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## Analysis of parcel lockers' efficiency as the last mile delivery solution – the results of the research in Poland

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### Abstract

Last mile deliveries are one of the major effectors of heavy traffic of commercial vehicles in the whole city area. Due to e-commerce's generic specificity, its functioning on B2C market is based on home deliveries. In recent years very interesting and popular solution became the parcel lockers as the efficient last mile delivery system. This paper is focused on the analysis of usability and efficiency of this measure based on the example of Polish InPost Company system. It introduces the results of pilot survey realized in Szczecin (Poland), as well as the general expectations regarding the efficient utilization of this kind of solution.

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### 1. Introduction

Last mile deliveries are one of the major effectors of heavy traffic of commercial vehicles in the whole city area. Their essential features, significantly lowering the rational functioning of the transport system, include high degree of fragmentation and low range of use of the cargo load compartment of vehicles. The importance of this type of deliveries grows with the increasing interest in remote shopping. Currently, its biggest inducer on B2C market is e-commerce.

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According to “Global B2C E-commerce Report 2014”, B2C e-commerce sales have been increasing steadily since 2010 (Fig. 1) and the growth rate has been quite consistent over the last four years with average value of 23,6 % (Nagelvoort et al., p. 20). Development of e-commerce on B2C market is well illustrated by the example of Poland. The authors of the report published by Internet Standard Magazine, focused on e-business functioning analysis, highlighted that despite the global crisis the B2C e-commerce growth rate in Poland achieved the value of 20% in 2013 (E-commerce 2014, p. 6).

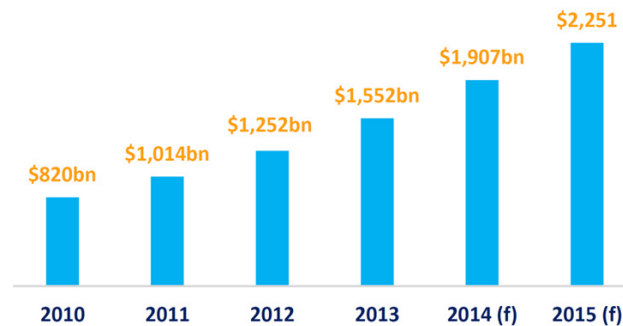


Fig. 1. B2C e-commerce sales increase since 2010. Source: Nagelvoort et al., p. 20.

Due to e-commerce’s generic specificity, its functioning on B2C market is based on home deliveries. It is possible to divide home deliveries into three categories (Durand, Gonzalez-Feliu 2012, p. 512):

- **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 delivered directly to home or picked up by the consumer, mainly by car, avoiding queues and waiting times at the checkout (car picking services are also known as “shopping drive”). However, car is not the only transport mode for end consumers for supermarkets or commercial centers with good public transport accessibility. 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 new local depots. In this case, the ordered products are prepared directly in a depot (depot-picking) located near the place of consumption in which they are picked up by the final consumer.

A popular solution among customers, due to its convenience, is direct home delivery usually realized by external courier services. 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. Individual customers usually buy small amounts of products, while expecting fast delivery. This forces the competitive market of transport services to respond dynamically to the emerging demand for transport. Often, in order to satisfy the customer, commercial vehicles provide their services regardless of the degree of use of their loading space. 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 vehicle in relation to the volume of deliveries. Additionally very often local authorities implement not enough efficient measures to reduce negative impact of urban freight transport. For example, in Poland these measures usually are focused on access restrictions (Kiba-Janiak, Cheba 2014), what resulting many problems in home deliveries. This is important problem taking to the account the significant role of local authorities in development of city logistics (Witkowski, Kiba-Janiak 2014).

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