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REVERSE LOGISTICS OF E-COMMERCE AS A CHALLENGE FOR THE CEP INDUSTRY

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Purpose: The aim of this article is presenting the CEP market from the perspective of the development of reverse logistics in e-commerce, which has recently played an important role both from the perspective of the customer and the companies.
Design/methodology/approach: The article is based on the analysis of literature, results of secondary research and own research conducted in 2017, 2019 and 2021 among online shops and in 2021 among CEP companies. A survey of Polish e-commerce and courier companies using the CAWI technique was conducted to gather information on the behaviours, expectations and attitudes of e-customers towards making purchases and returning goods in order to identify challenges for the CEP market.
Findings: As can be seen from the data analysis, the growth of the CEP industry during the Covid-19 pandemic is undeniable and is the result of the development of e-commerce and returns services. The average annual growth of courier services by 2025 in the Asia-Pacific area will be 10.8%, in America Sem. - 5.2%, in Europe - 5.1%, and in Poland - between 7-8%. The industry therefore has to deal with an increasing number of orders resulting from online shopping, new customer expectations related to security, or the reduction of direct contact.
Research limitations/implications: The return policy in e-commerce is still a growing topic, which is the biggest challenge for both online stores and courier companies. The conducted research is a starting point for further analyzes regarding: e-customers' expectations regarding the level of service in the area of returns, cooperation between entities from the CEP industry and online stores, or the automation and support of reverse logistics processes in the CEP industry.
Practical implications: The presented research results can serve as a source of knowledge for e-commerce entities as a foundation for building a competitive advantage on the market. For courier companies, they are the starting point for designing processes dedicated to handling return logistics for e-commerce.

Originality/value: The covid-19 pandemic contributed to the acceleration of the development of the e-commerce market around the world faster than specialists had predicted. This situation forced the KEP industry to redefine the processes so as to adapt them to the new reality and respond to the growing requirements of the client. However, as the volume of online purchases increased, so did the volume of returns, which has always been a challenge for e-commerce. The conducted research showed through which activities the KEP industry redefined its role in the electronic trade.

Keywords: CEP market, e-commerce, reverse logistics, Pandemic Covid-19.

Category of the paper: Research paper.

1. Introduction

The CEP industry has become one of the most important segments of the logistics sector. Its development, but also the redefinition of its activities, is undoubtedly influenced by e-commerce, reverse logistics, and the Covid-19 pandemic. The industry faces increasing expectations that it has to address. In addition to operational flexibility, more advanced e-customer service processes and innovative solutions in the field of devices/applications that facilitate order delivery or return, as well as maintaining sanitary safety in customer service are expected. Handling the increasing number of orders resulting from online purchases is undoubtedly a challenge for the CEP industry, but the key challenge is the handling of returns, i.e. reverse logistics, which has recently become increasingly important also for logistics operators.

Reverse logistics applies to all operations related to the reuse of products and materials. This is a type of supply chain management that moves goods from customers back to the sellers or manufacturers. Usually logistics deals with the events that bring the product to the customer. In reverse logistics, the asset moves back one or more steps in the supply chain.

Reverse logistics start at the end consumer, moving backward through the supply chain to the distributor or from the distributor to the manufacturer. Reverse logistics can also include processes where the end consumer is responsible for the final disposal of the product, including recycling, refurbishing or resale. The goal of reverse logistics is to recover value and ensure repeat customers. Less than 10% of in-store purchases are returned, compared with up to 40% of products ordered online (Courtney, 2019). Operative companies use reverse logistics to build customer loyalty and repeat business, and to minimize return losses.

Currently, according to the report *Reverse Logistics Market by Return type and End User: Global Opportunity Analysis and Industry Forecast, 2018-2025*, the global reverse logistics supply chain is valued at $ 415.20 billion and is projected to reach over $ 600.00 billion by 2025. Worldwide, returns are worth almost a trillion dollars annually and have become increasingly common with the growth of ecommerce. These predictions regarding the

development of the Reverse Logistics area are not surprising when you look at the parcel delivery market. Statista, a company that provides market and consumer data, provides data and forecasts for global package volume. In 2019, this number amounted to approximately 103 billion parcels and it is expected that by 2026 this volume will more than double - to 262 billion parcels sent (Placek, 2022). In Poland, the market of courier, express and parcels is also developing rapidly. In 2018, it was worth PLN 6.95 billion, which means an increase of 60% compared to 2014. Forecasts say that in 2023 the operators of this market will handle almost 850 million parcels, and the market value will reach nearly PLN 12 billion (The CEP market in Poland in the face of trends and new challenges).

As online sales boom, there's an inevitable side effect: More merchandise is getting returned, boosting costs and complexity for retailers. Not being able to see an item in person accounts for part of the difference, but consumers also shop differently online than in store. They may order multiple sizes or colors to try on at home, and then ship or take back what they don't want, with shipping paid for by the retailer, both ways in some cases.

Average return rates vary by category, but clothing and shoes bought online typically have the highest rates with 30 to 40 percent returned. In the next several years, as e-commerce grows globally, the amount of returns is going to be over a trillion dollars a year (Courtney, 2019).

Another factor adding to rising returns is more relaxed return policies. As retailers fight for market share in an increasingly competitive industry, return policies are allowing longer windows to bring back items. Also, retailers are often accepting online returns in stores, even if the items were never sold at the store. It is also worth returning to the aspect of customer experience with a brand that applies the reverse logistics strategy in its approach. Appropriate care of the customer who purchased the products is reflected in brand loyalty and is conducive to generating positive opinions. In the era of the virtual world and the ease with which users share their observations online, this is an element that must be taken into account in the strategy of operations.

To fully present the idea of this article and the carried out research, first of all, it is necessary to refer to the theoretical and terminological aspects of the CEP, e-commerce and reverse logistics market. However, the greatest attention has been given to explaining and presenting the terminology of reverse logistics, due to the fact that currently this terminology is used for various forms of returns, not only for waste.

2. CEP market, e-commerce - evolution and terminology

The history of mail order trade has a long pedigree, as the first large-scale sales attempts in this system were recorded as early as 1881. It was then that Alfred Hammacher issued and distributed to his customers a catalog with construction equipment and electronic tools. While this solution seemed very convenient over the decades, the disadvantages of catalog selling began to be noticed over the years. The catalogs were published seasonally and presented a limited assortment, and you had to wait up to several months for the next offer. The possibility of selling via the Internet meant that the offer of stores could be constantly updated, which was enthusiastically received by consumers, because they could make a purchase when the need arose.

The full potential of the Internet in commerce began to be used in 1994. During this time, the number of Internet users in the world grew by 2-3% per month. It was then that the first typical online stores were created, where an order could be placed via a special form or by adding a product to a virtual basket. Consumers immediately began to appreciate the fact that they decide when, where, for what amount and what they buy. The possibility of comparing prices and properties of various products in the network turned out to be important, thanks to which it was possible to quickly select the most advantageous offer (Skurpel, 2019).

Electronic commerce (e-commerce) is most often presented in two terms: narrower - in which it means the way of selling and buying products / services using electronic means via the Internet - and wider - in which it means concluding various commercial transactions via teleinformatic networks, without the need for direct contact between the parties, at the same time including making payments.

When defining the CEP market, a conventional definition of the CEP industry should be mentioned, describing it as courier, express, parcel services (CEP). It results from the fact that it is difficult to separate express services from parcel or courier services, as there are only few differences between them. For example, what can be considered as a difference is:

- in the case of courier services, the most important role is played by the courier responsible for delivering the parcel to the recipient,
- when it comes to express services, they are aimed at fast and reliable delivery of parcels, but are not accompanied by personal courier care,
- as for parcel services, they focus on domestic, often regular shipments of light weight and specific sizes.

The global dynamics of the CEP market is determined by the development of the e-commerce industry, reverse logistics, government regulations of individual countries, or restrictions related to the Covid-19 pandemic.

Polish law does not clearly define the courier service, which is the pillar of the CEP industry services (courier, express, parcel). On the one hand, the courier service is classified as a postal service, on the other - a transport service, and this approach may justify the lack of one specific definition. Courier companies in Poland began to appear in the 1980s, and therefore it is a relatively young industry. The opportunity for these entities was the liberalization of international transport regulations. Currently, the courier services market in Poland has a structure similar to their counterparts in the European Union. It covers all groups of service providers, i.e. integrators, entities offering express transport services throughout the country, local companies, enterprises operating in market niches, and intermediaries. Courier services are characterized by high diversity, which is influenced by: the subject of the services provided, the time of delivery, the type of transport, the geographical area of the operator's activities, as well as the type of the sender and recipient.

The CEP market continues to record a high pace growth around the world. Especially perceive can be impressive growth in developing countries itself, driven by the increasing popularity of the trade the increasing penetration of the Internet and smartphones, a growing middle-class population and theirs wealth and improved living standards. New technologies are transforming the entire supply chain and redefine the CEP industry. Technology becomes a key factor enabling the increase efficiency and meeting consumer expectations.

In 2018, the global CEP market amounted to EUR 306.2 billion (this is 8.6% more than the year before). At that time, there were 55.6 billion shipments in circulation (increase by 9.7%). Growth dynamics in the following years it won't be as fast anymore, but it has to stay on high level. In 2019, the CEP market in terms of value grew by 7.9%, reaching EUR 330.3 billion and in terms of numbers by 9.1% to 60.7 billion parcels (Statista, 2019). And in 2020 in terms of value, the market will reach EUR 356 billion, and in terms of numbers 63.6 billion shipments. Assuming a similar growth rate in the following years, the value of the world market in three years will amount to EUR 415 billion with 73.5 billion shipments.

The global CEP market grew by 13% in 2020. Both the domestic and international parcels market grew dynamically - by 13.2% and 12.5%, respectively. On the one hand, the pandemic in 2020 resulted in the collapse of the B2B parcel market, on the other hand, it caused the volume of B2C parcels to increase, thanks to which the record growth of this market was achieved. This is undoubtedly the effect of the development of e-commerce. Due to the Covid-19 pandemic, in 2020 and 2021 there was a dynamic accumulation of new online shopping users. According to the e-Marketer, the global e-commerce market grew by over 27% in 2020. The largest is the Asian market with 45% world market share. In the following years, this one the first will develop the fastest. In terms of the largest share in the world market KEP has DHL (38%), closely followed by FedEx (24%) and UPS (22%), TNT (5%) (Statista, 2018). According to the research carried out by TI - Transport Intelligence and Upply (https://trans.info/pl..., 27.10.2022) the growth rate of the courier and express parcels market will slow down after 2021. The average annual market will increase its value by 7.5% in 2020-

2025. According to the calculations of the authors of the report, this will mean that the value of the global express and courier parcels market in 2025 will be over 62% higher than in 2019.

Analyzing the development of courier services in individual regions, the Asia-Pacific area will maintain the highest growth rate in 2020-2025 with an average annual growth of 10.8%. This growth will be mainly due to the dynamic development of the market in China and other Far East economies.

North America and Europe will see much more modest growth in the courier industry - in the order of 5.2% and 5.1%, respectively, on an annual average.

In Europe, the B2B segment accounts for EUR 35 billion (52%), B2C - EUR 22 billion (32%) and C2X - EUR 11 billion (16%). B2B (business to business) includes outbound shipments and received by institutional clients, and in B2C (business to customer) is addressed to customers individual. C2X applies to postage shipments and received by individual customers, returns from consumers to online retailers and part shipments from micro-retail trade.

The European CEP market in 2018 was worth 67.8 billion euro (an increase of 5.1%), reaching approx. 10 billion parcels (increase by 5.9%) (Wik-Consult, 2019). It constitutes 22.1% in terms of value and 18% by number of the global market. The largest share in the European market, CEPs have domestic shipments. Foreign shipments amount to 25% respectively in value and 8% in number, the most of which The European CEP market is quite concentrated. Germany, Great Britain, France, Spain, Italy, The Netherlands, Belgium and Poland account for 76% of Europe GDP and 80% of total revenues from CEP. Most shipments for one person is in Germany, UK, France, Austria and countries Benelux. The German market is the largest market CEP - 3.52 billion parcels generated turnover worth EUR 20.4 billion (CEP Research, 2019). It has the largest potential, but characterized by strong competition and large barriers to entry. A bit smaller, but very much the British and French markets are large. In 2019, the European CEP market in terms of value grew by 4.9%, reaching EUR 71.1 billion and numerically by 5.8% to 10.6 billion parcels. In 2020 in terms of value, the market will reach EUR 74.5 billion, and in terms of numbers 11.2 billion parcels. Assuming a similar growth rate in the following years, the value of the European market too in three years it will amount to EUR 81.8 billion with 12.5 billion parcels.

The Polish CEP market in 2018 was worth PLN 6.95 billion, which was an increase of 60% compared to 2014 (12.5% average annual growth). The greatest increase valuable (14.8%) was recorded in 2018. However, the growth rate of the market in terms of numbers in 2018, compared to 2017, it reached 15.6%, which means the number was still growing faster shipments than the market value. Differences they will be at the pace of development in terms of value and volume to decrease in the following years.

Figure 1. Development of the CEP industry in Poland in comparison with Europe and the world in 2020. Source: own study.

According to the Last Mile Experts (https://trans.info/pl.., 27.10.2022) report, the Polish CEP market in 2020 reached a value of approx. PLN 10.7 billion and thus increased by over one fifth (by 22%) compared to 2019. 814 million parcels were sent. That was an increase by 34.8% compared to 2019. From 2015, the volume of parcels on the market increased by 163%. from the level of 309 million parcels. The Polish market is dominated by B2C shipments, which in 2020 accounted for 76.6% of the total volume of shipments. Those sent by enterprises to other companies represented 18.7% of the market, and those sent by private individuals - 4.7% (the dynamic development of the market was visible especially in the OOH - out-of-home segment). According to forecasts, in 2023 the CEP market in Poland will reach the value of PLN 16.2 billion, which will mean an increase by as much as 51.4% over three years. The volume of parcels on the market will reach 1.31 billion items in 2023. This is an increase of over 61% compared to the level from 2020 (especially dynamic in the B2C segment). In the years 2020-2023 (by an annual average of 19.7%). In this sector the volume will increase by a total of 72%.

3. Place of reverse logistics in traditional supply chains

Taking into account the specifics of the handling of returns in e-commerce, reverse logistics can be defined as the management of product flows (with accompanying information), returned from the consumption points to a retailer, distributor, manufacturer in order to recover the value

of goods as a result of repair and reassembly. sale, also to carry out their disposal or return for recycling (then these returns are referred to as EOL - end –of- life product return), finally to repair defective goods under the applicable warranty.

The reasons for such returns may be different and result, for example, from: failure to meet the customer's expectations (size, quality, color, etc.), product defect, wrong product not in accordance with the specificity of the order (mistake in packaging, incomplete order). This definition refers to the specificity of e-commerce returns in terms of the type and purpose of returns.

Reverse logistics can be defined as the process of managing products in the supply chain, recovered from individual exchange partners or their end users (Table 2). These are also any after-sales activities related to a product or service, aimed at optimizing or increasing the efficiency of all after-sales activities, contributing to savings in financial and natural resources (Reverse Logistics Association, 2012).

Table 1.
Reverse logistics areas of product management and reverse logistics market by return type

The area of sales process and products use	Area of after-use	Reverse logistics market by return type
- Returns of stocks and products surplus from advertising companies, - Product under warranty returns - Returns of complaint products due to defects and faults, - Returns of brand new products unwanted by customers	- Return of worn out products, - Return of obsolete products, - Return of physically and economically worn out products	- Recalls - Commercial Returns - Repairable Returns - End-of-use Returns - End-of-life Returns

Source: Wodnicka M., D. Skurpel, Reverse Logistics in Polish Commercial Companies from Economic and Management Perspective, European Research Studies Journal, Vol. XXIV, Iss. 4, 2021, pp. 821, 825.

Along with the growth of the e-commerce market and its importance for the customer, there has been a clear increase in interest in another dimension of the reverse logistics concept, which concerns the flow of returns of both full-value and defective products. At this point, the question arises whether the division into return logistics and reverse logistics is justified in the light of changes taking place in the economy, namely the development of the e-commerce market, or the enterprises in the area of customer service. Both reverse logistics and return logistics are related to the essence of the supply chain and flows occurring in it, and also relates to the management of goods / products returned. Currently, the scope of reverse logistics is not limited to waste only.

It covers material flows related to the recall of full value products from the customer as well as those that require repair or complaint, and therefore cannot be defined as waste. The status of the product after return depends on the condition of that product and the decision of the company to which such return is directed. Given the above, it becomes justified to use the term "reverse logistics" in a broader sense, referring it to both reverse logistics and return logistics.

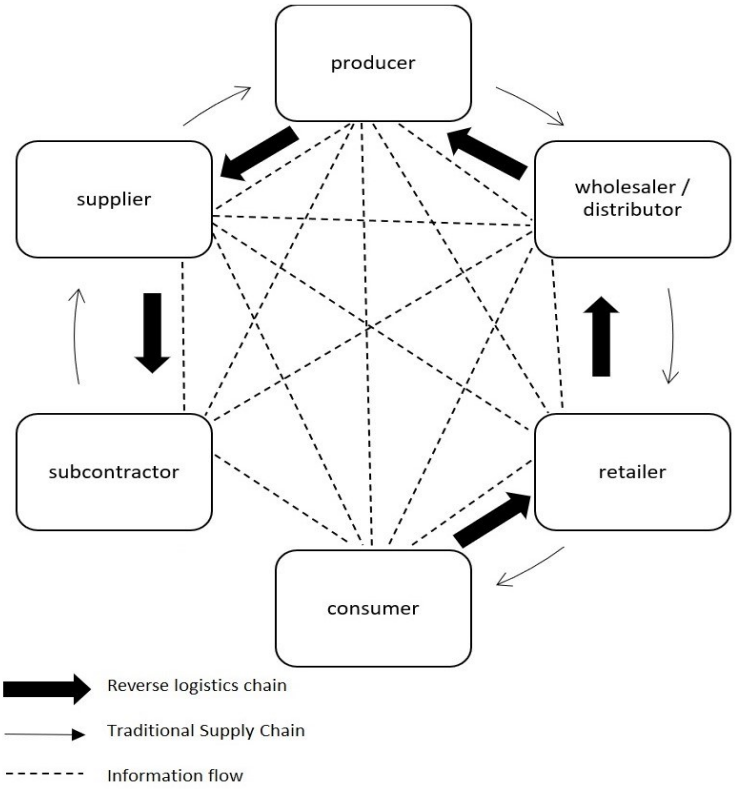

Figure 2. Reverse logistics in the supply chain.

Source: own study based on Lummus R.P., Krumwiede D.W., Vokurka R.J. (2001), The Relationships of Logistics to Supply Chain Management: Developing a Common Industry Definition, "Industrial Management and Data Systems", No. 108/8, p. 426.

The concept was further refined in subsequent Stock publications (1998) in Another Council of Logistics Management book titled Development and Implementation of Reverse Logistics Programs, and Rogers and Tibben-Lembke (1999) in a book published by the Reverse Going Backwards Logistics Association: Reverse Logistics Trends and Practices.

The product data collected when engaging with customers after delivery is an advantage of well-executed reverse logistics. Data provides insight into an organization's supply chain and an opportunity to improve products and/or the customer experience.

Optimized reverse logistics also leads to better supply chain visibility, which leads to benefits like:

- Cost reduction.
- Greater customer satisfaction.
- Better customer retention.
- Faster and better service.
- Loss reduction.
- Improved brand sentiment.
- Waste reduction and greater sustainability.

Successful implementation of RL networks requires many decisions relating to different hierarchical levels: strategic, tactical, and operational. However, the design of the RL network can be considered crucial in the decision making process. In practice, numerous RL networks can be observed that depend on the nature of the returned product (EoU: end-of-use products, EoL: end-of-life, etc.), the recovery process (remanufacturing, reuse, recycling), or the forward channel structure (centralized, decentralized). This way, the design of the RL network becomes a strategic issue in the context of SCM, and it is actually difficult to find a supply chain where RL is not present at least to some degree.

Nevertheless, the design of an RL network is based on three basic activities:

1. Collection of EoU products: according to (Dale et al., 1998) collection of EoU products can be considered the starting point of the system, and three different collection options can be observed depending on whether the collection is made directly by the manufacturer or remanufacturer, through a network of distributors and retailers, or through third-party logistics providers.
2. Inspection and Classification: one of the main characteristics of the product recovery management is the uncertainty associated to the recovered products, in terms of quantity (how many products will be returned), quality (about the condition of the returned products), and time (when the EoU product will be returned). These activities (inspection and classification) will determine the condition of the returned products, so an analysis of the locations and capacities of sorting centres is required.
3. Recovery Process: can be considered as the key element of an RL network due to, in this phase, the economic value of the returned product being recovered through one of the following options:
    - Reuse: implies very basic activities to recondition the product (cleaning, minor repairs) that do not modify their structure or their nature (Carrasco-Gallego et al., 2012).
    - Remanufacturing: requires additional activities (disassembly, inspection, repair, and assembly) to recover the value of the returned products and give them similar qualities and technical characteristics to the original products: laptops, printers, mobile phones, etc.
    - Recycling: only the economic value of the raw materials is recovered, so the returned product loses its identity: packaging material, glass, paper, plastic, etc. New opportunities for research in this stream can be considered, particularly those related to empirical application that could be of immediate help to practitioners (Aras, Boyaci, Verter, 2010).

A challenge of reverse logistics is that the flow must be bi-directional. Managers need to set up the right infrastructure for it to be effective. That often requires software that can automate and track every step of reverse logistics. Additionally, once that infrastructure is in

place, management needs to continually monitor and evaluate the organization's reverse logistics processes to ensure efficiency.

Companies must track inbound and outbound logistics to get the full picture. Inbound logistics manages the receipt of raw materials or goods from the supplier to the manufacturer. Outbound logistics is the processes that deliver the finished goods to the end user. Both inbound and outbound logistics are measured from the manufacturer's perspective, while reverse logistics can be part of any point in the supply chain.

4. Reverse logistics in e-commerce as the biggest challenge for the CEP market

According to a Happy Returns survey, nearly three-quarters of Americans say returns are their least favorite part of shopping online, so an easy return system is crucial for retaining shoppers.

In 2019, the return delivery costs amounted to 363 billion U.S. dollars in North America alone and global return costs of over one trillion U.S. dollars. The reverse logistics process may also include management and sale of surplus or returned equipment and machines from the hardware leasing business.

For example, when a defective item is returned by a customer, the manufacturing firm organizes return shipping, testing, dismantling, repairing, recycling or disposing of the defective product. In 2015, over 65 million U.S. dollars worth of defective sales products were returned to stores worldwide, while clothing and accessories accounted for the largest share of returned items in 2016. In the United States, some 5.8 million packages were returned in the first week of January, 2017. One of the most important return policy characteristic of online purchases is when return shipping is free or when the customer is able to get a full refund rather than a partial refund or in-store credit.

Consumers or end-users return a product for a variety of reasons, such as product defect, incorrect product delivery, end-of-life returns, and end-of-life returns. Reverse logistics deals with the logistics of these products. Reverse logistics therefore relates to all activities related to the transport of goods from the place of consumption to the place of origin (includes producers or distributors). The main goal of reverse logistics is to get as much value as possible from the returned product. The market is expected to grow with a CAGR of 4.48%. The market will grow to expected revenues of approximately $ 657.66 million by 2027 (InkWood). The base year included in the study is 2018 and the estimated period is 2019-2027. The growth of this market is driven by the following factors:

- Growth in the e-Commerce industry.
- Strict government regulations regarding the quality of products in the automotive industry.
- Need for reverse logistics in the pharmaceutical market.

The most important driving force is the development of the e-Commerce industry. The progress and wide use of technology make the e-commerce sector efficient and attainable. In 2018, Reverse Logistics by e-Commerce had the largest share in the revenues of 23.56% of the market according to the End User segment. The global e-Commerce logistics market is growing. However, the recall is more prominent in the e-commerce end-user segment. Withdrawals from the market are mainly due to a product that is not in line with customer satisfaction, a damaged product, offers to replace old products with new ones, etc. Reverse logistics is very important in this segment. The cost of returns is between 5% and 6% of the total revenue. Moreover, many e-commerce companies have a high percentage of returned goods. For example, the rate of return for Amazon is between 8% and 16%. This is a key challenge for the development of the global e-Commerce logistics market. It is also expected to be the fastest growing segment (InkWood).

The largest and fastest market for reverse logistics belongs to the Asia-Pacific region. The boom in e-Commerce and the creation of joint ventures by leading car transportation logistics companies are expected to drive the Asia-Pacific market. India is the fastest growing market in the Asia-Pacific region. India has over 400 million databases of internet users. E-commerce is seeing unprecedented growth in India.

The global reverse logistics market is market segmented by payback type and end user. The market by type of return is further broken down into recall, trade returns, repairable returns, end-of-life returns, and end-of-life returns. The end-user market is further broken down into e-commerce, automotive, pharmaceuticals, consumer electronics and more.

It is no longer a secret that returns in online retailing can make the difference between success and failure for e-commerce companies. To emphasize the importance of returns and reverse logistics in online retailing, and how customer behavior has changed in regards to returns. Even before the COVID 19 pandemic, the likelihood of a return after an online purchase was already 3 times higher than for offline purchases. Despite this, 66% of consumers have since preferred returns in brick-and-mortar retail regardless of purchase method. However, that has changed dramatically. E-commerce has grown at an unimaginable speed. As a result, both fulfillment toward customers and reverse logistics have become critical factors in customer satisfaction. For this reason, 40% of online retailers changed their return policies during the first phase of the COVID pandemic. Another 27% considered adjusting their returns strategy already back in May 2020 (https://blog.getbyrd.com/en/reverse-logistics).

Online retailers' membership schemes are also likely to have contributed to the rise in returns. By paying a monthly subscription for free delivery and returns, the marginal cost of purchasing/returning goods online is reduced and the perceived 'risk' of buying a product that

is not suitable is removed. 17% of EU28 (Eurostat) respondents announced that they would not buy online due to concerns about returning goods, according to a Eurostat survey.

Given the above-mentioned statistics, it is safe to say that reverse logistics and returns became an important part of doing business online. Howbeit, as online shoppers' behavior adapts to utilize returns as part of their shopping journey, costs for reverse logistics quickly skyrocket. To keep costs under control, e-commerce shops can explore ways to reduce the number of preventable returns.

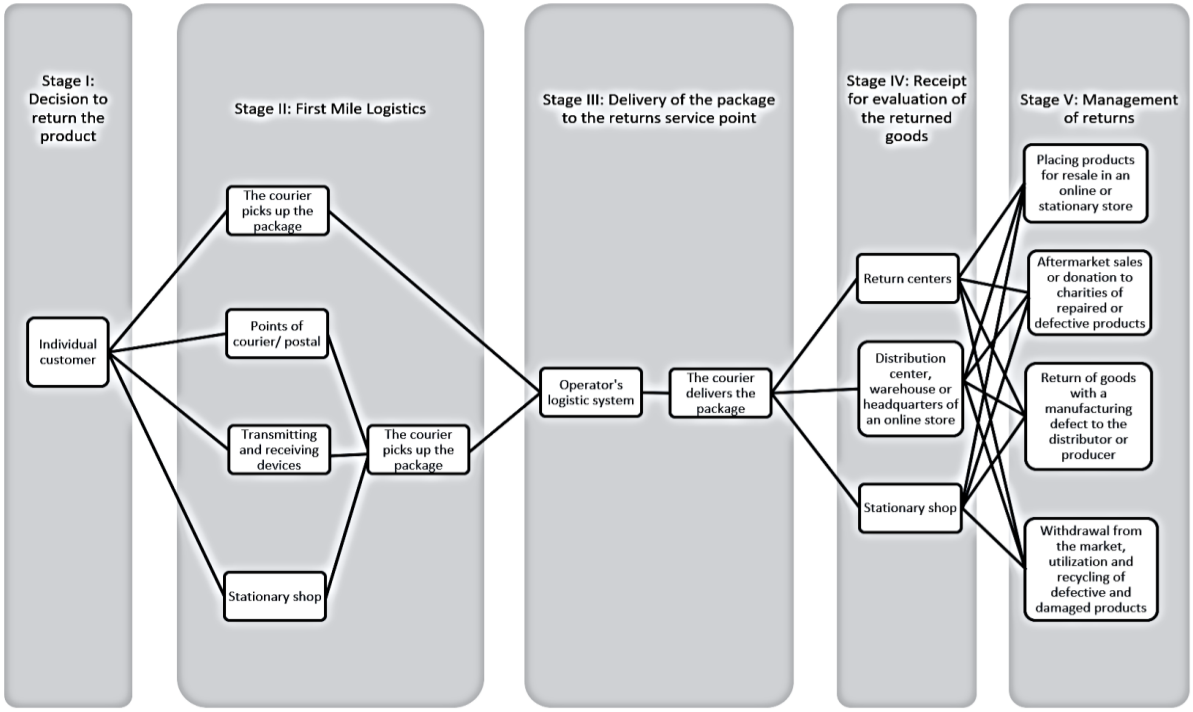

Figure 3. Product flows in the B2C e-commerce reverse logistics process.

Source: Monika Wodnicka, Dagmara Skurpel, Reverse Logistics in Polish Commercial Companies from Economic and Management Perspective, European Research Studies Journal, Vol. XXIV, Iss. 4, 2021, p. 825.

There are several basic stages in the B2C e-commerce reverse logistics process. The process is complex and includes a number of activities related to the collection of products from consumers, organization of transport, handling of warehouse processes, including quality control of returned goods and their re-sale or recycling, as well as the preparation of documents and information flow.

The product flow in the B2C e-commerce reverse logistics process consists of the following stages:

Stage 1: Decision to return the product.

Stage 2: First Mile Logistics.

Stage 3: Delivery of parcels to returns service points.

Stage 4: Receipt and assessment of returned goods.

Stage 5: Handling of returns.

The return logistics process is started when the consumer decides to withdraw from the contract and return the goods purchased in the online store. Pursuant to the Act on consumer rights of 30 May 2014, the buyer has the right to withdraw from a distance or off-premises contract and return the goods within 14 days from the moment the consumer receives the goods, and not from the date the contract is concluded, without the need to giving the reason. Some online stores offer longer terms, e.g. 30 days to cancel your purchase. During this time, the consumer must inform the seller about the withdrawal from the contract. He then has a few days to ship the products. Depending on the shop's policy, the customer may first, according to the information on the shop's website, send the returned goods at his own expense without contacting the seller. The consumer chooses any of the parcel delivery services available on the market, guided by the criterion, e.g. the lowest price or the convenience of sending the parcel. In the systems of the CEP and postal companies, this form of return is treated as posting the shipment by a person physical and not as a return.

Second, the consumer can send back the goods using the printed return label attached to the package. In order to create return labels, the online store must activate a service dedicated to handling return shipments at the CEP or postal operator. In Poland, as research has shown, this option is not very popular so far. E-shops fear that such simplification of return procedures will make it easier for consumers to decide whether to send back the goods.

In the third option, the consumer reports to the online store that he or she wishes to resign from the purchase (e.g. via e-mail, a form on the website or by calling the hotline). The e-shop indicates the address to which the product will be sent, as well as the documents and data that the customer should provide in electronic form and attach to the shipment. The seller can authorize a return order before sending the package and decide whether to cover the cost of the shipment whether he will cede it to the consumer. The Act of May 30, 2014 on consumer rights requires the seller to return to the customer only the costs of purchasing the product and delivery (in the amount of the cheapest delivery service offered by him). He is not obliged to cover the costs of the return shipment.

The second step in the process involves "first mile" logistics, the main challenge of which is to collect individual products from individual customers. There are several solutions available on the Polish market, offered by CEP and postal operators, which can be used to collect parcels from customers. The main difference between them is the degree of consumer's involvement in the service of the "first mile" and the subjective sense of comfort.

In the first variant, the courier collects the parcel in the door-to-door system at the location indicated by the consumer, e.g. at home. In the second option, the customer engages in the process of creating value by delivering the parcel to a selected place: a branch of the CEP company or a post office, partner points for collecting and sending parcels (including service companies, gas stations and stores open late) or self-service devices for collecting and sending parcels. As a rule, couriers collect postage.

Return parcels on the occasion of delivering parcels to a given point/device, which reduces the costs of transport and handling the "first mile". Some bricks and clicks retailers also offer customers the option of returning products purchased from an online store directly to a physical outlet. The seller can then check the condition of the goods and decide on its further path. A product can be put on sale in a store or sent up the supply chain.

At the third stage, the parcels go through the logistics system of the CEP operator or the postal operator handling the parcels. Most often it is organized in the hub and spoke system with a central sorting facility for a given region of the world or country and regional or local terminals. Local branches have two functions: they collect parcels sent by couriers from a given region, from where they are delivered to the system of national sorting plants, and separate parcels incoming from central sorting plants to couriers. Returns are delivered by couriers to the places indicated by the online store (e.g. to the address provided on the website or on the return label). The place of return may be different from the place sending the parcel.

The quick and efficient handling of returned goods is as challenging as 'first mile' logistics. Due to the scale of operation, small and micro online stores can handle returns on their own in the warehouse that prepares shipping. Large online stores usually outsource these activities to a logistics operator that handles shipments or specializes in handling returns, the so-called return centers. Employees in each of these places check the quantity and quality of the returned goods and the condition of the packaging. Then they decide whether the returned product is defective or damaged or is suitable for resale.

The further route of returns and the logistic handling of flows depend on the assessment of the condition of the returned goods, their type and place of storage. Efficient, undamaged products in original packaging can be immediately resold in an online store, stationary store or outlet (e.g. products returned after the season or after the collection has been withdrawn from regular sale). An important action is also to restore the value of the returned goods by, for example, repair or replacement of the damaged packaging. Defective or damaged products are usually repaired, discounted and sold on secondary markets (e.g. Allegro, e-Bay) or in special outlets or donates to charities. Goods with manufacturing defects may be advertised and sent back by the e-retailer to the distributor or manufacturer. Defective and unrepairable or expired goods are recycled or utilized.

5. Return logistics in Polish e-commerce- Research results

5.1. Data sources, instruments, tools and methods of research data analysis

In the academic field, most research conducted to date has been focused on tactical and operational aspects rather than on strategic issues (Carrasco-Gallego et al., 2010). As has been

previously reported, there are numerous reasons for implementing or operating an RL system. The most important of these are the following (Rubio et al., 2008):

- Economic: direct reasons (decreasing the use of raw materials, reduction of disposal costs, creation of added value for end-of-use products) and indirect reasons (demonstration of environmentally responsible behaviour, improved customer relations).
- Legal: in many countries (within the European Union, for example) companies are held accountable for the recovery or correct disposal of waste generated by products they produce or distribute.
- Social: the increased social awareness of the need to protect the environment has led to increasing demands for environmentally responsible behaviour by companies, particularly in terms of carbon emissions and waste generation.

The further part of the article, based on own research, presents the process of reverse logistics in e-commerce in the B2C segment. The study used secondary data, but most of all information collected during own research conducted in 2017, 2019 and 2021 on a group of 121, 139 and 141 e-commerce companies, respectively, and among e-customers, on a sample of 1,709 respondents who have ever made purchases online. Both surveys were carried out using CAWI (Computer-Assisted Web Interview) surveys on the internet panel.

Survey invitations for online stores were sent by e-mail. Due to the possibility of sending a certain number of messages by e-mail, a quota selection was decided according to the provincial criterion, and the sample size was set at 25% of the population.

In addition to the size of the sample, the key aspect determining its quality is representativeness, therefore the structure of the e-customer research sample was adjusted using an analytical weight to match the structure of Polish society in terms of key features related to the subject of the study. When constructing the weight, socio-demographic variables such as gender, age and place of residence were taken into account.

In 2021, qualitative research was also carried out using the in-depth interview tool. The survey was conducted among the managers of enterprises operating on the CEP market. The aim of the study was to determine what new solutions and innovations are introduced by enterprises related to adapting to the new conditions caused by the Covid-19 pandemic.

5.2. The CEP industry in the handling of e-commerce returns

PostNord's survey of European consumers indicates that German shoppers were the most likely to have returned a package in 2018, with 53%: of respondents having returned items. This could partly be down to payment methods – in Germany, for example, it is usual to pay for ecommerce purchases by credit card, and consumers are charged at a later point for their online orders, whereas, in the UK, consumers are generally charged at the point of purchase. It's also worth considering that the increasing ease of purchasing goods online using website cookies at checkout etc. could ultimately result in a rise in impulse or 'panic' purchases.

An estimated 315 million parcels were returned in Germany in 2020. This is an increase of 4.6 percent. compared to the number of parcels returned in 2019, which is attributed to the impact of the COVID-19 pandemic on purchasing behavior.

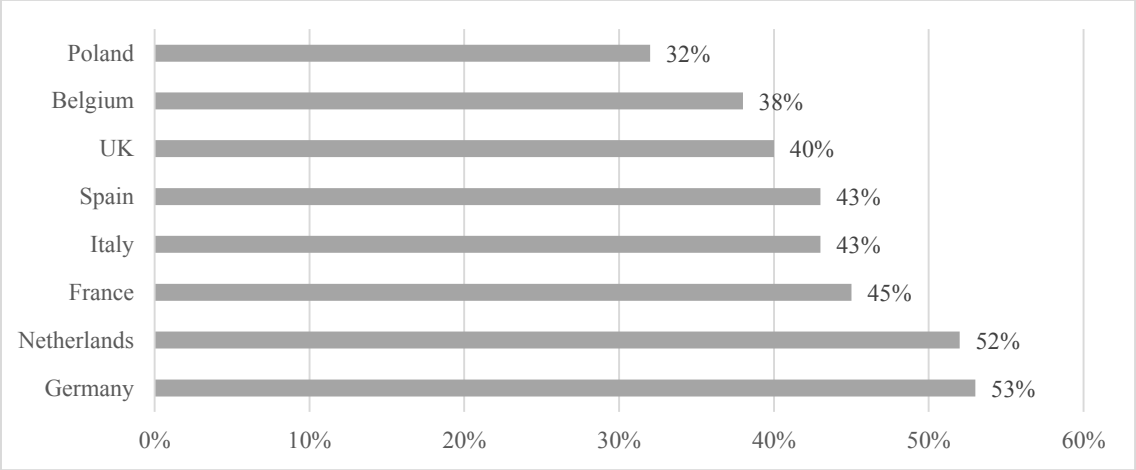

Figure 4. Share of population returning online purchases in 2018.

Source: Eurostat.

Europe's retailers are now having to adapt their logistics operations to deal with ecommerce returns as consumers are faced with more ways to return goods bought online across the continent.

Some multinational ecommerce operators are now developing dedicated centres across Central Eastern Europe (CEE) to process returns. Amazon's returns warehouses in Dobrovíz, Czech Republic and Sereď, Slovakia cater for returns across CEE markets, similar to the Dunfermline returns centre for Amazon's UK returns.

However, most online retailers continue to carry out returns operations from their existing distribution centres. Poland remains a key distribution hotspot among ecommerce operators in Europe due to cheaper labour costs, proximity to the rest of Europe, access to power and ability to develop new stock. Zalando's distribution centres are strategically located across Poland to cater for distribution and returns within the Baltic and Scandinavian markets. For smaller online retailers, we are seeing a rising number of parcel drop off lockers emerge from companies such as Polish company, InPost. These companies partner with online retailers and parcel delivery companies to provide a convenient drop off point in urban areas, including shopping centres and transport hubs.

Own research shows that the level of returns recorded by Polish enterprises is stable. 7 out of 10 respondents declare that returns constitute up to 10% of all completed orders. Only every fifth respondent indicates that the level of returns oscillates around 11-10 percent (Figure 3).

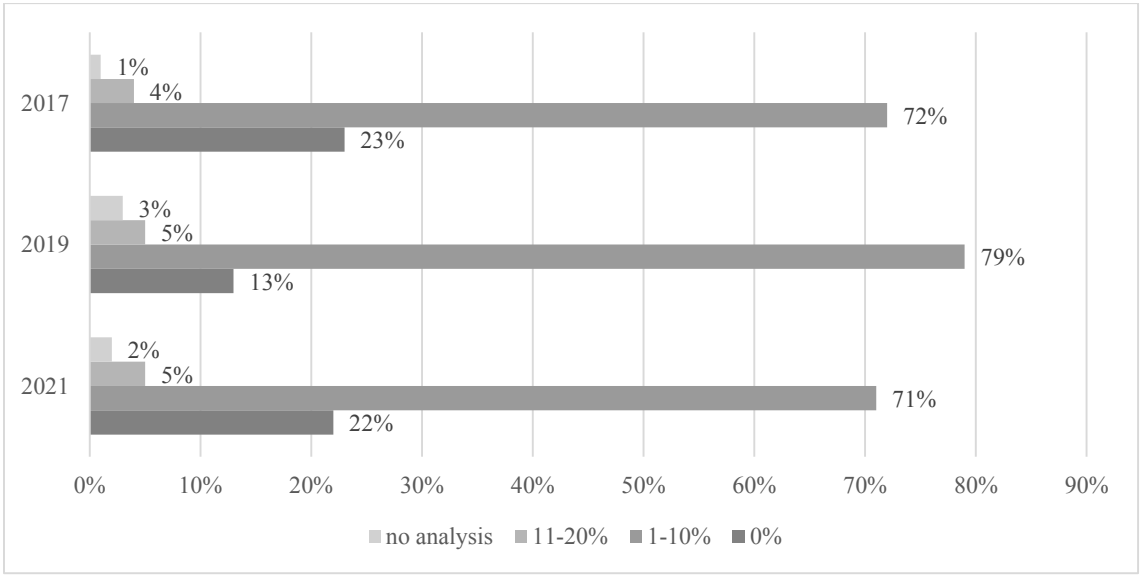

Figure 5. Percentage of returns on all orders in Poland.

Source: own research.

Based on our own research, there are three main and basically the only reasons why customers decide to return the goods: damage to the goods in transport (42% in 2021), sending the wrong goods (44% in 2021) and breakdown (failure) of goods during use (14% in 2021). There are several basic stages in the B2C e-commerce reverse logistics process. Depending on the type of company - operating only on the Internet (pure player) or having a network of traditional outlets (brick and click) in addition to an e-shop - different channels and return options are available. According to the 3C rule (convenience, choice, channel), defining the needs of customers in online commerce, the key factors in ensuring an appropriate return policy are: convenience in returning goods, flexibility of the system and the choice of several options for returning goods. Equally important for e-customers are free returns. Some companies have made free returns an element of their business strategy and an asset that distinguishes them on the market (Wodnicka, Skurpel, 2021).

As the research carried out shows, more than half of those asked, 52% to be exact, returned the goods to an online store at least once. The most common reason for sending the order back is the aforementioned possibility of exercising the right of return without giving a reason. This proves that e-shop customers are not only aware of their rights, but also become a source of value that they use.

Another reason for the return of purchases is the seller's mistake, as a result of which the buyer received products other than what he ordered. 43% of respondents received damaged goods, and 39% complained about a product that broke during the warranty period. Among the other motives, the most frequently mentioned were the wrong size of the clothes, product non-compliance with the description, unsatisfactory quality and the wrong choice of goods.

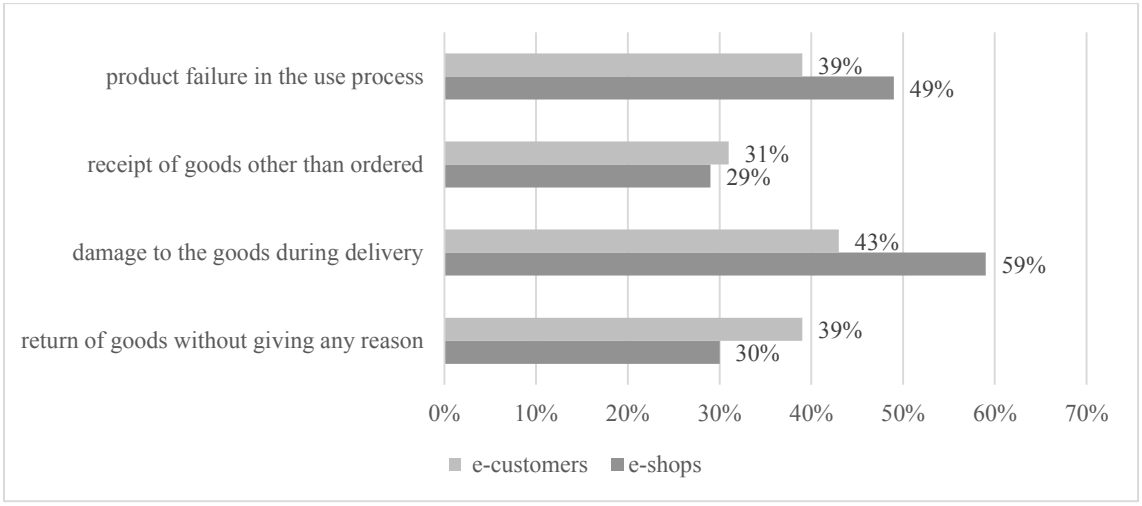

Figure 6. Reasons for returns from the point of view of online stores and their customers.
Source: own research.

According to e-stores, complaints resulting from a product failure during the warranty period account for 30% of returns, 59% of damage in transport, and 29% of all returns were the result of an error by a store employee. Almost half of the returns were determined by the customer's decision to return it without giving a reason.

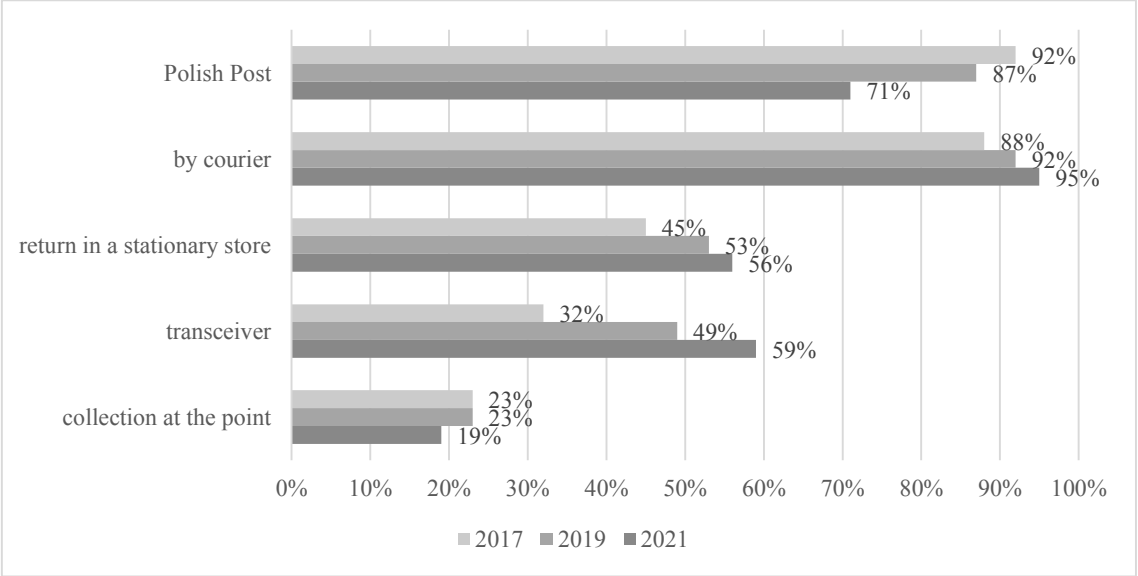

Figure 7. Channels through which the customer can return the product.
Source: own research.

Polish online stores most often offer customers the possibility to choose from several return channels (Figure 5). In recent years, Polish postal services have been losing popularity in favor of courier companies, sending and receiving devices (in Poland, so-called parcel lockers) and the possibility of returning goods in a stationary store. An issue still neglected by entrepreneurs is the costs associated with returns. In 2019, only 21% of the surveyed entities declared that they cover the cost of shipping the returned goods, in 2021 it was 23%. This means that in

7 out of 10 stores, the customer bears the cost of returning the products to the online store. Every 10th return must take place through the same channel as the delivery. The decision to replace the goods or return the money is made in 61% of cases within 48 hours, only every fifth e-shop needs 5 working days for it.

Among the customers who advertised the goods, 9% reported that they encountered problems in the complaint process related to the e-shop's refusal to accept the goods, the lack of any response from the store's staff or the need to repeatedly ask for a refund.

The complaint process in electronic stores is assessed positively, but the cost of returning the goods and the repair time are still questionable aspects. Online stores should bear in mind in this respect that customer service from the store and the costs borne by the customer are an attribute of value. Therefore, it is important not to charge the costs of customer returns, especially when the return is the result of incorrect shipment of the goods.

Complaints also inform the supplier that there are errors in the delivery of the order. Therefore, they cannot be taken personally, but conclusions must be drawn from delivery or product irregularities

According to the LME report on OOH deliveries, the number of PUDO points in Poland increased by 70% at the turn of 2020 and 2021 compared to mid-2019 and currently there are over 30,000. such locations (the much more populous Great Britain and Italy have 38,000 and 36,000 such points, respectively). For comparison, the increase in OOH supplies in Europe in this period was 40%.

Table 2.
Actions Taken by companies operating on the CEP market in pandemic COVID-19

Actions	**Description**
Ozonation of packages	Shipments are ozonated in the carrier's warehouses and then safely delivered to the addressee.
Possibility of cashless payment and resignation from cash on delivery payments	This solution in the courier industry has long been a matter of time. However, the pandemic effectively accelerated their implementation, which significantly improved the delivery process.
Delivery to a parcel machine - Paczkomat, Locker, SwipBox machine.	The development of a network of parcel machines in a situation of distance restrictions, parcel lockers turned out to be the most promising form of picking up and sending the parcel. The clear leader of this form of delivery in Poland is InPost.
Introduction of the parcel collection service without the need for a signature	When placing an order, it is enough to select the option with a request to leave the package at the door or in another place that is safe for the shipment. A solution in which the recipient does not have to sign the confirmation of receipt has become popular. Instead, all he has to do is give the courier the PIN code he receives via SMS or email before delivering the package.
Development of a network of coolomats	The increase in the popularity of online grocery shopping has driven the emergence of parcel machines with a cooling function to safely store heat-sensitive products, and above all, food.
Contactless returns	Quick returns service, which allows you to return at parcel machines to selected partner e-shops without registration.

Surce: own research.

The respondents pointed out one more important aspect which is directly related to the development of reverse logistics. It is primarily about the creation and development of shipping and collection points or tools for self-management of delivery or returns.

In the process of reverse logistics in B2C e-commerce it is important to identify the reason for the return at the earliest possible stage and to make the return route of the products dependent on it. Thanks to this, it is possible to shorten the process implementation time and reduce logistic costs (including inventory and transport costs). Visibility of the shipment thanks to the visibility of the shipment is essential for the efficient management of the process real-time information flow between e-retailers and logistics companies and consumers. It is possible thanks to unfolding applications and information technologies by logistics operators and CEP, and system integration IT business partners. Also equally important are: flexibility of the system, for the sake of to the high uncertainty as to the time, quantity and quality of returned goods, and the time of the process. This is crucial for retailers operating in industries with a high return rate (e.g. clothing or footwear), products with a short life cycle, seasonal, with a short shelf life and high value goods.

6. Conclusions – summary

To sum up, with the advent of e-commerce and the change in the commercial policy of enterprises, reverse logistics refers to the return of a given good / product to the place of origin, as well as its management through, firstly, re-entering the market of a product that has a different price due to for a lower quality or after minor treatment, restoration to the as-delivered condition with a specified quality (e.g. replacement of the packaging); second, as part of recycling, recovering some parts of the product that can be repaired and used in the production of new products, or using recovered materials to produce other goods, and ultimately disposal.

As the data analysis shows:

1. The development of the CEP industry during the Covid-19 pandemic is undeniable and is the result of the development of e-commerce services and returns.
2. Average annual growth in courier services through 2025 in Asia Pacific will be 10.8%, in North America. - 5.2%, in Europe - 5.1%, and in Poland between 7-8%. (the courier market in Poland is one of the fastest growing segments of the logistics sector in Europe).
3. The CEP industry has to deal with the handling of the increasing number of orders resulting from online purchases, new customer expectations related to security, or the limitation of direct contact.

4. The form and quality of delivery in online commerce constitute a very important element of the "customer experience". This means that consumers perceive the online purchase execution and the courier service as a whole.
5. The return market is also a challenge. The results regarding returns of goods are questionable, although the vast majority of e-shops state that the share of returns in the total number of orders does not exceed 10%. Among the people who returned, nearly 30% received the goods that did not comply with the order, and another 43% returned the parcel because it was damaged in transport. These results clearly show the importance of delivery logistics and are the basis for a thesis that the quality of delivery affects the value for the customer. For over 80% of customers, contact with e-shop employees in the process of returning the goods was not a problem, as well as the effectiveness of product repair, which probably translated into the assessment of the service in the eyes of the customer. Communication with customers is a strong point of online stores.
6. The CEP industry, in order to meet the requirements of the market changed by the pandemic, will have to adapt new solutions in operational processes and definitely focus on the development of technology.

References

1. Aras, N., Boyaci, T., Verter, V. (2010). Designing the reverse logistics network. In: M.E. Ferguson, G.C. Souza (eds.), *Closed-loop supply chains: new developments to improve the sustainability of business practices* (pp. 67-97). CRC-Press, Taylor & Francis.
2. Carrasco-Gallego, R., Ponce-Cueto, E., Dekker, R. (2012). Closed-loop supply chains of reusable articles: a typology grounded on case studies. *International Journal of Production Research, 50*, pp. 5582-5596.
3. CEP Research (2019). *German CEP market growth slows but record peak looms*, https://www.cep-research.com/news/german-cep-market-growthslows-but-record-peak-looms, 20.10.2022.
4. Corominas, A., Mateo, M., Ribas, I., Rubio, S. (2015). Methodological elements of supply chain design. *International Journal of Production Research, Vol. 53, Iss. 16*, pp. 5017-5030.
5. Courtney, R. (2019). *That sweater you don't like is a trillion-dollar problem for retailers. These companies want to fix it.* CNBS.
6. Dale, S.R., Tibben-Lembke, R.S. (1998). *Going Backwards: Reverse Logistics Trends and Practices.* Reno, NV: Reverse Logistics Executive Council.
7. E-commerce in Europe 2020, postnord, https://www.postnord.se/siteassets/pdf/rapporter/e-commerce-in-europe-2020.pdf, 27.10.2022.

8. Eurostat.
9. Global parcel shipping volume between 2013 and 2027 (2022).
10. Global Reverse Logistics Market Forecast 2019-2027. InkWood research. www.inkwoodresearch.com, 25.10.2022.
11. https://blog.getbyrd.com/en/reverse-logistics, 17.09.2022.
12. https://happyreturns.com/resource, 27.10.2022.
13. https://trans.info/pl/globalny-rynek-przesylek-kurierskich-bedzie-rosl-rocznie-o-7-proc-do-2025-241727, 25.10.2022.
14. https://trans.info/pl/rynek-kurierski-w-polsce-rosnie-dwucyfrowo-wzrost-jeszcze-przyspieszy-227511, 15.09.2022.
15. Huk, K., Robaszkiewicz-Ostręga, J. (2018). Logistyka zwrotów na przykładzie hurtowni farmaceutycznej Neuca-Logistyka sp. z.o.o. *Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu, nr 505*, p. 304.
16. Khurana, A. (2019). *Defining the Different Types of E-Commerce Businesses,* https://www.thebalancesmb.com/ecommerce-businesses-understanding-types-1141595, 23.10.2022.
17. Kozerska, M. (2014). Obsługa logistyczna obszaru e-commerce. *Zeszyty Naukowe Politechniki Śląskiej, seria: Organizacja i Zarządzanie, z. 68,* p. 52.
18. Lysenko-Ryba, K. (2015). Logistyka zwrotna jako źródło korzyści konkurencyjnych. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, nr 249*, p. 194.
19. OECD. Guide to Measuring the Information Society. The role of the e-procurement in the purchasing process (2011). RePEc OECD, p. 72.
20. Reverse Logistics Association (2012). http://www.reverselogosticstrends.com/reverse-logistics.php, 16.09.2022.
21. Reverse Logistics Market by Return type and End User: Global Opportunity Analysis and Industry Forecast, 2018-2025 (2019).
22. Rubio, S., Chamorro, A., Miranda, F.J. (2008). Characteristics of the research on reverse logistics (1995-2005). *International Journal of Production Research, 46*, pp. 1099-1120.
23. Rubio, S., Jiménez-Parra, B. (2014). Reverse Logistics: Overview and Challenges for Supply Chain Management. *International Journal of Engineering Business Management*, p. 1.
24. Sadowski, A. (2006). Reverse logistics w terminologii logistycznej. *Logistyka, nr 4*, p. 38.
25. Skurpel, D. (2019). *Obsługa logistyczna w handlu elektronicznym*. Wydawnictwo Uniwersytetu Łódzkiego, pp. 45-46.
26. Skurpel, D. (2019). *Obsługa logistyczna w handlu elektronicznym*. Wydawnictwo Uniwersytetu Łódzkiego, pp. 83-84.
27. Statista (2018). *Couriers and local delivery service providers' global market share in 2018*, https://www.statista.com/statistics/236309/market-shareof-global-express-industry, 27.10.2022.

28. Statista (2019). *Courier, express and parcel (CEP) market size worldwide between 2009 and 2019,* https://www.statista.com/statistics/723986/cepmarket-total-revenue-worldwide, 27.10.2022.
29. Stock, J.R. (1988). *Development and Implementation of Reverse Logistics Programs*. Oak Brook, IL: Council of Logistics Management.
30. Stock, J.R. (1992). *Reverse Logistics*. Oak Brook, IL: Council of Logistics Management.
31. *The CEP market in Poland In the face of trends and new challenges*, https://www.gs1pl.org/kontakt/publikacje-i-wytyczne/branze/transport-spedycja-logistyka-tsl/426-rynek-kep-w-polsce-w-obliczu-trendow-i-nowych-wyzwan/file, 25.10.2022.
32. Wik-Consult (2019). *Development of Cross-border E-commerce through Parcel Delivery*, https://www.wik.org/fileadmin/Studien/2019/ ET0219218ENN_ParcelsStudy_Final.pdf. 28.10.2022.
33. Wodnicka, M., Skurpel, D. (2021). Growth Global Market of E-Commerce Cross Border: The Case of Poland. *European Research Studies Journal, Vol. XXIV, Iss. 1*, p. 1122.
34. Wodnicka, M., Skurpel, D. (2021). Reverse Logistics in Polish Commercial Companies from Economic and Management Perspective. *European Research Studies Journal, Vol. XXIV, Iss. 4*, pp. 821, 825.