STUDY OF ONLINE CONSUMER SALES:

THE ECONOMIC IMPACTS OF ONLINE CONSUMER SALES ON ADDITIONAL PACKAGING AND ITS COSTS IN IRELAND

Prepared for

Repak Limited

By

PMCA Economic Consulting

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Executive Summary

This report presents estimates of the packaging volume and cost implications of a particular form of e-commerce that is growing very rapidly, namely when consumers in Ireland make online purchases of goods from abroad. Examples of such purchases are clothing and footwear, and electronic gadgets. Unlike other forms of e-commerce, such as when a consumer buys groceries online from an Irish-based retailer, or purchases a pizza from a local take-away, the packaging imported into Ireland from distant/overseas online sales is not accounted for by the national packaging compliance system, which is coordinated predominantly by Repak and implemented in practice by its Members. Nevertheless, the imported packaging must be paid for, and the escalating cost of coordinating the collection, recycling and/or recovery of the additional packaging is falling predominantly on Repak Members.

It is estimated in this report that the average cost of dealing with the imported packaging currently is €618 per Regular Repak Member. But more worryingly is the rate of growth in this cost, driven by the increasing popularity of the e-commerce in question: at the rate of growth evident between 2015 and 2019, the cost per Regular Member will exceed €1,000 by 2023 and €4,000 by 2031. Such high cost increases are unwelcome at any time, but the prospects are especially noteworthy today, when compliant businesses are facing into the challenges of Brexit and other sources of economic uncertainty.

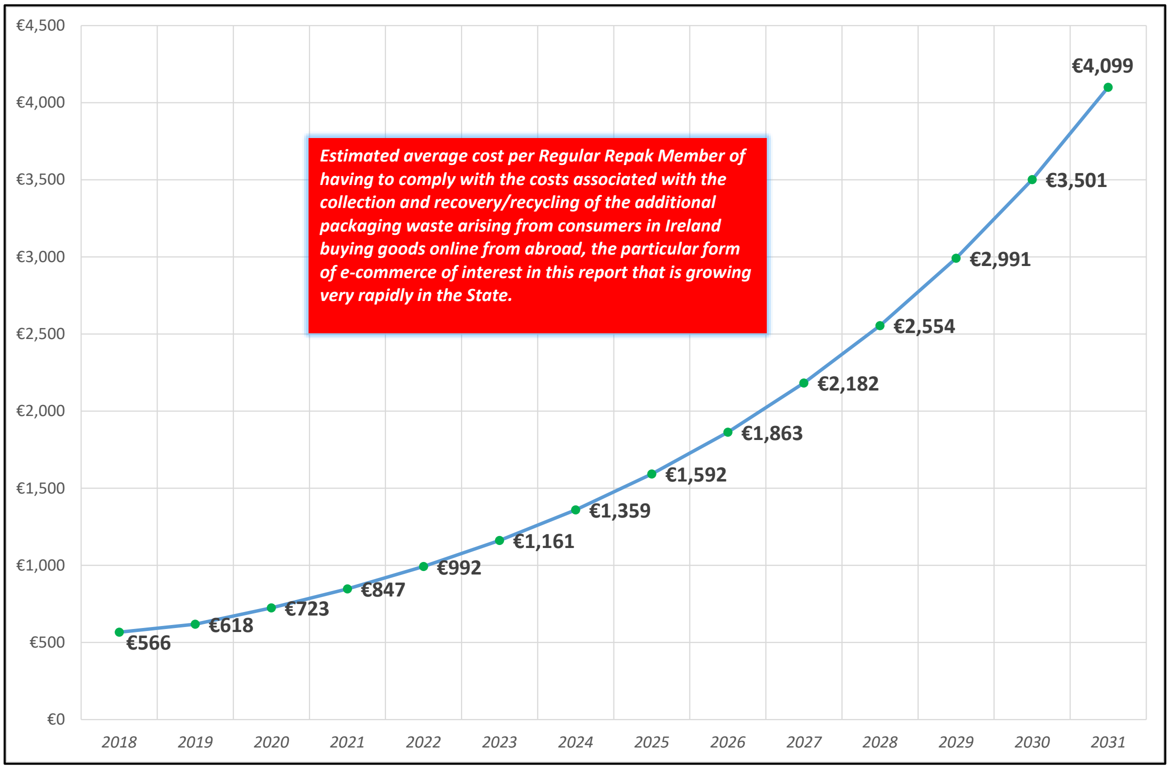
This study builds on the previous PMCA studies for Repak published in 2018 and 2017. To the best of our knowledge, the latter study was the first of its kind to estimate the packaging implications of online consumer goods purchases from abroad and the corresponding packaging compliance costs. The methodological approach used in the previous PMCA studies is applied in the present study and the details are outlined in the main body of the report. The key trends for the years studied since 2015 are tabulated below and commented on overleaf (CAGR (2015-2019) shows the average annual growth rate).

KEY RESULTS OF THE STUDY – DETAILS IN THE MAIN BODY OF THE REPORT

	Year and Growth				
Indicator	2015	2016	2018	2019	CAGR (2015-2019)
1. Value of Consumer Goods Purchases from Abroad *via* Online (€m)	1,334	1,518	2,003	2,403	16%
Real GDP (€m)	259,716	272,453	311,992	324,929	6%
2. % Share of Real GDP - Value Share	0.51%	0.56%	0.64%	0.74%	10%
3. Quantity of Consumer Goods Purchases from Abroad *via* Online (Units)	23,181,378	27,221,573	33,046,379	38,802,347	14%
4. Tonnes of Packaging Imported to Ireland from Online Buying - Total	5,937	7,520	10,049	11,740	19%
5. Tonnes of Packaging Imported to Ireland from Online Buying - Cardboard	4,778	5,791	7,552	8,862	17%
6. % Packaging Imported to Ireland from Online Buying - Cardboard (5÷4)	80.5%	77.0%	75.1%	75.5%	-2%
7. Tonnes of Packaging Imported to Ireland from Online Buying - Plastics	845	1,099	1,633	1,912	23%
8. % Packaging Imported to Ireland from Online Buying - Plastics (7÷4)	14.2%	14.6%	16.2%	16.3%	3%
9. Tonnes of Total Packaging Waste Generated in Ireland (2018e and 2019e)	983,384	991,298	1,070,218	1,099,114	3%
10. % of All Packaging Waste due to Imported Tonnes - Volume Share	0.60%	0.75%	0.93%	1.06%	15%
11. Ratio of Volume-to-Value Share (10÷2)	1.2	1.4	1.4	1.4	5%
12. Cost (€)	326,527	413,592	612,983	716,126	22%
Regular Repak Members	993	1,108	1,083	1,159	4%
13. Cost per Regular Repak Member (€)	329	373	566	618	17%

Main Findings of the Study

1. The value of consumer goods purchases from abroad *via* online by people living or based in Ireland is estimated at €2,403m in 2019. While this figure represents strong average annual growth of 16% on the estimate in 2015 (€1,334m), the value of the e-commerce of interest has been estimated cautiously in this study, as it has been in the previous PMCA studies for Repak in 2017 and 2018. Nevertheless, the 16% CAGR is more than double that of Ireland's real GDP during the same period (6%), one of the highest in the developed world. This in turn illustrates the extent of growth in distant online sales to consumers in Ireland.
2. The value of the e-commerce as a proportion of Ireland's real GDP has risen from 0.51% in 2015 to 0.74% in 2019, or by 10% CAGR during 2015-2019.
3. The quantity of imported consumer goods into the State through online sales is estimated at almost 39 million individual units in 2019 and to have grown at the rate of 14% CAGR since 2015.
4. The corresponding volume of imported packaging accompanying the consumer goods entering the country is estimated to be 11,740 tonnes in 2019, and to have increased by 19% CAGR since 2015.
5. Cardboard remains the principal type of packaging material accompanying the imported consumer goods but its share has fallen from 80% in 2015 to 76% in 2019.
6. On the other hand, the share of imported packaging materials due to plastics is growing. This is a concern for Ireland, owing to the problems associated with plastics recycling that have come to our attention in the past few years, and which now constitute a major global environmental issue. Particularly noteworthy is that the volume of imported plastic packaging waste from the e-commerce in question has grown very rapidly by 23% CAGR during 2015-2019, compared with the 17% CAGR in respect of cardboard, which nonetheless represents strong growth.
7. The estimated 11,740 tonnes of imported packaging associated with the online purchasing of consumer goods from abroad by people in Ireland is estimated to account for 1.06% of all packaging waste generated in the State in 2019 (including the 11,740 tonnes). This *volume share* has increased from 0.60% in 2015 and exceeds the *value share* of the e-commerce (0.74% in 2019 and 0.51% in 2015). The gap between the volume and value shares is likely to grow in the coming years as more and more imported packaging enters the country from distant online purchases by Irish-based consumers. The relative volume share is highlighted in this report, and in the previous reports by PMCA (2017 and 2019), because the rapidly rising volumes of packaging waste arriving into the country (accompanying the online goods purchased by consumers) must be paid for, predominantly by Regular Members of Repak, even though they have not been responsible for the additional tonnes.
8. Because compliance with household packaging waste is substantially more costly per tonne than commercial or 'backdoor' compliance, the strong growth in additional tonnes from distant online sales to consumers in Ireland has significant cost implications for Repak Members, the predominant compliance route for obligated businesses in the State under the packaging waste leglisation. Particularly affected are Regular Members comprising packaging material manufacturers, packaging converters, brand-holders, importers, distributors and retailers. The cost per Regular Member is estimated at €618 in 2019, which represents 17% CAGR on the 2015 level. At this rate of growth, the cost per Regular Repak Member would exceed €1,000 by 2023 and €4,000 by 2031 (illustrated in the chart overleaf).



Recommendation

Clearly, in commissioning this study from PMCA in the past three years, Repak is very concerned about the cost implications of the e-commerce of interest for its Regular Members. The distant online sellers overseas are not contributing to the compliance costs associated with the collection and recovery/recycling of the additional imported packaging arising in the State due to the e-commerce in question. It is falling predominantly on Regular Members of Repak and is set to escalate in the coming years due to the popularity of the online buying by consumers in Ireland.

In view of the findings of this report, it is recommended that the Department of Communications, Climate Change and the Environment (DCCAE), in conjunction with the Environmental Protection Agency (EPA), commences a proactive examination of the e-commerce considered in this study (*ideally on a disaggregated good-by-good basis*) and the most effective policy response (*and specifically the question of who (what stakeholders) should contribute to the cost associated with the additional packaging waste generated and how*). If all the packaging were coming from online sales conducted through Irish-based businesses, there would be no issue, so long as those businesses were compliant with the packaging waste legislation. It is important that more Irish businesses acquire online selling capability, and that broadband availability is extended across the whole country, and affordably so.

Glossary of Terms

CAGR	Compound annual growth rate (measure of the average annual growth rate).
Department/DCCAE	Department of Communications, Climate Change and the Environment.
EPA	Environmental Protection Agency.
EU	European Union.
EU28	The twenty-eight Member States of the European Union (EU).
Eurostat	Official statistics agency of the EU.
g	Gram (there are 1,000 grams in a kilogram (kg) and in turn 1,000,000 grams in a (metric) tonne).
GDP	Gross domestic product (measure of an economy's national income).
HDPE	High density polyethylene.
IMF	International Monetary Fund.
IT	Information technology (sometimes also referred to as 'ICT', meaning information and communications technology).
kg	Kilogram (thousand grams). There are 1,000 kg in a (metric) tonne.
LDPE	Low density polyethylene.
Major producer	Businesses involved in the production, distribution and retailing of products containing packaging who annually place more than 10 tonnes of packaging (other than packaging for reuse or export) on the Irish market and have an annual turnover of more than €1 million.
Packaging	Any material used to contain and protect goods or to aid in their handling, delivery or presentation. Packaging is made from such materials as cardboard, paper, glass, plastic, steel, aluminium, wood, and composite materials such as those used in milk and juice cartons. The European legislative framework covers all types of packaging, including the outer box that holds a larger batch of smaller packaged products.
PET	Polyethylene terephthalate.
PMCA	PMCA Economic Consulting.
PP	Polypropylene.
PS	Polystyrene.
PVC	Polyvinyl chloride.
Repak	Repak Limited.
SME	Small and medium enterprise.
Supra	Latin citation term referring to 'above'.
Via	Latin/French term meaning 'by' or 'through'.
PC	Personal (desktop) computer.

Acknowledgements and Disclaimer

Acknowledgements

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Disclaimer

This report is the sole responsibility of PMCA Economic Consulting. By virtue of preparing the report or otherwise in connection with this study, PMCA will not assume any responsibility or have any liability to any third parties.

1 Introduction

1.1 Purpose of the Report and Background

This report is prepared for Repak by PMCA Economic Consulting. It adds to the previous 2017 and 2018 PMCA reports for Repak which estimated the additional packaging arising in Ireland from *consumers* in the State making *online* purchases of *goods* from *overseas* locations (from other EU countries or non-EU countries outside of the country).[1]

This particular form of e-commerce is growing strongly in Ireland, resulting in higher volumes of imported packaging arriving into the State, the cost of which is becoming increasingly burdensome on Repak members, who end up having to bear the vast majority of the compliance costs of dealing with the additional packaging (in terms of coordinating the recovery and/or recycling of the imported packaging).[2]

The 2017 report by PMCA estimated that over 27 million individual items of consumer goods were imported into Ireland as a result of online purchases from abroad by consumers in the country in 2016. Accompanying these items were an estimated 7,520 tonnes of imported packaging; the corresponding figure in 2015 was 5,937 tonnes based on an estimated 23 million units of imported consumer goods in that year. Informing these estimates of imported packaging tonnes were independent surveys of the types of goods purchased by consumers through online channels (laptops, PCs and mobile devices) in different countries, including Ireland, in 2015 and 2016 conducted by Ipsos/PayPal. The market research evidence from Ipsos/PayPal permitted the derivation of estimates of the numbers of items per category of goods purchased by consumers in Ireland from the estimated total value of the e-commerce of interest, and in turn the volumes of imported packaging by material type (cardboard, plastics etc.) with the help of Repak's expertise and experience in packaging technology.

Adopting the same approach, the 2018 PMCA study estimated that the volume of imported packaging due to online purchases from overseas by consumers in Ireland exceeded 10,000 tonnes in that year, representing 19% average annual growth on the estimated 5,937 tonnes of imported packaging in 2015. The 2018 study also estimated that the cost per Regular Member of Repak of dealing with the additional packaging waste due to the imported consumer goods was €526 in that year, up from €373 in 2016 and €329 in 2015. At that rate of growth, the 2018 report projected that the compliance cost per Regular Repak Member could exceed €1,000 by 2023 and surpass €4,000 by 2031.[3]

This report estimates the volume of imported packaging entering Ireland in 2019 and the corresponding cost per Regular Member of Repak, using the same approach in the 2017 and 2018 PMCA studies.

It is important that the reader is mindful of the particular type of e-commerce of interest in the series of studies, namely *online purchases of goods by consumers in Ireland <u>from abroad</u>*. This differs from (a) *online purchases of goods by consumers in Ireland <u>from domestic sources</u>* (for example grocery shopping from Irish-based retailers or fast food deliveries within Ireland or buying goods online from Irish-based retailers, where the retailers are compliant with the packaging waste legislation) and (b) *online purchases by <u>businesses</u> in Ireland from <u>domestic or overseas sources</u>*.

1 The 2017 PMCA report for Repak is available here and the 2018 PMCA report is accessible here.

2 Businesses in Ireland can choose between two routes for complying with the packaging waste legislation: joining Repak or self-complying by registering with a local authority. The predominant route is to become a member of Repak.

3 Regular Members are packaging material manufacturers, packaging converters, brand-holders, importers, distributors and retailers. Scheduled Members retail directly to consumers but are not brand-holders or importers of products sold on-site.

In the latter two forms of e-commerce, the packaging entering the country is accounted for by compliant businesses but in the first form (studied in the 2017 and 2018 PMCA reports and in this report) the packaging from overseas is unaccounted for, but nonetheless tends to get aggregated into the usual packaging waste generated in Ireland and ends up being paid for by compliant businesses, at additional and growing cost to these businesses (given the rapid growth in the e-commerce of interest).

1.2 Methodology

To the best of Repak's or PMCA's knowledge, the 2017 study was the first of its kind to estimate the *volume of packaging* arising from online cross-border shopping by consumers, in Ireland or other countries. While estimating the volume of additional packaging is a complex task, given the international nature of the supply chain and the variety of goods purchased, PMCA was nonetheless able to derive informed estimates of the volumes of additional packaging imported into Ireland, and in turn the additional cost that may be attributed to the extra packaging arising, using other evidence in the public domain and with the assistance of Repak's packaging technology expertise and experience.

The approach taken in the 2017 study was to begin with existing research of relevance, which enabled estimation of the value of online purchases from overseas locations of the main categories of consumer goods involved (computers, electronic equipment, health and beauty products, clothes/footwear etc.), from which estimates of the volumes of such goods by category could be found, using unit price data to convert the values into volumes. From the estimated volumes of goods, the corresponding packaging by material type was then estimated, based on the types and volume of packaging required to convey the categories of goods from overseas to Ireland. The analysis in the 2017 report was carried out on the basis of 'representative' products purchased online by consumers, where independent data on their respective prices and packaging for international conveyance were incorporated into the analysis (noting that the representative goods were found in independent survey evidence to be the *principal* types of good purchased by consumers through online means, and thus that the volume of goods, and in turn the imported packaging, are likely to be underestimated).

The following observations are relevant to note here. First, the analyses in this and the previous PMCA reports exclude consumer online purchases of e-products (for example music downloads), which do not necessitate packaging. Second, the 2017 PMCA report was based in part on international market research data from Ipsos/PayPal for the years 2015 and 2016; the 2018 PMCA report was based on corresponding Ipsos/PayPal market research data for that year; this explains the absence of estimates in 2017, for which to the best of PMCA's knowledge there was no corresponding market research data. While there is no corresponding market research for 2019 (at least during the time when this study was carried out by PMCA in September 2019), the estimates presented for that year are based on the Ipsos/PayPal market research evidence for 2018.[4]

[4] That the estimates of additional packaging imported into Ireland through online consumer goods purchases are likely to be underestimated in this and the previous PMCA reports stems from the rate of growth in the e-commerce of interest. An Post's 'Annual Report 2018' sheds light on the extent of growth. On the growth of its parcels business, it states (p. 13): *"2018 saw greater than expected growth in the parcels business … For example, contract parcel revenues increased by 35%. Volume grew steadily during the year culminating in record-breaking Black Friday, Cyber Monday and Christmas volumes. The peak November/December period far exceeded expectations with volumes 60% ahead of 2017, making it our busiest ever Christmas for parcels"*. The Annual Report 2018 proceeds to say that An Post's new Dublin Parcel Hub opened in late 2018.

1.3 Summary of Results of the Previous PMCA Studies

A summary of the key results of the 2017 and 2018 PMCA studies is provided in Table 1.1. The results are based on data from the following sources:

- Indecon study for the Department of Communications, Climate Action and Environment (DCCAE) (2016).[5]
- Ipsos/PayPal market research on the main categories of goods purchased by consumers in Ireland and other countries *via* online in 2015, 2016 and 2018.[6]
- International Monetary Fund (IMF) estimates of real gross domestic product (GDP) in Ireland in 2015, 2016 and 2017.[7]
- Data on price levels of the main categories of consumer goods (from Eurostat and other sources).[8]
- Assistance from Repak regarding estimates of the volumes of packaging materials (kilograms, kg) accompanying the imported consumer goods purchased online by consumers based in Ireland.

The estimates in Table 1.1 are outlined overleaf.

Table 1.1: Key Summary Statistics Concerning the Packaging Implications of Online Purchases of Goods from Abroad by Consumers in Ireland (2015, 2017 and 2018)

	Year and Growth			
Indicator	**2015**	**2016**	**2018**	**CAGR (2015-2018)**
1. Value of Consumer Goods Purchases from Abroad *via* Online (€m)	1,334	1,518	2,003	15%
Real GDP (€m)	261,542	274,965	309,779	6%
2. % Share of Real GDP - Value Share	0.51%	0.55%	0.65%	8%
3. Quantity of Consumer Goods Purchases from Abroad *via* Online (Units)	23,181,378	27,221,573	33,046,379	13%
4. Tonnes of Packaging Imported to Ireland from Online Buying - Total	5,937	7,520	10,049	19%
5. Tonnes of Packaging Imported to Ireland from Online Buying - Cardboard	4,778	5,791	7,552	16%
6. % Packaging Imported to Ireland from Online Buying - Cardboard (5÷4)	80%	77%	75%	-2%
7. Tonnes of Packaging Imported to Ireland from Online Buying - Plastics	845	1,099	1,633	25%
8. % Packaging Imported to Ireland from Online Buying - Plastics (7÷4)	14%	15%	16%	5%
9. Tonnes of Total Packaging Waste Generated in Ireland (2018e)	983,384	991,298	977,477	-0.2%
10. % of All Packaging Waste due to Imported Tonnes - Volume Share	0.60%	0.75%	1.02%	19%
11. Ratio of Volume-to-Value Share (10÷2)	1.2	1.4	1.6	10%
12. Cost (€)	326,527	413,592	562,738	20%
13. Cost per Repak Member - Regular (€)	329	373	526	17%

Source: Study of Online Consumer Sales : The Economic Impacts of Online Consumer Sales on Additional Packaging and its Costs in Ireland (November 2018) (prepared by PMCA for Repak, supra footnote 1).

5 'Assessment of the Macro-Economic Impact of Internet/Digital on the Irish Economy', which can be accessed here.
6 The Ipsos/PayPal 2018 survey is available here. The 2016 and 2015 surveys used in the 2017 PMCA report are accessible here.
7 The IMF World Economic Outlook Database (April 2018), which is updated/revised every year.
8 The Eurostat data permits comparison of price levels among EU countries. The price levels of the main categories of goods considered in the 2017 and 2018 PMCA reports were informed by web searches and involved an element of judgement.

The Indecon study for the DCCAE estimated that online consumer goods imported to Ireland were worth €1,334m in 2015, up by almost 50% on the estimated value in 2012 (€906m). This cumulative growth corresponds with 13.8% compound annual growth rate (CAGR), which implies the estimate of €1,518m for the value of the relevant market in 2016 (PMCA's estimate using the Indecon estimates for 2012 and 2015). The estimate of €2,003m in 2018 shown in Table 1.1 is based on a higher CAGR of 16%, as reported in the Ipsos/PayPal market research study for 2018, which indicated that the relevant e-commerce market in Ireland is growing by 16% CAGR, within which the sub-market facilitated by online sales using mobile devices is growing by 35% CAGR (the estimate of €2,003m in 2018 was derived by PMCA in the 2018 report as €1,727m times 1.16, where €1,727m is the estimate of the value of the relevant market in 2017, given as €1,518m times 1.138) (figures subject to rounding).

The second line of estimates in Table 1.1 above shows that the value of the e-commerce of interest as a proportion of real GDP in Ireland grew from 0.51% in 2015 to 0.55% in 2016 and to 0.65% in 2018. These proportions are based on the IMF's estimates of Irish real GDP in its World Economic Outlook Database (April 2018) (which are shown in Table 1.1 between the first and second lines of figures). Due to revisions in the latest IMF figures (April 2019), the proportions are slightly different in the latest estimates reported in Section 2.

The third line of figures in Table 1.1 are the estimates of the number of items of goods purchased by consumers in Ireland from abroad through online channels (clothing and footwear, electronic products etc.). These are informed by the value estimates (the first line of figures in Table 1.1) and the Ipsos/PayPal market research data on the main categories of goods purchased *via* online by consumers in Ireland.

The fourth, fifth, sixth, seventh and eighth lines of Table 1.1 above relate to the estimates of packaging imported into Ireland from the e-commerce of interest, where it is seen that the tonnes of additional packaging imported into the country grew strongly by 19% CAGR between 2015 and 2018, within which imported plastics waste increased by 25%, which is particularly concerning given that plastics are more difficult to recycle and present particular problems for the environment and biodiversity, as widely reported in the media in recent years.

Lines 9 and 10 of Table 1.1 show that the volume share of the imported packaging into Ireland due to consumers in the country buying goods through online channels has increased from 0.60% in 2015 to 1.02% in 2018, which in turn means that the volume share (line 10) has exceeded the value share (line 2). In other words, while the monetary value of the e-commerce of interest is growing strongly (by 15% CAGR 2015-2018), the volume/tonnes of imported packaging due to the e-commerce in question is rising even more rapidly (19% CAGR 2015-2018), which presents a clear and present danger to the environment and biodiversity in the State, not least to life in Ireland's inland and marine waterways. Line 11 of Table 1.1 shows that the ratio of the volume-to-value share (line 10 divided by line 2) exceeds unity and is growing rapidly by 10% CAGR 2015-2018.

Finally, lines 12 and 13 of Table 1.1 show the cost implications of the imported additional tonnes of packaging due to the e-commerce in question. The total cost estimates in line 12 are given as the line 4 estimates multiplied by €55 or the cost per tonne in respect of the recovery/recycling of household packaging waste for 2015 and 2016 and €56 per tonne in 2018 (however, the latest information from Repak is that the cost per tonne in 2018 was €61 and this figure is also applied for 2019, the details are given in Sub-Section 2.5). Expressed per Regular Member of Repak results in the estimates in line 13 of Table 1.1, where the PMCA report of 2018 estimated that the cost per Regular Member of Repak of having to deal with the additional imported tonnes of packaging waste from the e-commerce in question grew by 17% CAGR during 2015-2018 – at this rate of growth the cost per Regular Member of Repak would exceed €1,000 by 2023 and breach €4,000 by 2031.

2 Updated Results and Projections

2.1 Value of the Relevant E-Commerce Market of Interest

We begin our analysis of the updated results for 2019 with the estimated value of goods purchased by consumers in Ireland *via* online currently. The results are shown in Table 2.1.

Starting with the estimated value of the relevant market of €1,334m in 2015, based on the Indecon report for the DCCAE in 2016, the estimated value in 2016 (€1,518m) is based on the CAGR of 13.8% implied by the former figure and the estimate of the value of the relevant market in 2012 (€906) in the Indecon study.[9] The same rate of growth (13.8%) is applied to give the PMCA estimate of the value of the relevant market in 2017 (€1,727m). The market value of €2,003m in 2018 is based on the CAGR in the Ipsos/PayPal market research study for that year.[10] For the current year, it is assumed (by PMCA) that the value of the relevant e-commerce market will grow by 20% between 2018 and 2019, which implies a CAGR of 16% during 2015-2019, which is still likely to be a conservative estimate of the rate of growth of the relevant market of interest in this study. This leads to the estimate of market value of €2,403 in 2019.

As a proportion of real GDP, the value of the e-commerce of interest has risen from 0.51% in 2015 to 0.56% in 2016 to 0.64% in 2018 and to 0.74% in 2019, bearing in mind that the value of the relevant market is likely to be underestimated in this study.[11]

Table 2.1: Value of Goods Purchased from Abroad *via* Online by Consumers in Ireland in Absolute Terms and as a Proportion of Real Gross Domestic Product (GDP) in Ireland (2015-2019)

	Year and Growth				
Indicator	**2015**	**2016**	**2018**	**2019**	**CAGR (2015-2019)**
1. Value of Consumer Goods Purchases from Abroad *via* Online (€m)	1,334	1,518	2,003	2,403	16%
Real GDP (€m)	259,716	272,453	311,992	324,929	6%
2. % Share of Real GDP - Value Share	0.51%	0.56%	0.64%	0.74%	10%

Source: Indecon report for the DCCAE (2016) (supra footnote 5), Ipsos/PayPal market research on online shopping by consumers (2018) (supra footnote 6) and IMF World Economic Outlook Database (April 2019); PMCA Economic Consulting analysis.

2.2 Volumes of Consumer Goods from Online Cross-Border Purchases

Having estimated the value of the relevant market (€2,403m in 2019), the next step in the analysis is to estimate the volumes of goods purchased by consumers in Ireland through online channels from abroad. To do that, we employ the latest available Ipsos/PayPal market research data for 2018, which informs the main categories of goods purchased in this way.

9 *Supra* footnote 5.

10 *Supra* footnote 6

11 The real GDP figures in Table 2.1 are from the latest IMF World Economic Outlook Database (April 2019) (available here), which revise the corresponding figures in the April 2018 release (Table 1.1).

For the past few years, online payments provider PayPal, in collaboration with market research organisation Ipsos, has been surveying consumers in countries around the world to gain a better understanding of cross-border e-commerce. The market research pertains to physical consumer goods and differentiates between domestic and cross-border online transactions. Ireland features in the 2018 survey (the latest available at the time this report was carried out by PMCA in September 2019), as it did in the 2015 and 2016 surveys.

In 2018, the incidence of online cross-border shopping was found to be most prevalent in Ireland, proportionately. In particular, 16% of all online shopping by consumers was conducted on domestic-only purchases (down from 19% in 2016), while 65% of all online consumer goods shopping was on both domestic and overseas shopping (67% in 2016) and *19% was on cross-border-only purchases* (*up from 14% in 2016*). The 2018 Ipsos/PayPal survey gives a breakdown of the main categories of goods purchased by consumers through online means from abroad, with the proviso that the data apply to all consumers surveyed in all countries.

Table 2.2 summarises the information contained in the 2018 survey. The column headed '% Purchases' is reproduced from the Ipsos/PayPal findings, while the '% Share' column has been estimated by PMCA. It is evident that the Ipsos/PayPal results relate to the main categories of goods purchased by consumers in Ireland through online means and that there are other goods purchased in this way as well, but with less frequency compared with the main categories shown. Like the previous PMCA studies in 2017 and 2018, the results in this report (for 2019) are based on the main categories of goods based on the % share distribution in Table 2.2.

Table 2.2: Main Categories of Goods Purchased from Abroad through Online Means by Consumers in Ireland (2018)

Category	% Purchases	% Share
Clothing/apparel, footwear and accessories	68%	19%
Consumer electronics, computers/tablets/mobiles & peripherals	53%	15%
Toys and hobbies	53%	15%
Jewellery/watches	51%	14%
Cosmetics/beauty products	46%	13%
Collectables, memorabilia and art	42%	12%
Sports and outdoors equipment	40%	11%

Source: *Ipsos/PayPal market research on online shopping by consumers (2018) (supra footnote 6); PMCA Economic Consulting analysis.*
Note: *The '% Purchases' figures are reproduced from the Ipsos/PayPal market research (2018), and the '% Share' figures are calculated by PMCA. The % Purchases figures relate to all consumers in all of the countries sampled by Ipsos/PayPal.*

Together with the estimated value of the e-commerce of interest (€2,403m in Table 2.1 above), the % share figures in Table 2.2 are used to derive the estimated values of purchases on the main categories of consumer goods shown in Table 2.3 below. Thus, for example, the estimated spend of €463m on clothing/apparel, footwear and accessories is given as the % share of 19% attributed to that category of goods (in Table 2.2) multiplied by €2,403m and the other spending levels in Table 2.3 are calculated correspondingly, with the total value of €2,403m fixed in each case.

Table 2.3: Estimated Volumes of Goods from Online Purchases from Abroad by Consumers in Ireland (2019)

	€m	Representative Products		
Category	**2019**	**Product**	**Unit Price (€)**	**Quantity (2019)**
Clothing/apparel, footwear and accessories	463	Pair of Shoes	100	4,629,645
Consumer electronics, computers/tablets/mobiles & peripherals	361	Laptop/Tablet	700	515,486
Toys and hobbies	361	Standard Monopoly Game/Chess Set	20	18,041,999
Jewellery/watches	347	Wrist Watch	100	3,472,234
Collectables, memorabilia and art	313	Vintage Pictures/Photos (Delicates)	100	3,131,819
Sports and outdoors equipment	286	Golf Clubs	250	1,143,795
Cosmetics/beauty products	272	Skincare, Haircare, Fragrances (200ml glass bottle)	50	1,815,547
		Skincare, Haircare, Fragrances (200ml plastic bottle)	30	6,051,824
Total	**2,403**	**Total Quantity**		**38,802,347**

Source: Indecon report for the DCCAE (2016) (supra footnote 5), Ipsos/PayPal market research on online shopping by consumers (2018) (supra footnote 6), Eurostat data on price levels and other price data from web searches; PMCA Economic Consulting analysis.

To estimate the corresponding quantities of goods imported to Ireland, we may convert the values (€m) of the main categories of goods in Table 2.3 by assuming a 'representative product' per category and its unit price. Thus, for example, in the first category clothing/apparel, footwear and accessories the representative product is assumed to be a pair of shoes (for men or women) at a unit price of €100, which implies the estimate of over 4.6 million pairs of shoes being imported into the State through the e-commerce in question in 2019. Proceeding in this way across all assumed representative products in the main categories results in the estimate of 38.8m units of goods imported into Ireland this year. This estimate represents a 17% increase on the estimated 33m units in 2018 and a 67% increase on the estimated 23.2m units in 2015 (or a CAGR of 14% 2015-2019).

2.3 Tonnes of Additional Packaging from Online Cross-Border Purchases

Having estimated the quantities of representative goods imported to the country through online purchases by consumers in Ireland, we next estimate the volumes of packaging materials accompanying the products entering the country in this way.

The analysis presented in Table 2.4 below shows, for each of the representative products, the estimated volumes (tonnes) of the specific packaging materials associated with the estimated volumes (as derived in Table 2.3). It is estimated that a total of 11,740 tonnes of packaging materials accompanied the almost 39m imported goods in 2019, which translates into an average of 303 grams of packaging materials per imported product, which is about the same as that estimated in the 2018 report by PMCA (304g) but greater than the 276g and 256g in 2016 and 2015 estimated in the PMCA report of 2017 (303g is roughly the weight of a modern (unstrung) tennis racquet). The results of the three PMCA results covering 2015-2019 suggest that consumers engaging in online shopping from Ireland are increasing the range of their purchases as well as the quantity, with the result that more imported packaging accompanying the imported goods is entering the country.

Most of the imported packaging is cardboard, which accords with experience in practice (8,862 tonnes of cardboard were imported in 2019, representing 75% of all imported packaging, the same proportion observed in 2018 but lower than the corresponding percentage estimated in 2016 (77%) and 2015 (80%).

Noteworthy is that the volume of imported packaging due to plastics is increasing: from the analysis in Table 2.4, 1,912 tonnes of plastic packaging were imported in 2019, compared with 1,633 tonnes of plastic packaging in 2018, up from the 1,099 and 845 tonnes of plastic packaging materials entering the country in 2016 and 2015 respectively (23% CAGR 2015-2019). In 2019, the share of all additional imported packaging materials due to plastics was 16.3%, marginally higher compared with 2018 (16.2%) and appreciably higher than the estimated 14.6% in 2016 and 14.2% in 2015.

The estimation of the volumes of packaging materials associated with the representative consumer products has included inputs from Repak's experience and expertise in packaging technology. Regard has been given to the typical volumes (kg) of packaging materials associated with the representative products imported, allowing for the reality that the representative goods entail more packaging compared to where they are bought in retail outlets at home; but the analysis is also mindful that suppliers of online goods, and freight operators, will have an incentive to ensure that the packaging is not excessive, for commercial and environmental reasons.

Table 2.4: Estimated Tonnes of Packaging Materials from Online Purchases from Abroad by Consumers in Ireland (2019)

	Packaging Materials (Tonnes) (2019)														
				Paper/Cardboard				Plastic							
Representative Product	**Steel**	**Aluminium**	**Wood**	**Tetra**	**Paper**	**Cardboard**	**Glass**	**PET**	**HDPE**	**PVC**	**LDPE**	**PP**	**PS**	**Other Plastic**	**Total**
Pair of Shoes	0	0	0	0	287	861	0	0	0	0	231	0	0	0	1,380
Laptop/Tablet	0	0	0	0	3	103	0	0	0	0	26	0	0	0	132
Standard Monopoly Game/Chess Set	0	0	0	0	108	4,240	0	0	0	0	902	0	0	0	5,250
Wrist Watch	0	0	0	0	17	556	0	0	0	0	52	104	0	0	729
Vintage Pictures/Photos (Delicates)	0	0	0	0	0	642	0	0	0	0	63	0	0	0	705
Golf Clubs	0	0	0	0	57	572	0	0	0	0	80	57	0	0	766
Skincare, Haircare, Fragrances (200ml glass bottle)	0	0	0	0	9	436	454	0	0	0	54	9	0	0	962
Skincare, Haircare, Fragrances (200ml plastic bottle)	0	0	0	0	30	1,452	0	121	0	0	182	30	0	0	1,816
Total Quantity	**0**	**0**	**0**	**0**	**512**	**8,862**	**454**	**121**	**0**	**0**	**1,590**	**201**	**0**	**0**	**11,740**

Source: Total volume estimates derived in Table 2.3, Repak estimates of packaging materials (kg) associated with online cross-border purchases of goods by consumers in Ireland; PMCA Economic Consulting analysis.
Note: See Glossary for definitions of the plastic material types.

2.4 Contextualisation of the Updated Results

The latest available data from Eurostat show that there were 991,298 tonnes of packaging waste generated in Ireland in 2016. According to Repak estimates, the corresponding figure for 2018 was 1,070,218 (PMCA understands that the 2018 figure is to be finalised by the Environmental Protection Agency (EPA) in 2020). Repak expects the figure for 2019 to be 2.7% higher than the 2018 figure, implying the estimate of 1,099,114 tonnes. This in turn means that the estimated 11,740 tonnes of packaging waste due to consumers in Ireland engaging in online purchases of goods from overseas constitutes 1.06% of all packaging waste placed on the market in Ireland (that is, the 11,740 tonnes plus the 1,099,114 tonnes). The 1.06% *volume share* of all packaging waste in Ireland due to the e-commerce of interest exceeds the *value share* of the e-commerce in question (namely 0.74%, based on the estimated value of the relevant market as a proportion of Ireland's real GDP in 2019, as shown earlier in Table 2.1, p. 5).

This leads to the conclusion that ***the additional volume of imported packaging waste due to the e-commerce of interest is disproportionately large in Ireland***. The additional volume of packaging tonnes due to the e-commerce exceeds the monetary value of the online purchases on a proportional basis, which is what matters to Repak and its Members from a packaging compliance perspective because the additional tonnes of imported packaging have to be collected and recovered or recycled at an extra cost to the compliance system in Ireland, falling predominantly on Repak Regular Members.

Furthermore, the gap between the *volume share* and the *value share* attributed to the e-commerce in question is growing, which implies that the compliance cost falling on Regular Members of Repak is escalating over time.

2.5 Estimated Cost from Online Consumer Goods Purchases from Abroad

Household packaging is much more expensive to collect by waste operators than business or commercial packaging. According to the Repak Annual Report 2017, the average cost of household collection and recycling/recovery was €56 per tonne in that year, compared with €10 per tonne in respect of commercial tonnes.[12] The equivalent information for 2018 (latest year) is available on the same page of Repak's 2018 Annual Report, which implies €61 per tonne for the household sector based on household tonnes of 274,333 and funding costs of €16,822,354 in 2018.[13] This cost per tonne is applied for 2019.

The implication is that distant sales to consumers from online sources overseas places an additional burden on Repak Members for complying with tonnes for which they are not responsible. Ordinarily, Repak Members and other compliant businesses (through local authorities) are responsible for the tonnes they generate in terms of collection and recovery/recycling of their packaging waste streams, where they have an incentive to optimise the packaging generated in the economy given the need for packaging and at the same time the need to ensure that packaging is not excessive or more than necessary to maintain a clean environment. But the packaging from distant sellers to consumers in Ireland is something that compliant producers in Ireland have no control over and this stream of packaging waste coming into the country is growing very rapidly (by 19% per year during 2015-2019, Table 2.5, p. 11) and is likely to continue growing strongly in the years ahead as more and more consumers engage in online purchases of consumer goods sourced from overseas.

The 11,740 tonnes of additional packaging materials estimated to enter Ireland this year from the e-commerce in question (remembering that the estimate is likely to be conservative) is estimated to cost €618 per Repak Member (Regular) (based on €61 per tonne in respect of the household sector). The €618 average cost per Regular Repak Member represents 17% CAGR on the corresponding estimate for 2015 (€329). At this rate of increase, the cost per Regular Repak Member would break €1,000 by 2023 and exceed €4,000 by 2031 – a substantial uplift in cost by any measure or standard (see Figure 2.1 overleaf).

[12] Repak's Annual Report for 2017 is available here. Page 29 shows that funding costs for household tonnes (268,118) was €14,972,080 or €56 per tonne in 2017 (figures subject to rounding).

[13] Repak's Annual Report for 2018 is available here.

Figure 2.1: Projected Average Cost per Regular Repak Member of Dealing with the Additional Imported Packaging from Online Purchases of Goods from Abroad by Consumers in Ireland (2018-2031)

Source: Extrapolation of the estimated average cost per Regular Repak Member at 17% CAGR 2015-2019 (Table 2.5, p. 11).

2.6 Summary of the Changes in Imported Packaging over Time

The following trends for 2015, 2016, 2018 and 2019 are apparent from Table 2.5 overleaf:

- The value of consumer goods purchases from abroad *via* online channels by people living or based in Ireland is estimated at €2,403m in 2019. While this represents average annual growth of 16% on the estimate in 2015 (€1,334m), the value of the e-commerce of interest in this study has been estimated cautiously. Nevertheless, notwithstanding the conservative approach applied in this report, the 16% CAGR in respect of the relevant market is more than double that of Ireland's real GDP during the same period (6%), one of the highest in the developed world. This in turn illustrates the extent of the rapid growth in distant online sales to consumers in Ireland.
- The value of the e-commerce as a proportion of Ireland's real GDP has risen from 0.51% in 2015 to 0.74% in 2019, or by 10% CAGR during 2015-2019.
- The quantity of imported consumer goods into the State through online means is estimated at almost 39m individual units in 2019 and to have grown at the rate of 14% CAGR since 2015.
- The corresponding volume of imported packaging accompanying the consumer goods entering the country is estimated to be 11,740 tonnes in 2019, and has increased by 19% CAGR since 2015.
- Cardboard remains the principal type of packaging material accompanying the imported consumer goods but its share has fallen from 80% in 2015 to 76% in 2019.

- On the other hand, the share of all imported packaging materials due to plastics is growing very strongly. This is a major concern, owing to the problems associated with plastics recycling that have been highlighted in the past few years, and which now are a significant global environmental issue. Particularly noteworthy in the table below is that the volume of imported plastic packaging waste from the e-commerce in question has grown very rapidly by 23% CAGR during 2015-2019, compared with the 17% CAGR in respect of cardboard, which represents strong growth.
- The estimated 11,740 tonnes of imported packaging associated with the online purchasing of consumer goods from abroad by people in Ireland is estimated to account for 1.06% of all packaging waste generated in the State in 2019 (including the 11,740 tonnes). This *volume share* has increased from 0.60% in 2015 and exceeds the *value share* of this form of e-commerce (0.74% in 2019 and 0.51% in 2015). The gap between the volume and value shares is likely to grow in the coming years as more and more imported packaging enters the country from distant online purchases by Irish-based consumers.
- Because compliance with household packaging waste is substantially more costly per tonne than commercial or 'backdoor' compliance, the strong growth in additional tonnes from distant online sales to consumers in Ireland has significant cost implications for Repak Members, the predominant compliance route for obligated businesses under the packaging waste leglisation. Particularly affected are Regular Members comprising packaging material manufacturers, packaging converters, brand-holders, importers, distributors and retailers. The cost per Regular Member is estimated at €618 in 2019, which represents 17% CAGR on the 2015 level. At this growth, the cost per Regular Repak Member would exceed €1,000 by 2023 and €4,000 by 2031.

Table 2.5: Key Summary Statistics Concerning the Packaging Implications of Online Purchases of Goods from Abroad by Consumers in Ireland (2015-2019)

	Year and Growth				
Indicator	**2015**	**2016**	**2018**	**2019**	**CAGR (2015-2019)**
1. Value of Consumer Goods Purchases from Abroad *via* Online (€m)	1,334	1,518	2,003	2,403	16%
Real GDP (€m)	259,716	272,453	311,992	324,929	6%
2. % Share of Real GDP - Value Share	0.51%	0.56%	0.64%	0.74%	10%
3. Quantity of Consumer Goods Purchases from Abroad *via* Online (Units)	23,181,378	27,221,573	33,046,379	38,802,347	14%
4. Tonnes of Packaging Imported to Ireland from Online Buying - Total	5,937	7,520	10,049	11,740	19%
5. Tonnes of Packaging Imported to Ireland from Online Buying - Cardboard	4,778	5,791	7,552	8,862	17%
6. % Packaging Imported to Ireland from Online Buying - Cardboard (5÷4)	80.5%	77.0%	75.1%	75.5%	-2%
7. Tonnes of Packaging Imported to Ireland from Online Buying - Plastics	845	1,099	1,633	1,912	23%
8. % Packaging Imported to Ireland from Online Buying - Plastics (7÷4)	14.2%	14.6%	16.2%	16.3%	3%
9. Tonnes of Total Packaging Waste Generated in Ireland (2018e and 2019e)	983,384	991,298	1,070,218	1,099,114	3%
10. % of All Packaging Waste due to Imported Tonnes - Volume Share	0.60%	0.75%	0.93%	1.06%	15%
11. Ratio of Volume-to-Value Share (10÷2)	1.2	1.4	1.4	1.4	5%
12. Cost (€)	326,527	413,592	612,983	716,126	22%
Regular Repak Members	993	1,108	1,083	1,159	4%
13. Cost per Regular Repak Member (€)	329	373	566	618	17%

<u>Source</u>: Based on the earlier exhibits of analysis by PMCA Economic Consulting in this section of the report (Table 2.1-Table 2.4).
<u>Note</u>: This table is an updated version of the corresponding table in the PMCA report of 2018 (p. i) (supra footnote 1).

3 Conclusions and Recommendation

3.1 Conclusions of the Study

The main finding of the research conducted in this report is that the additional packaging entering Ireland from consumers making online purchases from abroad is growing very rapidly: it is estimated that the volume of packaging accompanying the goods coming into the country will be 11,740 tonnes at the end of this year, representing an average annual rate of growth of 19% compared with 2015, a very high rate of increase by any comparison (even though the approach to the analysis in this study is conservative).

What is significant about the imported additional packaging from distant online sales is that the cost of its collection and recycling/recovery must be incurred. The average cost per Regular Repak Member currently is estimated at €618, up from €329 in 2015. At this rate of increase (17% CAGR), the average cost per Regular Repak Member would exceed €1,000 in four years' time (by 2023) and surpass €4,000 by 2031, which represent substantial cost uplifts for the compliant businesses concerned.

Clearly, in commissioning this study from PMCA in the past three years, Repak are very concerned about the cost implications of the e-commerce for its Regular Members. The distant online sellers overseas are not contributing to the compliance costs associated with the collection and recovery/recycling of the additional imported packaging arising in the State due to the e-commerce in question. It is falling predominantly on Regular Members of Repak and is set to escalate in the coming years due to the popularity of the online buying by consumers in Ireland, which may threaten the competitiveness of these businesses.

3.2 Recommendation

In view of the findings of this report, it is recommended that the Department of Communications, Climate Change and the Environment (DCCAE), in conjunction with the Environmental Protection Agency (EPA), commences a proactive examination of the e-commerce considered in this study (*ideally on a disaggregated good-by-good basis*) and the most effective policy response (*and specifically the question of who should pay for, or contribute to, the additional packaging waste generated and how*).

If all the packaging were coming from online sales conducted through Irish-based businesses, there would be no issue, so long as those businesses were compliant with the packaging waste legislation. It is important that more Irish businesses acquire online selling capability, and that broadband availability is extended across the whole country, and competitively so.

The economic consequences of the growing e-commerce are even more pertinent when one factors in its effects on the environment and biodiversity, with especially significant growth in extra plastics packaging entering the country as a result of consumers in Ireland engaging in cross-border online shopping (typically the consumers are unaware of the source of the goods or may not care about the packaging implications of their purchasing but it is not without economic cost for compliant businesses in Ireland and the wider environment).