

The impact of the COVID-19 pandemic on courier delivery innovation – InPost company case study

Magdalena Czerwinska, Magdalena Maciaszczyk, Agnieszka Rzepka

Lublin University of Technology, Lublin, Poland

m.czerwinska@pollub.pl

m.maciaszczyk@pollub.pl

a.rzepka@pollub.pl

Abstract: The COVID-19 pandemic has changed many markets, including the courier market. This market still has great potential. Thanks to the introduced innovations and due to the growing demand for courier services and the development of e-commerce, it is currently one of the most dynamically developing industries. In the face of the pandemic, courier companies had to adapt to the new operating conditions. The implementation of innovations (i.e. parcel lockers) has become one of the key development trends in the contemporary mechanisms of for creating the competitiveness of enterprises. Parcel lockers introduced by InPost in Poland in 2009 now operate in other countries, there are over 23,000 of them in Europe. They are also located in Asia, both Americas, as well as in the Middle East and Africa. The aim of the article is to show the reaction of courier companies to the COVID-19 pandemic through the example of InPost. The article also demonstrates that difficult pandemic conditions cause adjustment processes on the courier market related to the implementation of innovations by courier companies. Various innovative solutions introduced by InPost during the pandemic were analysed. The main features of InPost courier services that distinguish the company's activity compared to its competitors have been identified. It was shown that the company reacted innovatively to the difficult pandemic conditions, and its actions were positively assessed by consumers. To support this view, in the empirical part of the article, we will look at the research conducted in 2021 in Poland. The survey was conducted among young consumers (students of Lublin University of Technology aged 19-26).

Keywords: Innovation; courier services, parcel lockers, pandemic, COVID-19

1. Introduction

The dynamic technological progress that has been taking place in the world since the beginning of the 21st century has recently been further accelerated by the COVID-19 pandemic. The pandemic conditions have accelerated another industrial revolution - industry and economy 4.0 are being replaced by industry and economy 5.0, which allow for a harmonious and synergistic combination of human and device work (Breque, De Nul and Petridis, 2021).

An important element of Economy 5.0 is e-commerce. Electronic commerce has become the foundation of economic development over the years. Its significance and dynamic growth are the result of its ability to enable businesses to expand into new markets, and consumers to make convenient and secure purchases. The practicality of e-commerce has made it the fastest growing retail market. The COVID-19 pandemic has further contributed to the development of e-commerce. Social distancing, isolation, quarantine, and avoidance of public or crowded places have increased consumers' desire to shop online (Taher, 2021).

Currently, the development of e-commerce is determined by several factors, including digital transformation, the COVID-19 pandemic, and changing consumer behaviours. A demanding generation of Z has emerged in the economy. These are people who grew up in times of easy access to the Internet, have no problems with online shopping, and are familiar with new technological solutions.

The high potential of e-commerce stimulates the development of the Courier, Express and Parcel Market (CEP Market). With the increasing popularity of online shopping, e-commerce handling has become one of the main areas of activity for CEP operators and a driving force behind the development of this industry (Gulc, 2020).

The main objective of the article is to demonstrate the reactions of courier companies to the COVID-19 pandemic, using InPost as an example, and to identify innovative solutions introduced by InPost during the pandemic that distinguish the company's activities from its competitors.

2. Literature review on the e-commerce industry and the courier delivery market

Globalization, technological and technical progress, and the development of the electronic communication market are phenomena that have the strongest impact on all areas of economic activity in the 21st century. They

have led to the emergence of e-commerce. Its beginnings date back to the mid-1990s and are inseparably linked to the popularization of the Internet.

It is the easy and fast way of conducting transactions online that has led to the rapid development of e-commerce. In recent years, more and more people have been shopping online because it is convenient, saves time, and offers a wide range of goods. This is due to the increased availability of fast Internet, the development of mobile devices, and electronic payments.

The COVID-19 pandemic has further accelerated the development of the e-commerce industry. The pandemic accelerated the digitization process among consumers and changed their previous habits. People who had previously rarely or never used e-commerce began to shop online. One of the effects of the pandemic was a change in the age structure of e-commerce customers. Research (Toska et al., 2022, Watanabe, Omori, 2020, Lee, Lee and Lee, 2021) indicates that during the pandemic, interest in the internet and online shopping increased in older age groups (from the so-called Silver generation). Customer preferences regarding the method of parcel delivery have also changed. As a result of the pandemic, more and more customers prefer contactless parcel pickup (e.g., using parcel lockers), which allows them to avoid direct contact with couriers and minimize the risk of infection (Szpilko et al., 2021).

2.1 Development of the e-commerce industry

From March to June 2020, record-breaking online shopping activity was reported. In 2020, the share of e-commerce in global trade exceeded 16.5%, reaching a record value of 4.2 trillion dollars (Ciesielski, 2020), and the total time spent using e-commerce mobile applications increased by 40% in 2020 compared to the previous year (App Annie, 2021). In 2021, the global e-commerce market reached a value of 13 trillion USD, and it is predicted that the market will reach 55.6 trillion USD by 2027 (Astute Analytica, 2021).

In 2022, China was the largest e-commerce market, and forecasts predict that it will remain the leader until 2027. The value of the Chinese market in 2022 was 1,156.3 billion USD (Statista, 2023).

The Central and Eastern European region, led by Poland, is one of the fastest developing in the world. In the last decade, the Polish e-commerce market has been growing at a rate of around 20-25% annually. According to experts (The Chamber of Digital Economy, 2023), by the end of 2022, internet sales directed to consumers and businesses (B2C and B2B) were expected to reach a value of PLN 850 billion. Over the decade from 2013 to 2023, the value of the B2C e-commerce market increased fivefold, the value of the B2B e-commerce market increased 3.5 times, the share of digital sales in total retail sales increased threefold, and the number of registered online stores increased 2.5 times.

However, the intense development of the e-commerce sector is accompanied by many challenges, among which experts most often mention the efficiency of the supply chain and the need for further investment in last-mile logistics, including courier, express, and postal services.

Based on market observations and analysis of current trends, it is predicted that the main factors influencing the Polish e-commerce market in the coming years will be: inflation growth, expansion of marketplaces - leading global purchasing platforms, new technologies, and ongoing generational turnover (increased share of "digital native" generations (Millennials and Generation Z) in overall consumption, for whom digital shopping is a completely natural and often preferred option) (PwC, 2022).

According to the "Polish CEP 2022" report (Last Mile Experts, 2022), in the near future - despite the economic crisis and international tensions - the intensive development of the e-commerce and CEP industry will remain at a high level. The predicted growth in value and quantity also means the need for operators and e-sellers to secure adequate warehouse and logistics support. Currently, dedicated e-commerce facilities account for nearly 7.5 million square meters of warehouse space in Poland, or over 30% of total warehouse supply. Compared to the state in 2019, this is an increase of up to 84%, indicating a clear upward trend.

2.2 The factors influencing the development of the CEP industry

E-commerce growth drives demand for efficient functioning of courier, express, and parcel services (Mordor Intelligence, 2023). Q-commerce is on the rise, and customers expect fast and high-quality courier services. Timeliness, fast delivery, and safety make courier services appealing to businesses and consumers, with the market undergoing constant changes (Gulc, 2017).

First of all, the development of the courier shipments market is stimulated by the growth of online trading. With the development of e-commerce, the number of delivered packages has more than doubled in the last decade, and today, 10% of global retail sales are made online (Wang, Kern, 2021).

The global CEP market handles approximately 55.6 billion shipments every day (GS1 Poland, 2019).

The largest CEP market in the world is China, which accounts for 40% of the total global delivery volume. Quantitative and qualitative forecasts for the development of the global CEP industry predict continuous growth (Janczewska, Janczewski, 2020). The value of the global courier services market reached \$375.5 billion in 2020. From 2021 to 2026, the market is expected to grow at an average annual rate of 6%. The growth rate in Poland is expected to be similar (Szpilko et al., 2021).

According to a 2019 report by Mordor Intelligence (Mordor Intelligence, 2019), it is expected that the courier services industry worldwide will be worth as much as \$400 billion by 2024.

In 2021, the global CEP services market reached a value of \$394 billion. It is forecasted (Imarc, 2022) that the market will reach a value of \$519.6 billion by 2027. The growth trend is also continuing in Poland. In 2021, the value of the courier services market was 18.5 billion PLN, which represents a 16% increase compared to the previous year (Last Mile Experts, 2022). The growth rate is almost three times higher than the growth rate of Poland's GDP, which means that the potential of this market will not be exhausted for a long time (GS1 Poland, 2019).

An important factor influencing the development of the CEP industry is also the development of technology, especially in the area of logistics process automation and digitalization. The expansion of automatic sorting, delivery through robots and delivery drones (McKinsey & Company, 2019) shortens the delivery time and increases efficiency. The same goal is also served by the development of same-day delivery services. Many companies already offer same-day delivery services (Hausmann et al., 2014), and even delivery within a few hours.

Advanced parcel tracking systems allow customers to track their shipments in real time. This tool increases trust in courier companies, which builds customer loyalty.

Another important factor is the competition in the market. There are a large number of courier companies operating in the Polish market - global entities such as DHL, UPS or FedEx, as well as national companies such as InPost, Polish Post or DPD (Dynamic Parcel Distribution). Such a market structure encourages, and even necessitates, continuous investment and innovation to increase competitiveness.

In summary, the CEP industry in Poland is still in a phase of dynamic development and is growing at a pace consistent with global trends. In the coming years, further automation and digitalization of logistics processes, investment in new technologies, and competition between courier companies can be expected, which will contribute to improving the quality of services and shortening delivery times (Marczuk et al., 2015, Ratajczak, Lorenc, 2015).

It seems that the future shape of the CEP industry will depend primarily on technology and innovative technical solutions. These include various Industry 4.0 solutions (process automation, Internet of Things, artificial intelligence, Big Data, digital technologies for warehouse logistics, GPS software, and RFID (Radio-Frequency Identification) technology) (Cywiński, 2022).

A new and very important trend in the courier delivery market is sustainable mobility efforts (Perboli, Rosano, 2019). Many companies are introducing new solutions that allow them to reduce the impact of their operations on the environment. An example of this could be the use of electric vehicles for delivering packages.

One of the challenges facing courier companies is the increasing number of deliveries to private consumers.

Another challenge is the increasing competition in the courier delivery market. Many companies prioritize customer service quality, invest in developing new technologies, and offer services tailored to individual customer needs. As a result, courier companies will have to operate more innovatively and flexibly to meet market demands and increase their competitiveness.

2.3 The impact of COVID-19 on the courier delivery market

The COVID-19 pandemic has affected many industries and sectors of the economy. One industry that has particularly felt the effects of the pandemic is the courier delivery industry. On the one hand, the attractiveness

of courier services has increased due to the pandemic. On the other hand, restrictions on movement, lockdowns, quarantines, sanitary procedures, and changes in customer purchasing preferences have caused changes in the courier delivery market (Rokicki et al., 2022). As numerous epidemic restrictions have limited, and at times blocked, brick-and-mortar trade, the challenge for the courier delivery industry became to handle a huge number of orders resulting from the increasing scale of online shopping (Sułkowski et al., 2022). The pandemic has caused an increase in the frequency of online shopping and therefore the use of courier services, with consumers starting to prefer contactless forms of delivery and payment. Research (Szpilko et al., 2021) has shown that, in the assessment of consumers, the level of service quality has increased (compared to pre-pandemic times), primarily in terms of service safety, delivery time, and the availability of shipment tracking options.

The COVID-19 crisis has been identified by many courier companies as an opportunity for growth and to acquire new markets and customers. The response of many entities was to develop creativity and introduce new innovative solutions that address the new pandemic-driven economic conditions (Thukral, 2021). One example is the company InPost described in this article. The company started in 2006 in Poland. It operates not only in Poland but also in other countries across Europe, Asia, both Americas, and Africa. The global courier delivery market reached a value of \$343 billion in 2019 and was expected to grow to \$464 billion by 2027 (Singh, Mutreja, 2020). However, the increasing number of online purchases, caused by the pandemic, has affected the courier delivery market's development faster than expected in earlier forecasts (Gruenwald, 2020). With the closure of physical stores, customers began to use e-commerce more often, which in turn led to an increase in the number of courier deliveries. The global e-commerce market grew by 20% in 2020 (McKinsey & Company, 2020), prompting many companies to invest in developing their courier delivery services, introducing more flexible delivery services, and investing in new technologies.

3. InPost company

InPost is one of the largest courier companies in Poland, specializing in package delivery services.

Thanks to innovative solutions such as parcel locker networks, automatic sorting systems, and flexible operations, InPost has achieved dominance in the Polish parcel delivery market, despite the presence of large courier companies such as DHL, UPS, or FedEx.

InPost is the market leader in Poland, both in terms of volume and revenue (Last Mile Experts, 2022). In just the last year, the company has grown by almost 40%, and its key competitive advantage is the largest parcel locker network in Europe. DPD ranks second in the market, and both companies are responsible for about 64% of the volume and just under 50% of the revenue in the CEP market (tab. 1). As a leader in the industry, InPost is also perceived positively by consumers (as rated by 74% of respondents in a study conducted by the authors in 2022).

Table 1: The leading companies in the courier delivery segment in Poland in 2021

| No. | Company name | Market share (in %) in terms of | |
|-----|--------------|---------------------------------|-------|
| | | volume | value |
| 1 | InPost | 41.7 | 24.4 |
| 2 | DPD | 22.2 | 23.1 |
| 3 | Polish Post | 11.1 | 9.7 |

InPost constantly develops its services, adapting to the needs of its customers.

InPost also focuses on the development of sustainable logistics and introduces innovative solutions related to e-mobility and environmental protection. The company invests in electromobility and already uses a fleet of electric cars in some cities in Poland.

It also pays attention to environmental protection and strives to minimize its impact on it by reducing energy and water consumption, using eco-friendly packaging, and promoting recycling.

In addition, InPost is an innovator in the field of automated sorting of shipments. In 2019, it opened the most modern package sorting terminal in Europe in Gliwice, which enables the processing of up to 60,000 packages per hour. Currently, the company has 12 logistics centers. The new sorting centers meet very high requirements - both in terms of location and communication with main roads, as well as the appropriate number of docks and courier shelters.

As the first company in Poland, it introduced the possibility of tracking packages and correspondence, which had a direct impact on building consumer trust.

InPost also operates in the area of corporate social responsibility. In 2020, the company announced a commitment to carbon neutrality by 2025. InPost plans to reduce its greenhouse gas emissions by investing in renewable energy and improving the energy efficiency of its operations. It engages in social initiatives, for example, through the establishment of a scholarship fund for talented children and youth in 2022. It also supports various foundations, such as the IT Girls Foundation (since December 2022), which aims to increase the participation of women in the IT industry. InPost also conducts educational campaigns on environmental protection and encourages its customers to use more eco-friendly delivery methods, such as parcel lockers.

3.1 InPost parcel lockers

The network of InPost parcel lockers is one of the biggest advantages of the company. Transforming the last link in the supply chain into completely different, previously unknown devices has completely changed the look of this industry worldwide and made the Polish company a significant player in global markets.

Parcel lockers are intelligent boxes that allow for parcel collection and dispatching around the clock, without the need to wait for a courier. Parcel lockers provide over a tenfold increase in courier efficiency, who can deliver 600-700 packages to parcel lockers per day, while a traditional courier delivers about 60 packages per day to customers (Ostoj, 2015).

Parcel lockers have caused a decrease in courier burden despite the increasing demand for courier services. The journey of the parcel has shortened, and deliveries are simplified.

The logistics of package pickup and delivery to the InPost parcel lockers by couriers is managed by an IT system. If the chosen the InPost parcel lockers is full, the package is redirected to a temporary parcel locker, which is no more than 2 km away from the originally selected parcel locker.

Another factor increasing the efficiency of courier work is the ability to combine the tasks of package pickup and delivery. Ultimately, the InPost parcel lockers solve the "last mile problem," which is the final, most expensive stage of delivering a package to the recipient. This is not only an ecological solution, but also cheaper for the recipient and more efficient for the courier.

By the end of 2009, there were already 300 such devices in operation in Poland, and another 150 were added in 2010. A breakthrough moment for the development of InPost was the presentation of parcel lockers at Post Expo 2012 in Brussels. A week after the end of Post Expo, a wave of orders for Polish machines offered by InPost started. In September, 48 the InPost parcel lockers were sent to Australia, and in October, the first devices were installed in the UK, where there were eventually to be 1,300 by the end of 2013 (Morawski, 2021). Currently, the InPost parcel lockers are present worldwide, including in the United Arab Emirates, Estonia, Lithuania, Latvia, Czech Republic, Slovakia, Slovenia, Germany, Iceland, Ireland, Colombia, Brazil, the Netherlands, and Australia.

According to InPost data (InPost, 2023) by the end of 2022, the number of InPost parcel lockers around the world had approached 28,000, of which 8,600 are located in international markets and their number is still growing. Within one year, the number of parcel lockers increased by 120%. InPost is increasingly expanding its presence in international markets. In 2020, InPost signed an agreement with eBay to collaborate on package delivery to EU countries. In 2021, the company announced plans to expand into non-European markets, including the United States and Canada. The InPost parcel locker network comprises 27,939 lockers, of which 19,306 are in Poland (as of the end of 2022) and is constantly expanding. In the first quarter of 2022, the company opened 430 new lockers in Poland and 1,500 in Europe. During the same period, the InPost parcel locker network handled 68.5 million shipments, representing a 32% increase compared to the same period in the previous year. In Poland, the parcel lockers handled 61.4 million shipments, while outside of Poland, they handled 7.1 million shipments.

It is worth paying attention to the technological development of InPost parcel lockers. In 2020, the company introduced an innovative "Post-leasing Parcel Locker" system, which allows the use of existing parcel lockers instead of creating new ones. Thanks to this, InPost can develop its parcel locker network faster and cheaper, while also protecting the environment by minimizing the amount of materials used.

4. Methodology

To identify and discuss the impact of the COVID-19 pandemic on innovations in courier services, the case of InPost was analysed. The analysis focused on the information provided on the company's website regarding their response to the pandemic reality. Additionally, additional insights were gathered by conducting survey research among consumers - InPost clients. In particular, our sample consisted of 873 respondents, representing Generation Z (students of Lublin University of Technology aged 19-26). The survey examined the use of InPost parcel lockers during the COVID-19 pandemic. A purposive sampling technique was employed, with the age of the respondents (qualifying them as representatives of Generation Z) as the criterion. While the sample was not representative, the obtained results can serve as a reason for further exploration of the selected research problem. The survey research was conducted using the Computer Assisted Web Interview (CAWI) technique.

A structured and standardized questionnaire was used as a research tool. It consisted of two parts: the core part containing questions related to the research topic, and the demographic section. Responses were measured on a 7-point Likert scale (strongly disagree, disagree, somewhat disagree, no opinion, somewhat agree, agree, strongly agree). The research was conducted in January-February 2021. In the following section, the key observations that emerged during the data collection process are presented and discussed.

5. Results and evaluation InPost's response to COVID-19

COVID-19 has become the biggest motivator in history for using remote forms of contact. The world has been forcibly pushed towards reducing interpersonal contact, resulting in an increase in interest in services provided by companies like InPost.

In response to the challenges faced by the courier, express, and parcel market during the COVID-19 pandemic, InPost introduced a series of innovative changes to its services to ensure the safety of its customers and employees.

InPost, anticipating an increase in demand for parcel locker services, began to expand its network in all locations. The pandemic conditions caused more and more deliveries to be made using parcel lockers instead of what other services (courier network, pickup at the post office or at a specific company's physical store. According to data from the E-commerce in Poland 2021 report, the most commonly chosen delivery method is delivery to InPost parcel lockers (77% of respondents), followed by courier delivery to home/work, chosen by 50% of respondents. In third place are deliveries to partner points (e.g., Żabka stores) (21%) (Gemius, 2021). In 2022, 81% of respondents chose parcel lockers, 43% chose courier delivery, and only 17% chose delivery to partner points (Gemius, 2022).

Our research has also confirmed this. 89.2% of respondents admitted that the pandemic caused an increase in the use of parcel lockers. 83.8% rated that during the pandemic, parcel lockers had an advantage over competitive forms of delivery (such as personal pickup or courier).

InPost also recognized the potential of using parcel lockers in areas other than e-commerce. It presented an innovative offer directed, among others, to local governments, called the "Office 24" service. It is a solution aimed at offices and public administration bodies, whose main task is to enable the handling of official matters practically at any time.

In 2020, the infrastructure was significantly expanded and the possibilities of handling shipments were increased by over 40%. This applies to both the number of InPost parcel lockers and the number of sorting and logistics centers. As volumes continue to increase (figure 1), these actions are being continued.



Figure 1: Size of the e-commerce market in Poland (in billion PLN)

InPost also introduced disinfection in their branches and parcel lockers, and provided their couriers with personal protective equipment such as masks and gloves. The company also encouraged its customers to use safe payment methods, such as card or online payments.

During the COVID-19 pandemic, InPost also showed social initiative. Together with its business partners and institutions, the company introduced the "Package for Medic" campaign, which involved free delivery of packages containing food and hygiene products for medical personnel.

In 2020, InPost introduced the InPost Box, an automated parcel pickup point that allows for contactless parcel pickup from the comfort of one's car. The company also launched the InPost Go service, which allows for parcel drop-off without the need to leave one's car.

In 2020, the company announced its investment in technologies related to unmanned deliveries. InPost plans to use drones and courier robots for delivering packages to areas that are difficult to access or in the case of very urgent shipments. As of yet, the company has not provided detailed plans in this area. In addition, InPost is developing its mobile applications, which allow customers to conveniently and easily use parcel locker services and track the status of their shipments. These applications also offer various features, such as the ability to file complaints, use insurance services, or generate shipping labels. Currently, the InPost Mobile app is used by 9 million users (Gemius, 2021).

Thanks to the app, opening the locker with the order was made possible not only through the panel on the parcel locker, as it was previously, but also through one's phone. This definitely facilitated parcel pickup and increased customers' sense of security, as they no longer had to worry about touching the screen on the parcel locker.

In 2020, InPost launched a service for sending packages through the app, which allows for sending packages to any parcel locker without printing a label.

In addition, InPost has abandoned the signature requirement for package pickup and introduced retrieval codes, which have eliminated the need for direct contact between the recipient and the courier.

In the era of the pandemic, InPost has presented more new features, such as weekend deliveries.

The company has coped well with the surge in work. The parcel delivery services to parcel lockers have increased, resulting in full capacity of the lockers. InPost's response to this phenomenon, which resulted in lower parcel locker efficiency and additional courier burden, was a lottery that encouraged customers to pick up their shipments more quickly.

InPost's actions during the pandemic were positively evaluated by the company's customers. During research conducted by the authors in 2021, 72.9% of respondents rated InPost's response to new customer needs arising from pandemic conditions as very good. The remaining respondents (27.1%) were dissatisfied and complained about the lack of a parcel locker near their place of residence. These were residents of rural areas.

Respondents also positively assessed elements of the company's activity that were important to them during the pandemic: fast delivery time (91.6%), attractive prices, competitive compared to other forms of delivery (85%), increased capacity of parcel lockers (68%), greater number of parcel lockers (93.5%), placement of parcel lockers in smaller towns (80.8%), introduction of an easier system for sending and receiving parcels (75.5%), possibility of using parcel lockers 24 hours a day (90.3%), easy operation of parcel lockers (88.7%), touchless operation of parcel lockers (74.5%), weekend delivery (85%), InPost Mobile application (74.9%), and the ability to track parcels (91.4%).

InPost's proper response to the difficult pandemic reality resulted in the strengthening of the company's position in the market. InPost expanded its operations and increased its revenues. InPost achieved double-digit growth on key markets in 2022, significantly increasing its share of revenue from international operations. The volume of handled shipments increased by 44% year over year, reaching 744.9 million units. Revenues for the year 2022 increased by 53.8% year over year, reaching 7.079 billion PLN (InPost, 2023).

All of these actions taken by InPost during the COVID-19 pandemic demonstrate that the company cares not only about its business interests, but also about the needs of society and its employees.

6. Conclusion

InPost quickly and effectively responded to the challenges posed by the COVID-19 pandemic by swiftly adapting its procedures and infrastructure. The company prioritized the safety and well-being of its employees and

customers by implementing measures to minimize direct contact and facilitate remote work. As part of these efforts, InPost increased the number of parcel lockers and introduced touchless parcel pickup options. Additionally, customers were provided with the convenience of online payment methods, and the mobile application was enhanced with special features that proved invaluable during the pandemic.

Moreover, InPost demonstrated its commitment to supporting local communities during these challenging times. The company donated over 200 tons of protective equipment to medical facilities, contributing to the crucial fight against the virus. Furthermore, InPost organized a charity campaign in which 100,000 PLN was donated to an infectious disease hospital, further aiding in the pandemic response (InPost, 2023).

It is worth noting that InPost's actions during the pandemic were well-received by the company's customers. Research conducted by the authors in 2021 revealed that 72.9% of the respondents rated InPost's response to the new customer needs arising from the pandemic as very good.

Individuals who rated InPost's response to COVID-19 negatively cited issues with timely delivery of parcels, overcrowding, and malfunctions of parcel lockers that hindered the pickup of shipments as reasons for their evaluation.

The main limitation related to the interpretation of the research results is the non-representative sample - only representatives of Generation Z, students from one study program and one university were examined. This does not provide a basis for generalizations regarding the research subject. Conducting future studies with a broader group of individuals using parcel lockers will enable a comprehensive examination of opinions regarding InPost's response to the pandemic reality.

References

- App Annie (2021) *The State of Mobile 2021 Report* [online]. Available at <https://www.data.ai/en/go/state-of-mobile-2021/> [Accessed 10.02.2023].
- Astute Analytica (2021) *Global B2B E-Commerce Market, By Type, By Payment Mode, By Enterprise Size, Estimation & Forecast, 2017 – 2027* [online]. Available at <https://www.researchandmarkets.com/reports/5511320/global-b2b-e-commerce-market-by-type-by> (Accessed 8.02.2023).
- Breque, M., De Nul, L. and Petridis, A. (2021) *Industry 5.0: towards a sustainable, human-centric and resilient European industry*, Publications Office of the European Union [online]. Available at <https://data.europa.eu/doi/10.2777/308407> [Accessed 8.02.2023].
- Ciesielski, M. (2020) *E-commerce and fintech. Interconnected vessel system Report "300 Research"* [online]. Available at https://static.300gospodarka.pl/media/2020/11/Raport_E-commerce-i-fintechy_System-naczy%C5%84-po%C5%82%C4%85czonych_2020-r.pdf [Accessed 10.02.2023].
- Cywiński, M. (2022) "Innovations in the courier services", *Globalization, the State and the Individual*, Vol 30, No.2, pp 49-56.
- Gemius (2021) *E-commerce in Poland 2021 Report* [online]. Available at <https://www.gemius.pl/wszystkie-artykuly-aktualnosci/raport-e-commerce-w-polsce-2021.html> [Accessed 10.02.2023].
- Gemius (2022) *E-commerce in Poland 2022 Report* [online]. Available at file:///D:/Users/Magda/Downloads/Raport_e-commerce_2022_-9.pdf [Accessed 10.02.2023].
- Gruenwald, H. (2020) *Parcel Delivery Services boom during Covid-19*, Norman, OK.
- GS1 Poland (2019) *Courier, Express, and Parcel (CEP) Market in Poland. In the face of trends and new challenges Report* [online]. Available at https://gs1pl.org/app/uploads/2022/01/Rynek_KEP_w_Polsce_W_obliczu_trendow_i_nowych_wyzwan.pdf [Accessed 5.02.2023].
- Gulc, A. (2020) *The relational model of the courier service quality shaping system in the e-commerce industry*, Publishing House of Białystok University of Technology, Białystok.
- Hausmann, L., Herrmann, N. A., Krause, J. and Netzer, T. (2014) *Same-day delivery: The next evolutionary step in parcel logistics* McKinsey and Company, March [online] Available at <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/same-day-delivery-the-next-evolutionary-step-in-parcel-logistics> [Accessed 10.02.2023].
- Imarc (2022) *Courier, Express and Parcel (CEP) Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2022-2027* [online]. Available at <https://www.marketdataforecast.com/market-reports/courier-express-parcel-market> [Accessed 10.02.2023].
- InPost, 2023, *InPost news* [online]. Available at <https://inpost.pl/aktualnosci> [Accessed 12.02.2023]
- The Chamber of Digital Economy (2023) *A decade of Polish e-commerce. e-Chamber report 2023* [online] Available at <https://eizba.pl/cyfrowa-baza-wiedzy/the-e-chamber-report-a-decade-of-polish-e-commerce/> [Accessed 8.10.2023].
- Janczewska, D., Janczewski, J. (2020) "Assessment of the quality of logistics customer service – on the example of courier industry", *Innovative Management in the Economy and Business*, Vol 31, No. 2, pp 173-187.

- Last Mile Experts (2022) *Polish CEP report 2022* [online]. Available at <https://lastmileexperts.com/reports-subscriptions/> [Accessed 10.02.2023].
- Lee, C. K., Lee, A. S. H., Lee, C. E. C. (2021) "Internet usage among senior citizens during Covid-19" *In 2021 7th International Conference on Research and Innovation in Information Systems (ICRIIS)*, pp. 1-6, IEEE.
- Marczuk, A., Caban, J., Porębska, E., Drożdżel, P., Duda, K. and Mikulski, M. (2015) "Market and logistics of courier services in Poland", *Logistics*, No. 3, pp 3075-3084.
- McKinsey & Company (2019) *The future of parcel delivery: Drones and disruption* [online]. Available at <https://www.mckinsey.com/~media/McKinsey/Featured%20Insights/The%20Next%20Normal/The-Next-Normal-The%20future-of-parcel-delivery-vf> [Accessed 1.02.2023].
- McKinsey & Company (2020) *COVID-19: Implications for business* [online]. Available at <https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/covid-19-implications-for-business> [Accessed 1.02.2023].
- Morawski, J. (2021) „Last Mile Logistics - Customer Service Improvements”, *Entrepreneurship and Management*, Vol 22, No. 2, pp 241-257.
- Mordor intelligence (2019) *Courier, Express, and Parcel (CEP) Market-Growth, Trends, and Forecast (2020-2025)* [online]. Available at <https://www.mordorintelligence.com/industry-reports/> (Accessed 1.02.2023).
- Mordor Intelligence (2023) *Courier, Express, and Parcel (CEP) Market - Growth, Trends, COVID-19 Impact, and Forecast (2023-2028)* [online]. Available at <https://www.mordorintelligence.com/industry-reports/courier-express-and-parcel-cep-market> (Accessed 1.02.2023).
- Ostoj, I. (2015) "Self-service on top, or InPost decides to introduce parcel lockers" *Research Papers/ University of Economics in Katowice*, pp 42-46.
- Perboli, G., Rosano, M. (2019) „Parcel delivery in urban areas: Opportunities and threats for the mix of traditional and green business models" *Transportation Research Part C: Emerging Technologies*, No. 99, pp 19-36.
- PwC (2022) *Development prospects for the e-commerce market in Poland in 2018–2027* [online]. Available at <https://www.strategyand.pwc.com/pl/en/publications/2022/development-prospects-for-the-e-commerce-market-in-poland-in-2018-2027.html> (Accessed 10.02.2023).
- Ratajczak, J., Lorenc, A. (2015) "Evaluation of the effectiveness of logistics customer service in the CEP industry" *Logistics*, No. 6, pp 1251-1261.
- Rokicki, T., Bórawski, P., Beldycka-Bórawska, A., Szeberényi, A. and Perkowska, A. (2022) "Changes in Logistics Activities in Poland as a Result of the COVID-19 Pandemic" *Sustainability*, Vol 14, No. 16, pp 10303.
- Singh, A. and Mutreja, S. (2020) *Courier, Express, and Parcel Market by Destination (Domestic and International), User Type (B2B and B2C), and End Use (Retail and E-commerce, Healthcare, and Others): Global Opportunity Analysis and Industry Forecast, 2020–2027* [online]. Allied Market Research. Available at <https://www.alliedmarketresearch.com/courier-express-and-parcel-market-A11516> [Accessed 12.02.2023].
- Statista (2023) *eCommerce report 2023, Statista Digital Market Outlook* [online]. Available at <https://www.statista.com/study/42335/ecommerce-report/> (Accessed 8.02.2023).
- Sułkowski, Ł., Kolasińska-Morawska, K., Brzozowska, M., Morawski, P. and Schroeder, T. (2022) "Last Mile Logistics Innovations in the Courier-Express-Parcel Sector Due to the COVID-19 Pandemic" *Sustainability*, Vol 14, No. 13, pp 8207.
- Szpilko, D., Bazydło, D. and Bondar, E. (2021) "The impact of the COVID-19 pandemic on the scope and quality of courier services. Preliminary research results" *Marketing and Market*, No. 5, pp 11-22.
- Taher, G. (2021) "E-commerce: advantages and limitations" *International Journal of Academic Research in Accounting Finance and Management Sciences*, Vol 11, No. 1, pp 153-165.
- Thukral, E. (2021) "COVID-19: Small and medium enterprises challenges and responses with creativity, innovation, and entrepreneurship" *Strategic Change*, Vol 30, No. 2, pp 153-158.
- Toska, A., Zeqiri, J., Ramadani, V. and Ribeiro-Navarrete, S. (2022) "Covid-19 and consumers' online purchase intention among an older-aged group of Kosovo" *International Journal of Emerging Markets*, (ahead-of-print).
- Wang, S., Kern, J. (2021) Digitalization Solutions in the Competitive CEP Industry—Experiences from a Global Player in China. W: J. Kern, M Sullivan *The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution*, John Wiley & Sons, pp 97-112
- Watanabe, T., Omori, Y. (2020) "Online consumption during and after the COVID 19 pandemic: Evidence from Japan" *The Impact of COVID-19 on E-Commerce*, No. 10, pp 978-1.