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THE IMPACT OF E-COMMERCE

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Thorsten F.J. Seeber

TH Aschaffenburg

18.12.2019

Thorsten F. J. Seeber

The impact of E-commerce on logistics real estate in Germany

Assignment from:

Thorsten F.J. Seeber

Dipl.-Btw. | Immobilienökonom

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Author:

Herr Thorsten F. J. S e e b e r

Aschaffenburg | Germany

University of applied sciences Aschaffenburg

TECHNISCHE HOCHSCHULE ASCHAFFENBURG

FAKULTÄT WIRTSCHAFT UND RECHT

WÜRZBURGER STRASSE 45

D-63743 ASCHAFFENBURG

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1. List of Abbrevations

B2B	BUSINESS TO BUSINESS
B2C	BUSINESS TO CUSTOMERS
FTC	FREIGHT TRANSPORT CENTRE
GDC	GOODS DISTRIBUTION CENTRE
LC	LOGISTICS CENTRES
DC	DISTRIBUTION CENTRE (DC):
TC	TRANSHIPMENT CENTRE (TC) (CROSS DOCKING):
CD	CROSS DOCKING
FDC	FREIGHT DISTRIBUTION CENTRE
DDP	DISPATCH WAREHOUSE
RFID	RADIO FRECQUENCY IDENTIFICATION

2. Introduction

E-commerce and logistics are playing an increasingly important role in the modern economy. The supply of consumer goods to private households and the supply of economic goods to companies is an integral part of today's economic life without online commerce. The ever-increasing share of e-commerce in the total movement of goods has had serious consequences and brought about changes.

This applies in particular to the requirements and new tasks that logistics real estate in Germany has to fulfil.

Previous logistics property types and forms of operator will lose importance in the medium term. New property standards will prevail in the market with regard to technical equipment, ecological requirements, location and size of the property.

The use of modern and digital technologies (RFID technology, artificial intelligence, virtual reality, drone logistics, street hubs, big data, etc.) in logistics properties is indispensable for the successful and sustainable fulfilment of all requirements.

These are necessary to solve problems such as last mile, environmental protection, inner-city traffic and the intelligent development of logistics infrastructures in a sustainable and efficient way.

The author of this scientific work has been working in the field of development and strategic consulting for logistics real estate for more than 20 years.

The focus of this work is on e-commerce, logistics real estate and the influence of e-commerce on logistics real estate in Germany.

E-commerce will be of increasing importance for the logistics real estate industry in Germany. The aim of this scientific work is to analyze the increasing influence of e-commerce on the logistics real estate industry in Germany.

3. E-commerce

3.1 Defining E-commerce

The definition of e-commerce gives rise to a variety of - not conclusively defined - response options. The literal and meaningful translation signifies that e-commerce refers to the automated execution of transactions via electronic networks in the sense of online shopping[1]. There is currently no clear and generally accepted definition of the term e-commerce. The reason for this is that e-commerce is a relatively new topic in both economic and social terms. In addition, there are various application areas for e-commerce, which is also reflected in the large number of definition approaches. A comprehensive definition that covers most facets is:

> *"E-commerce is the electronic management of business pro-cesses and transactions between business entities via electronic networks."*

3.2. Factors influencing change

3.2.1 Changes in consumption behaviour

E-commerce turnover increased from 1,000,000,000 EURO in 2000 to over 53,000,000,000 EURO in Germany in 2018. If the years 2017 and 2018 are considered in isolation, e-commerce turnover increased by 4,400,000,000.000.- EURO in this period by itself. The forecast for 2019 is for a further increase of EUR 4,500,000,000.000 (Appendix 1)[2]. In the coming years and decades, this development will result in increasing demand for logistics services - especially in the CEP sector - and will increase the demand for online trade-specific logistics properties.

The inhabitants of Germany, Great Britain and France are responsible for 70%[3] of Internet retail sales in Europe. It is also forecast that this growth will be exceeded again in the next three years[4]. In 2015, 47 million people in Germany purchased or ordered goods or services for private consumption via the Internet. This corresponds to 77%[5] of Internet users aged ten and over, an increase of around 20% compared to 2010, when around 39 million private consumers purchased goods and services online. This trend shows that consumer behaviour is increasingly shifting from offline to online[6].

Retail companies, especially the large online market players, have taken advantage of the new framework conditions in recent years and developed better interaction behaviour with customers. This offers advantages for both the company and the consumer. Consumers can compare prices more easily and easily and save time and money. Retailers, on the other hand, can present more and better their inventory. It has also been proven that consumers spend more money in less time than in offline retailing because they can quickly switch between product types[7].

3.2.2. Development of shipping models

In view of the growth of online commerce through e-commerce, almost all delivery models were further developed and improved. In order to compete with their competitors, online companies were required to adapt their delivery models to the individual needs of their customers.

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[1] See Weber, (2002), p. 43.
[2] See HDE Handelsverband Deutschland Online Monitor, (2019), p. 6
[3] See Statista, (2015)
[4] See Münchow, (2016), p. 50
[5] See Destatis, (2016)
[6] See Destatis, (2016)
[7] See Münchow, (2016), p. 50

The main changes that online merchants had to adapt to are faster delivery speeds. More than 30%[8] of large retailers already offer next-day delivery. 10%[9] of online retailers already offer same-day delivery. The customer also has more options to specify specific delivery times or fixed delivery days, which can increase the price for the trade and delivery. However, the free delivery model that has been widespread so far is not considered sustainable by many. This model is tempting consumers to order many items of clothing in different sizes and colours, for example, and send them back what doesn't fit or doesn't like. This will lead to companies opting for the so-called "free but not free model", which requires a monthly threshold to ensure free and fast delivery to the customer.

[8] See Münchow, (2016), p. 50
[9] See Münchow, (2016), p. 50

4. Logistics Real Estate

4.1. Defining Logistics Real Estate

There is no standardized definition of the term logistics real estate in the technical literature[10]. All real estate used for storage, distribution and picking of goods - in the broader sense - is referred to as logistics real estate[11].

In the narrower sense, the definition is limited exclusively to real estate used for the short-term and immediate storage, distribution and order picking of goods. Mainly in the international specialist context, there is no uniform assignment of logistics real estate to industrial or commercial real estate. In German-speaking countries, warehouses are primarily assigned to industrial real estate and logistics real estate to commercial real estate[12].

By contrast, in Anglo-Saxon parlance, both warehouses and logistics properties are referred to as industrial properties[13].

Logistics real estate can be further distinguished from other types of real estate by its use, location and size.

In general, logistics properties are located at transport hubs and are used by companies for commercial purposes.

A minimum size of 5,000- 10,000m ² and a clear room height of 10 to 12 metres characterise the logistics properties managed as operator properties. By definition, the term operator property means that the management of the property is taken over by the user. In Europe, logistics properties are classified in the "Core Plus" risk category[14].

4.2. Types of Logistics Real Estate

Logistics properties can be characterised by their macro- and micro-location as well as by their specific features. There are various criteria and factors to classify the multitude of characteristics of logistics properties[15].

The differentiation can take place on different levels. On the one hand, it is possible to differentiate between logistics properties with regard to their use (for example, between production and disposal), and on the other hand, a distinction can be made between their use for procurement and distribution logistics[16].

Specific and process-oriented real estate is mostly necessary within production and disposal logistics. Real estate procurement and distribution logistics are subject to a relatively uniform standard. Third-party usability is thus significantly higher in the latter area. However, there are exceptions in the use segment of procurement and distribution logistics, such as in the area of high-bay or refrigerated warehouses[17].

The following technical terms refer to the different types and characteristics of logistics real estate. In some cases, these terms are used interchangeably. The characteristics of a logistics property are defined by the designation of its individual characteristics, for example with regard to use, technical

[10] See Steinmüller, (2003), p. 173
[11] See Bömer-Kleindienst, (2006), p. 453
[12] See Walzel, (2005), p. 120
[13] See Benjamin/Zietz/Sirmans, (2003), pp. 279-323
[14] See Schulte, Immobilienökonomie, (2008), p. 240
[15] See Ehrmann, (2003), p. 28
[16] See Ehrmann, (2003), p. 28
[17] See Schulte, (Immobilienökonomie), (2008), p. 240

interior design, type of stored goods, location of the logistics property, disposition of manpower, accessibility and the sum of building complexes[18].

These are essential in order to understand all current and future requirements of logistics properties.

4.2.1 Freight transport centre (FTC): FTC serve logistics service providers and transporters to optimise the transport of goods. They are located at the interfaces of different modes of transport. The central unit is the transhipment facility[19].

4.2.2 Goods distribution centre (GDC): A goods distribution centre is used for picking incoming goods and for customer-specific distribution to branches and/or production sites. The classic operators of a goods distribution centre are companies from industry and commerce[20].

4.2.3 Logistics centres (LC): A logistics centre is a mixed form of goods distribution and goods traffic centre. It is characterised by a wider range of logistical functions and activities[21].

4.2.4 Distribution centre (DC): A distribution centre is almost identical to a supply centre in terms of logistics services. The difference can be seen in the fact that the operator is not himself the company from trade or industry, but that these properties are operated by a service provider[22].

4.2.5. Transhipment centre (TC) (cross docking): The task of a transhipment centre is the pure transhipment of goods from long-distance to local traffic and vice versa[23].

4.2.6 Freight distribution centre (FDC): In order to achieve route-optimised delivery to the respective recipients, one or more manufacturers use the FTC as a large-area warehouse for goods and products[24].

4.2.7 Dispatch warehouse (DDP) and courier, express and parcel depots (CEP): The CEP and the DDP are used to compile the parcel dispatch and as a collection point. The courier, express and parcel logos are processed in CEP depots. CEP depots usually have no ramps. Parcel sorting systems with corresponding entrances and, above all, multiple exits are installed in the halls[25].

4.3. Development of the logistics business area

Over the last five years, the trend of an almost annually growing volume of finished projects has manifested clearly. After a new all-time highs were reached in 2016 and 2017 respectively, a downturn in new space access compared with the previous year was recorded for 2018 for the first time since 2015[26]. Although the first quarter was the strongest since market observation began, the new construction volume was still below the 4,000,000 m²[27] mark due to a comparatively restrained second half of the year with a good 3,900,000 m²[28] of new logistics space. (Appendix 2)[29].

This represents new space in logistics properties of just under 24,000,000 m²[30] between the years 2013 and 2018.

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[18] See Sommerer (1998), pp. 72-82
[19] See Schulte, (2008), p. 241
[20] See Schulte, (2008), p. 241
[21] See Schulte, (2008), p. 241
[22] See Schulte, (2008), p. 242
[23] See Schulte, (2008), p. 242
[24] See Schulte, (2008), p. 242
[25] See Schulte, (2008), p. 242
[26] See Feld, et al., (2019), p. 146
[27] See Feld, et al., (2019), p. 146
[28] See Feld, et al., (2019), p. 146
[29] See Konsortialstudie der bulwiengesa AG mit Berlin Hyp, Bremer AG, Garbe Industrial Real Estate GmbH und Savills, (2018)
[30] See Feld, et al., (2019), p. 146

The result of new construction in 2018 is on a level with the average new construction volume in the timeframe from 2013 to 2017. The first quarter of 2018 was characterised by a particularly high new construction volume, with substantially more than 1,000,000 m² of new logistics space. Looking at the spaces in the pipeline for 2018 and 2019, it can be assumed that construction activity will remain high.

The continuing high demand for logistics space will keep new construction activity at a high level in 2019. In particular in the A-cities and more and more also in their suburbs, which are often already characterised by demand surpluses and strong competition for logistics properties, potential areas for new construction developments are limited.[31]

[31] See Feld, et al., (2019), p. 146

5. The impact of E-commerce on Logistics Real Estate

One of the key factors behind demand is the rapidly growing e-commerce business. As a result of the rising demand volume, new areas are often needed to handle the linked logistics processes. The impact of structural changes through globalisation, digitalisation and new consumption paradigms does not stop at the other logistics segments. A mixture of the most diverse influencing elements comes into play, including increasing flexibility, rising cost pressure and the consequences of urbanisation. In order to be prepared for the present and future challenges, it is necessary that the location, technical building equipment and space concept of logistics properties can meet the requirements of the respective users[32]. The following factors should be mentioned here.

5.1. Business to business (B2B) and Business to customers (B2C)

The previous distinction between (B2C) (commercial transactions between companies and end customers) and (B2B) (commercial transactions between companies) is becoming increasingly blurred in the course of digitalisation. Manufacturers and merchants who were previously mainly active in the B2B sector are now increasingly operating online shops and are therefore also increasingly active in the B2C sector[33].

Especially in the B2C sector, this development leads to an increase in the business activities of CEP service providers. The growing relevance of the CEP sector is also reflected in the sharp rise in annual shipments. Between 2000 and 2015, the annual volume of consignments will increase by around 74%[34] from just under 1,700,000,000[35] consignments to around 2,900,000,000[36] consignments. The market volume is expected to grow to over 3,800,000,000[37] consignments by 2020 (Appendix 3)[38] . In addition to the increasing exchange of goods in the commercial sector, the main drivers of this increase are the strong expansion of Internet trade.

In most cases, however, the existing portfolio properties do not meet the structural and technical requirements of the CEP service providers. This development thus leads to the construction of new, suitable logistics properties and a dynamic demand for suitable space[39].

5.2. RFID (Radio Frecquency Identification) technology

The (RFID) technology makes it possible to store a lot of information (Big Data, Internet of Objects) on a transponder. This can be done by direct implementation on the goods or in the form of a sticker. All necessary data can be recorded contactlessly (if necessary also via GPS).

RFID technology is closely linked to the logistical requirements of e-commerce and thus also directly to the requirements and above all to the location of a logistics property. RFID technology has functions such as: controlling goods through the supply chain, location and status reports, sorting out expired goods, storing the temperature and price required for a product[40].

[32] See Feld, et al., (2019), p. 146
[33] See Nölling, Kompendium der Logistikimmobilie, (2016), p. 100
[34] See BIEK, KEP-Studie, (2016), p.11ff
[35] See BIEK, KEP-Studie, (2016), p.11ff
[36] See BIEK, KEP-Studie, (2016), p.11ff
[37] See BIEK, KEP-Studie, (2016), p.11ff
[38] See BIEK, KEP-Studie, (2016), p.13
[39] See Schulte, (2008), p. 242
[40] See Schulte, (2008), p. 244

5.3. Requirements for logistics real estate

In the construction of new logistics facilities, attention must be given to the prevention of structural irregularities. Otherwise it could lead to radio wave deflection, which would prevent an automated flow of goods[41].

Increasing technisation and digitalisation will change the building structures of logistics properties. Single-storey logistics properties that are currently in line with the market can become less efficient than, for example, high-bay warehouses. More expensive plots of land could also become interesting for logistics properties due to the lower space requirement, and logistics property locations close to the city centre could thus gain in importance[42].

The logistics property must enable optimum inward and outward transfer of shipments and their sorting. In order to meet the highly complex requirements of logistics tasks, all processes in the logistics property must be kept efficient, standardised and automated (RFID, Internet of Things).

The real estate must also make the heart of the logistical processes, the sorting system and the storage systems usefully usable and link them with each other[43].

Against the background of the extended value chain and the further increase in e-commerce, the demands placed on logistics properties have increased. For example, additional space will be required for order picking and storage as well as for the provision of production goods. In addition, there will be high demands on technology and technical equipment. Without these, the fully automated control of the logistics process cannot be guaranteed. In addition, an adequate ceiling height and load-bearing capacity as well as a good connection to the respective modes of transport and to the end consumers and customers are still obligatory and necessary[44].

5.4. Location factors

In view of the rapid growth of e-commerce, the fundamental issue is the often demanded proximity of logistics to the consumer. The spatial effect here is the accelerating process of relocation of logistics networks to densely populated conurbations and their peripheral areas[45].

RFID technology will increase the level of automation further. As a result, fewer employees will be required to operate a logistics facility. As a consequence, the labour potential of a region is less important for the selection of locations for logistics properties[46].

Online companies and CEP service providers are increasingly looking for suitable distribution centres (hubs) - also in inner-city locations - and are changing their usage requirements from large-scale logistics properties to smaller logistics properties for the distribution of goods on the "last mile" to the customer. The so-called "cascading system"(Appendix A4)[47]. is the current solution. Large central warehouses in integrated conurbations that replenish the supply warehouse on the outskirts, which in turn replenish the above-mentioned small microdepots in the inner cities.

Logistics properties in high-density conurbations can serve more people than logistics properties in peripheral locations. If, however, one considers the development of the average degree of coverage within a radius of 5 km around a logistics centre, it becomes obvious that the most important major regions do not record any significant growth. As far as the logistics market in Berlin is concerned, the development is very striking, as the average supply rate has fallen from 188,000 to 105,000 inhabitants.

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[41] See Schulte, (2008), p. 243

[42] See Schulte, (2008), p. 244

[43] See Nölling, Kompendium der Logistikimmobilie, (2016), p. 101

[44] See Schulte, (2011), p. 522

[45] See bulwiengesa (2019), Logistics and Real Estate

[46] See Schulte, 2008, S. 244

[47] See Bulwiengesa AG, Berlin Hyp AG, BREMER AG, Goodman Group, Savills Immobilien Beratungs-GmbH (2017), p. 58

The reason for this is that logistics service providers have found alternative locations further away from the German metropolis. With one location Although most consumers can be reached in a conurbation and a large city, it has become very difficult to realise new locations in inner-city locations. For this reason, logistics service providers have increasingly opted for a larger number of alternatives in peripheral locations and suburbs of large cities[48].

Freight forwarding and transport logistics naturally occupy a distinctive position in this context. This sector generates the highest space turnover by a large margin. In this context, locations within the most important logistics regions are favoured. Subsequently, it is the users from the automotive logistics and e-commerce sectors who have demanded logistics space to a large measure in recent years. In addition, the production-related logistics sectors are more frequently to be found in areas outside the major logistics regions. A look at the logistics space shows that there are significant differences between the logistics sectors, whether they are built for their own use or rented. Beverage/food logistics and industrial and chemical/pharmaceutical logistics are characterised by a higher rate of owner-occupancy. Forwarders/transport logistics and e-commerce largely rely on the leasing of logistics space in order to be able to act flexibly in their location policy[49].

It can be assumed that the rising demand for consumer goods and commercial goods from the online trade will not reach its peak by far, so that a significant growth impulse can be anticipated in this sector[50].

[48] See bulwiengesa (2019), Logistics and Real Estate
[49] See Feld, et al., (2019), p. 146
[50] See Feld, et al., (2019), p. 150

6. Conclusion

The strongly growing importance of e-commerce in the overall economic processes will continue to increase. This will have a lasting impact on all private and entrepreneurial areas of our lives, our society, our entrepreneurial activities and our economy.

Other technical innovations, such as artificial intelligence, virtual reality and VR glasses, will lead to disruptive changes. These changes have to be analysed and subsequently implemented in the logistics sector and thus also in logistics real estate.

The big challenge is to combine digiated trade and change with the real transport of goods. Intelligent interfaces and interdisciplinary close cooperation from the most diverse areas of research, sociology and economics will be necessary to meet the future requirements of consumers, companies, especially the environment and society.

After all, a logistics property is far more than a large hall with numerous gates.

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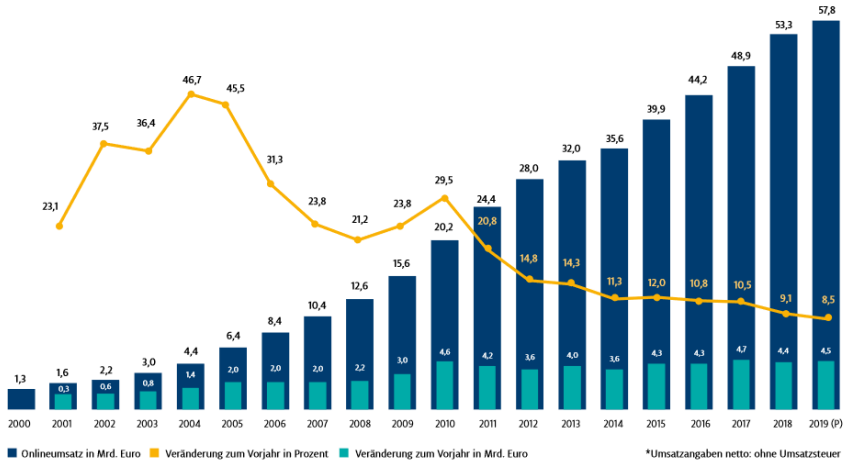
8. Appendix

Figure 1:

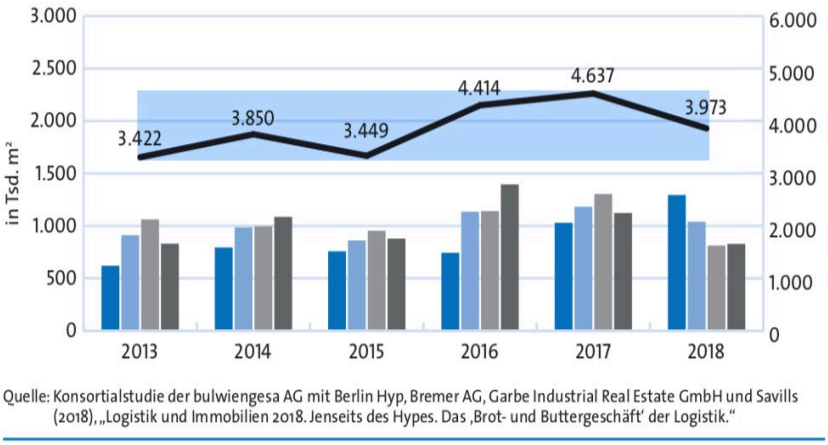
Share, change and sales volume of e-commerce in comparison to the total consumer goods trade in Germany in the years 2000 to 2019 (forecast)



See HDE Handelsverband Deutschland Online Monitor, (2019), p. 6

Figure 2:

Quarterly overview of the completed new building areas in the logistics sector in the years 2013 to 2018

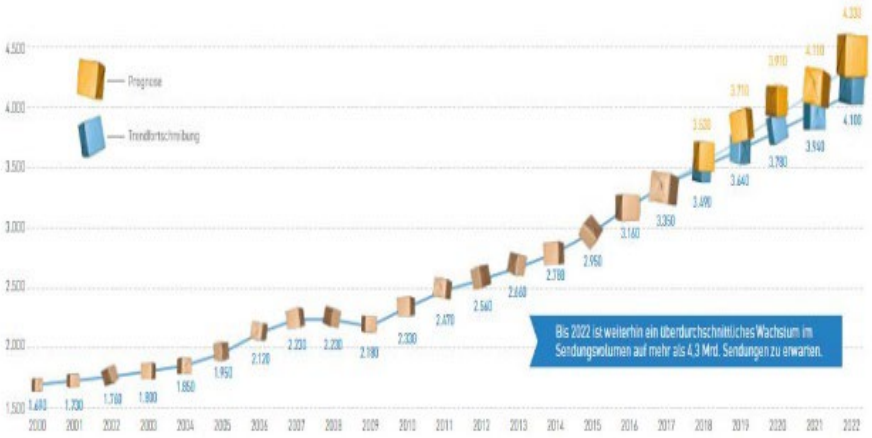


Quelle: Konsortialstudie der bulwiengesa AG mit Berlin Hyp, Bremer AG, Garbe Industrial Real Estate GmbH und Savills (2018), „Logistik und Immobilien 2018. Jenseits des Hypes. Das ‚Brot- und Buttergeschäft' der Logistik."

See Schulten A. (2019)p. 146

Figure 3:

Overview of the annual parcel volume in the years 2000 to 2022 (forecast)



See BIEK, KEP-Studie, (2016), p.13

Figure 4:

Systemic representation of the so-called "cascaden system"

Fig. 23: CASCADING SYSTEM OF CITY LOGISTICS AT A GLANCE

See Bulwiengesa AG, Berlin Hyp AG, BREMER AG, Goodman Group, Savills Immobilien Beratungs-GmbH (2017), p. 58