The deliveries’ specificity in e-commerce

B2C e-commerce sales have been increasing steadily since 2010 and the growth rate has been quite consistent over the last four years with average value of 23.6%². In Poland this rate achieved the value of 20% in 2013³. It is possible to specify a number of factors affecting the growth of interest in e-commerce. However, the key factors include⁴:

• new demand – aging of the population (older people discover the convenience of online shopping, while young people are used to the Internet and remote ordering by the Internet)
• traditional shopping is hit by the economic crisis and the competition of online shops: number of stores is reduced
• certain goods, such as groceries, are being sold on the Internet: currently, it is only a small share but considering the above mentioned factors, this sector will face an increase in the near future
• people use smartphones to purchase goods online.
• Due to e-commerce’s generic specificity, its functioning on B2C market is usually based on home deliveries. It is possible to divide them into three types⁶:
  • home deliveries from a supermarket, where orders are prepared by a picker (store-picking), mainly on the outskirts of the urban area without major changes in the supply strategy; the purchased products are either directly delivered at home or picked up by the consumer, mainly by car, avoiding queues and waiting times at the checkout of the store (car picking services are also known as “shopping drive”). However, for proximity supermarkets or commercial centers with good public transport accessibility, car is not the only transport mode for end consumers. In all cases, these trips can be assimilated to personal trips for shopping purposes
  • home deliveries from a specific warehouse, where orders can be prepared (warehouse-picking) and where important changes are noted in the supply chain, because the warehouse is not located in a peripheral area. Then, the ordered products are delivered to the place of consumption using light goods vehicles, through an optimized route. These trips are made by small city freighters and can be assimilated to traditional e-commerce HDs with more restrictive constraints
  • out home deliveries through proximity reception points, where the supply changes consist of including new local depots. In this case, the ordered products are directly prepared in a depot (depot-picking), located near the place of consumption in which they are picked up by the final consumer.

Development and the growing importance of e-commerce offer new opportunities to integrate and improve supply chains⁷. On the other hand, however, they pose new challenges in terms of supply chain management, due to the specificity of delivery. One of the biggest problems with the organization of the supply of goods to customers in e-commerce is that there is a significant fragmentation of the orders, resulting from the fact that individual customers usually buy small amounts of products. Additionally, their expectations regarding fast realization of the orders have an influence on competitive market of transport services, which is forced to respond dynamically to the emerging demand for transport. Due to that fact and in order to satisfy the customer, delivering companies provide their services regardless of the degree of use of loading spaces of vehicles. On the other hand, at this point it is worth to highlight the problem of inadequate fleet of transport companies, which is not adapted to the needs of e-commerce, particularly in the context of the size of the vehicles in relation to the volume of deliveries. Therefore, one of the most important categories of good practices in current urban freight transport systems become solutions to rationalize the last mile delivery, through the use of⁸:
  • reception boxes, permanently fixed to a wall outside the customer’s home, to which access is possible using a key or an electronic code; customer can be alerted of the delivery by mobile phone or email; used mostly for parcels, but can be used for foods if the boxes are temperature controlled
  • delivery boxes, owned by the retailer or delivery company.

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2 Article reviewed.
pany; filled with the goods at the distribution depot, and then temporarily attached to the home via a locking device fixed on the wall in a secure place at the customer’s home; empty boxes or boxes containing returned goods are then collected by the delivery company either as a separate collection round or as part of the next delivery.

- **controlled access systems**, provide the delivery driver with a means of gaining access to a locked area to leave the goods in; a key may be sealed inside a unit, which is mounted in a location where delivery staff can access it; the driver enters an access code into the sealed unit to release the key and open the nominated delivery location to leave the goods.

- **collection points**, based on the use of locations other than customers’ homes to which goods are delivered (the nearest Post Office, convenience store or a petrol station; often have long opening hours. Goods are delivered by the retailer or their carrier to the collection point and the customer is informed that their order is ready for collection. Customers may arrange with the collection point for the goods to be delivered to their home. Collection points result in fewer delivery locations and improved drop density.

- **locker-banks are groups of reception box units (lockers)**, which are similar to collection points although they are not sited at each customers premise but sited in apartment blocks, work places, car parks, railway stations etc. Customers are not usually assigned to their own locker to optimize usage (lockers have electronic locks with a variable opening code, and can be used for different customers on different days). They may be dedicated to one delivery company or used by many. Customers may be notified by message about when their delivery has arrived, the box number and location, and the code to open the box. Locker-banks require the customer to make the final leg of the journey. However, locker-banks are located to make the deviation in customers’ journeys as short as possible.

Important and popular solution become locker-banks, as they favor the reduction of traffic and improve the use of cargo compartment by consolidating deliveries and making them more independent from the available time slots. Example of this kind of measure is well-known in Poland parcel lockers system, implemented by InPost company.

Efficiency of parcel lockers from the customer point of view – case of Szczecin

The study carried out in Szczecin consisted of the survey, which was realized to assess the usability of parcel lockers from the users’ point of view. It was the pilot stage of the survey, which is currently being realized throughout Poland under GRASS project⁹.

The pilot survey was focused on customers of online shops, lived in Szczecin. They were asked for:

- overall rating of parcel lockers
- the reasons for parcel lockers’ utilization
- expectations regarding the location of parcel lockers
- evaluation of the current locations of parcel lockers in Szczecin.

According to the results achieved in Szczecin, most respondents are satisfied with utilization of parcel lockers (28% of them rate this system with 10 points in 10-point scale, with 1 being the worst value and 10 the best one). Weighted average overall rate for parcel lockers usability equaled 8,18 points. The most important reason for utilization of this kind of delivering system is the price (Fig. 1). Based on the data from 100 most popular online shops in Poland, for parcel average value of less than 120 PLN and with payment realized by credit card, average costs of deliveries realized by three major operators in Poland are respectively: 9.15 PLN for InPost parcel lockers, 10.81 PLN for Polish Post and 14.24 PLN for couriers services.

The other most important reasons for parcel lockers’ utilization are their availability and localization. The most important expectations of parcel lockers’ users regarding

⁹ www.grassproject.eu (accessed on 10.03.2015).
the localization include: close location from home, on the way to work and availability of parking spaces (Fig. 2).

The opinions of parcel lockers’ users in Szczecin regarding the current locations of utilized machines show that 28% rated them with the highest value. Weighted average rating for this factor equaled 7.46 points in 10-point scale. However, the most important condition of efficiency of parcel lockers is the willingness of online retailers to deliver goods to the location, which does not match the address of the purchaser and, on the other hand, the willingness of online shops’ customers to receive their goods from parcel lockers. For the purchaser the most important barrier of utilization of parcel lockers is the fact that the final leg of the journey must be made by them.

The directions for parcel lockers development

Nowadays more than 3000 InPost parcel lockers are utilized in 20 countries all over the world10. In Germany similar system has been implemented by Deutsche Post in cooperation with DHL11. It seems that in the next few years the popularity of this solution will increase. Moreover, this idea could be utilized not only on B2C e-commerce market. Interesting challenge for this kind of delivering system are shop deliveries. This kind of solution was proposed under CityLog project12. CityLog BentoBox is an innovative concept consists for the carrier in delivering out of hours of shopping with available packages to the recipients in a smart package system (Fig. 3). This system was tested in Berlin and in Lyon13.

Parcel lockers can also be successfully utilized in the operation of reverse logistics, which is a natural consequence of the customer orientation in present supply chain management14, which is of particular importance with regard to e-commerce. The ability to return goods is one of the key advantages to customers while making purchases online. Therefore, the utilization of parcel lockers directly corresponds with the objectives of outsourcing in the context of reverse logistics15.

It should be emphasized that the utilization of parcel lockers within reverse logistics is important in the context of promoting sustainable urban freight transport. Reducing

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11 www.standorte.dhl.de/packstationen_paketboxen (accessed on 10.03.2015).
12 www.city-log.eu (accessed on 10.03.2015).
13 Ibidem.
18 www.c-liege.eu (accessed on 10.03.2015).
the negative impact on the urban environment is one of the key challenges of the cities in European Union. And reverse logistics is an important part of logistic processes taking place within cities. Given its significant influence on the impact of transport on the environment\textsuperscript{16}, the utilization of parcel lockers becomes an interesting alternative. According to the results of an analysis made by researchers from the AGH University of Science and Technology in Krakow realized in October 2013, the courier servicing InPost parcel lockers is able to deliver 600 parcels in just one day, with travel distance of about 70 km in comparison to respectively 60 parcels and 150 km in traditional delivery system. It results with CO\textsubscript{2} emission 1516 tons per year in comparison to 32500 tons in traditional courier service\textsuperscript{27}. Similar results were achieved in analysis on influence of parcel lockers on the city area, realized by the Department of Logistics and Transport Systems at the Maritime University of Szczecin as the part of C-LIEGE project\textsuperscript{28}. Due to that analysis, parcel lockers are consistent with sustainable development assumptions.

Conclusion

Parcel lockers are a very interesting and efficient measure. According to the results of the analysis presented above, this kind of delivery system is well assessed by users. Moreover, this solution has very high potential and it could be utilized not only in B2C e-commerce market as this is an interesting example of reverse logistics services outsourcing. Nevertheless, implementation and efficient utilization of parcel lockers require the support of local residents, courier/delivery companies and the owners of places where parcel lockers are located. Additionally, local authorities must be involved in the stage of implementation with regard to the permission and the selection of sites. It is directly connected with major role of local authorities in the development of sustainable city logistics\textsuperscript{29} as it may help to achieve better results regarding the usability of this measure.

Abstract

The growth of B2C e-commerce market results in the increase of importance of last mile deliveries in the city area. Due to e-commerce’s generic specificity, functioning of the deliveries in e-commerce on B2C market is based on home deliveries. Due to influence on the growing demand for deliveries, which consequently could have the impact on traffic and congestion problem as well as city environment, it is important to look for the alternative measures, which will help to reduce this negative impact. In recent years a very interesting and popular solution became parcel lockers as the efficient last mile delivery system. This paper is focused on the assessment of usability of this measure based on the example of InPost company system.

Keywords: supply chain management, city logistics management, last mile delivery, parcel lockers, e-commerce, B2C, reverse logistics, logistics services outsourcing

Paczkomaty jako rozwiązanie wspomagające zarządzanie dostawami ostatniego kilometra w handlu elektronicznym

Streszczenie


Słowa kluczowe: zarządzanie łańcuchami dostaw, zarządzanie logistyką miejską, dostawy ostatniego kilometra, paczkomaty, handel elektroniczny, B2C, logistyka odwrotna, outsourcung usług logistycznych

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