

IS E-COMMERCE GOOD FOR EUROPE?

Economic and environmental impact study

EXECUTIVE SUMMARY

Independent study
commissioned by Amazon



This report is the result of an independent study led by Oliver Wyman with the support of Logistics Advisory Experts (LAE), a spin-off of the Institute of Supply Chain Management of St Gallen University. It has been conducted over a 12-week period and was commissioned by Amazon. The analysis is based on official statistics up to 2019 (unless stated otherwise) and publicly available information. The study does not use any private information from Amazon or other retailers or transport operators. Consumer behavior data is based on proprietary surveys conducted by Oliver Wyman in 2020 across Europe (France, Germany, Italy, Spain, United Kingdom).

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After two decades of double-digit growth, what impact is e-commerce having on the retail industry and the wider environment? This question is particularly important after 2020, a year dominated by the COVID-19 crisis, as e-commerce played a critical role while many stores were closed.

To answer the question, Oliver Wyman and LAE conducted a pan-European¹ study that included: Analysis of official statistics from Eurostat, Euromonitor, and national statistics institutes; an independent retailer survey²; consumer surveys³; and the development of a CO₂e impact model. Here are some of our key findings:

ECONOMIC IMPACT

Both online and offline retail create jobs, with physical retail surface area remaining stable despite a decreasing number of outlets

OVERARCHING TRANSFORMATION

The retail sector is evolving at different speeds across Europe, as physical retail rationalises, online shopping grows, and some household spending shifts to services.

Over the past 20 years, retail in Europe has faced two major transformations: first, a move from independent to organised retail⁴; and then, since 2000, the growth of e-commerce.⁵ This latest change has been accelerated by the COVID-19 crisis and is now evolving into various forms of omnichannel retail.

On average in the eight countries studied, offline (or physical) retail is growing. E-commerce is growing faster but still only represents 11 percent of total retail sales. Total retail sales, combining both physical and online, increased at 2 percent per year between 2010 and 2019 to reach €2,189 billion. E-commerce is growing faster than offline retail in all the countries studied but still only accounted for 11 percent (€251 billion) of total retail sales across the eight countries in 2019, up from 4 percent (€73 billion) in 2010. E-commerce accounted for 50 percent of total retail growth from 2010 to 2019 (€174 billion), after growing by an annual rate of 15 percent. E-commerce has penetrated the surveyed countries to different extents, varying from 5 to 20 percent as a share of total retail sales. But the categories with the highest penetration are mostly the same across the surveyed countries (hobby and leisure, electronics, and fashion), suggesting an ongoing convergence across Europe.⁶

Organised retailers represent a growing proportion of physical retail and are increasingly operating an omnichannel format. They gained 5 percentage points of total physical retail sales in the eight countries from 2010 to reach a 62 percent share in 2019. They also accounted for 20 percent of growth in online sales from 2010 to 2019.⁷ While organised retail in Spain and Italy is now growing as a proportion of physical retail, in northern European countries (France, Germany, Netherlands, and the UK) it is growing slowly or not at all, indicating that this transformation is now almost complete there.

A portion of household spending is shifting toward services. The shift to services, such as restaurants, is visible in all countries. In Germany, for example, household spending on services increased by an annual rate of 3.4 percent between 2005 and 2019, while spending on fashion, furnishings, household goods, and books only grew by 1.7 percent. In Spain, spending on services increased by 1.2 percent, while combined spending on fashion, furnishings, household goods, and books rose by 0.1 percent.

IMPACT ON JOBS

The retail industry is creating net jobs both online and offline — and with similar labour intensity.⁸

Overall, both online and offline retail have steadily created jobs over the past decade. Direct employment in retail increased by 1.3 million on a net basis from 2008 to 2018 in the eight countries studied. Of these jobs, about 300,000 were in e-commerce and 1 million in physical retail. In addition, one direct e-commerce job leads to another 1.2 indirect jobs in fulfilment and delivery. One direct physical retail job requires another 0.2 indirect job in fulfilment and delivery.

Buying products online creates as many jobs as buying them offline, at a comparable average cost per full-time employee (FTE). From an end-to-end perspective, including indirect jobs, physical retail and e-commerce are equally labour intensive, generating €220,000 in sales per FTE. However, the models have different labour mixes: E-commerce creates more jobs in the logistics sector and fewer in retail.

IMPACT ON THE COMMERCIAL FOOTPRINT

Physical stores are transforming to fewer (-0.9 percent per year between 2005 and 2019) but larger stores, with a stable total commercial surface (+0.3 percent per year from 2005 to 2019) across the eight European countries studied.

At a city level, analysed samples show no statistically significant correlation between e-commerce growth and the evolution of the commercial footprint. Instead, physical retail trends mostly reflect local demographic trends and a city's attractiveness, as measured by population, wealth, and the importance of tourism. Large cities with above-average rates of e-commerce shopping, such as London, Paris, and Hamburg, show stable or growing physical retail. Medium-sized and smaller cities with growing and wealthier populations show better-than-average trends in retail outlets and jobs, as well as a higher frequency of e-commerce purchases. In contrast, medium-sized and smaller cities and suburbs with decreasing populations and below-average wealth show declines in physical retail and below-average e-commerce frequency.

IMPACT ON STORES' PERFORMANCE

A survey of independent stores⁹ found that selling online helps the growth of physical stores.

Independent physical retailers selling online show more growth than pure offline peers. Of non-organised stores with an online presence in France and Germany, 52 percent are growing, compared to 39 percent of stores that operate only offline. The key benefits of selling online are higher revenues and increased traffic to stores. Non-organised physical retailers use the online channel more in countries with relatively high e-commerce penetration: Up to 25 percent of non-organised retailers in Germany and the UK and 48 percent in the Netherlands offer online sales. However, only 10 percent in Italy and 16 percent in France sell online.

COVID-19 EFFECT AND OUTLOOK

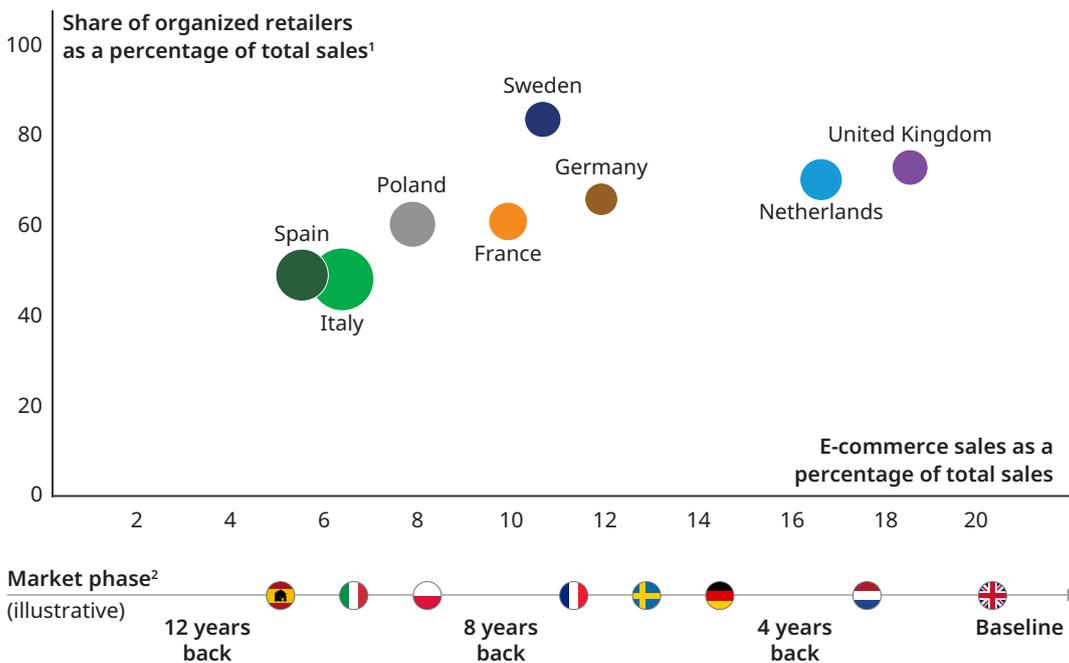
Both physical retail and e-commerce are facing new transformations that have been accelerated by the COVID-19 pandemic.

The COVID-19 crisis has accelerated the adoption of online retail in all eight countries. The increase in online sales from 2019 to 2020 was three times that from 2018 to 2019. The pandemic’s impact on retail sales is diverse, with retail growing in four of the countries under review and declining in the other four, essentially reflecting countries’ lockdown policies. The full effect on physical retail cannot yet be measured.

Offline retail will still represent at least two-thirds of retail sales a decade from now — assuming e-commerce growth rates of between 10 and 15 percent. The distinctions between online and offline retail and between services and goods will tend to blur, as omnichannel shopping increases and takes on new forms. New trends such as social commerce¹⁰ and sustainable retail will develop. Both large and small retailers will have to invest to adapt.

Exhibit 1: Maturity of organized trade and penetration of e-commerce sales

2019, Organized retailers sales and e-commerce sales as a share of total national sales, %



1. Retail sales of chain’s (>0.1% market share); 2. Relative positioning of countries based on e-commerce share of total sales progression — as observed in the UK.

Sources: Euromonitor, Eurostat, Oliver Wyman analysis

ENVIRONMENTAL IMPACT

On average, in Europe, e-commerce has a lower end-to-end environmental impact than physical non-food retail

This report evaluates the impact of retail in terms of end-to-end CO₂ equivalent, or CO₂e. This evaluation addresses non-food products (books, consumer electronics, and apparel) in Europe.¹¹ Its scope is the journey from the factory to the home, including drivers that differ between e-commerce and physical retail, such as transportation, packaging, and the energy consumed by buildings. Production is not taken into account, since it has a similar impact regardless of the distribution model.

CO₂E EMISSIONS

Non-food offline retail causes 1.5 to 2.9 times more CO₂e than e-commerce.

In the Nominal Case (or most common case), driving to a physical store emits between 3 and 6 times more CO₂e than ordering a non-food product online. The nominal case is defined as “the most common situation,” where a consumer drives to a store, buys one product, and does not return it. In this case, at a European level, emissions are 4,100 g CO₂e for driving to a store and 900 g CO₂e for ordering online.

In the Average Case, reflecting an average between multiple real life situations, physical retail shopping emits 1.5 to 2.9 times more CO₂e per product sold than e-commerce. Emissions are 2,000 g CO₂e for shopping in a physical store and 800 g CO₂e for e-commerce. This case factors in a variety of consumer behaviours (for example, using a car for physical shopping in 50 percent of cases, returning some products, and buying multiple products in one trip) and supply chain configurations (such as cross-border orders). The key factors explaining the difference are building energy consumption (160 g CO₂e for e-commerce and 1,200 g CO₂e for physical retail), last-mile transportation (200 g CO₂e for e-commerce and 600 g CO₂e for a consumer driving to a physical store), and packaging (an extra 100 g CO₂e for e-commerce).

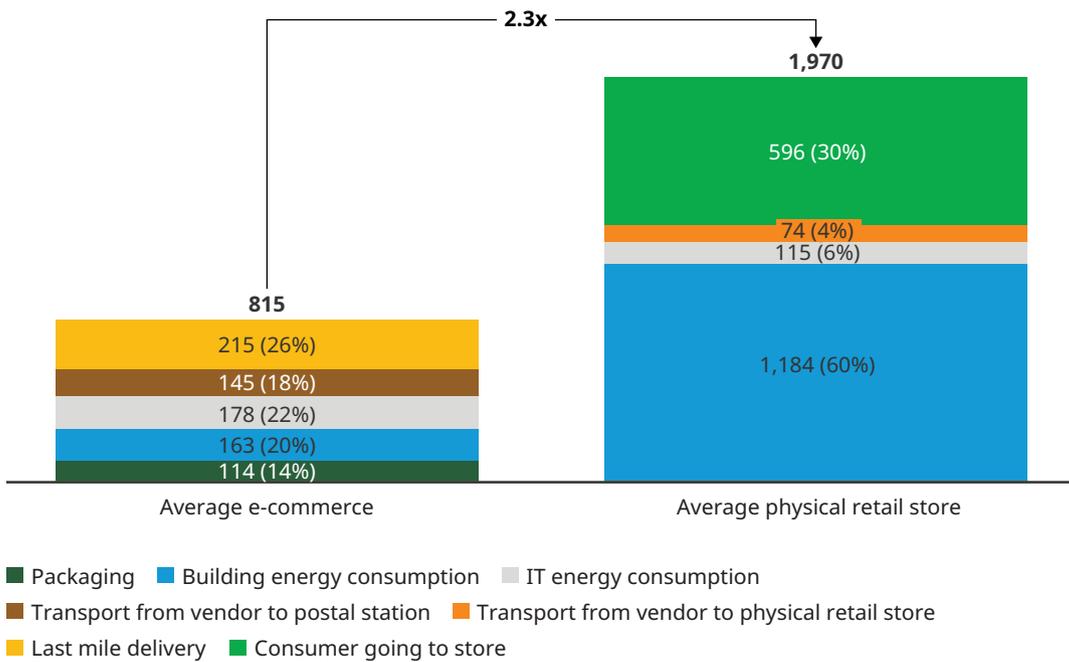
Disparities between countries mostly reflect their energy mixes. France has the lowest absolute impacts: 400 g CO₂e for e-commerce and 600 g CO₂e for physical retail — 1.5 times as much. Germany has the highest impacts: 1,000 g CO₂e for e-commerce and 3,000 g CO₂e for physical retail — 2.9 times as much. The reason is that Germany’s emissions per unit of energy production (609 g CO₂e per kWh) are 14 times as high as France’s (43 g CO₂e per kWh).

Differences between categories are mostly driven by store productivity, travel distance to the store, return rates, and packaging weight. On average, buying a book from a physical store causes 1.6 times the emissions of buying through e-commerce. For a piece of clothing, the multiple is 2.9. In the eight countries taken as a whole, CO₂e emissions are similar when a book or a consumer electronics product is bought online or in a physical store accessed on foot (about 700 g CO₂e in each case). A fashion product bought by walking to a store still causes twice the emissions as when it is bought online — mostly due to the store building’s energy consumption (heating and lighting needed for the space required to access and display products).

A direct air e-commerce shipment from a distribution centre in Asia causes 25 times more CO₂e than an e-commerce shipment from a mass storage facility in the EU which first sources products by sea, before shipping them to end consumers by road. This means that e-commerce has much less impact on the environment when products are shipped in bulk by sea and then stored close to the customer before being ordered.

Exhibit 2: CO₂e impact of a product purchased through different sale channels in Europe (Average case)

In grams of CO₂ equivalent emissions for an average non-food product



Source: Oliver Wyman analysis

Exhibit 3: Comparison of impacts from e-commerce and physical shopping in the Average caseImpact in grams of CO₂e and ratio of the impact for physical shopping to that for e-commerce

Product weight (g) ²	Fashion			Books			Consumer Electronics			Average cross-product ¹		
	Online	Physical retail	Ratio	Online	Physical retail	Ratio	Online	Physical retail	Ratio	Online	Physical retail	Ratio
	400			350			250					
France (Paris)	561	1,016	1.8x	227	224	1.0x	375	525	1.4x	354	513	1.5x
France (National)	593	972	1.6x	273	427	1.6x	428	427	1.0x	397	580	1.5x
Germany (National)	1,096	4,291	3.9x	829	1,256	1.5x	914	1,390	1.5x	988	2,853	2.9x
Italy (National)	1,047	2,763	2.6x	696	1,072	1.5x	870	960	1.1x	898	1,764	2.0x
Spain (National)	1,166	2,311	2.0x	605	1,599	2.6x	860	1,732	2.0x	897	1,916	2.1x
United Kingdom (London)	700	1,422	2.0x	425	804	1.9x	528	876	1.7x	584	1,126	1.9x
United Kingdom (National)	854	1,972	2.3x	583	974	1.7x	638	860	1.3x	729	1,444	2.0x
Min	561	972	1.6x	227	224	1.0x	375	427	1.0x	354	513	1.5x
Max	1,166	4,291	3.9x	829	1,599	2.6x	914	1,732	2.0x	988	2,853	2.9x
Average³	954	2,888	2.9x	653	1,065	1.6x	757	1,088	1.4x	815	1,970	2.3x

1. Weighted by e-commerce sales per product category for each country (Euromonitor, 2019); 2. Weighted by the number of e-commerce parcels per country (Oliver Wyman estimate, 2019).

Source: Oliver Wyman analysis

TRAFFIC

E-commerce saves 4 to 9 times the traffic it generates.

E-commerce deliveries to consumers generate 0.5 percent of total traffic in urban areas; physical retail generates 11 percent. These figures are based on analyses of Paris, Berlin, and London. In the Paris area, for example, physical retail (including store replenishment and consumers driving to stores) generates 4.7 times as much traffic per sales unit as e-commerce deliveries. Overall, e-commerce deliveries replace consumers driving to stores and save between 4 and 9 times the traffic they would otherwise generate.

LAND OCCUPATION

E-commerce occupies less than 0.3 percent of artificialized land in Europe; overall land use is higher for physical retail than for e-commerce when factoring in space for logistics, selling, and parking.

Logistics occupies less than 1.5 percent of total artificialized land. E-commerce represents 12 percent of the total built-up land used for logistics in France, 9 percent in Germany, and about 20 percent in the UK, reflecting those countries' different stages of e-commerce penetration and the relative sizes of retail in their total logistics operations. The land taken up by e-commerce is growing by between 13 and 17 percent per year, in line with e-commerce sales. The share of new build is between 56 and 66 percent.

For a given amount of revenue, required full land occupation (which includes storage and selling areas, as well as space for vehicles to access and park) is estimated to be 26 to 43 percent lower for e-commerce than for physical retail. E-commerce requires two to three times more fulfilment space but no selling areas and much less parking space.

The location of warehouses also can indirectly influence CO₂e impact. **A direct way to reduce CO₂e impact is to move logistics centres** (warehouses and, most importantly, delivery stations) **closer to city centres** to reduce fragmented last-mile transportation. Unfortunately, the development of European cities has gradually moved warehouses away from their centres because of real estate pressure, land-use policies, job-density requirements, and the search for economies of scale.

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Change is a constant in retail. Retailers have proved to be masters at adaptation and innovation, and the current digital transformation appears to be no exception. While this report shows the relative impacts of different retail channels, it also should serve as a call to do even more to prepare for retail's next stage of evolution: towards a carbon-neutral industry.

ENDNOTES

- 1 This study covers eight countries: France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, and the United Kingdom.
- 2 Survey conducted by Oliver Wyman in France and Germany during the fourth quarter of 2020.
- 3 Survey conducted by Oliver Wyman in 2020, including 10,000 consumers in France, Germany, Italy, Spain, and the UK.
- 4 Organized retail includes any food or non-food chains with a national or at least a regional footprint and with a national segment market share above 0.01 percent.
- 5 E-commerce refers to sales of products made via an online channel (personal computers and smartphones). They can be originated from either pure online retailers or physical retailers.
- 6 £, SEK, and PLN have been converted into €, using constant currency conversion of 2019 average exchange rates.
- 7 Across the UK, France, Germany, and Italy.
- 8 Defined here as the number of full-time equivalent employees to generate the same revenue.
- 9 Oliver Wyman survey conducted in December 2020, interviewed sample includes 800 stores in France and Germany.
- 10 Social commerce includes products or services ordered directly on a marketplace put in place by a social network.
- 11 France, Germany, Italy, Spain, and the UK.

About Oliver Wyman

Oliver Wyman is a global leader in management consulting that combines deep industry knowledge with specialized expertise in strategy, operations, risk management, and organization transformation.

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