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# THE IMPACT OF E-COMMERCE ON THE GERMAN ECONOMY

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# PREFACE

*E-commerce is becoming an increasingly important part of the global economy. The recent developments following the Covid-19 crisis has further emphasised the importance of this means of commerce to ensure economic resiliency.*

*To understand the magnitude and economic impact of e-commerce in Germany, Bundesverband E-Commerce und Versandhandel (Bevh) reached out to Copenhagen Economics to initiate a study of which* this *report summarises the results. Throughout the report, we dive into the concept of e-commerce to understand how it create*s *value from an economic point of view. Further, we describe the economic footprint of e-commerce on the German economy and provide perspectives on how e-commerce may develop and influence the area of commerce going forward.*

*This report has been published in an English as well as a German version with small discrepancies primarily reflecting language differences and case relevance in an international versus a German context.*

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# GLOSSARY

| TERM | DEFINITION |
|---|---|
| B2B | Business-to-business (B2B) transactions refer to selling products and services from one business to another. |
| B2C | Business-to-consumer (B2C) transactions refer to selling products and services from a business to a private consumer. |
| B2G | Business-to-government (B2G) transactions refer to selling products and services from businesses to federal, state or local agencies |
| Bevh | Bundesverband E-Commerce und Versandhandel (Bevh) is the industry association of the German e-commerce and mail order businesses that commissioned this study. |
| B&M | Brick and mortar (B&M) refers to companies that generate most of their sales volume through physical shops that customers can visit. |
| C2B | Consumer-to-business (C2B) refers to transactions from private consumers to businesses. |
| C2C | Consumer-to-consumer (C2C) transactions, also referred to as peer-to-peer transactions, are sales between two private consumers. |
| CAGR | Compounded annual growth rate (CAGR) is the mean annual growth rate of an amount over a specified period of time. |
| Consumer welfare | Consumer welfare refers to the utility that consumers receive from consuming a good or service that they purchase, minus the cost of the good. |
| D2C | Direct-to-consumer (D2C) refers to transactions from the manufacturer directly to consumers or business end users without a retailer or wholesaler as intermediary. |
| Economies of scale | Economies of scale describe cost advantages that firms can reap when increasing production. The cost advantages arise as costs are spread over a larger number of produced goods, such as average costs per unit produced decrease. |
| EDI | Electronic Data Interchange (EDI) denotes the electronic exchange of documents - such as purchase orders - between the IT systems of business partners. |
| G2C | Government-to-consumer (G2C) refers to transactions between public entities and consumers. |
| Income effect | The income effect refers to the indirect effect on consumer demand from having a larger income available |
| IoT | Internet of things (IoT) refers to the network of everyday devices that are connected to each other via the internet. |
| Marginal costs | The marginal cost of production refers to the cost added by the production of one more unit of a good or service. |
| LoV | Love of variety (LoV) is an economic concept that assumes that consumers prefer a larger variety of goods from which they can choose. |
| Price effect | The price effect refers to the direct effect on consumer demand from a price change. |
| SEO | Search engine optimisation (SEO) is the process of improving the quality and quantity of website traffic to a website or a web page from search engines. |
| SoMe | Social media (SoMe) are online social networks such as LinkedIn and Facebook |
| Utility | Utility is an economic term that refers to the total satisfaction received from consuming a good or service. |
| Value chain | A value chain consists of the full range of activities needed to create and deliver a product or service. |
| WTP | Willingness to pay (WTP) refers to the maximum price that a consumer will buy one unit of a product or a service. |

# EXECUTIVE SUMMARY

Since the first products were sold online, e-commerce has been evolving rapidly in scope and coverage, becoming an increasingly important part of the economy growing at 14% annually within the last five years in Germany.

Departing from a relatively narrow range of physical products sold by mail order companies, e-commerce has changed, transforming the very nature of the products being sold and the transactions taking place: From a physical book to an e-book to a podcast that can be downloaded and listened to everywhere. **What started largely as a business-to-consumer model is now much more driven by business-to-business transactions that generate three to four times larger online revenues in Germany today.** At the same time, e-commerce is enhancing the space for other buyer-seller relations, where consumers are selling to peers, for example. Today services are an essential part of e-commerce, accounting for 39% of the total e-commerce revenue in Germany in 2019.

Online marketplaces, which make up almost half of German B2C transactions, drive SMEs into the online space where they can start and scale their business on equal terms with their larger counterparts. Survey evidence concludes that among German companies selling online, **the smallest companies sold almost 30% through web shops and apps, while for larger companies this share ranged between 19% and 21%**. Direct-to-consumer sales are facilitated, revolutionising the space of commerce and bringing online companies closer to their customers, which moves the area of commerce from a push driven approach towards a more customer centric, pull driven model.

The development of e-commerce is creating substantial economic value for consumers, businesses and the wider society in a number of dimensions. Productivity increases as efficiency gains are harvested throughout the value chain driven by increased competition, scalability options and specialisation. The ability to tap into wider markets allows for more innovation as costs can be spread on a wider base of consumers. Mark-ups in the retail link are lowered, decreasing consumer prices by 0.2% relative to offline sale. When modelling a shift from offline to online shopping, it is estimated that **the productivity gains from e-commerce could amount to 0.15% of German GDP, which corresponds to €5bn in 2019.**

Consumer welfare is also directly boosted by the access to a wider array of comparable products and, as importantly, by the entirely new services being developed. Instead of buying a CD that requires access to a CD player, consumers can subscribe to a streaming service that provides instant access to a large reservoir of music wherever the consumer is situated. Consumers and producers in rural areas in particular are benefitting from the ability to sell and buy a wider range of products at lower prices. A wide range of international research shows that this leads to significant gains for consumers, with one study suggesting that the potential **consumer welfare gains from e-commerce could amount to 2-3% in Germany.** While these studies are clearly subject to uncertainties, it does provide strong evidence that the gains from E-commerce go much wider than the direct cost savings from having a more efficient retail and distribution industry.
The more direct footprint of e-commerce on the German economy is also evident. During the Covid-19 pandemic, e-commerce has been helping firms maintain access to consumers and ensure

economic resiliency during periods of lockdown, while at the same time unlocking new digital business models in the process. Today e-commerce is a fundamental part of the German economy. In 2019, B2B and B2C e-commerce sales reached an estimated €369bn and €99bn, respectively. That corresponds to **a GDP contribution of €100bn throughout the value chain from production to consumption, which in turn corresponds to 2.9% of total German GDP with 1,260,000 people employed.** This contribution is not directly linked to the wider productivity gains or consumer welfare increases described above, but simply expresses how many resources that are presently employed in E-commerce activities in Germany today.

E-commerce is becoming an increasingly important part of the economy with above market growth rates. **In 2019, 15% of the revenue in retail and wholesale sectors was generated through e-commerce, which represents a 6-percentage point increase within the last five years.**

All indicators suggest that the journey ahead for e-commerce will see continued growth in both scope and scale. Consumers increasingly demand companies to be present online, while new companies are increasingly starting their business online. Today, **87% of German consumers expect companies to have an online portal and 67% of new start-ups operate through a purely digital business model**, which represents a 5-percentage point increase compared to the previous year. Increased opportunities to create customer centric products and experiences through technology advancements are expected to take e-commerce up and beyond its current scope and scale in the years to come, where the online channel will shape our understanding of commerce further.

| Key figures | |
|---|---|
| **€5bn** | Productivity gains from e-commerce in Germany (2019 values, evaluated in 2015, corresponding to 0.15% of German GDP) |
| **2-3%** | Consumer welfare gains from e-commerce in Germany (evaluated in 2015) |
| **-0.2%** | Lower consumer prices in e-commerce relative to offline commerce in Germany (evaluated in 2015) |
| **€100bn** | GDP contribution throughout the value chain of e-commerce in Germany in 2019 (corresponding to 2.9% of total German GDP) |
| **€65bn** | GDP generated directly within e-commerce companies in Germany in 2019 (corresponding to 1.9% of total German GDP) |
| **€754bn** | Revenue contribution throughout the value chain of e-commerce in Germany in 2019 (corresponding to 11.9% of total revenues) |
| **€468bn** | Revenue generated directly within e-commerce companies in Germany in 2019 (corresponding to 7.4% of total revenues) |
| **x3-4** | Larger revenues generated through business-to-business transactions compared to business-to-consumer transactions in German e-commerce in 2019 (e-commerce company revenues of €369bn versus €99bn respectively) |
| **15%** | The percentage of revenue in retail and wholesale sectors that was generated though e-commerce in Germany in 2019 |
| **1,260,000 jobs** | Throughout the value chain of e-commerce in Germany in 2019 (corresponding to 2.8% of total German employment) |
| **768,700 jobs** | Within e-commerce companies in Germany in 2019 (corresponding to 1.7% of total German employment) |
| **+9-11 ppt** | Larger share of revenue generated online among the smallest relative to larger companies in 2018 in Germany (30% versus 19%-21% respectively) |
| **6 ppt** | Increase in the share of e-commerce revenue in the retail and wholesale sectors within the last five years in Germany (from 9% in 2014 to 15% in 20219) |
| **87%** | The percentage of German consumers who expect companies to have an online portal in 2019 |
| **67%** | The percentage of new start-ups operating through a purely digital business model in Germany in 2020 |
| **39%** | Service share of revenue in German e-commerce in 2019 (20% service share for business-to-consumer sales and 44% for business-to-business sales) |

CHAPTER 1

# THE FUNDAMENTALS OF E-COMMERCE

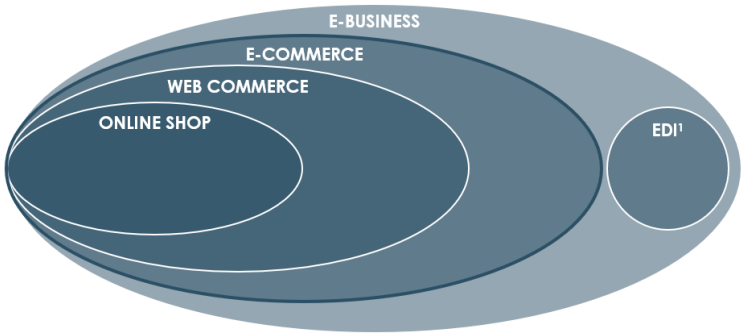
Since its introduction, e-commerce has become an increasingly important part of the global economy, with annual **growth rates ranging between 13-28% in the last decade**[1]. But what does the landscape of e-commerce look like today and how has e-commerce changed the way we do business?

This chapter explains the concept of e-commerce, the types of organisations involved as well as the new opportunities brought about by the channel. Section 1.1 explains the concept of e-commerce, what is being sold as well as the buyer-seller relations we see in the space. Sections 1.2 and 1.3 dive into the organisational players involved to understand the types of jobs created in this area as well as the role of marketplaces. Section 1.4 concludes the chapter by considering how e-commerce has enabled many companies to establish more direct customer relations.

## 1.1 E-COMMERCE EXPLAINED

E-commerce refers to any digital sale or purchase of goods or services by means of internet-based communication and transaction processes. E-commerce is part of e-business, which also covers industrial e-procurement via Electronic Data Interchange (EDI) or direct integration into buy-side buying systems. E-commerce transactions do not need to run through online shops or marketplaces but can also be based on the use of other digital devices[2].

**Figure 1**
**E-commerce illustrated**




Note: Electronic data interchange (EDI) is not considered part of e-commerce in this report
Source: Bevh definition of e-commerce, Copenhagen Economics project experience

[1] UNIDO (2019) p. 14
[2] Other digital devices such as voice commerce, chat shopping, Alexa-based skills or Google Assistant actions or Internet of Things (IoT) devices. While e-procurement usually has not been regarded as e-commerce, today many e-commerce platforms and marketplaces like Amazon Business and Mercateo have interfaces into procurement software or systems.

## What is being sold?

Many associate e-commerce with business-to-consumer (B2C) transactions of fashion, electronics or household items, but in fact e-commerce is much more than that. While it is true that nearly half of the revenue in B2C e-commerce of products in Germany falls within these categories, services related to travelling, mobility and tickets, for example, make up more than a fifth of the B2C revenue. Digital services such as music streaming and e-books are also part of B2C e-commerce.

E-commerce is rarely associated with business-to-business (B2B) transactions. However, in 2019, **B2B e-commerce revenue in Germany was three to four times larger than B2C revenue**, and this is not only a German trend. In 2018, it was estimated that the global B2B e-commerce revenue was up to three times larger than the global B2C revenue within e-commerce[3]. Compared to B2C, B2B online sales of products cover a broader range of categories, some of the largest being ICT equipment, food[4] and office supplies. Just as B2C, B2B e-commerce also involves sales of services, which made up almost half of sales in Germany in 2019.

Section 3 elaborates on footprint of e-commerce on the German economy described above.

## Evolving buyer-seller relations

Across all types of commerce, the online channel is lowering the barriers to trade allowing new types of transactions to enter the arena. While the traditional flow of transactions goes from businesses to consumers or from businesses to businesses, other types of transactions are becoming increasingly important for the economy as a whole. The main driver behind this development is e-commerce, which allows transactions to take place with less considerations for aspects such as spatial constraints and personal trust.

Consumer-to-consumer (C2C) trade is on the rise, with national and even global platforms such as eBay assuming the role as facilitators. Online marketplaces can take some credit for this development, as they bridge the key barrier to C2C commerce; trust.

Business-to-government (B2G) transactions represent another less known part of e-commerce, which is not exactly insignificant, holding about a tenth of online distributed production value in Germany[5]. This category covers online sales from businesses to federal, state, or local agencies of everything from IT support to healthcare equipment. Less common types of online transactions include consumer-to-business (C2B) transactions, which partly introduced along with circular economic business models[6], and government to consumer sales (G2C) involving city services, for example.

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3 UNIDO (2019) p. 14
4 Sale of food, drinks and tobacco, excluding catering
5 Internal estimates by Mercateo
6 As an example, see circular economy initiatives among larger companies such as H&M Garment Collection Program

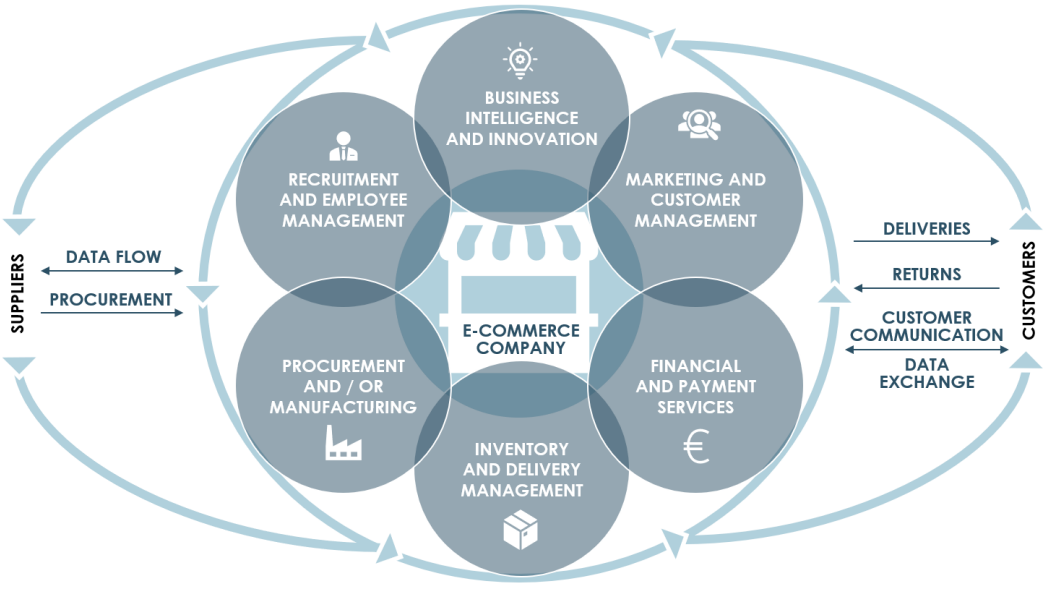
## 1.2 THE E-COMMERCE COMPANY

It is not straightforward to describe a stylised e-commerce company, as the e-commerce space is occupied by a diverse set of organisations. Businesses selling online may be wholesalers or retailers. However, an increasing part of these businesses are also directly involved in manufacturing enabled in part by e-commerce. E-commerce businesses may also be part of the tourism, ticketing or finance sector, as these sectors also convey their products and services online.

Closing in on e-commerce businesses operating in wholesale or retail, these businesses perform many traditional commerce functions, but in new ways and with different priorities. For example, marketing and customer management is an integrated part of these businesses, although customer service is performed online and customer relationship management as well as marketing is likely to be based on a more advanced set of data available through online features such as search engine optimisation (SEO)[7]. Similarly, business intelligence and innovation also have the potential to be enlightened by elaborate customer and market insights based on data summarising online purchasing patterns, for example.

Depending on the degree of outsourcing, inventory and delivery management may also be an important part of the e-commerce business, along with financial and payment services. Business functions such as recruitment, employee management and procurement may function on very parallel terms as compared to traditional brick and mortar (B&M) companies.

**Figure 2**
**Stylised illustration of an e-commerce company**



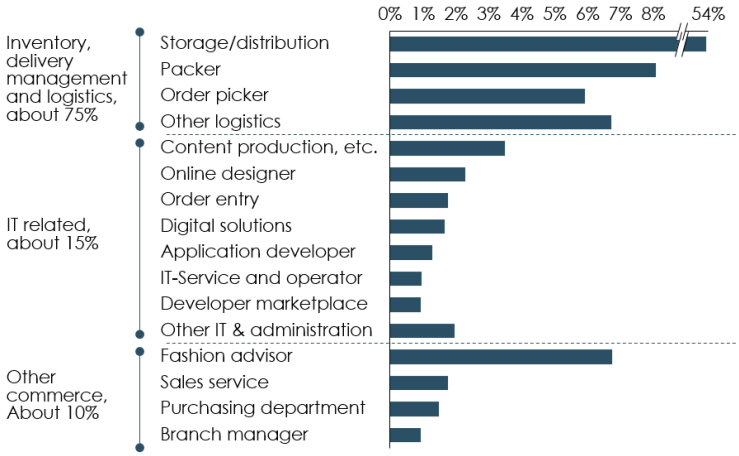

Source: Bevh definitions and member input, Copenhagen Economics project experience

[7] SEO is the process of improving the quality and quantity of website traffic to a website or a web page from search engines.

## Jobs in e-commerce

The organisation of e-commerce companies holds many different functions and similarly the jobs within e-commerce are highly diverse, though with a high share of the new logistics/warehousing and IT related jobs. In a sample of 10 German e-commerce companies, primarily operating within fashion, Bevh finds that about 75% of the jobs fall within the category of inventory, delivery management and logistics, while about 15% jobs are related to IT. These percentages will be highly dependent on the degree of outsourcing, but generally constitutes a large part, considering the downstream value chain[8].

**Figure 3**
**Job profiles across 10 German e-commerce companies**
Percent of employees




Note: Data are from 2016.
Source: Bevh (2018) based on a survey of 10 companies. Due to the limited sample size, numbers are not representative for the industry, but may better represent a subset of companies (e.g. the fashion industry).

Employment in e-commerce covers the entire spectrum from unskilled or semi-skilled jobs to own training and advanced training degrees to general and specific university degrees. A 2017 German study shows that wages in e-commerce are generally significantly above the minimum wage. Unskilled and semi-skilled workers, such as customer service personnel, are generally payed anything from the minimum wage to +75%, whereas skilled personnel, such as procurement personnel, are payed relatively higher, above minimum wages within the range of +35% to +215% with IT developers topping the range[9].

Unskilled and semi-skilled jobs are usually found in logistics and to some extent in customer service. Working in a warehouse, especially picking and packing, requires little prior knowledge due to technical support[10].

8 A value chain consists of the full range of activities needed to create and deliver a product or service. In this setting, the downstream part of the value chain refers to the activities taking place after the involvement of the e-commerce company.
9 Bevh (2018) based on a survey of 350 companies.
10 Such as pick-to-light, pick-by-voice, package erectors, and digital packing instructions.

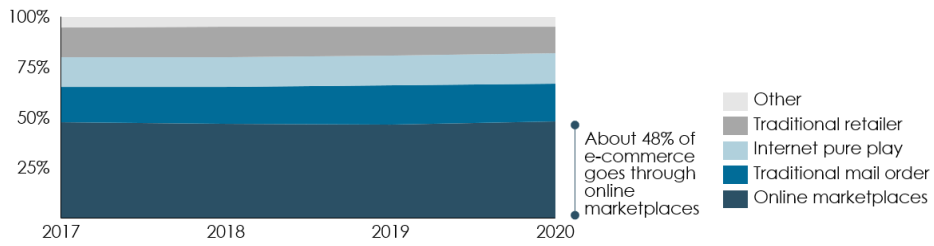
It is also possible to complete intermediate educational levels within e-commerce. These qualifications certify specialist competences in areas such as commercial management, marketing, customer support and digital sales channel management. At university level, studies in business administration, industrial engineering, business informatics or computer science in particular lead to general qualifications in e-commerce. Within these subject areas, a large number of specialised fields of study related to e-commerce have developed at a wide variety of universities of applied sciences and universities.

### Marketplaces, a central part of e-commerce

Marketplaces represent important players in the space of e-commerce. These companies facilitate contacts and transactions among buyers and sellers, be it B2B, B2C or C2C sales. Amazon and eBay are examples of well-known global platforms facilitating B2C and C2C transactions respectively. Marketplaces are also relevant in the B2B space, where Mercateo and Amazon Business represent the largest German platforms, while specialised platforms such as XOM Materials, Kloeckner.i, and Conrad Marketplace focus on a limited number of product areas.

Within the B2C space, it is estimated that **marketplaces make up almost half of German e-commerce purchases**. Among B2B transactions, the share is lower, as at least 90% of product sales come with more or less customised services. This means that many B2B transactions depend heavily on relations and common understandings of what is being delivered.

**Figure 4**
**B2C e-commerce via marketplaces in Germany**
Share of online purchases




Note: Data represents purchases by company class in Q1, not accounting for the impact of COVID-19.
Source: Bevh and BeyonData research

Generally, it is difficult to get an overview of C2C transactions, but it is fair to assume that a large part is facilitated online through marketplaces. Whereas payments may not run through the platforms, contacts are likely to be established and communication is likely to take place there. Online marketplaces have been an important driver of C2C e-commerce, allowing for a higher level of matchmaking and trust building among buyers and sellers. This dynamic has also sparked the peer-to-peer sharing economy movement, exemplified through platforms such as Airbnb and Uber.

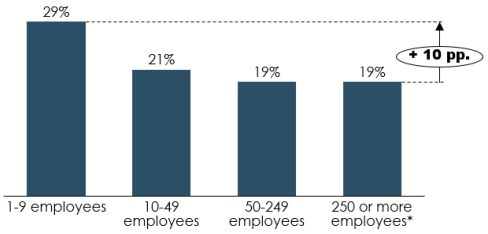
## 1.3 BRINGING LARGE COMPANY BENEFITS TO SMES

As we will review further in Chapter 2 e-commerce generally enables companies to reach a large audience at relatively low upfront investments. This particularly benefits start-ups and smaller companies without deep financial pockets to establish themselves through more traditional sales

channels. Online sales are therefore often more important to smaller companies than they are to larger firms.

Survey evidence concludes that among German companies selling online, **the smallest companies sold almost 30% through web shops and apps, while for larger companies this share ranged between 19% and 21%**, see Figure 5. This implies that companies of all sizes, and in particular smaller companies, leverage and benefit from e-commerce.

**Figure 5**
**Share of online revenue across online German companies in 2018**
Percent of turnover




Note: The numbers include B2C and B2B sales via websites and apps, but exclude sales through EDI.* The value for the largest companies was not reported in 2018 and is projected based on the growth rate from 2017 to 2018 in the second largest company group.
Source: DESTATIS, ICT indicators for enterprises.

## The role of marketplaces

The essential service provided by online marketplaces relates to facilitating contact, communication and transactions between buyers and sellers. However, depending on the platform and the companies leveraging it, services may extend into areas such as logistics, warehousing and IT.

For many smaller companies that have not yet established a solid customer base and who are facing large costs to set up standard functions such as payment solutions, marketplaces provide a platform to get started. These companies benefit from the already established customer network on the platform. At the same time, they are able to outsource standard e-commerce business functions to marketplaces with a size that allows harvesting of scale benefits.[11]

Generally, online market platforms allow buyers to purchase goods and services directly from several suppliers with a high degree of cross-company transparency on prices and qualities. This is important for private consumers, but may also benefit companies, when considering B2B market places, where procurement departments can access many different suppliers at low process and information costs and similarly, where B2B suppliers can reach a wide audience. Primarily indirect material is traded on B2B marketplaces. Unlike direct material, such as car seats for production of an Audi, indirect material is the tools and material that companies use to produce their products, such as the gloves that mechanics use when installing Audi car seats.

[11] Scale benefits or economies of scale refer to cost advantages reaped by companies when, for example, production size is increased. These cost advantages arise as costs are spread over a larger number of goods.

**Box 1 The case of Mercateo**

In Europe, the Mercateo platform is one of the largest online B2B marketplaces, with the main product categories; IT, hardware, software, and office supplies. Mercateo was founded in Germany in 1999 and has since then grown to supply more than 10 European countries.

Mercateo focuses not only on optimising the process around the products sold on the marketplace, but also on establishing a network between suppliers and buyers, similarly to the network that Facebook and LinkedIn create among their users. More than 90% of products sold B2B online are accompanied by some service level, a large part of which is subject to special agreements. This makes the network an essential supplement to the online marketplace which, in itself, is primarily capable of facilitating standard transactions.

Mercateo expects to see a large number of companies joining B2B marketplaces in the future because the platforms work as a neutral intermediary that connects companies to a network of relevant suppliers and procurement departments. Enriched by the network element, this allows businesses to be connected to more suppliers and/or clients with whom they exchange products, accompanied by more or less specialised services.

Source: Interview by Copenhagen Economics with Bernd Schoenwaelder on December 1st, 2020

Bevh members also express the importance of selling online via online marketplaces. The box below features a statement from KW-Commerce, a medium-sized German e-commerce company[12].

**Box 2 Growing a business with e-commerce platforms**

"Our business model evolves around using online marketplaces – large international and smaller local online marketplaces. In our start-up phase, selling via online marketplaces facilitated the process of acquiring customers and gaining brand recognition quickly. The advantage of online marketplaces is that we can sell our products without having to invest a lot of money and energy into online marketing. This allowed us to grow rapidly. The same holds for other start-ups and smaller companies."

Jens Wasel, CEO of KW-Commerce

Source: Interview by Copenhagen Economics on September 17th, 2018.

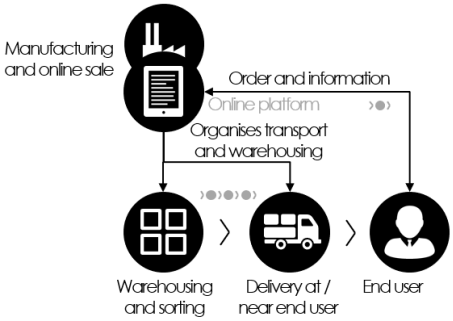
[12] Based on interviews by Copenhagen Economics in 2018 (see Copenhagen Economics (2018)).

## 1.4 DIRECT-TO-CONSUMER SALES

Direct-to-consumer (D2C) sales imply a situation in which a goods manufacturer sells directly to consumers or to business end users using their own sales channel instead of selling their goods through an external retailer or wholesaler who in turn sells the goods to the final consumer with a mark-up[13].

Manufacturers who want to sell directly to consumers have to integrate a sales function into their business and take ownership of a retail shop (e-commerce or B&M), enabling the manufacturer to take over the margins associated with retail. However, it also requires the manufacturer to take on a new business function carrying internal costs from maintaining a sales channel, such as the costs of marketing, IT, sales personnel, and customer service. A stylised D2C e-commerce value chain is illustrated in Figure 6.

**Figure 6**
**Stylised illustration of an e-commerce D2C value chain**




Source: Bevh member input and Copenhagen Economics project experience

### Increasing D2C sales enabled by the online channel

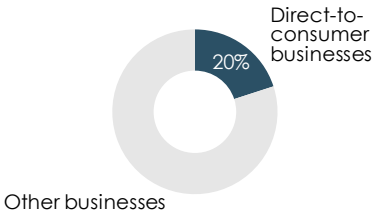
By giving manufacturers an online platform, e-commerce makes direct selling feasible for more companies, including manufacturers[14]. Direct selling is becoming increasingly important in e-commerce, with the benefits of manufacturers getting direct access to consumer insights, owning costumer relationships and offering personalised products[15].

Global direct sales have increased in recent years from €139bn in 2012 to €160bn in 2018[16]. Wellness products are the largest product group in direct selling, making up one-third of the total revenue. The D2C sales model is also very popular in Germany. In a survey of online consumers, Bevh finds that 20% of consumers' last purchasing destination was a D2C online shop, see Figure 7. When manufacturing companies were asked, almost half said that they would like to sell directly to consumers[17].

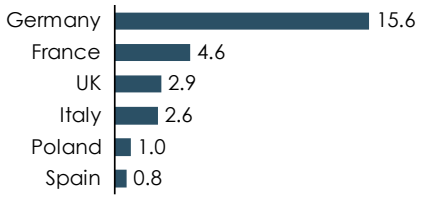
13 For example, see DSA (2020).
14 For example, see American Express (2010) and Retaildogma (2020).
15 For example, see current and future trends of e-commerce here Orendorff, A. (2020) and Winkler, N. (2020) .
16 See Statista (2020a) and Statista (2020b).
17 Based on Bringg (2018).

**Figure 7**
**Direct selling in Germany**

**Latest online shopping destination**
Percent of respondents




**Direct sales in selected markets in 2019**
Billion EUR




Note: Right figure: Based on projections of GDP for Spain and France, Direct sales in retail stores. Left figure: B2C sales
Source: Left figure: Bevh survey of online consumers. Right figure: Eurostat, Statista based on survey data, and exchange rate from the US Federal Exchange.

Germany is also leading when it comes to direct selling in Europe. The total revenue from direct selling in Germany was €15.6bn in 2019 (up from €2.9bn in 2012)[18], which is larger than the *combined direct selling revenue* of €11.9bn in France, the United Kingdom, Italy, Poland, and Spain in 2019, see Figure 7. Given their relative economic sizes, **direct sales is two to four times larger in Germany than in France, the UK, Italy, and Poland, and eight times larger than in Spain.**

[18] Based on numbers from Statista.

CHAPTER 2

# CHANNELS OF ECONOMIC VALUE CREATION

Since its introduction, e-commerce has changed the landscape of commerce. Goods are now available online in many varieties, and transactions can be made quickly and cost efficiently. Companies can scale through e-commerce and reach a broader audience, and some new companies providing digital goods and services are even *born global*. In a few clicks, consumers based in all locations can buy products online from around the world.

This chapter examines how e-commerce creates value along two channels. Section 2.1 shows that there is an increase in productivity and GDP from e-commerce and explains the reasons behind this. Section 2.2 focuses on the value creation for consumers as a result of having access to a broader variety of products at a lower price through e-commerce.

## 2.1 ECONOMIC IMPACT THROUGH PRODUCTIVITY GAINS

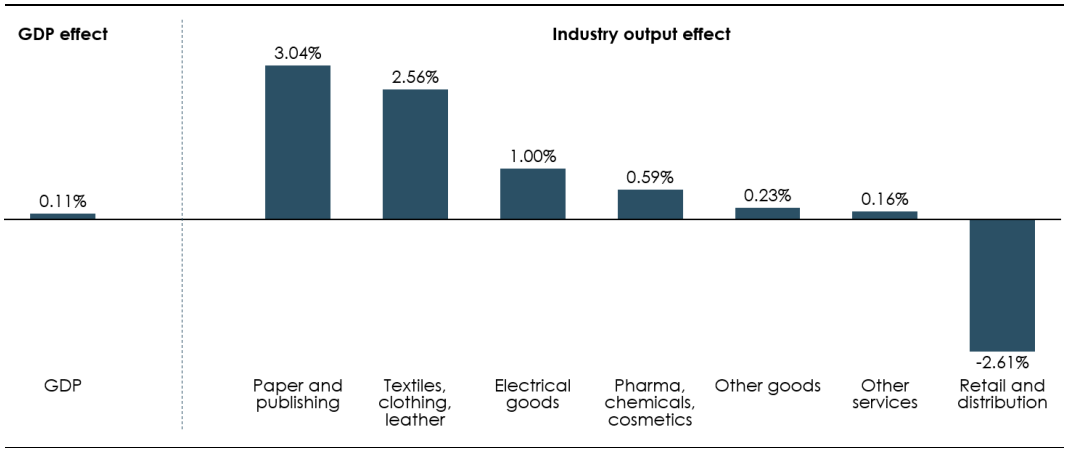
The economic impact of e-commerce cannot be measured by considering the retail and wholesale industries alone. In fact, the productivity effect from e-commerce is primarily seen in other industries. Since e-commerce facilitates more efficient sales compared to traditional B&M, the retail margins are lower. The productivity effects are therefore primarily seen in the manufacturing industries as these industries can sell their products more efficiently to the consumers through e-commerce[19]. Furthermore, with the lower prices in retail, consumers can increase consumption and thus buy more products.

When these effects are examined jointly, an EU wide study has found that shifting from offline to online shopping in and between European countries could **increase German overall productivity and GDP by 0.15%**, see Figure 8, **corresponding to an increase of €5bn in GDP in 2019**[20]. The effect is driven by an estimated increase in the efficiency of the retail and distribution industries that allows resources to be shifted to be shifted to other sectors, notably industries that are producing the goods and services most dominant in e-commerce (paper and publishing, textiles and electrical goods).

[19] E-commerce is found to be more productive *per employed* than B&M. For example, one has found an increase in labour productivity across German B2B firms when they start selling online, see ZEW (2004).

[20] Joint Research Centre (JRC) of the European Commission.

**Figure 8**
**Economy wide productivity and GDP impact of a shift from offline to online commerce in Germany**
Percent change, 2015 evaluation




Note: The impact on real GDP stems from lower trade costs and retail efficiencies. JRC has modelled a shift of shopping from offline to online in Europe in a macro-economic equilibrium model with lower implied costs for trade through e-commerce, based on survey data. The JRC uses survey data on cross-border e-commerce between EU Member States to estimate the implied cross-border trade cost reduction when consumers move from offline to online consumption as well as the implied costs of perceived regulatory barriers to e-commerce.
Source: JRC (2015), tables 7, 8, and 11.

An increased uptake of e-commerce leads to lower output in retail and distribution, and increased output in other industries through two primary channels: *fiercer price competition and lower cost of retail* and *scalability and increased specialisation* as discussed in more detail below.

## Fiercer price competition and lower costs of retail

Empirical studies show that e-commerce tends to lower prices in retail due to increased competition and efficiency gains[21]. Since e-commerce allows companies to reach a broader market, there are effectively more suppliers to compete against. When more retailers can reach a given consumer, price competition becomes tougher, ultimately benefitting consumers.

When consumers spend less money on the same retail goods, they are able to increase their consumption in other areas, which benefits other industries in the economy. In total, it is found that increasing shares of e-commerce leads to higher household consumption, higher consumer welfare, and higher GDP. Viewed in isolation, retail output decreases because the retail price effect[22] is larger than demand increases. In economic terms, the price effect dominates the income effect[23] in retail.

[21] JRC (2015), page 3 and 9.
[22] The income effect refers to the indirect effect on consumer demand as a result of having more income available, in this case, as a result of a price reduction of products bought online. Some consumers may choose the buy more goods and services, while others buy better quality, increase savings, or work less.
[23] The price effect refers to the direct effect on consumer demand from a price change, in this case a price reduction of products bought online.

**The mark-ups online are found to be on average 8% lower for German multi-channel retailers compared to B&M shops**, with the largest differences seen in electronic and household appliances[24]. For some services, the price decrease is found to be even larger. For example, **handling fee for airline tickets was lowered by 87%** when the handling service went online in the late 1990s[25], and it is fair to assume that this price is close to zero today. A similar price drop can be seen for banking services, bill payments and software distribution when going online.

The cost of retail and distribution through e-commerce is lower than for offline sales[26], due to price competition and efficiency gains in the retail link. The efficiency gain stems from online retailers having lower input cost in their operation, for example, reduced labour costs, lower inventory costs and lower communication costs[27]. However, some costs are likely to be larger for e-commerce than for offline retail, such as distribution costs due to higher last-mile transport costs.

These cost changes suggest that e-commerce is expected to increase distribution costs and decrease retail costs. Data does not allow us to draw more specific conclusions on the individual impacts, but the total impact on costs of retail and distribution is deemed negative[28].

### Scalability and increased specialisation

In principle, the catchment area of an e-commerce company is unlimited[29], whereas the potential customers for B&M companies are physically confined, for example, within a driving distance of the store, see Figure 9[30]. Online trade is evidently international, as more than 60% of European online consumers shop from overseas retailers[31].

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24 Based on a collection of prices for multi-channel retailers in 10 countries including Germany, see Cavallo (2017), page 291. The electronic and household appliance prices are reported as an average of the 10 countries (not specifically for Germany).

25 Based on prices from 1999. OECD (1999), page 14.

26 JRC (2015), pages 3, 6-8.

27 In a case study for a Lithuanian company that adopted e-commerce into their business , labour costs and costs of inventory both fell by 40%, which led to an efficiency increase of 58% in these areas, and an overall yearly efficiency increase by 3%. See Barsauskas et al. (2007), page 86.

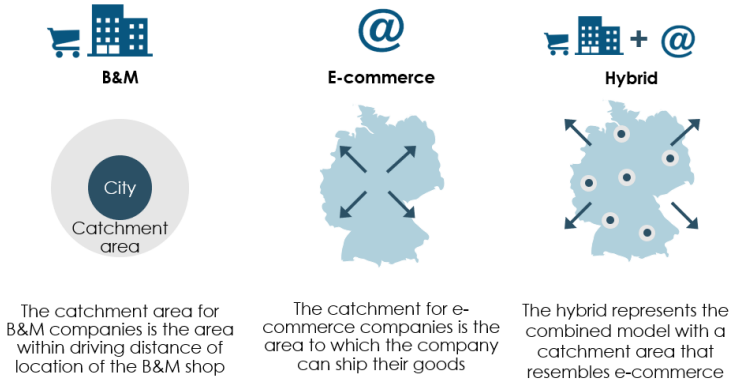
28 JRC (2015), pages 3, 6-8.

29 If the e-commerce company sells goods, these goods would have to be shipped. Therefore, the catchment area is only limited by the possibilities of shipping goods.

30 For B&M, there are also business models where the retailer sends parcels to consumers outside the driving distance of the shop.

31 See Orendorff, A. (2019).

**Figure 9**
**Illustration of catchment areas across commerce models**




Source: Bevh member input and Copenhagen Economics project experience.

As a consequence, distance is found to matter less for online trade that it does for offline trade. In general, the distance from a seller to a consumer has a negative effect on trade, as there are transport costs, for example. However, the negative effect of distance is found to be much lower for online trade than for offline trade[32]. **One study estimates this distance effect to be 65% lower for online sales**[33]. This is likely due to lower consumer transport costs, lower search and information costs for the consumer, and lower distribution costs. The broader market reach provides e-commerce companies with opportunities to scale production further and thus reduce production costs through economies of scale[34].

The e-commerce model offers lower distribution costs to a broader consumer audience[35], which allows for increased specialisation[36] because different companies can specialise to a greater extent within the areas, where they possess a relative advantage. This increases the productivity of companies as they learn new ways of operating, innovate their products, and achieve economies of scale, which also allows companies to create new products and varieties ultimately benefitting consumers.

The broader market reach facilitated through e-commerce also allows new niche companies to enter the space of commerce, as they can scale production to the minimum viable production scale. This means that some niche products that were not profitable to sell through the B&M model become profitable through e-commerce, where they can reach a larger immediate market.

32 Based on international trade in Europe where online and offline purchases were compared. See JRC (2015), page 7 and 13
33 Lendle et al. (2013), page 3.
34 For example, see Go-Gulf (2016).
35 JRC (2015).
36 *New Trade Theory* is usually used for international trade economics, but is relevant for the benefits of e-commerce as well. See Hummels & Lugovskyy (2005), Copenhagen Economics (2009).

### From push to pull

One can argue that e-commerce changes the setup of commerce from being primarily push-driven (where the retailer 'pushes' certain products from warehouses onto store shelves) towards a more pull-driven approach (where the customer 'pulls' the items they want directly from warehouses.

The use of digitally available data allows a reverse flow of information from the consumer to the producer, which holds a large potential for companies to advance their business in a customer-oriented direction. The information flow also decreases the level of uncertainty around demand for given products throughout the value chain, which enables efficiency gains in form of inventory cost reductions and greater resource efficiency to meet actual demand.

As the amount of uncertainty diminishes with the pull model, so does the need for overproduction and overstocking to avoid being out-of-stock. This leads to greater resource efficiencies, as less material is used for overproduction of goods that may not be sold. The pull-driven mechanism can thus increase the profitability of companies *and* have a positive environmental impact.

With the rise of big data, companies that operate in the digital sphere can more accurately predict demand, which lowers the cost of warehousing, inventory, etc.[37]. For some industries, 'just-in-time manufacturing'[38] is a possibility brought about by e-commerce, effectively lowering the risk of overproduction for the company as well as the need for warehousing.

## 2.2 CONSUMER BENEFITS AND WELFARE GAINS

In economic terms, consumer welfare refers to the utility[39] that consumers receive from consuming a good or service that they purchase, minus the cost of the good. It is sometimes measured using consumers' willingness to pay (WTP)[40] for a given service or good minus its price. The positive effect of e-commerce on consumer welfare runs through two main channels[41]:

**Lower prices increase the consumers' potential to buy higher quality items or more products and services for the same amount of money (the income effect).** As outlined in Section 2.1, e-commerce lowers the prices that consumers pay for like-to-like products. In particular, **e-commerce is found to lower consumer prices by 0.2% in Germany relative to offline commerce**[42]. The lower product costs imply that for the same amount of money, consumers can either purchase more or better-quality products.

**E-commerce also increases the variety of products and services that a consumer has access to which increases the likelihood of consumers finding the products and services they prefer**. Classical consumer theory suggests that a larger variety of goods and services results in a higher consumer welfare through love of variety (LoV)[43]. LoV implies that consumers achieve a higher level of welfare by having a broader palette of differentiated products to choose

37 For example, see Amazon Forecast (2019).
38 For a description of just-in-time production, see ShipBob (2019).
39 Utility is an economic term that refers to the total satisfaction received from consuming a good or service.
40 The economic term WTP refers to the maximum price which a consumer will buy one unit of a product or a service.
41 In addition, higher productivity increases the household income, which again leads to increased consumer welfare.
42 JRC (2015), table 11.
43 *New Trade Theory* is usually used for international trade economics but is relevant for the benefits of e-commerce as well. See Hummels & Lugovskyy (2005), Copenhagen Economics (2009).

from. Studies have shown that access to increased variety through online sales increases consumer welfare. For example, in 2000 Amazon supplied 57 times more book titles online than a traditional independent US bookstore, which was estimated to enhance consumer welfare from reading books by 40%[44].On a macro level for the US, switching to e-commerce has been estimated to result in a 1% permanent welfare gain from increased consumption alone, equivalent to €840[45]. This means that the lower prices allow consumers to spend €840 more on other goods and services, ultimately increasing welfare.

**For Germany, a study estimated that the potential consumer welfare gains from e-commerce could lead to amount to 2-3%[46]**. The gains arise from lower search costs for online consumers, resulting in a real income increase for consumers. Thus, consumers can increase their consumption which increases consumer welfare[47].

E-commerce is particularly impactful in rural areas, where the channel also enables consumers to access a broader variety of products at a lower price. B&M stores located in these areas typically have fewer varieties of products available than in the urban areas[48]. The price levels for goods in B&M stores is found to be lower in the cities than in rural area in the US, when accounting for accessibility and different varieties of products[49]. In fact, the larger the city is, the lower the prices of goods, suggesting a higher price competition in cities. This means that people living in rural areas have a smaller basket of goods to choose from at a relatively higher price via B&M stores.

While opportunities to buy products in B&M stores differ across urban and rural areas, access to e-commerce shops does not. This means that the welfare gains brought about by e-commerce are correspondingly larger in rural areas.

## 2.3 THE CASE OF DIGITAL SERVICES

While many associate e-commerce with physical products, the term also covers a range of digital products and services. Over the last two decades, there has been a rapid shift towards digitalization in traditional entertainment goods such as books, movies, games and music, whereby they now exist in digital form on different platforms. The music industry provides an example, which epitomises what digital innovation can do to transform an entire industry by making pre-existing physical goods and competencies obsolete.

Two decades ago, the global music industry revenue originated only from physical distribution, including CDs, cassettes and vinyls. But since 2004, the digital music share of revenue (including streaming, digital downloads and other digital formats) has increased at a rapid rate. In 2019, **digital music formats constituted 74% total music industry revenue globally**[50], see Figure 10.

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44 Amazon had 23 times more book titles than Barnes & Noble (a US book retail chain). See Brynjolfsson (2003), page 1580.

45 €840 corresponding to 1.000 USD, Dolfen et al (2019), page 34

46 The welfare gain stems from lower search cost using online shopping, see Lendle et al. (2013), pages 16 and 37, using data from eBay. The method behind the calculation is described in Arkolakis e.t al (2012)

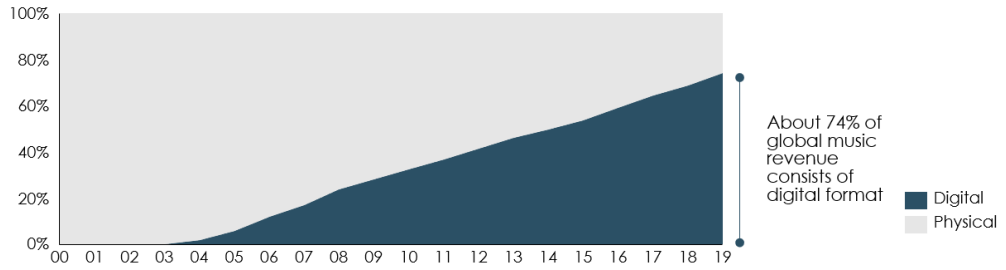
47 See Arkolakis et. Al (2012), e.g. page 112.

48 There is more variety available in US cities, the larger the city is, see Handbury and Weinstein (2015), page 270-272.

49 Handbury and Weinstein (2015), page 287. When not adjusting for different varieties, the price actually increases in cities. The authors argue that the reason for this is that cities typically have more varieties, including high price varieties that drive up the prices of average goods.

50 According to IFPI (2020) Global Music Report 2019 and IFPI (2019) Global Music Report 2018; total revenue excludes performance rights and synchronisation revenues.

**Figure 10**
**Global music revenue by format, 2000 to 2019**
Percent of total annual revenue




Note: This excludes performance rights and synchronisation revenues
Source: Copenhagen Economics based on IFPI Global Music Report 2019 and 2018

While less drastic, a major transformation has also taken place with respect to books, magazines and newspapers. For books, physical formats still dominate the market, whereas e-books and audio-books accounted for approximately 20% of total revenue in 2019[51].

## Welfare gains through increased consumption at lower prices

This transformation towards digital services in areas such as the music and book publishing industry is associated with relatively large gains in consumer welfare[52]. A primary driver is the fact that many digital services, such as the ones provided by Spotify and Kindle, hold close to zero marginal cost, meaning that there are next to no costs of selling an additional product once the first one has been sold[53]. As a result of this, as well as the scalability of these digital services, consumers prices of many digital services are lowered, which increases consumer welfare. In Germany, books are an exception, as regulation orders digital formats be sold at the same price as physical formats.

**Box 3 Amazon's Kindle Direct Publishing**

Digital business models bring great scalability options to service providers, enabling digital businesses to serve an increasing number of customers with less resources than through traditional non-digital means.

Amazon's Kindle Direct Publishing (KDP) is an example of hyper scalable online business model, which lets anyone publish and sell Kindle e-books through the platform. The publishing process through KDP is nearly instantaneous, after which the published book becomes available to customers globally in one to two days. In addition, the author retains the copyright and derivative rights. For this service, Amazon collects a portion of the book's profits and returns the rest as royalties to the author. These royalties vary from 35 to 70%, depending on geographical location and pricing.

51 AAP (2019).
52 Brynjolfsson et al. (2018), pages 1, 3-4.
53 'Zero marginal cost' means that supplying an additional song has a cost that is almost zero and does not refer to the payments made to music suppliers or artists.

In comparison to a traditional publishing process with a publishing house, where the author can expect between 5-15% in retail royalties and often forfeits their rights to the work for a given contract duration, there can be significant economic incentives to self-publish, for example, through the KDP platform. By avoiding publishing fees as well as material, printing, warehousing and transportation costs, the upfront costs of self-publishing e-books through the KDP are very low (including possible editing, marketing, design costs) and marginal costs over time are practically non-existent, meaning that there are no additional costs associated with delivering a given e-book to new buyers. Advantages of publishing through a traditional publishing house include greater publicity and wider distribution in shops. In comparison, Kindle e-books are only sold online on the Amazon Kindle store, but KDP self-publishing allows all writers to not only become published authors, deciding the terms of their book themselves, but also grants them the opportunity to achieve a large scale at a low cost.

Source: Amazon Direct Publishing; Amazon (2020) 'Publish your book'; The Bindery Agency (2018) 'Royalties: How do publishers pay authors?'

This also means that the total revenue in these industries (music, books etc.) may decrease, potentially leading to lower GDP and employment. Therefore, some argue[54] that it does not make sense only to look at GDP and traditional productivity[55] as a proxy for well-being, but instead examine the societal benefits of these technological advancements. While the scale-up of digital services may imply a lower GDP in the music industry, it does improve consumer welfare.

In addition, the accessibility of digital services increases the demand for these products[56]. Digital services are much easier to access than their traditional counterparts (CDs, books, etc.). For example, Spotify allows you to listen to millions of tracks on several devices in different locations as long as you have an internet connection, whereas listening to CDs is confined by physical dimensions and to a limited number of tracks. No matter where consumers go, they have instant access to their digital music, allowing them to listen and read on their mobile devices everywhere.

Digital content consumption has been estimated to **increase consumer welfare in the US equivalent to €1,570 per digital consumer per year from 2004 to 2017**[57].

54 For example, Brynjolfsson et al. (2018), pages 4, 8-9.
55 Often measured as value added per employed.
56 See Brynjolfsson et al. (2018), pages 8-9, 36, and 54.
57 In 2017 USD and euro. Byrne & Corrado (2020): pages 24-25.

CHAPTER 3

# THE ECONOMIC FOOTPRINT IN GERMANY

E-commerce is an essential part of the economy around the globe, and Germany is no exception. The continuing digitalisation and shift in consumer behaviour puts e-commerce on a path to even greater economic significance, and the catalysing impact of the Covid-19 crisis will most likely amplify this development over the next years.

Section 3.1 outlines the economic footprint of e-commerce in Germany looking at both B2B and B2C sales of goods as well as services. Section 3.2 looks at the development of the sector within the last five years[58].

## 3.1 A FUNDAMENTAL PART OF THE GERMAN ECONOMY

E-commerce is an important part of the German economy. Specifically, we estimate that German e-commerce generated about **€754bn in revenues** and contributed with about **€100bn to the German GDP** in 2019. The former accounts for **11.9% of total revenues**, whereas the latter accounts for **2.9% of the total German GDP** in 2019. Moreover, we estimate that German e-commerce companies **supported about 1,260,000 jobs** in the German economy, corresponding to **2.8% of total employment**. These estimates do not include online transactions within financial services[59]. However, as a result of the ongoing digitalization, financial services are also increasingly sold online. In 2018, the German financial sector generated an output of about €264bn, of which financial services (e.g. banks) made up €146bn, while insurance, reinsurance and pension funding made up €82bn.[60] A substantial share of the latter of these transactions in particular is likely to have taken place online.

### Direct and indirect contributions of e-commerce

German e-commerce contributes to the German economy both directly and indirectly. The direct contribution relates to what e-commerce companies produce and sell. The direct revenue contribution therefore includes sales of e-commerce companies. The direct GDP contribution contains the value added generated within the same e-commerce companies through wage payments and profits. In turn, the indirect contribution refers to the economic activity supported along the supply chains of these e-commerce companies. It is driven by the goods and services not for resale purchased by e-commerce companies from their suppliers who then purchase goods and services from their suppliers and so on. The indirect footprint does not include so-called goods for resale, such as sales of fashion items from a manufacturer intended for direct resale.

The revenue and GDP generated directly within e-commerce companies amounts to €468bn and €65bn, respectively. Practically, this implies that **German e-commerce companies have generated €468bn in revenues and contributed to GDP with €65bn** through wage payments

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58 The estimates reported in this chapter are constructed by Copenhagen Economics based on several external data sources. See Appendix A for an elaboration of methodology and sources. We define e-commerce as purchases and sales of goods and services that are carried out online. It includes both transactions via online shops as well as marketplaces (B2B and B2C only), but excludes sales by private sellers and sales to and from governments due to data limitations. Exports are included, whereas imports are excluded in the estimates.

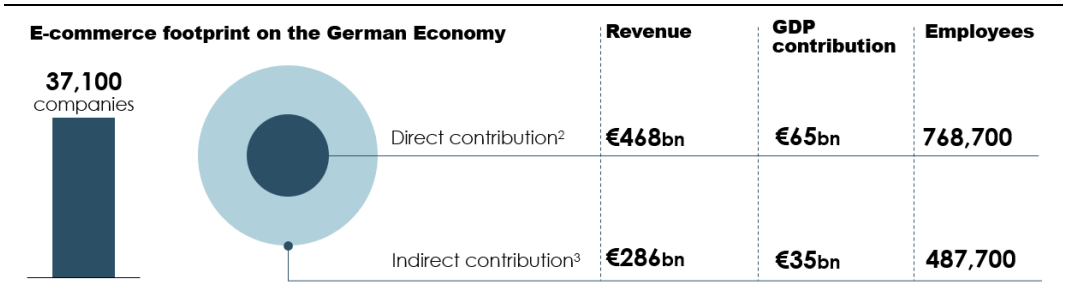
59 Due to a limited availability of data on e-commerce in financial services and methodological considerations. See the appendix for a detailed description of which industries are not included in this analysis.

60 Based on sectoral output data from the national accounts (K64 and K65).

and profits, corresponding to about **7.4% of total output and 1.9% of GDP**[61]. We estimate that this economic activity **supports about 768,700 jobs** in the e-commerce corresponding to **1.7% of total German employment**.

In addition to this, there is a substantial indirect economic contribution: By purchasing goods and services from German suppliers, e-commerce companies generate economic activity in other companies, which, in turn, generate activity in the companies along their supply chain and so on. These effects work through the entire supply chain and accumulate to about **€286bn in generated revenue** and a **GDP contribution of about €35bn.** We estimate that about **487,700 jobs are supported** through the economic activity generated by e-commerce in the **industries along its supply chain, corresponding to 1.1% of total German employment.**

**Figure 11**
**The footprint of e-commerce on the German economy in 2019**




Note: Estimates exclude VAT. All numbers include economic activity generated via e-commerce exports. 1) Includes companies with a B2B online shop as well as B2C companies with e-commerce as their main activity. 2) Measures the economic activity generated directly within e-commerce companies. 3) Measures the economic activity generated within the industries that supply e-commerce companies with goods and services nor for resale.
Source: Copenhagen Economics, based on Bevh (2020), HDE (2019), IFH (2013), IFH (2019) and DESTATIS (annual statistics of wholesale and retail trade).

The indirect contribution benefits other industries in the German economy. Noting that indirect effects exclude goods for resale, warehousing and transport industries, postal companies and real estate companies seem to benefit most from the activity in e-commerce industries. E-commerce businesses also have above average expenses within the IT and marketing industries. All in all, these industries account for more than half of the total expenditures of e-commerce companies.

The activity among e-commerce companies also gives rise to tax revenues benefitting society as a whole. Taxation in relation to the digitalisation and internationalisation of economies is generally a widely debated topic, where several European countries are currently working towards implementing separate digital service taxes (DST). Building on insights from our 2018 publication about the DST, the German case reveals a higher Effective Average Tax Rates (EATR) of 25% on digital businesses compared to traditional businesses taxed at 21%[62].

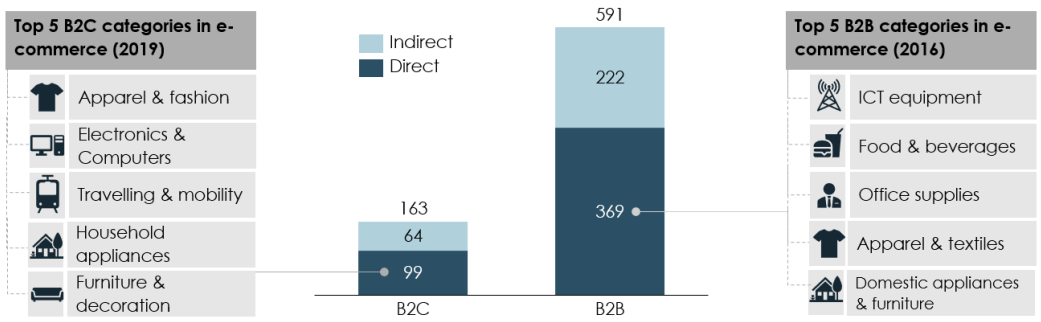
[61] The major difference in relative contribution to output and GDP, respectively, is due to the fact that within the retail and wholesale sectors, a large fraction of output is generated from goods that are bought from other industries and then resold without substantially changing the product. This part of turnover is included in the e-commerce output, but is not part of the GDP (which only includes the value added of the reselling process).

[62] Copenhagen Economics based on the Devereux/Griffith methodology, PwC & ZEW (2017) and OECD database.

## E-commerce in B2C and B2B

Across B2B and B2C transactions, e-commerce is an important sales channel for goods and services[63]. In 2019, e-commerce generated about €369bn in direct sales B2B (excluding EDI), with an additional €222bn of revenue generated indirectly along the B2B supply chain, see Figure 12. **Revenue from B2C e-commerce amounted to about €99bn** with an additional **€64bn being generated indirectly** along the supply chain.

**Figure 12**
**Direct and indirect B2C and B2B e-commerce revenue in 2019**
Billion EUR




Note: Most important B2C categories are based on sales volume; the most important B2B categories is based on the number of B2B-companies with an online shop in the respective product category.
Source: Copenhagen Economics, based on Bevh (2020) and IFH (2019), Bevh & Creditreform (2017)

The **B2B revenue is three to four times as large in absolute numbers as e-commerce revenue from B2C transactions**[64]. However, as the B2B market is larger in terms of overall (online and offline) sales, **the online penetration in B2B sales is still lower than in B2C**[65].

The product categories sold online to consumers and businesses are very different. Clothes and shoes make up for the largest part of e-commerce sales to private consumers, followed by electronics, computers and computer accessories (including software downloads, etc.). Mobility services such as train and plane tickets and travel services such as hotel bookings are also commonly purchased online. For B2B e-commerce, ICT equipment, food[66] and beverages were the most common product categories, followed by office supplies.

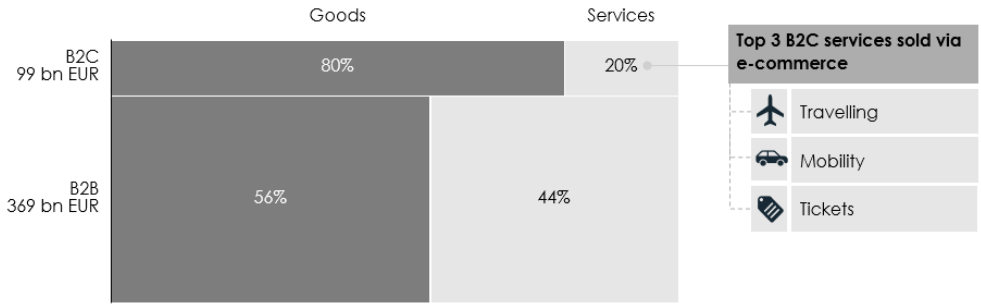
63 Our definition of B2B e-commerce excludes transactions via Electronic Data Interchange (EDI).
64 This is roughly in line with an estimate of global B2B e-commerce sales in 2018 being about two to three times as large as B2C e-commerce sales. See UNIDO (2019), p. 14.
65 The estimate of B2B e-commerce revenue by IFH suggests that, excluding EDI, B2B e-commerce revenue makes up about 6% of total revenue in the industries considered and about 8% of the revenue in the wholesale industry. Compared to that, the share of B2C e-commerce in the retail industry is estimated at about 11% in 2019. See HDE (2020).
66 Sale of food, drinks and tobacco, excluding catering.

### Goods and services sold online

With an **overall service share of revenues amounting to 39%,** e-commerce sales of goods exceed the sale of services, but by considerably less so for B2B transactions. While about 80% of total B2C e-commerce sales are goods (including digital goods such as e-books and music downloads), only 56% of total B2B e-commerce is trade in goods, see Figure 13. **B2C services,** such as holiday packages, train tickets and car-sharing thus **account for only about 20% of total B2C e-commerce sales**[67]. **For B2B sales, this share is about twice as large, at 44%.** Much of this revenue is likely to consist of services that accompany products, such as equipment maintenance, as more than 90% of B2B product sales come with more or less customised services[68].

The relative importance of services in B2B e-commerce resembles the dynamics in overall B2B sales: The largest 10 service industries (excluding financial services and public administration) accounted for about 45% of total B2B sales in Germany in 2014[69]. Moreover, services have become more important over the past years in ever more digitalised economies. For Germany, this is particularly the case for its large manufacturing industry, where an ongoing *servitisation* has meant that manufacturing companies are increasingly relying on services as inputs[70]. The relatively large share of services in B2B e-commerce reflects this growing importance of services in overall B2B trade.

**Figure 13**
**Share of revenue in e-commerce from goods and services in 2019**
Percent of total direct revenue




Note: The revenue from services in B2B e-commerce for 2019 is estimated based on the share of revenue from goods in manufacturing and wholesale in 2018 from IFH (2019).
Source: Copenhagen Economics based on Bevh (2020) and IFH (2019).

## 3.2 AN INCREASINGLY IMPORTANT ECONOMIC FACTOR

The footprint of e-commerce on the German economy documented above can be expected to increase over the coming years. E-commerce has been an important driver for economic performance during the Covid-19 crisis and will benefit from the investment in digitalisation across German

67 The services contained in this estimate are mostly made up of non-digital services, such as train tickets, hotel bookings and financial services as well as some subscription-based services that are not included, see appendix for details.
68 Internal estimates by Mercateo.
69 This estimate is based on the input-output table from WIOD which is only available with a time lag. The table is structured around industries, so an exact split of goods sales compared to services sales cannot be made. However, predominantly looking at service industries provides a good indication of the service sales between businesses.
70 See Copenhagen Economics (2018) for a detailed description of this development. Typical B2B services in manufacturing include engineering and consulting services, transportation, retail services as well as maintenance services.

businesses made throughout the crisis. This adds to the already positive development in e-commerce, as outlined in the section below.

## Development of e-commerce over the past five years

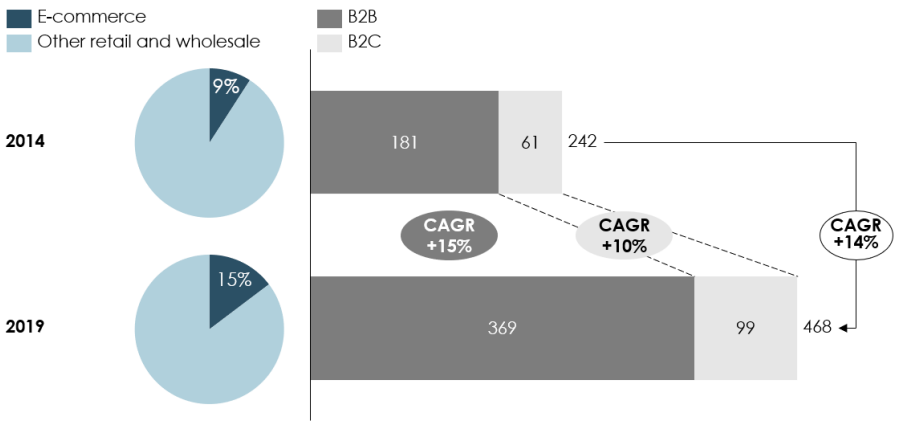
Over the past five years, revenue in e-commerce has been growing substantially: The average compounded annual growth rate **(CAGR) of e-commerce in Germany amounted to about 14%** between 2014 and 2019, see Figure 14. While **B2C revenues grew by about 10% annually**, **B2B revenues grew by more than 15% per year** over the past five years. Though the online penetration is still lower in the B2B area, the development implies that B2B is catching up with B2C e-commerce.

The e-commerce growth rates have exceeded revenue growth in other related sectors. Comparing the development of e-commerce sales to the development in the entire retail and wholesale sector shows that e-commerce revenue has grown at a higher pace. We estimate that **the share of e-commerce in retail and wholesale grew from about 9% in 2014 to about 15% in 2019**, see Figure 14[71]. This underlines the growing importance of e-commerce in the German economy.

**Figure 14**
**Development of B2B and B2C e-commerce, 2014-2019**

**Share of wholesale and retail**
Percent

**Revenue in B2B and B2C**
Billion EUR




Note: B2C exports in 2014 are estimated based on the annual growth rate in the share of exports in B2C e-commerce between 2018 and 2019 from E-commerce Europe; see appendix for details.
Source: Copenhagen Economics based on Bevh (2020), IFH (2013, 2019) and DESTATIS (annual statistics of wholesale and retail trade)

[71] This percentage depicts the share of the sum of B2B and B2C sales in the respective year in the entire retail and wholesale sectors (with sector codes WZ08-46 and WZ08-47 according to the classification of sectors in the German economy from DESTATIS). Since the wholesale and retail sectors exclude services, B2B and B2C sales also exclude services for the calculation of these shares.

One reason for the higher growth rate in B2B e-commerce compared to B2C is that development towards e-commerce has been slower in the past. Through shifts in the behaviour of private consumers, B2C has become increasingly digital, whereas B2B companies seem to have invested less in a digital sales channel[72]. This is also exemplified by the relatively late start of Amazon Business in Germany in 2016, compared to Amazon's B2C shop which was launched in Germany in 1998.

The development of e-commerce combined with the impact of the Covid-19 pandemic on the structure of the German economy and on consumer behaviour suggests that e-commerce will play an even bigger role in the German economy in the future.

[72] For example, see Netz98 (2020)

CHAPTER 4

# THE JOURNEY AHEAD

Throughout this report we have established the economic importance and impact of e-commerce in the global as well as the German economy. Given the development within the last five years and in particular during the Covid-19 crisis, it is likely that e-commerce will become an even more important economic factor in the future. But what will drive this development, and which key trends will shape the area within the next five years?

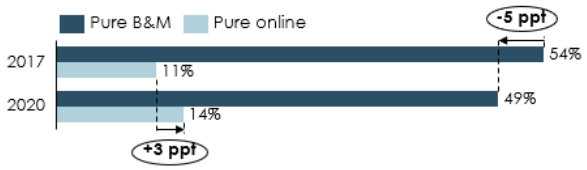
Section 4.1 looks at the potential drivers of the shift towards e-commerce and explains how the health crisis has impacted the area and emphasised the importance of the digital channel. We conclude the study in Section 4.2 with our perspectives on trends that will be shaping the area in the years to come.

## 4.1 THE SHIFT TOWARDS DIGITAL

The shift towards online commerce is likely to be driven by demand as well as supply. Today, consumers expect businesses to be present online. In 2019, **87% of German consumers stated that they expect companies to have an online portal for customer service**[73], and 71% made at least one online purchase in the last three months[74].

The online model is preferred by many companies, and the new opportunities in online selling drive more companies to choose the online model. Within the last three years, the **share of companies with a pure online business model in Germany increased by 3-percentage point** while the **share of companies with a pure B&M model declined by 5-percentage point**, see Figure 15.

**Figure 15**
**Sales channels in Germany**
Percent of companies




Note: Based on survey of about 2,000 (2017) and 1,500 (2020) companies. Values for 2020 are based on surveys conducted between January and May 2020
Source: DIHK & ibi research (2020): *Der Deutsche Einzelhandel 2020*

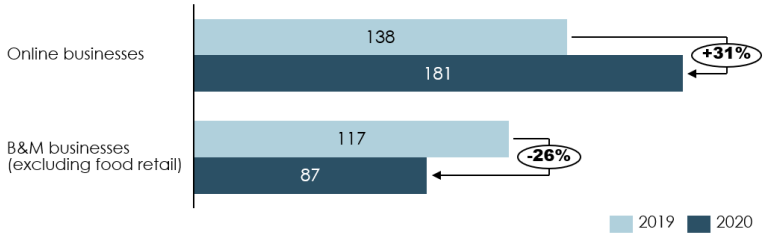
### Economic resiliency through Covid-19

The restrictions imposed by governments in efforts to contain the spread of Covid-19 have had adverse effects on private businesses and economies globally. In addition, consumer uncertainty has increased, reducing the demand for many non-essential goods and services, which has exacerbated

[73] See Microsoft (2019) p. 47.
[74] Number from 2019. Eurostat data (isoc_ec_ibuy) accessed on December 1st, 2020. The EU average was 49% in 2019

the situation for many businesses. Generally, e-commerce businesses have shown to be more resilient than traditional brick & mortar businesses on a global scale in the face of the pandemic and economic turbulence that has followed. This has also been the case in Germany where **online businesses saw a 31% increase in their revenues** in April 2020 relative to April 2019, while **B&M businesses have seen a 26% decrease in revenues** over the same period, see Figure 16.

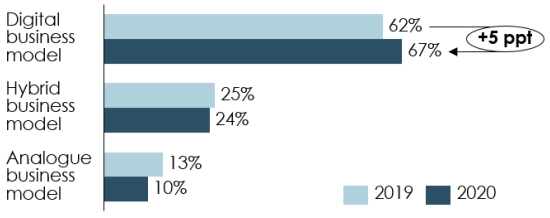
**Figure 16**
**German retail business revenue**
Million EUR, constant prices




Note: B&M retail revenue excludes food retail.
Source: DESTATIS (monthly retail statistics) based on April 2020 and 2019 data for 'retail sale via mail order houses or via Internet' and 'Retail sale in non-specialised stores (excluding food)'.

In particular, Covid-19 has demonstrated the importance of e-commerce as a channel to ensure a continuity of activities and revenue flows. For many businesses, the transition towards e-commerce has become an essential part of their overall strategy in an increasingly digital world, where a number of pure B&M players are losing market shares, being more exposed in times of crisis[75]. This is reflected in the business models of start-ups in Germany, where an increasing majority are operating through digital business models, see Figure 17. In particular in 2020**, 67% of new start-ups operate through digital business models**, which represents a **5-percentage point increase**, compared to the year before.

**Figure 17**
**Start-up business models in Germany**
Percent of businesses




Source: Deutscher Startup Monitor 2019 and 2020.

75 OECD (2020).

The important role of e-commerce for businesses during the Covid-19 pandemic is also exemplified by the case study in Box 4, which illustrates how e-commerce provides businesses with a way to deal with the negative consequences of the Covid-19 pandemic.

**Box 4 Moving online with Zalando**

With Covid-19 limiting the mobility of consumers and the ability of B&M stores to sell to their customers, more and more businesses are shifting towards digital business models. However, transforming from an analogue business model to a hybrid or a fully digital business model is typically a resource-intensive exercise.

Zalando has accommodates this reality for many non-digital fashion retail businesses with the Connected Retail program, which eases the process for B&M retailers to set up an online business and sell to their customers directly through the Zalando platform.

B&M retailers benefit from an easy set-up process, online content, payment services, customer care and dedicated B2B support from a personal account manager. This means that B&M stores do not have to bear the expenses associated with setting up an online shop, but still maintain control over their stock volumes, prices and discounts.

During the course of 2020, Zalando has expanded the Connected Retail program into new European countries in an effort to support more B&M retailers across Europe. Currently, the program is in place in eight European countries, including Germany, The Netherlands, Denmark, Norway, Finland, Sweden, Spain and Poland, serving over 2100 retailers and averaging 6400 orders a day.

Source: Zalando Corporate

On an aggregate level, e-commerce has been paramount to many economies around the world during the Covid-19 crisis, including the German economy. E-commerce has been an important maintainer of demand on a macroeconomic level, and particularly during periods of strict restrictions when many physical businesses were temporarily closed. Going forward, Covid-19 will likely be a long-run catalyst for the digital transformation of many economies, where e-commerce businesses will play an ever-increasing role in total economic output.

## 4.2 KEY DEVELOPMENTS WITHIN THE NEXT FIVE YEARS

Looking ahead, e-commerce is expected to become an even more important factor in the global as well as the German commerce landscape. The online channel is likely to influence the development within commerce through technical advancements combined with the ever-increasing focus on the customer.

Below we briefly outline some of the trends expected to dominate e-commerce in the coming years.

### Technical advancements of commerce

Technical advancements within augmented reality (AR) are likely to be leveraged further in the coming years in order to enhance the online customer experience. This will allow customers to experience products in ways that resemble the experience at physical shops, potentially allowing a larger variety of goods to be traded online[76].

As a part of the wider trend around voice technology, voice commerce, chatbots, smart home assistants and voice recognition systems are also expected to spread in the e-commerce arena. There will be a growing volume of voice search, which will pose even more requirements on e-commerce businesses to adapt[77].

Artificial intelligence (AI) generally refers to intelligence demonstrated by machines as opposed to humans or animals. AI is influencing the development within several areas of the economy, and e-commerce is no exception. Going forward, AI will be even more important for e-commerce companies to learn and adjust to individual customer preferences[78].

### Moving even closer to the customer

Customer centricity and individual customer journeys will be important focus areas of businesses within e-commerce going forward, where businesses increasingly expected to understand and adapt to customers in real time. Social commerce through social media (SoMe) is expected to grow further through platforms such as Facebook Marketplace, where transactions are facilitated in a format that is familiar to customers[79].

In many areas of the economy, sustainability trends are booming partly or fully driven by customer preferences to which e-commerce is no exception. The unique opportunities provided by the online channel across sharing economy platforms and C2C 're-commerce' are expected to continue their growth path[80].

The change from the push-driven to the pull-driven approach[81] has potential for further customisation of products driven directly by demand. D2C commerce will enable further integration between demand, business development and production, driving a more customer centric approach throughout the value chain. The online shopping experience is also expected to be personal, where recommendations are based on individual behaviour, for example[82].

In summary, customer centricity leveraging technical advancements will be a key factor in taking e-commerce further in the coming years, where the online channel is expected to take on an even more important role in the space of commerce in Germany as well abroad.

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76 For example, see Forbes (2020).
77 For example, see Big Commerce (2020).
78 For example, see Big Commerce (2020).
79 Based on Copenhagen Economics project experience within the area of social media.
80 For example, see Core DNA (2020).
81 See Chapter 2.1 for elaborations.
82 For example, see Oberlo (2020).

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APPENDIX A

# ESTIMATION OF THE ECONOMIC FOOTPRINT OF E-COMMERCE IN GERMANY

In this appendix, we briefly go through the methodology for calculating the economic footprint of e-commerce in Germany referenced primarily in Chapter 3. of this report. For further elaborations on methodology and sources, we refer to the extended appendix[83].

Estimates cover B2B and B2C sales and encompass both direct and indirect effects. Direct estimates refer to revenue, value added and employment attributable directly to e-commerce companies, whereas indirect estimates refer to economic activity supported by the e-commerce companies along their supply chains. The estimates cover the sale of goods and services online, either via online shops or marketplaces. It excludes transactions based on orders by e-mail, post or phone. E-commerce exports by German companies are included, whereas imports are excluded.

Table 1 shows an overview of the results.

**Table 1**
**Overview of e-commerce estimates, 2019**

| Indicator | B2C including exports | B2B including exports | Total |
|---|---|---|---|
| Direct revenue (excluding VAT) | €99bn | €369bn | €468bn |
| Indirect revenue (excluding VAT) | €64bn | €222bn | €286bn |
| Direct GDP contribution | €15bn | €50bn | €65bn |
| Indirect GDP contribution | €9bn | €26bn | €35bn |
| Direct employment, number of people | 243,800 | 524,900 | 768,700 |
| Indirect employment, number of people | 134,000 | 353,700 | 487,700 |
| E-commerce companies | 25,700 | 11,300 | 37,000 |

Note: B2C denotes sales from companies to private consumers. B2B denotes sales from one business to another. The numbers are rounded and include both goods and services e-commerce. B2B data exclude EDI. Numbers are reported excluding VAT. Exports are included.
Source: Copenhagen Economics based on the sources listed in this appendix, see methodology below.

All estimates are cross-checked against relevant literature and data sources[84], and we find that our results are in line with these sources. For elaborations, we refer to the extended appendix[85].

The direct revenue estimates refer to the sales undertaken via e-commerce to final consumers (B2C) and to businesses (B2B). The B2C e-commerce revenue estimate is based on a survey of about

[83] Bevh can supply an extended version of the appendix.
[84] Revenue estimates are cross-checked against estimated from HDE and DESTATIS, value added estimates are cross-checked using information from selected annual reports of e-commerce companies as well as data from WIOD, employment estimates are cross-checked with estimates based on data from DESTATIS as well as data from selected annual reports.
[85] Bevh can supply an extended version of the appendix.

40,000 German final consumers commissioned by Bevh. The survey covers both goods and services sold online either via an online shop or a marketplace, but excludes sales by private sellers on these marketplaces and e-commerce exports.[86] We add e-commerce B2C exports to this revenue estimate by using a recent estimate of the magnitude of e-commerce B2C exports.[87] This results in our estimate of B2C e-commerce revenue of **€99bn.**

We estimate the B2B e-commerce revenue based on IFH results (2019) from 2018.[88] We extrapolate this estimate to 2019 using the annual growth rate in B2B e-commerce revenue between 2012 and 2018. This results in our estimate of B2B e-commerce revenue of **€369bn**.

The direct employment estimates refer to employment within the B2C and B2B e-commerce industries. These estimates are calculated based on the revenue per employee in e-commerce intensive industries within retail and wholesale. For B2C, the data on revenue per employed are from DESTATIS for the retail sector (via mail order houses or via internet). This results in our estimate of direct employment in B2C e-commerce of about **243,800**. For B2B, we apply the same methodology, but revenue per employee is based on the 10 sub-sectors within wholesale with the highest share of e-commerce. This results in our estimate of direct employment in B2B e-commerce of about **524,900.**

The GDP contributions of B2C and B2B e-commerce are based on estimates of the share of e-commerce value added (profits and wages) compared to total e-commerce revenue in the retail and wholesale industries. Data are from DESTATIS (annual statistics of wholesale and retail trade) and the resulting GDP contribution estimates are **€15bn** and **€50bn** for B2C and B2B e-commerce, respectively.

The number of e-commerce companies are based on results from 2015 and 2016 for B2C and B2B respectively.[89] We estimate the number of B2C companies in 2019 based on the excess growth in employment in the period 2015-2019 compared to the period of 2012-2015 where the number of companies was estimated to be almost constant. This yields our estimate of about **25,700** B2C e-commerce companies in 2019. The number of B2B e-commerce companies is estimated based on a development in the number of employees per company that resembles the B2C trajectory. This yields our estimate of **11,300** B2B e-commerce companies in 2019.

The indirect revenue, GDP contribution and supported employment measure economic activity indirectly supported in the supply chains of e-commerce companies. The estimates are based on our input-output model, which uses the input-output table from WIOD - expanded by the B2C and B2B 'e-commerce industries' - to estimate so-called 'indirect multipliers'. To achieve that, the model uses the interlinkages between the different industries in the German economy and matrix calculations. The indirect estimates are obtained by multiplying direct estimates with these indirect multipliers.

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86 The B2C e-commerce survey does not include financial services. It also excludes certain subscription-based services such as LinkedIn memberships or subscriptions to online dating platforms.

87 See Cross-Border Commerce Europe (2020), available here. The estimate is based on the 500 largest European cross-border retailers.

88 This estimate of B2B e-commerce revenue excludes financial services, public administration, agriculture, mining, healthcare and some other smaller industries. This includes manufacturing, wholesale, construction, energy and water supply, transport, ICT, and some other smaller industries.

89 The B2C estimate is 25,200 from bevh (2018) and only counts companies with e-commerce as their main activity. The B2B estimate is 5,500 from Bevh & Creditreform (2017) and counts those companies with a B2B online shop.