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The Problem with Plastics

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KPMG Ireland

Recent shifts in consumer sentiments on plastic use represents substantial opportunities for businesses across all sectors"

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Globally, plastic consumption has quadrupled over the past 30 years[1]

We produce 300 million tonnes of plastic each year worldwide, half of which is for single-use products[2]

1 OECD
2 NRDC

Getting the Facts Straight

Plastics have become an integral part of modern society and have contributed significant economic benefits in terms of low production costs and durability. Plastics have also contributed to the advancement of human health, namely through the use of plastic for safer food packaging and in medical equipment. Despite these benefits, the production and consumption of plastic around the globe has increasingly come under criticism. This is mainly due to their non-renewable composition (distillation of crude oil), and the fact that many plastics are non-biodegradable or non compostable, with several types regarded as difficult to recycle, such as polystyrene and Styrofoam[3]. The massive increase in plastic use over the past three decades, largely driven by emerging market demand[4], has led to increased pressure being placed on sectoral groups to seek sustainable and environmentally sound alternatives. Given that the global plastic market is projected to grow at a compound annual growth rate (CAGR) of 3.7% for the period 2020-2030[5], it is unlikely sectoral groups will see these pressures being alleviated in the near future.

A strong shift in consumer sentiment on plastic use in recent years has seen widespread protest against single-use plastics (SUPs), largely driven by public concern on global issues such as climate change and ocean pollution.

Scientists have studied the distribution, concentration, and impacts of plastic pollution on the natural environment and the risks this can pose for human health. It is estimated that approximately 8 million tonnes of plastic waste are released into the world's oceans each year from coastal regions[6]. Once in the oceans, prevailing currents distribute the plastic waste all around the globe where they breakdown into smaller fragments called microplastics. Microplastics can in turn become large ocean garbage patches, such as the South Pacific garbage patch, which is estimated to cover 3 million square kilometers.

75% of participants in a global survey on plastics agree that single-use plastics should be banned as soon as possible[7]

3 RTS
4 OECD
5 Statista
6 National Geographic
7 IPSOS

The impact of plastic on wildlife can be wide-ranging, and can cause harm to species such as whales, turtles, fish, birds and even on a microscopic scale to species like zooplankton. While most wildlife deaths caused by plastic are a result of entanglement, many more are due to ingestion. Microplastics have the same effect as larger plastic debris but on a much smaller scale. These tiny particles of plastic (less than 5mm in diameter) have been discovered in almost every environment on Earth, from the remote sea ice in the Arctic, the deepest trenches in the Pacific Ocean, to the atmospheric fall-out in the Swiss Alps and Antarctic snow (i.e., rain, sleet and snow containing microplastics). Microplastics can be derived from larger plastic debris which have been weathered by heat, UV rays, wind and water, or they can be released directly into the environment from manufactured microplastics, such as synthetic clothing fibres or cosmetic microbeads. Microplastics break down further into smaller pieces referred to as 'nanoplastics' and have recently been found in human lungs and blood[8]. While the effects of these novel contaminants in our bodies are yet to be determined, we must begin to identify their sources and implement measures to halt the uncontrolled spread of plastic waste.

Microplastics have been detected in 90% of protected Irish marine environments[9]

It is estimated that the average person consumes 50,000 microplastic particles and inhales a similar amount each year based on a scientific study to estimate human ingestion of plastic particles[10]

Addressing the Issue

The world's reliance on plastic products cannot be switched off overnight, but there are solutions to the problems discussed above. There is increased pressure being placed on businesses to use alternative materials in their products, and on governments to regulate unsustainable plastic use. Decision makers have begun to respond to these changes by implementing regulatory tools to reduce the production and consumption of plastics. Policies such as Extended Producer Responsibility (EPR), regional recycling targets and SUP bans are all contributing to the creation of a more circular economy.

Governments have the greatest amount of control over this issue in the short, medium, and long term. They can use regulatory instruments such as legislative plastic product bans (such as SUPs) and material prohibitions (such as Styrofoam), economic instruments such as levies on suppliers, retailers, and consumers (e.g., the plastic bag tax), or a combination of these. Some of these earlier measures have proven very successful over time, with the Plastic Bag Levy in Ireland resulting in a reduction from 328 bags per capita in 2002 to an estimated 14 bags per capita in 2014[11].

At a regional scale, the EU's 'plastics tax' is one of several tax reforms proposed as part of the Green Deal which aims to reduce consumption of raw materials and waste, promoting the move towards a circular economy. The plastic tax contributes to environmental funds through non-recyclable plastic consumption (with an estimated 10-15 major economies expected to be levied across Europe[12]). This tax also allows each member state to design their own plastic tax and decide how it should be implemented.

8 National Geographic
9 Irish Times
10 The Guardian
11 Gov.ie
12 KPMG

Ireland's Targets

Ireland has set ambitious recycling targets for plastics and packaging to dramatically reduce its unsustainable linear relationship with this waste stream and move towards a more circular economy. These targets will not only help Ireland to achieve its net zero ambitions for 2050, but will also aid in the implementation of the Whole of Government Circular Economy Strategy 2022-2023. While Ireland is currently ahead of the EU recycling target of 22.5% for plastics (31% in 2021), more action is needed to keep the momentum required to hit increased targets of 50% plastics recycling in 2025, and 55% by 2030[13].

Less than one third (28%) of Ireland's plastic packaging waste was recycled in 2019, with almost all remaining plastic packaging being sent for incineration[14]

Sectoral Analysis

Some sectors rely on plastics more than others. The packaging sector is the dominant user of primary/virgin plastic (non-recycled/purpose made), making up 42% of total plastic use, equating to 146 million tonnes annually. This sector is followed by building and construction (19% of total annual use), followed closely by textiles[15]. Primary plastic use by these sectors does not entirely reflect the amount of waste generated by these sectors, which is heavily influenced by the plastic product's lifetime. Packaging remains the top sector with the largest amount of plastic waste, mainly due to the fact that most packaging has a short, or even single-use lifetime (often less than 6 months). Building and construction, however, use plastics in a much different way, with an average plastic use lifetime of 35 years[16].

There is an opportunity for those sectors, that use the largest quantities of primary plastic and generate the most waste, to re-think their production cycles and material use in order to increase product durability and the use of alternative materials.

Are Businesses Doing Enough?

A recent study by DW and the European Data Journalism Network assessed some of Europe's largest food and drink companies to determine whether their commitments to reduce plastic waste have been adhered to or not. The research identified 98 plastic commitments from 24 companies headquartered in Europe. Of these, 37 pledges should have been delivered upon by this year, however 68% had failed to do so or were improperly reported on[17]. Unsurprisingly, these figures are similar to studies on other industries, such as textiles, cosmetics, and household equipment, whereby 42% of claims were deemed to be false, misleading, or exaggerated[18]. As these commitments are entirely voluntary, there is little incentive for companies to invest the time and financial resources required to implement the changes required. More comprehensive legislation is needed to push companies in the right direction.

Irish businesses are legally obligated to segregate packaging waste by material type for the purposes of recycling under Regulation 5 of the European Union (Packaging) Regulations 2014[19]. Despite REPAK funding the recycling of packaging waste in Ireland to help meet national targets, 2020 saw a 3.5% decline in tonnes of backdoor plastic packaging waste funded versus 2019. This was largely due to improper segregation of plastic waste (i.e., plastic waste being put into general waste bins), contamination of recyclable materials, and inadequate waste collection infrastructure or services to meet business needs. While this trend is concerning, it also represents a significant opportunity to increase plastic packaging recycling rates, given that almost 50% of all packaging waste generated in Ireland arises at commercial premises[20].

13 REPAK
14 EPA
15 OurWorldInData
16 OurWorldInData
17 DW
18 European Commission
19 Irish Statute Book
20 REPAK

Opportunities for Change

Several consumers have now switched to products made from paper, aluminium, or glass packaging instead of plastic, however similar to other materials, the entire environmental picture must be assessed.

Bioplastics

Bioplastic has emerged as a promising substitute for many plastic products we use today such as medical devices and food packaging. This is a material derived from plants and other biological materials instead of petroleum. It is produced through the extraction of sugars from plants (e.g., corn, sugarcane) and converting it into polylactic acids (PLAs), or polyhydroxyalkanoates (PHAs) that are engineered form microorganisms. PLA is the cheaper of the two examples outlined here and the most common type of bioplastic we see today, with widespread uses including plastic bottles, utensils, and textiles[21].

Despite the benefits we can gain from alternatives like bioplastics, there are concerns with growing plants for biopolymer development, including extensive fertiliser or pesticide use, and the rationale for diverting land away from food production towards bioplastic production[15]. Furthermore, bioplastics have similar impacts to petroleum-based plastics if they are disposed of incorrectly and end up in the ocean.

Paper

Paper is the most common alternative to single use plastic products, such as cups, straws, cotton buds, and bags. This is due to paper performing the same function as its plastic sibling but without harmful microplastics, chemical leaching, and releasing fumes when burnt. Does this mean that paper could be our answer to solving the plastic problem? Not entirely. As with other plastic alternatives, there are environmental trade-offs to take into account.

Research by the Northern Ireland Assembly shows it takes more than four times as much energy to manufacture a paper bag as it does a plastic bag. Additionally, during the production of a paper bag, trees – which would otherwise absorb greenhouse gases – are cut down to meet demand. What's more, the majority of paper bags are made by heating chips of wood under high temperatures and pressure within a chemical solution which results in the emission of greenhouse gasses. The chemicals involved can also contribute to water pollution and lead to problems as they work their way through the food chain[22].

Even more toxicity is created when paper bags degrade. Strikingly, paper bags generate 70% more air and 50 times more water pollutants than plastic bags when decomposing. Then there's the issue of the space they consume: around seven lorries would be needed to transport the same number of paper bags as could be delivered by a single lorry carrying plastic bags.

Paper bags tend to be fragile and are almost never reusable. Plastic bags, on the other hand, can be very lightweight and yet still strong enough to carry a full load of shopping. A plastic bag can carry 2,500 times its own weight, stay strong when wet, and also be put to many other uses in the home[18]. Despite this, the current practice of utilising plastic bags as a single-use product means that their use is unsustainable and has long-lasting negative impacts on the environment.

21 National Geographic
22 NI Assembly

Glass and Aluminium

Whilst glass is one of the most widely recycled materials, glass bottle production uses considerably more energy when compared to aluminium and virgin polyethylene terephthalate (PET) and produces the most solid waste and the highest volume of greenhouse gasses[23].

Even though an aluminium can is lighter than a glass container, and some plastic packaging, the level of energy used in the smelting and sheet production process offsets the weight advantage. As a result, the PET bottle system has the lowest total energy input into the manufacturing process. If we then consider fossil fuel consumption, an aluminium can will have the lowest fossil fuel profile. Case studies have shown that 78% of production energy can come from fossil fuels, the remaining 22% from the hydropower used in aluminium smelter factories for instance.

PET, on the other hand, uses the most fossil fuels in its production, as its raw materials are oil and natural gas. At the same time, however, it is often the lightest material compared to aluminium and glass and therefore has the lowest travel costs and carbon emissions. Glass, meanwhile, is the heaviest material compared to plastic and aluminium, meaning it has the most travel costs and carbon emissions. When finally discarded, glass has a higher volume density than aluminium and PET (both of which can be crushed) and disposal, therefore, requires more transportation loads leading to more fuel consumption and carbon emissions etc.

However, glass also has the benefit of zero leaching issues, meaning that it can be reused year after year with no negative impact on our health. This contrasts favourably with plastic, where long term use will inevitably lead to plastic leaching into the substance it is carrying.

WEIGHING UP THE PROS AND CONS

It's a mixed picture for the materials we should be seeking when trying to reduce our plastic use. Whilst recognising that no type of packaging or product is fully sustainable and contributes to waste production in some form, there are a number of variables to consider when seeking to reduce our material footprint[24]:

Raw materials: What materials are being extracted from the Earth's natural resources to make the product? Does it use non-renewable materials that must be shipped vast distances for manufacturing? Or does it comprise of locally sourced materials that are regenerative? Are recycled materials being used as raw materials in the product?

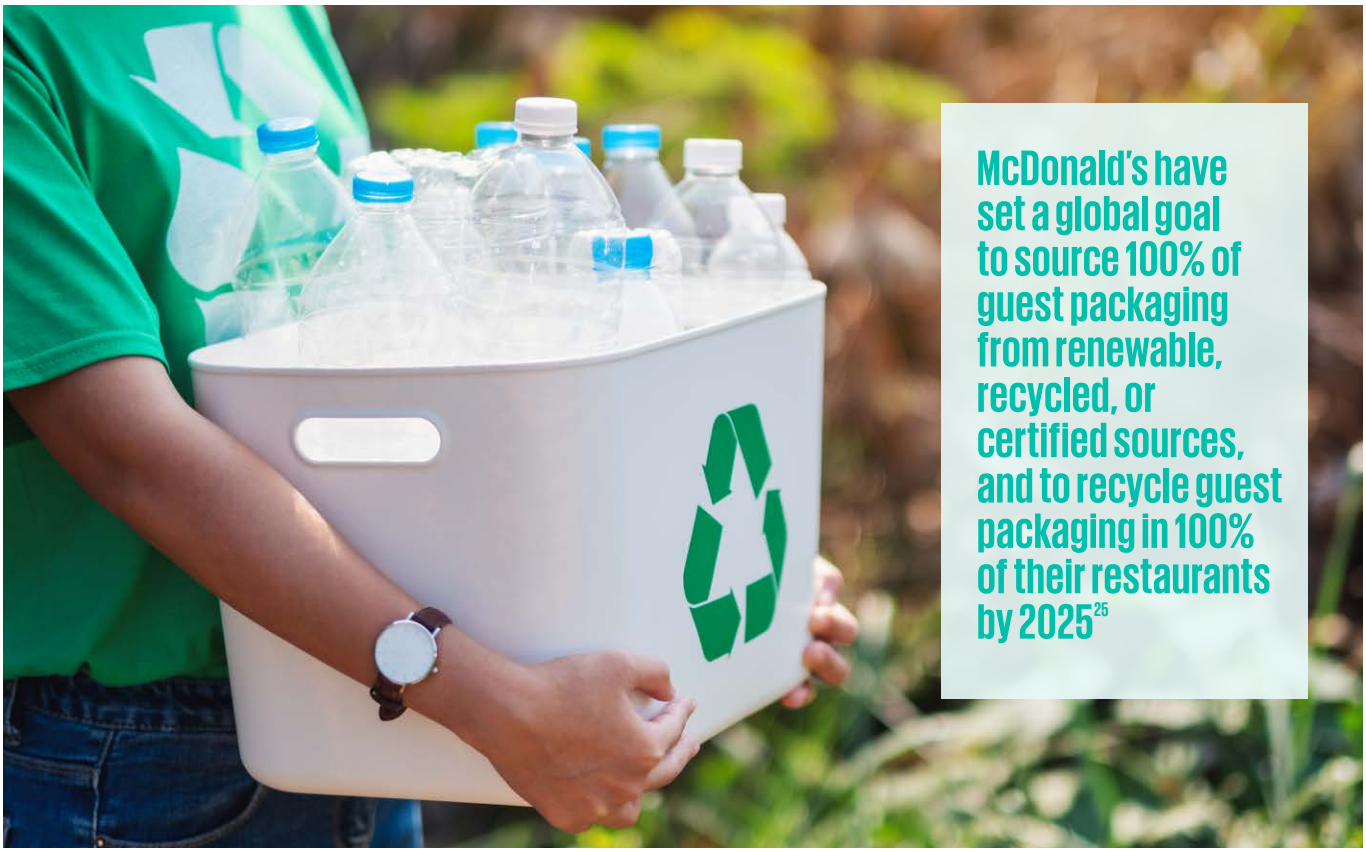
Manufacturing: How intensive is the production process? Does it use renewable energy in the process? What is the carbon and water intensity of the operation?

Recyclability: Can the product be recycled easily by local waste management facilities? Has circularity been incorporated into the product design to allow for easy dismantling and enhanced recycling? Are the materials already widely incorporated back into the circular economy?

While there is no definitive answer on which material is best for any given product, thinking about the above questions can help manufacturers and consumers make informed decisions to help reduce their material footprint. Designing for circularity is a key component of closing the loop in a product's life cycle.

23 DocPlayer
24 OurGoodBrands

Next Steps: Reduce, Reuse, Recycle



McDonald's have set a global goal to source 100% of guest packaging from renewable, recycled, or certified sources, and to recycle guest packaging in 100% of their restaurants by 2025[25]

This pivotal moment of change in the plastic space represents a major opportunity for businesses to take advantage of strong and growing consumer sentiments.

Companies should begin to look towards technologies that produce durable products and extend product use once they have reached the end of their life-cycle. Forward-thinking companies that identify the opportunities for innovation will benefit from a competitive advantage as they are able to meet customer demands and reduced costs.

As outlined previously, different sectors use plastics in a variety of ways and for a myriad of reasons. This results in a wide range of opportunities to reduce plastic use across different industries. Here are some immediate actions for businesses:

01. Conduct a waste audit of your business and evaluate the items that will become waste. What will be thrown away? How will it be disposed of? What can be switched for an alternative material?

02. Examine your organisation's waste hierarchy and seek ways to reduce and simplify it. Identify any non-essential plastic uses, and how they can be removed through design changes or purchasing choices.

03. Challenge procurement practices to ensure reusable or recycled goods are favoured. Seek to introduce more modular products that are easily repaired or upgraded.

04. Ensure local waste management facilities are capable of dealing with eco-products (compostable cups, biodegradable bottles etc.).

After introducing their first zero-carbon bottling plant, Evian have pledged to only produce bottles that are 100% recycled by 2025[26]

25 McDonald's
26 Evian

How KPMG can help

KPMG's Sustainable Futures team of experts draw on the insights and experience of a global multidisciplinary practice.

We have particular expertise in advising clients in:

- Strategy creation and development
- Circular Economy strategy development and implementation
- Impact assessments and supply chain modelling
- Consumer Behaviour Change models and impact
- Collaboration and Convening initiatives across markets
- Regulation assessments
- Risk Integration
- ESG Due Diligence
- Non-Financial Assurance and Reporting services

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