them are much more likely to be effective if policies are coordinated between nations.

ACADEMIC TEAM

Professor Jeff Gold



Jeff Gold is co-founder of the HRD and Leadership Research Unit at Leeds Business School, a collaborative project with several organisations including Hallmark Cards, Morrisons plc, Skipton Building Society, BUPA, LBBC Ltd, Webanywhere and TheWorks.

Olga Munroe



Olga Munroe is Head of the Retail Institute at Leeds Beckett University. Olga provides strategic direction for the Institute and steers the knowledge exchange platform that provides support to industry partners, trade organisations and fellow academic institutions.

Ben Mitchell



Ben Mitchell leads on research and consultancy on a range of subjects relating to retail, packaging, consumer insights and sustainability policy. His work for the Retail Institute has seen him support companies in the development of new products and business strategies.

Andy Lima



Andy Lima is a business entrepreneur and academic with a broad range of experience in business creation, lecturing, researching and consultancy work in relation to working with both SMEs and large corporations. Andy's work focus on supporting businesses and new ventures as well as developing improvements to existing business models.

INDUSTRY CONTRIBUTORS

Brian Lodge



Bruce Funnell



Phil Husband



Victoria Callaghan



Russell Granville



Conrad Hart-Brooke



Debbie Waldron-Hoines



Patrick Heskins



Jason Forrester



Paul Sherratt



Will Mercer



Simon Capell



Adrian Dale



David Harding-Brown



Other Contributors we would like to thank:

Prof Stephen Abbott, Scientist, Founder of TCNF

Dr Ernst Krottendorfer, University of Applied Science, Vienna

Dr Manfred Tacker, University of Applied Science, Vienna

David Wilson, Vanden Recycling

Sophie Gilham, Recycling Technologies

Professor Paul Gately, Morelife

Dr Aftab Dean, Leeds Beckett University

Mark Warner, Sustainability Manager, Leeds Beckett University



METHODS AND APPROACH

The Future of Packaging Collaborative Group

Intense scrutiny of the retail packaging supply chain follows increased public awareness of ocean plastic pollution and criticism of single use plastics.

This has led to calls from consumers, campaigners and government for better, more radical solutions for reducing waste, pollution, littering and energy consumption. Despite many years of pro-environmental innovation in packaging, the industry must meet these challenges while maintaining standards in packaging functionality and food protection and remaining economically viable. Retailers and manufacturers are still coming to terms with this new level of attention and expectation to change.

This report presents the findings of a collaborative endeavour involving representatives from across the retail packaging supply chain, including retailers, brand owners, packaging suppliers and industry associations.

The Future of Packaging group also received input from international experts, local government and public sector organisations. The issues described in this report are representative of our discussions, the evidence presented and the agreed priorities of the group. We believe that the recommended actions, if followed, would have a significant positive impact on resolving the many issues faced by consumers, businesses and policy makers.



THE PLASTIC PROBLEM

Anti-plastic campaigners state that the damage to marine wildlife and eco-system, along with the potential health implications for people ingesting micro-plastics, means that radical change is necessary. They argue waste collection will never be sufficient as plastic tends to end up in the environment and call for a shift from the onus on recycling towards putting an end to plastic production.

People working in the packaging industry feel frustrated by their struggle to communicate effectively any evidence that demonstrates the benefits of plastic packaging. Plastics may be the only viable option for providing some foods conveniently and safely and eliminating plastic could cause a huge increase in food waste, a fact not always acknowledged in the environmental assessment of packaging. As around one third of food produced around the world is wasted[1], reduction in the use of plastics could increase that figure and remove potential solutions to the problem.

In addition, the carbon footprint of packaging could significantly increase if producers were to switch to heavier materials that require more energy to manufacture and distribute.

Solutions are likely to require the input from all areas and levels, including manufacturers, retailers, government, consumers and campaign groups. Our collaborative approach considered multiple future scenarios that could affect policy implementation and new product development. We discussed the potential impact of changes in markets and governmental change along with a wide variety of developments relating to materials, distribution and the waste infrastructure. However, numerous questions remain relating to public perceptions of packaging and effective communication to ensure better understanding and implementation of solutions.



CONSUMER BEHAVIOUR & COMMUNICATIONS

Consumer Perceptions of Packaging

Increased awareness in society of plastic pollution has generated calls for retailers to change the way that everyday groceries and fast-moving consumer goods (FMCG) are packaged. Several non-government organisations have launched campaigns calling for the reduction or elimination of plastic. These tend to simplify the complexity of an issue with wider environmental, political and social implications. Nonetheless, when consumers see products that they perceive as wrapped in excessive packaging or using materials associated with pollution or environmental harm, they are now more likely to complain directly to retailers or publicly, using social media.

There are many examples of products that use excessive packaging without justification. In the recent public debate, some products have become a symbol of what people perceive to be an unnecessary use of plastic. The cucumber is among these products and, therefore, is a prime example of the plastic packaging quandary.

Fresh produce being unwrapped in supermarkets is an example of such an 'eco-paradox'. As consumers demand the removal of packaging from easily perishable foods without appreciating the relationship between protective packaging functions and food waste, a problem of larger scale with high impact greenhouse emissions.

There is a danger that radical campaigns calling for a plastic ban, which are emotionally appealing to consumers, might cause negative unintended consequences for the environment without addressing the core of the problem. Businesses often feel pressured to act, giving into public demands, even when the action will lead to opposite, negative effects. Fresh produce being unwrapped in supermarkets is an example of such an 'eco-paradox'. As consumers demand the removal of packaging from easily perishable foods without appreciating the relationship between protective packaging functions and food waste, a problem of larger scale with high impact greenhouse emissions.

The dilemma is whether to continue using plastic that may end up polluting rivers and oceans and ultimately infiltrating the food system or allowing morally troubling levels of food waste decomposition which contribute to high levels of greenhouse gas emissions.



Plastic packaging is extremely useful. It enables retailers to offer convenient solutions to consumers seeking ready-to-eat food or extended shelf life. In some cases, plastics may be the only viable option for providing some foods conveniently and safely.

However, it is understandably very difficult to explain this effectively to busy consumers who prefer not to spend considerable time weighing up the relative benefits of the packaging for every product they purchase. It is much easier for consumers to generalise about which packaging formats are 'good' and which are 'bad'.

As researchers and businesses engaged in grocery retail markets, members of the Future of Packaging group understand the importance of convenience to people and the tendency of most to choose what is easiest. This means that any solutions to the packaging problem must be easy to understand and, when action by the consumer is required, it must be easy to implement, both during and at the end of the life of the product.

In many ways, there has already been great progress in reducing the environmental impact of packaging. Over the years, it has become lighter so that less material is required and transportation costs (including fuel) are lower. Where possible, product manufacturers have switched to materials that are easier to recycle. As will be described later in this report, innovation is happening in both recycling processes and in materials to overcome problems relating to those packaging formats that are not currently recyclable.

Nonetheless, these developments will still need consumers to play their part in making them work. New products and processes must be financially viable and that may require consumers to change their behaviour.



Any solutions to the packaging problem must be easy to understand and, when action by the consumer is required, it must be easy to implement, both during and at the end of the life of the product.



Surveys conducted by The Retail Institute (and other organisations) recognise that people would buy environmentally friendly products if they were available and affordable. Many say they would be willing to pay more if they knew it was better for the environment.

We also know that such attitudes do not always convert into behaviour. Understandably, sometimes cost is a barrier. There are some occasions when people perceive pro-environmental products as less functional because the materials are not as strong, or the pack does not protect the product as well as the eco-friendly alternatives.

There have also been examples of manufacturers who have switched products to smaller packs (but still containing the same amount of product) and observed a drop in sales because customers perceived retailers were trying to charge more for less.

The key factor in our environmental debate is the consumer demand for convenience, which often means compromising on materials for optimum cost. Tackling these problems and public misconceptions requires not only effective communication but also a strong understanding of human behaviour and what helps to change it.

However, at the very heart of our environmental crisis is excessive consumption, unsustainable approaches to exploiting natural resources and creating insatiable consumer demand. Taking steps now to unpick, understand and tackle damaging practices will help us in creating a more sustainable future for humanity and the planet.



Behaviour Change

We understand that consumers will not have the capability, willingness or opportunity to change behaviour without significant intervention from businesses and government. Businesses must create a level playing field in terms of price, convenience and functionality to encourage people to buy eco-friendly alternatives while government must use its available policy levers to incentivise new product development and provide the infrastructure to enable real environmental change. Alternative materials require enough scale to compete on price while the waste management system has the responsibility of ensuring that such materials reach their intended destinations.

We also need to understand more about what truly changes consumer behaviour. What will encourage people to buy more eco-friendly products and how can we ensure that they dispose of packaging waste so that it reaches its intended destination? We know that a growing number of consumers are willing to pay more (to avoid plastic) and expectations are growing that businesses will do more to eliminate single use plastics. However, we need to learn about what works to encourage a large increase in consumer recycling. Retailers are considering collection hubs at stores, schools and transport points so that consumer waste does not leak into the environment.

Businesses must create a level playing field in terms of price, convenience and functionality to encourage people to buy eco-friendly alternatives while government must use its available policy levers to incentivise new product development and provide the infrastructure to enable real environmental change.

A prominent policy tool is the introduction of deposit return schemes (DRS) to boost recycling. However, it is still unclear whether such schemes achieve their expected outcomes. As the impact may vary according to materials and formats, careful piloting and evaluation of DRS programmes is essential for ensuring the effective design and implementation of future programmes. Such research should include analysis of consumer behaviour and identifying which actions are effective in motivating change. These could involve subtle influences (nudges) that encourage consumers to support their own decisions and actions.

This requires understanding the 'default' action of consumers and methods of changing that situation. However, it is also important to appreciate the unintended consequences of interventions that could limit their effectiveness. In the case of DRS, this might mean reduced kerbside recycling due to consumers switching to deposit returns, with no net gains in recycled materials. Removing high value recyclables (such as PET drinks bottles) from the kerbside streams could mean that the lower quality and lower value plastic materials becomes unattractive for waste companies to recycle.



Communications - Next steps

Communicating with consumers is vital to solving plastic pollution and packaging's contribution to climate change. While the increased scrutiny of packaging has generated greater accountability, the media coverage has led to some misconceptions about plastic. Although industry cannot fully justify the use of plastic in all products, there are many situations where it is environmentally still the best material.

Our Future of Packaging group considers improvement in public understanding of packaging as an essential link in a chain of actions to improve its environmental impact. No solutions can work without engagement from all stakeholders and everyone taking responsibility to reduce waste, littering and pollution. There are numerous high-profile examples of conflicting messages or misinformation relating to packaging and recycling.

Examples of 'Greenwashing' – where companies make unsupported claims about their product – further undermine industry's reputation and trustworthiness to deliver pro-environmental solutions.

To ensure that communication is effective, we need to understand more about public perceptions of packaging and the environment. The simple principle to guide an effective change is to make the correct behaviour easy and convenient for people to follow, and socially unacceptable to disregard. We believe that an evidence-based approach to tackling plastic pollution and climate change is the only way forward. We must base any solutions on science rather than rhetoric and all sides of the argument must take responsibility for the accuracy and objectivity of their evidence.

This includes admitting our mistakes and listening to others. To support that process, we need greater agreement on the appropriate indicators of environmental impact. Scientifically informed and legislatively stipulated guidance, supported by widely accessible educational environmental tools, can help to resolve the conflicting interests of multiple stakeholders and support industries with their green decisions.

We must base any solutions on science rather than rhetoric and all sides of the argument must take responsibility for the accuracy and objectivity of their evidence. (...) To support that process, we need greater agreement on the appropriate indicators of environmental impact.



Communications - Next Steps

Different European institutions are developing concepts for standardised sustainable metrics that should be displayed on packs to inform consumers' environmental decision making. Introduction of such metrics would empower consumers to drive demand for sustainable products and provide opportunities for businesses to base their innovation efforts on truly environmental criteria.

To change consumer perceptions and behaviour, communication is key to helping people to understand the value of various packaging formats. There is a sense within the retail packaging supply chain that businesses have failed in the past to communicate why they use particular packaging formats and materials. This might include switching to plastic from glass or paper in order to provide greater protection or functionality to the consumer. Such innovations have been commercially very successful in many grocery categories.

In addition, years of progress in reducing the carbon footprint of packaging appear to have gone unnoticed by consumers. The use of lighter materials and extensions to shelf life have reduced energy and material consumption and food waste. There have also been great improvements in the labelling of packaging such as the OPRL system providing guidance on recyclability. However, the public criticism of plastics suggests that such improvements are not recognised or dismissed as businesses merely acting in self-interest.

The challenge for industry, therefore, is to provide consumers with clear instructions for separating and recycling and help them to understand the choice of packaging formats and materials. A key challenge is the bad reputation of plastics and its effect on the wider retail sector. Given the complexity of the many different pack sizes, products, categories and retail settings, it is difficult to make sure that messages are clear, visible and consistent. Uniformity should apply across industry with leadership from government adding legitimacy through independent communication channels.

Education must be the centrepiece of any strategy for changing the current paradigm regarding sustainable packaging. This includes the education of the whole supply chain, consumers and government. Standardised measures of sustainability should be central to any communication strategy. However, establishing a common definition for environmental measures is very difficult because of conflicting interests of multiple stakeholders and the constant evolution of methods and terminology. Sustainable grading systems could be an effective way of achieving that goal. Above all, it is vital that we can raise awareness of packaging's true environmental benefits.

Standardised measures of sustainability should be central to any communication strategy. Sustainable grading systems could be an effective way of achieving that goal.





ENVIRONMENTAL MEASURES

The discrepancy between consumer and industry perceptions of what is environmentally friendly suggests a need for clear, universally understood definitions and metrics. The full environmental impact of any product must consider a wide range of activities from cradle to grave or, from the circular economy perspective, cradle to cradle.

The complexity of packaging consumer goods comes from the vast diversity of products, safety regulations, supply chain arrangements and manufacturing methods. For each packaged product, there is a different trade-off between the carbon footprint of these factors, material recyclability and likely consumer behaviour.

In recent decades, the retail packaging supply chain has made considerable progress in reducing the environmental impact of packaging. Reducing the weight of materials while maintaining functionality and preventing food waste has reduced the overall carbon footprint of packaging.

We acknowledge that reducing cost has played a large role in driving these improvements. However, the industry now has considerable technical knowledge that is applicable to further innovations in reducing environmental impact.

Blanket approaches that ignore the technicalities of packaging solutions could mean that measurement or regulation could produce unintended consequences that actually increase environmental impact.

It can also be difficult to measure impact when costs, resources and systems are subject to constant change. Therefore, we need to develop a well-informed process for implementing the circular economy. For instance, energy audits should incorporate the benefits of not doing other things.

The Future of Packaging group agrees that the circular economy is a key principle for defining environmental impact. We welcome the input from our colleagues from Circular Analytics at the University of Applied Science in Vienna, who advised the group on some principles of applying the circular economy to packaging. They spoke of difficult trade-offs between criteria during sustainable evaluations that incorporate direct and indirect environmental impact combined with recyclability criterion.

**The circular economy
is a key principle
for defining
environmental impact.**



Environmental Measures

The recommended approach requires the development of tools to evaluate the circularity of a product or product portfolio. It also means ensuring that individual businesses and the supply chain in which they operate have the mind-set, skills and opportunity to transform products, collaborate and implement circular projects.

However, we recognise that there are significant challenges in achieving a circular economy. Circular Analytics stated that our world is currently only 9% circular with considerable room for improvement in recycling rates. However, we also acknowledge that there is a potential conflict between recyclability and life cycle goals.

For example:

- Multilayer pouches produce low CO2 emissions, but recycling is not possible.
- Monolayer bottles require high CO2 emissions, but recycling is possible.

The climate emergency emphasises reduction of carbon footprint to prevent further rises in global temperatures. Therefore, recycling is not the number one priority. Supporting the recycling infrastructure is costly in carbon terms. While there is pressure to increase recycling collections as recycling is familiar and comfortable (for the public), the challenge is how to shift away from recycling to reducing the amount of waste produced.

A possible future solution that some UK retailers are currently testing, aims to eliminate the need for recycling, by encouraging consumers to use refillable containers for FMCG goods. While remodelling our retail in-store operations is an exciting opportunity, there is no doubt that the recent Covid-19 outbreak presented the retailers with slight limitations to its functionality.

Many companies, including some within our group, work with the objective of reducing their carbon footprint. This leaves them with difficult choices between steering away from materials with high carbon impact, towards more carbon effective plastics, the latter carrying a risk of plastic pollution if material leaks into the environment.

In theory, we could resolve dilemmas like this using universally agreed and usable evaluation tools. If the circular economy is the principle on which to base those tools, then it can guide decisions about which path to take.

However, we appreciate that developing such a tool is far from easy. The different environmental priorities of various stakeholders may impair agreement. In addition, it is difficult to produce a generalised, universal method when we know that circular design must take account of international, national and local markets, involve the whole supply chain and consider often localised recycling streams and infrastructure.



Environmental Measures

Further issues in the definition and measurement of circular economy include whether to include commercial viability and whether energy audits should account for the benefits of not doing other things.

For example, should measures account for current and potential consumer use? These problems are evident in the challenges that we face as businesses. The answers will determine major decisions on investment for the medium

and long-term. These could relate to the choice of materials to use or strategic development of recyclable or reusable formats. Such choices have implications for retail distribution, infrastructure development and investment in new safety and functionality solutions. Potential solutions that could reduce environmental impact will only work if industry can implement them at sufficient scale. There may also be legislative barriers to change.

Environmental Measures - Next Steps

A key question for the future is whether it is possible to have a definitive answer to the question: what is environmentally friendly? Given the complexity of this question, we understand that more research is necessary to standardise industrial life cycle analysis techniques.

Existing tools, such as eco-audits (streamlined LCA's), investigate the following product aspects:

1. Material Production: All materials have energy 'embodied' in them, energy needed to (naturally or synthetically) create and extract them to shape them into a usable material stock.

2. Product Manufacture: This focuses on the primary shaping processes since they are the most energy intensive steps in manufacturing. For example, Blow-moulding for PET bottles or Extrusion for Cans.

3. Transport: Estimates of energy for transportation from manufacturing site to point of sale. It is not just the bottles that travel, it is also the water they contain.

4. Product Use: Looks at energy used by, or on behalf of the product during its useful life. For example, for drinks this would be refrigeration for an average of two days. However, for a hot water kettle, this would be electricity consumption for the lifetime of its useful life.

5. Disposal: Evaluates the energy to collect, clean (if needed), shred and sort materials at the end of life. End of life options consist of: landfill, incineration to recover energy, recycling, reengineering and reuse. By landfilling, all energy embodied in materials is lost, whereas by reusing, all energy in materials is recovered. Others are in between and energy recovery in recycling depends on the recycling fraction.



A uniform environmental standard that can be widely adopted by the industry is needed to provide a reliable environmental scale across products or materials. Wider and standardised understanding of energy consumption (CO2 footprint) is required to bring us closer to unravelling the real challenge facing us – striving for net-zero greenhouse gas emissions by 2050.

The Future of Packaging group advocates training and research initiatives to enhance understanding of these issues among people in the industry and the public. Circular economy and climate change training for new product development could consist of an objective view on how to weigh up costs and benefits.

It will also cover methods for evaluation, justification and marketing. In addition, we support projects that investigate consumer recycling behaviour, the factors that determine different recycling rates and what works in encouraging people to change their domestic practices.

The group identified a shared need for a standardised system to measure the environmental impact of our products. The eco-criteria should be shaped by legislators, who should continue to work collaboratively with industry and academia, to jointly create the optimal grading system to support our innovation efforts and our global transition to a sustainable economy.





WASTE INFRASTRUCTURE & COLLECTION SYSTEMS

Collection Consistency

The Future of Packaging group's discussions on the issues faced by the packaging industry often led to the waste infrastructure. If industry justifies the use of plastic packaging through its recyclability, the current recycling rates in the UK and elsewhere are far too low.

The solution is either to improve recycling or limit plastic production. The view of our collaborative group is that due to the potential consequences of abandoning plastic in some product categories, greater effort is necessary to improve the systems for collecting and recycling waste. In addition, the forthcoming legislation incentivising businesses to use recycled content (30% recycled plastic tax), encourages development of structures for collection and recycling of quality plastic materials.

One of the most commonly discussed problems is lack of consistency in the UK recycling system. We are all becoming increasingly aware that some local authorities collect packaging materials while others do not.

This happens with all materials. In some districts, there is no kerbside collection of glass while it has been the standard in others for many years.

For plastic, there are many different materials, not all of which are recyclable and some of those that are recyclable are not collected. This is a source of frustration for the public. They cannot see why, for example, their polypropylene (PP) yoghurt pots do not get recycled when their high-density polyethylene (HDPE) milk cartons do. The knowledge that the neighbouring council does collect PP compounds that frustration. Furthermore, the tendency for different collection systems – where recycling is co-mingled in some areas and sorted separately elsewhere – adds to the sense of inconsistency, unfairness and confusion.

The view of our Collaborative Group is that due to the potential consequences of abandoning plastic in some product categories, greater effort is necessary to improve the systems for collecting and recycling waste.



Waste Infrastructure & Collection Systems

The Grüner Punkt (Green Dot) system in Germany is often cited as one of the most efficient waste management schemes in the world. The Duales System Deutschland (DSD), an independent body that operates the system, collects a fee from companies whose products require packaging. The businesses place a distinctive Green Dot logo on their products to indicate they paid the fee for the product to be recycled when it becomes waste. The system is easy for consumers to use; they simply place their finished waste pack or product in a yellow bin for collection, sorting and recycling (where possible) at DSD facilities. Germany reports the highest recycling rates in the World – at around 68% compared with 44% in the UK.

However, this could have the side effect of encouraging more unnecessary consumption because it takes responsibility away from the consumer entirely.

There is also a recycling success story closer to home. In Wales, the recycling rate is close to Germany at around 63%. In contrast to England's disjointed system of 343 local authorities, Wales has a unified process. However, we appreciate that there are strong reasons for the variation in recycling systems. However, local councils have restrictions including low budgets and long-term contracts that limit change or investment. It is important to recognise that different approaches will work better in different circumstances. Comprehensive research is required to map those situations so that all waste collectors and recyclers can learn the best practice for their local area.

The inconsistencies of recycling systems have implications for businesses in the retail packaging supply chain working to improve the sustainability of their products. It is massively inefficient (and therefore less sustainable) to use different packaging materials for the same products according what happens to be recycled in different locations and countries. Recycling rates could be higher if more materials, such as flexible plastics, were recycled routinely. We understand that systems favour rigid plastics because their collective weight is much greater, and items are recycled more easily in mechanical processes than flexibles. Flexible plastics, like films, also present technical difficulties as multi-layer laminates are impossible to separate in PERFs. Other aspects, like high ink coverage results in low quality recylate due to contamination and the inability to remove the ink from the material.

However, given that flexible plastics often end up as litter and plastic pollution, we need recycling solutions for this widely used material.



Waste Infrastructure & Collection Systems

Flexible plastic recycling is possible – it is commonly recycled in Germany, for example – but smaller pack sizes such as confectionery wrappers are especially difficult to process. Small pieces of packaging do not go through the recycling stream due their size (A3 sized plastic goes through recycle streams but not anything smaller). In such cases, collection is more about avoiding environmental leakage than for the value of the material. This suggests a need for market manipulation.

All plastics are recyclable but there is not the infrastructure for all. For flexible plastics, collection is a key challenge.

Improving collection rates would produce the tonnage of flexible plastics to make recycling commercially viable. The value of waste is a commercial business. The market determines the price of some materials, effectively making some waste more valuable and other waste non-recyclable. It may require government intervention through taxation and subsidies to help the market to maximise recycling rates and optimise environmental outcomes for all materials. This is important because of the expected requirement for plastic packaging to consist of a minimum of 30% recycled content. Packaging companies cannot meet these targets without access to a greatly increased and consistent supply of good quality recycled materials.

For flexible plastics, collection is a key challenge.

Improving collection rates would produce the tonnage of flexible plastics to make recycling commercially viable.



Innovation

Science and industry continues to seek solutions to these issues. The question is, in what direction should innovation go? New products and processes need scale to make them environmentally and financially sustainable. That requires considerable investment, supported by government. There is a natural tendency for business to avoid the risks associated with being the first to invest in a new system or technology.

The Future of Packaging group discussed several kinds of innovations that could help to resolve the plastics problem. These include switching to reusable (rather than recyclable) containers, developing new closed-loop recycling systems to ensure the right quality of feedstock and reverse logistics. The benefits and barriers associated with each solution vary according to product category. While reusable containers could work well for groceries such as cereals or other dried goods, it is much more complex for aerosols, which must meet strict safety standards for processing gases.

The development of chemical recycling (chemcycling) highlights the need for careful, proportionate investment. Chemcycling is a potential solution for materials that are currently difficult to recycle such as flexible plastics or plastics with residues. Recycling Technologies, a chemcycling company that presented to the Future of Packaging group, claimed that while mechanical recycling has the potential to increase recycling rates from 12% to 40%, chemical recycling can contribute a further 50% by effectively 'recycling the unrecyclable'.

Chemcycling offers the ability to produce virgin material from waste. This limits the use of fossil fuels while producing a material of the same quality as plastic made from virgin material, an advantage over mechanically recycled plastic that loses some of its useful properties each time it is recycled. This means that businesses do not have to compromise on product performance, colour or odour as they might have to for mechanically recycled plastic.



Chemical manufacturers such as BASF have already reported some successful chemical recycling trials. This includes the production of Polyamide for cheese packaging and materials for the construction and automotive industries. Other businesses are considering chemcycling in collaboration with companies in their supply chain as a way of helping them to reach their objectives of 100% of products being recyclable.

The current limitations of chemcycling relate to stage of development, lack of infrastructure and acceptance from the market and regulators. It is still at a relatively early stage of prototyping and testing and, in addition to building facilities to process the waste, steps will be necessary to ensure recyclers can collect enough waste to make it viable. Potential legislative barriers include bringing waste onto chemical processing sites and rules about the end use of the product for food-grade packaging.

There is also a question of whether the output of chemcycling should make plastic bottles. This is because other industries can use it for something that is more valuable. To gain public support, industry will have to identify the products that consumers would accept as made from chemically recycled materials and account for the energy used in the process.

If chemcycling encourages greater use of plastic, it is uncertain whether this would be acceptable to both food safety regulators and consumers. It not only requires plenty of plastic packaging as a feedstock, it also relies on industry to continue using plastic in order for the output to maintain value. Although technological developments will reduce energy usage, it is far higher than for mechanical recycling. As with other aspects of plastic packaging, there is also a significant communication issue. Industry must avoid unsubstantiated claims and its messages must be clear and consistent. It could be that the way forward is not to make grand claims. The journey requires the use of evidence and claims made based on a model of argument. That might consist of a 'circularity of improvement' argument that stipulates making changes in small, transparent steps, revisiting outcomes and adjusting again in a continuous learning process.

There is already enough information available to suggest that chemical recycling has the potential to improve the amount of packaging waste that is lost or goes to landfill. It is still early days and there are several issues to address to ensure it is a workable solution for industry, consumers and the environment.

The journey requires the use of evidence and claims made based on a model of argument. That might consist of a 'circularity of improvement' argument that stipulates making changes in small, transparent steps, revisiting outcomes and adjusting again in a continuous learning process.



We need to work together to understand more about this promising area of innovation. The example of chemcycling represents the kind of dilemma commonly faced by industry with regard to the environment. There are multiple potential paths, all with different strengths and weaknesses. Some choices rely on government, consumers and other businesses effectively supporting the decision with their own actions and behaviours. To achieve such agreement within industry often goes against competitive instincts.

However, post-consumer packaging retains its value in its material and, if processed correctly, it could remain in the market and be repurposed - avoiding landfill, incineration or leakage into the environment. Social enterprising business models like localised small waste processors the collaborate with councils, could be a way forward for single stream processing of valuable packaging materials, benefiting communities, raising consumer awareness and embedding positive recycling behaviours, supporting circular economy objectives.

Next Steps - Waste Infrastructure & Collection Systems'

The Future of Packaging group spent much time considering issues relating to the broad question whether it is possible to have an effective and well-working collection scheme for packaging in place. Consumers and industry both experience frustration due to the inconsistencies of the UK waste management system. A more coordinated, standardised system can boost recycling rates and enable better decision making about packaging formats and materials. We understand that it would take considerable time to achieve that goal and that flexibility in the system is important to allow for local differences. It is also important to learn from good practices within the UK and abroad in order to maximise the amount of waste collected for recycling.

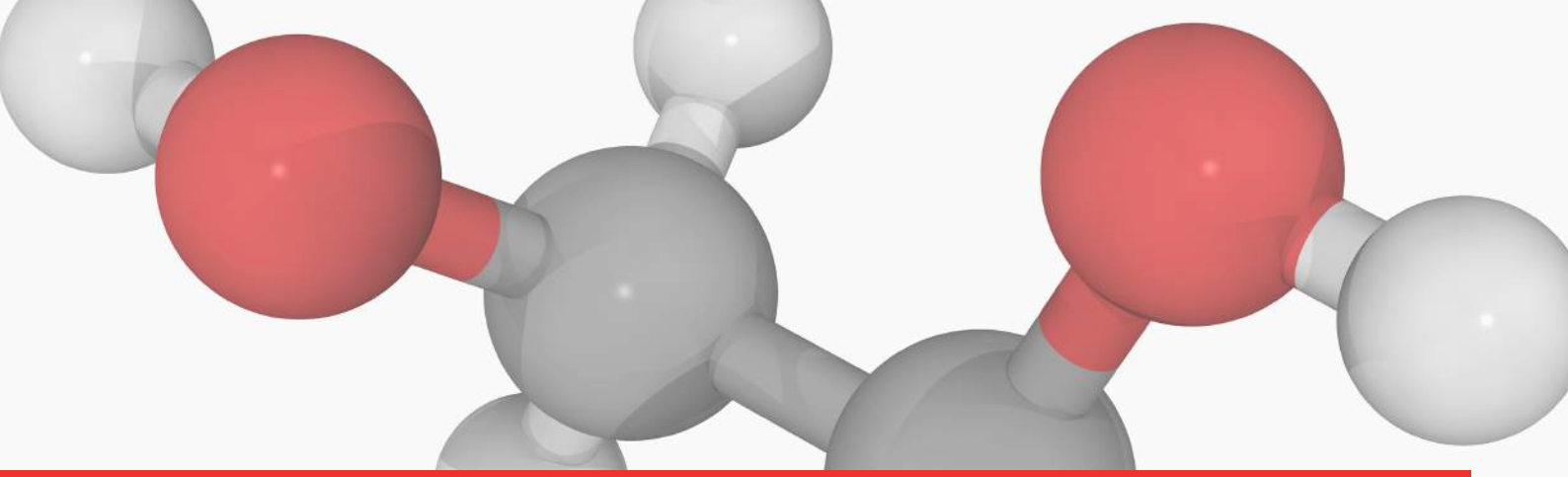
Some of the group members developed localised, circular waste practices for their manufacturing sites, providing great examples of proactive initiatives that developed more specialised and localised waste management.

Standardisation of waste collection in the UK has political implications and might take some time to address. However, collection of data on composition of recycled waste could be a feasible goal for local councils to adopt. Comparable, standardised data can be extremely useful in Life Cycle Analysis, when we try to ascertain the energy required for recycling of materials. At the moment, the way in which data is recorded and classified differs per UK regions.

As innovation continues with the objective to make packaging more sustainable, industry needs government assistance to determine the right paths and support confident investment to make new techniques scalable.

As innovation continues with the objective to make packaging more sustainable, industry needs government assistance to determine the right paths and support confident investment to make new techniques scalable.





MATERIALS

The choice of materials is at the heart of sustainable packaging. Ocean pollution leads to calls to move away from plastics to other materials such as paper, metal, glass or compostable plastic alternatives. There are also criticisms of what appears to be the excessive use of packaging and the reliance on fossil fuels to produce plastic. Developing alternatives to plastic is a costly process, and for FMCG products the high cost of material is a barrier to wider implementation.

Plastic's ubiquity also comes from its usefulness. Its use as a food packaging material has grown significantly during the last half century. It is not just an alternative material to paper, metal and glass. It has enabled the packaging of previously unpackaged foods, the development of new food products and created new eating practices.

The packaging industry can claim many success stories that have a positive impact on society and the environment.

These include re-sealable and portion packaging, restricting food waste and enabling healthy eating. Businesses in the packaging supply chain continually improve food production safety, hygiene, food protection and counterfeiting prevention. It has also worked to eliminate non-recyclable plastics and reduce the weight of others in order to reduce the carbon footprint and save costs.

All of these developments and many more require extensive research and development. Both scientific evidence and business considerations determine the choice of packaging material. This means that alternatives must also have a scientific basis to ensure it meets product protection and safety requirements.



Materials

The businesses represented in the Future of Packaging group described their projects that are investigating potential changes to packaging materials. This includes the shift from polystyrene to polypropylene yoghurt pots, making them more recyclable. There is also work looking at resolving the problem of laminated packaging. The multiple layers in formats such as cheese pouches are necessary because of the different barrier properties of each layer. Cheese requires (airtight) modified atmosphere and 90-day shelf life. Three materials are sandwiched together.

Layers are very difficult to separate, making the packaging effectively non-recyclable. Innovations in compostable or removable laminates requires the businesses producing the component materials to work together. This includes the adhesives used to stick the layers together. Making adhesives easily removable, for de-lamination, with demand for good performance is one of the many challenges that businesses are working on in this area. Another is encouraging recyclers to delaminate the packaging waste. This requires more infrastructure to collect and create scalable technical solutions.

Paper is an alternative material with generally a better reputation than plastic. Work to develop alternatives to plastic involves doing more with paper without affecting recyclability. A key issue is water in the sense of maintaining recyclability while making paper more water resistant. Trials to change chemical consistency on paper fibres (Cellulose) involves understanding the required packaging properties already delivered by plastics so that paper can meet them.

Another area of innovation attracting a heated industry debate is compostable packaging. Composting or biodegradation of plastic in natural or industrial environment is a concept that can appeal to consumers as an ultimate answer to ocean pollution. However, any leakage of our waste into the environment is morally troubling and should be prevented as a priority. Compostable solutions are also not circular, and do not feed into the cradle to cradle concept. Saying that, if the collection and separation system could support post-consumer waste, these materials could provide viable alternatives to carbon-based plastics.



There are several common beliefs about new materials like bio-polymers or compostables that are not factual. Not all compostables are made from non-carbon feedstock and not all bio-based plastics will naturally biodegrade. Also, because these solutions are new, consumers can misunderstand the correct way of disposal of such products. This is especially true for items that are required to be industrially composted but, with no local infrastructure, might end up as a contaminant in a traditional recycling stream.



An area of debate with regard to compostable packaging is whether it is classifiable as recyclable. While technically organic recovery (i.e. composting) is a form of recycling, they are not recyclable in the sense of re-creating the material for repeated use. This distinction is important for those companies seeking to achieve targets of their packaging being 100% recyclable.

As aforementioned, biodegradables can present a problem once they enter standardised recycling streams. Most of these materials need particular conditions in order to break down, releasing methane, a greenhouse gas, when they decompose. In existing infrastructures, they contaminate other plastic streams at recycling facilities, with no technology to separate them effectively from non-biodegradable materials. Similarly, compostable materials ought to be separate from other materials for processing through anaerobic digestion to ensure the full benefits of compostability (such as obtaining nutrient rich fertiliser) and offset greenhouse gas emissions.



To ensure a successful wider application of compostable packaging, there must be continued improvements in the compostable infrastructure. It is also important for the correct compostable certifications, (e.g. OK Compost from TUV Austria), to become more recognisable by consumers to ensure correct disposal.

Compostables have a potential to become an alternative to hard-to-recycle laminates. The multiple layers in such materials are difficult to separate in recycling systems, meaning that compostability has a strong appeal.



However, with low adaptation of industrial scale aerobic digestion solutions, the contamination issue remains. While compostable solutions might work very well in a closed loop-setting, at the present time the existing UK infrastructure is not ready to deal with those material variations nor is it in a position to adapt a UK wide system nationally without significant investment.

The expectation to make more packaging from recycled materials also has promise for some categories but has problems for others. Producing food-grade packaging from recycled materials works well for PET, but is more difficult for other materials, like polyolefins. Availability of commercially viable and safe material is limited, and the costs are prohibitive. For some products, manufacturers can only use virgin material (plastic or paper) to ensure there is no food contamination.

Another important area of exploration for better environmental packaging are bioplastics. These materials prove attractive because long term they offer ceasing our reliance on oil-based feedstocks, therefore offer a better carbon footprint. In the future, when natural fossil resources become scarce, plastics will have to rely on alternative agricultural or microorganism (bacterial) components. The shortfall of bioplastics at the moment is their high production cost (about 3-4 times more than fossil based). Many innovation efforts in biopolymer science focus on improving synthesis processes to make these more economically viable.

There is some historical confusion whether all bio-based plastics are biodegradable. Although some bio-feedstock materials offer degradability, others replicate properties of traditional plastics, like PET, but both need an appropriate end-of-life stream.

At the moment, in traditional waste streams bioplastics can become a contaminant. For example, PLA plastic is indistinguishable from PET plastic during flotation and density separations. Further in the process, when combined with PET, PLA can reduce the quality and value of the re-pelletised PET polymer. Lower melting temperatures of most PLA plastics also creates issues for kerbside recycling. Biodegradable bioplastics require specific conditions to degrade, a process that needs specialist composting systems taking several months.

An important question for the Future of Packaging is whether retailers will still want to remove and reduce plastics. The answer could have a significant impact on the range of alternative materials available for future product categories.



Next Steps - Materials

The plastics debate stimulated further research into alternative feedstocks or end-of-life processes for packaging. The ultimate goal is to create a material that can offer the benefits of traditional plastics but eliminates our dependence on fossil fuels at prohibitive cost. Potential for environmental pollution (littering and leakage into the environment) and circularity (recycling capability) are aspects that are now being taken into consideration by packaging designers.

Compostable and bio-based materials share one common problem – correct collection, segregation and processing at the end of life, to avoid contamination of existing streams.

The waste infrastructure is a critical element that needs to support our transition into non-fossil reliant economy.

While many of the new developments have potential to offer alternative materials in specific product categories, these also must all overcome barriers such as cost and scalability. Grocery products have especially small profit margins, which means that until alternative materials become competitive with oil-based plastics, someone

will have to pay – consumers, retailers or packaging suppliers. To generate the right amount of scale requires investment. As with recycling solutions, the choice of which path to take involves some risk.

Retailers and brand owners have a key role. If their target is to avoid using traditional plastic, that suggests investment by packaging companies in alternative materials. Targets to ensure all packaging is recyclable could mean they make different choices. With troubling rates of food waste in the UK, simply unwrapping produce from protective packaging is not a morally comfortable choice retailers wish to make, despite public or media pressures.

An important question for the Future of Packaging is whether retailers are willing to make a strategic investment in plastic or packaging alternatives to boost innovation, provide scalability and stimulate a more dynamic recycles market. The answer could have a significant impact on the range of alternative materials available for future product categories.





LEGISLATION

The issues discussed so far – communicating with consumers, environmental measures, waste management and packaging materials – all call for government intervention to guide, incentivise, fund and prevent the behaviours associated with positive and negative environmental outcomes. However, for government to be effective in what activities it chooses to support, or control, depends on strong evidence of what works and what produces the optimum sustainable results. As environmental issues have risen up the political agenda in recent years, the competing interests of policy makers and the limited time they have to assess the evidence has become more obvious.

Climate change and pollution are global issues, which means that policies to address them are much more likely to be effective if policies are coordinated between nations. The implementation of EU legislation might be a solution to this problem. However, it is questionable whether the UK government will commit to sharing those environmental goals and legislative actions post Brexit.

The Future of Packaging group discussed a range of policy developments that have implications for the retail packaging supply chain. These include the potential impact on business of new taxes and ensuring that government invests the money raised from those taxes in effective new infrastructure projects. We understand the use of taxation is an important driver for change, making it cost effective to use different materials and providing an incentive to adapt behaviour. Using tax revenue to invest in consumer communications is also seen as something that needs to be addressed on a national and regional level.

Proposals for deposit return schemes (DRS) in Scotland and the rest of the UK are a prime example of policy that requires care in its design and implementation. Any schemes should ensure that it can meet its claimed objectives, i.e. increasing recycling rates and enabling a consistent and reliable flow of materials for recycling. Potential barriers include costs of reverse vending storage installation and shortage of space, especially among convenience retailers, to manage high volumes of returned containers.



There are also industry concerns about unintended consequences, such as switches to packaging materials or formats with a higher environmental impact or apprehension that the DRS scheme will reduce the quantity of drinks containers within residual waste, but will not eliminate it, which means additional costs associated with processing residual waste streams.

The DRS system might also require retailers to increase staffing to manage returns and prevent delays at the tills. The effects on recycling rates could vary according to packaging material. It could be harder to increase rates for materials such as glass and paper that already have high rates compared with plastics. There must be appropriate scrutiny of policies during implementation so that we all learn the right lessons about what works.

Whose Responsibility

Legislation can influence multiple aspects of sustainable packaging. Taxation and incentives can encourage businesses to make products that fit with a set of environmental principles such as the circular economy. However, legislators must take care not to create new problems by punishing companies with taxes for using packaging formats, such as those made from polyolefins, which cannot incorporate recycled materials (post-consumer resin).

Regulations can allow new techniques for production or waste processing. Legislation also sets an example to the public of the activities that are socially acceptable. This comes through government communication or the symbolic support of activities through other policy tools.

Government can also lead on the principles that guide policy. In the sustainable packaging field, responsibility is hugely significant.

Extended Producer Responsibility (EPR) suggests that the government will force the packaging sector to pay for improved collection systems. While it does address consumer responsibility (to dispose of packaging appropriately and avoid non-sustainable goods), it is likely that EPR means the consumer pays, as prices increase to pay for new taxes and material development.

Some retailers have already absorbed the cost of switching to alternative materials. However, taxation of virgin plastics makes it difficult to avoid price rises. While this may be a necessary outcome, it is important to understand policy consequences such as this in advance.

Extended Producer Responsibility (EPR) suggests that the government will force the packaging sector to pay for improved collection systems. While it does address consumer responsibility (...) it is likely that EPR means the consumer pays, as prices increase to pay for new taxes and material development.



Policy makers should recognise that investment in standardised waste collection systems is required to create a robust and effective circular system. The matter is complicated because devolved administrations in the UK manage their own regions, but a unified approach is desirable for effective waste management at a national level. The issue of consumer communications is also seen as something that should be addressed across the UK.

Businesses find it difficult to provide their customers with consistent labelling for recycling, because of the fragmented infrastructure.

Putting an onus on consumers by asking them to “check local recycling”, is not an effective way to avoid contamination in recycling streams. Therefore, some businesses want government to intervene in consumer communications and ensuring consistency in collection in order to enable them to access enough good quality recyclates from kerbside sources.

Next Steps – Influencing Policy

The UK government has significant potential power to influence the direction that the retail packaging supply chain takes in this country. Members of the Future of Packaging group have experienced some frustration that the government has – so far – not used enough evidence in its plans to regulate the industry.

Legislators have not been ready to develop laws regarding sustainable packaging. We expect this to change as governments increasingly prioritise and learn more about the issues. We also recognise that industry has a responsibility to provide government with the right information to make effective policy. However, many different businesses expressing their own perspectives on the issues will not necessarily help government to choose the best path.



A coordinated industry message would be more powerful. Businesses in the packaging supply chain must continue to learn about communicating with policy makers and raising awareness of emerging issues. In addition, government must also seek independently verified evidence to identify best practice solutions.



ORGANISATIONAL CHANGE

The issues discussed so far have implications for each individual organisation in the retail packaging supply chain. Reducing packaging or plastics, increasing recyclability, adjusting business models in line with legislation are all activities that involve setting new priorities and reorganising resources. In addition, the need to assess the business's environmental credentials from the top of the organisation to the bottom and then communicate effectively to all stakeholders has led to each company expanding their sustainability-focused personnel.

There are many drivers for organisations to change. Of course, it is bad for brands to have an association with pollution. Ultimately, such an association leads to a fall in profits. The issues faced by the packaging industry are collective. This could drive collective communication efforts to explain the actions of retailers and packaging companies.

The Future of Packaging group discussed a range of policy developments that have implications for the retail packaging supply chain.

These include the potential impact on business of new taxes and ensuring that government invests the money raised from those taxes in effective new infrastructure projects. We understand the use of taxation is an important driver for change, making it cost effective to use different materials and providing an incentive to adapt behaviour.

As businesses move into new areas of operation, they are likely to face a range of challenges and barriers to change. Cost is a leading issue. Many alternative solutions are more expensive than the currently preferred packaging or production methods. Businesses must absorb those costs to avoid them being passed on to consumers. Packaging companies report that some of their clients are unwilling to pay more to meet their targets. Balancing the costs of innovation against sales volume is difficult. Businesses make money from manufacturing, not from innovation. Therefore, it is not about being an innovator but being a close second. There is a sense of a 'herd mentality' that needs legislation to trigger movements to change.



The diverse needs of client companies exacerbate the difficulty of knowing where to invest. Because different things are recycled in different countries, it is not possible to provide a one-size-fits-all approach. One member company reported that it uses 500 different grades of polythene films because it is normal for businesses to create value for customers and offer variety. Improving sustainability might involve going against these business instincts.

Another issue is the infrastructure needed to improve packaging sustainability. Supply of recycled plastic is unreliable with demand outstripping supply. The Future of Packaging group noted the issue of ownership of recycling processes. In contrast to the paper industry, where businesses own the recycling process, in plastics there is no ownership of processed material. Paper benefits from a less complicated system and greater control of the problem.

For plastic, organisations must rely on external factors to increase the supply of recycled materials. These include resolving some of the system inconsistencies and waste disposal behaviour of consumers.



Businesses make money from manufacturing, not from innovation. Therefore, it is not about being an innovator but being a close second. There is a sense of a ‘herd mentality’ that needs legislation to trigger movements to change.

The challenge of educating people on what is recyclable and how to separate waste belongs to both industry and government. This means that organisations must learn to work together to overcome perceptions of complexity, contradictions and changes to the overall message.

Some problems are specific to organisations but need external assistance to resolve them. Safety regulations can limit the movement of waste for recycling. For example, waste generated from chemical processing sites might not be recycled due to fear of contamination. Other businesses rely on the supply of plastic for products that have fundamentally environmental virtues. This includes plastic pallets, which are more durable, easier to clean and enable greater supply chain efficiency than the wooden equivalent. However, businesses manufacturing plastic pallets have the challenge of ensuring they have enough recycled material to make their product and then make customers feel more comfortable about using plastic.



Changes to business models, processes and relationships with others will generate inevitable shifts in organisational culture. Such changes are always difficult as they reveal tensions and make people feel threatened in their positions. To achieve unity within organisation, culture change is needed from the bottom upwards as well as top-down.

Effective businesses understand the multiple working cultures within their organisations and the impact of history, geography, tasks and roles. These are all factors to manage in the process of changing resources, systems, contracts and business models in order to enhance sustainability.

Improving the sustainability of internal systems can help to shift organisational culture. The Future of Packaging group members described the efforts within their individual businesses to limit waste and the carbon footprint. Activities include eliminating plastic stretch wrap on pallets and other uses of plastic in day-to-day work. Creating a register of plastics in the business and a strategy for each sub-division are methods some organisations are implementing. Educating the workforce on waste separation contributes to general public knowledge of the issue. The workforce, in turn, can improve energy reduction processes if organisations encourage them to share ideas from the shop floor. Changing internal habits is a form of leading by example that could help to initiate change in the marketplace.



The workforce can improve energy reduction processes if organisations encourage them to share ideas from the shop floor. Changing internal habits is a form of leading by example that could help to initiate change in the marketplace.



Next Steps - Organisational Change

Organisations continue to change their products and services to become more environmentally friendly while improving the sustainability of their internal systems and processes. Consequently, their need for collaboration and cooperation increases. The choice of which path to take depends on agreed sustainable indicators and approaches to dealing with plastic packaging.

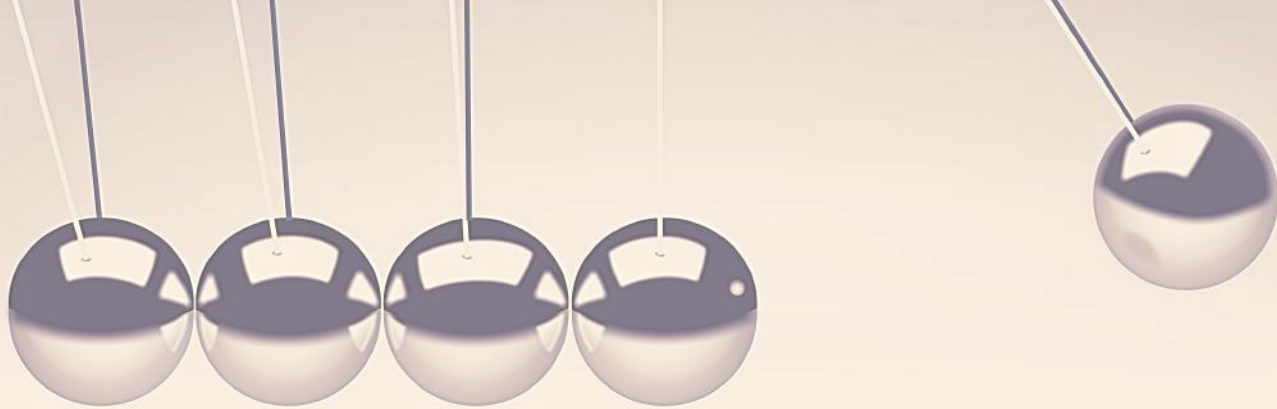
Lack of collaboration may provide some with a competitive advantage but ultimately undermines any efforts to reduce plastic pollution and the overall carbon footprint. Businesses clearly recognise this, as there are numerous examples of large and small collaborations, including the UK Plastics Pact, The Alliance to End Plastic Waste and our own Future of Packaging group.

While there is considerable value to working together and sharing problems and solutions, these endeavours must produce concrete outcomes that the public trusts as genuine attempts to save the planet. Individual organisations must build sustainable practices into their business strategies to enhance commercial viability and decision-making.

If more businesses do this, it becomes easier for them to make connections with each other. This could transform the 'herd mentality' into collective leadership towards positive action. Leadership may require new or existing independent bodies to create concerted, evidence-based campaigns for deliberative action, setting clear priorities for measurement, investment and communication.



Individual organisations must build sustainable practices into their business strategies to enhance commercial viability and decision-making. If more businesses do this, it becomes easier for them to make connections with each other. This could transform the 'herd mentality' into collective leadership towards positive action.



CONCLUSION AND RECOMMENDATIONS

Conclusion

Many of the actions described in this report require collective action, as they are too big for individual organisations to manage on their own. However, The Future of Packaging group agrees that action is crucial to resolving the issues faced by the retail packaging supply chain. These include pushing for improved infrastructure and getting more materials back for recycling. Working out options for moving towards these are tasks for further consideration. Other actions require clarification. For example, definitions of 'costs' relating to chemical recycling to include circular economy, efficiency and carbon/energy use. Overall, the actions reflect the continuing need for information and understanding to inform the development of collective strategies.

The members of the Future of Packaging group face many complexities within their own businesses as well as the social, economic and political context that call for a cross-industry collaborative approach. Everyone is doing something but there are limitations for each company. There is a need for whole system, rather than piecemeal, approach. While many are nudging along in the right direction, it needs central coordination. Drivers of change include retailers. However, they can only go as far consumers will go with them. Some retailers take on environmental products as a competitive advantage. This is good but the pace of change could be faster, thus the need for a collective system.

THE FUTURE OF PACKAGING: OUR CALLS FOR ACTION

1. Consumer Behaviour & Communications

The packaging supply chain must develop a communications framework across the sector. This should raise awareness on the role of plastic in providing safe products with clear and consistent instructions for separating and recycling to help consumers with correct disposal of their products at the end of life. Businesses must create a level playing field in terms of price, convenience and functionality to encourage people to buy eco-friendly alternatives. Independent charitable organisations could play a role in educating consumers on food waste reduction and non-littering behaviours.

2. Environmental Measures

The plastics supply chain should agree a shared definition of environmental impact, underpinned by the principles and clearly defined metrics of the circular economy. We call for a unified approach based on holistic scientific practices, utilising tools such as life cycle analysis, to define carbon footprint measures for all products to unpick trade-offs between packaged products, including life cycle stages such as recycling. This approach would enhance understanding of wider environmental issues among people in the industry and the public. We call for businesses to embed eco-design strategies, such as implementing design for recycling as a standard industry practice.

3. Waste Infrastructure & Collection Systems

Government investment is essential to develop new waste infrastructure solutions and enable dynamic end-of-life innovation. A UK-wide strategy is required to standardise recycling waste collections and recycling practices across the country, aiming to develop specialised and scalable potential solutions for difficult-to-recycle materials. Local authorities could encourage social enterprising for specialised waste processors to help develop single-stream capabilities and new solutions to process valuable packaging material. We also call for a new national anti-littering campaign to raise public awareness of the negative environmental impacts of littering and fly tipping.

4. Materials

The retail supply chain should continue the innovation efforts in developing recyclable or re-usable packaging formats with considerations for reduction or simplification of materials, with no compromise on shelf-life. Understanding trade-offs between materials and their complete journey from feedstock to end of life is critical to developing better, holistic approaches to environmental product development. Collaborative, design led approaches to materials strategy must ensure that principles of Circular Economy and carbon measures form the basis of a coordinated pro-environmental market strategy. This should involve the packaging industry, brand owners and retailers supported by government, and must be communicated effectively to consumers.

5. Policy and Legislation

Strong evidence of what works and what produces the best sustainable results should be the basis of policy and legislation. A coordinated industry message from all packaging trade associations is needed to provide government with the right information to make effective policy leading to legislation based on independently verified evidence. Climate change and pollution are global issues, which means that policies to address them are much more likely to be effective if policies are coordinated between nations.

6. Organisational Change

Individual organisations must build sustainable practices into their core business strategies to enhance commercial viability and decision-making, and enable positive change. They should share these good practices across the sector. Improved connections within the retail supply chain is essential for building collective leadership towards a positive environmental future.

COLLECTIVE STATEMENT

We call for action at both an individual organisation and global level. Individual organisations must build sustainable practices into their core business strategies to enhance commercial viability and decision-making.

They must work to develop sustainable solutions according to the varying recycling infrastructures of different countries and regions.

While the packaging industry continues to work hard to create better products for the environment, we need to see the same innovation from the waste infrastructure.

To enable better packaging design, we need greater standardisation of recycling systems. However, that does not mean prescribing a single, permanent arrangement that could stifle innovation. We must allow big solutions to emerge and have the flexibility to implement them. What is right now may not be right in the future.

All of us – government, industry, waste companies and consumers – have a role in finding solutions in collaboration.

APPENDICES AND REFERENCES

- Heller, M.C., Selke, S.E.M. and Keolian, G.A. (2019) 'Mapping the Influence of Food Waste in Food Packaging Environmental Performance Assessments', *Journal of Industrial Ecology*, 23(2), pp.480-494.
- Martin-Rios, C. et al (2018) 'Food waste management innovations in the foodservice industry', *Waste Management*, 79, pp.196-206.
- Schnurr, R.E.J. et al (2018) 'Reducing marine pollution from single-use plastics (SUPs): A review', *Marine Pollution Bulletin*, 137, pp.157-171.
- Wohner, B. et al (2019) 'Packaging-Related Food Losses and Waste: An Overview of Drivers and Issues', *Sustainability*, 11(1), p.264
- https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=sdg_11_60&plugin=1
- <https://www.letsrecycle.com/news/latest-news/welsh-recycling-rate-drops-62-7/>
- <https://lgiu.org/local-government-facts-and-figures-england/#section-3>
- Thank you to Dr Suneel Kunamaneni for sharing academic materials on biopolymers



LEEDS BECKETT UNIVERSITY
LEEDS BUSINESS SCHOOL

The Retail Institute
Leeds Beckett University
Rose Bowl
Portland Gate
Leeds
LS1 3HB