

# Parcel Lockers, an Answer to the Pressure on the Last Mile Delivery?



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## 1 Introduction

Over the last decade, e-commerce has spurred the growth in parcel lockers. By “parcel locker”, the authors refer to automated parcel machines where users can send and/or receive parcels. This relatively new phenomenon has the potential to alter the traditional postal delivery model significantly. Section 2 of this chapter describes the range of parcel locker types. Many distinctions are possible, such as by provider, location, collection point and mobility. The chapter continues with a consumer perspective on parcel lockers in Sect. 3. In general, users find parcel lockers user-friendly. Access to parcels at every hour of the day is especially well-received. Sometimes, e-retailers or postal operators encourage the use of parcel lockers through a price reduction.

Next, in Sect. 4, the chapter looks more deeply into the parcel locker landscape of five nations. Germany was chosen because of its pioneering role in deploying parcel lockers. Spain also has a rather mature parcel locker market. Sweden was picked because of its use of community mail boxes in some rural regions, which could improve the perception and acceptance of parcel lockers. Estonia is a European frontrunner in digitalization. Belgium was a logical choice due to the nationality of the authors. The chapter continues with the cost efficiency and sustainability of parcel lockers in Sect. 5. Section 6 touches upon the regulatory challenges of parcel lockers, while Sect. 7 concludes with a look into the future of parcel lockers.

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## **2 Different Types of Parcel Lockers**

The term ‘parcel locker’ encompasses a wide range. In what follows, we touch upon some possible parcel locker types.

### ***2.1 Public vs. Private Parcel Lockers***

Parcel lockers can be installed in either public or private spaces. For an installation in a public space, the local administration - in most cases this will be the municipality - must approve the placement. When placed in a public space, the scarcity of space might become an important issue. Most parcel lockers, however, are located in private locations. Examples include parking sites of supermarkets or gas stations, entry halls of workplaces or outside private enterprises located in the city center. Private parcel lockers can consist of just one cabinet and be located at a home just like an ordinary letter box.

Another public vs. private distinction is between publicly accessible parcel lockers and parcel lockers with restricted access to an individual or a certain group of individuals. In this paper, when talking about public parcels, the authors refer to publicly accessible parcel lockers.

### ***2.2 Electronic vs Mechanic Parcel Lockers***

Two main parcel locker types have emerged in the market. First is electronic parcel lockers. They can be connected to the Internet and send a notice of delivery to the receiver while at the same time generating a proof of delivery, both useful to the postal operator and e-retailer.

Second is mechanical parcel lockers. These mechanical parcel lockers can come with a soft-drop compartment in the bottom part of the locker, guaranteeing a waterproof and safe environment for the parcel until the customer collects it. Mechanical parcel lockers can be equipped with PIN code protection. A mailman, who is notified of the parcel locker PIN code, has access to the secured parcel locker.

### ***2.3 Stationary vs Mobile Parcel Lockers***

Although most parcel lockers are stationary, mobile parcel lockers may emerge in the near future (Joerss, Schröder, Neuhaus, Klink, & Mann, 2016). After locating the customer, the parcel delivery vehicle drives to the customer’s desired location. When

the truck stops at a certain point, the customer can access the secure package compartments by using a smartphone or entering a PIN code.

Different enterprises are developing mobile parcel lockers, making use of the technology of self-driving cars. Google, for example, has been granted a US patent for the development of a self-driving parcel delivery truck, which it named ‘autonomous delivery platform’.<sup>1</sup> Ford’s CEO stated that by 2021, parcel delivery can, next to ride-hailing, be one of the key commercial applications for the first fleet of fully autonomous vehicles.<sup>2</sup>

### 3 Consumer Preferences Regarding Parcel Lockers

According to an IPC study, 11% of all parcels are delivered to a parcel locker while 9% of returned parcels pass through a parcel locker as well. Parcel lockers are most popular in Finland (43%), Denmark (41%) and China (33%).<sup>3</sup> Furthermore, ability to select the delivery location is assessed with a score of 47%, ranking it seventh (International Post Corporation, 2018).<sup>4</sup> According to a study of the Maritime University of Szczecin, 70% of the respondents to a survey conducted in 2015 rated the use of parcel lockers in the Szczecin with a grade of 8 or higher on a 10-point scale (Iwan, Kinga, & Justyna, 2016).

A Polish study examining the young adults’ perception towards parcel lockers, revealed that young adults like parcel lockers for different reasons (Moroz & Polkowski, 2016).<sup>5</sup> Their preferences are, however, not fueled by ecological reasons—only 1% of youngsters choose parcel lockers because of environmental considerations. 24/7 availability (55%) and lower delivery cost (32%) top the table.<sup>6</sup>

In Sweden, a master’s thesis at Lund University (Bengtsson & Vikingson, 2015) found that 93% of the respondents did not know what a package vending machine was. However, all participants thought that the processes to retrieve and return a package were easy to perform. The authors believe that there is a significant lack of

<sup>1</sup>Patent named ‘autonomous delivery platform’ with patent number 9.256.852 B1 granted on 09/02/2016.

<sup>2</sup><https://postandparcel.info/74935/news/ford-ceo-sees-parcel-delivery-as-important-application-for-fully-autonomous-vehicles/>.

<sup>3</sup>Here, the popularity was measured by the question ‘Considering your online shopping experiences of the past 12 months, where have you had your parcels delivered to?’.

<sup>4</sup>A total of 20 innovations with regard to shopping online was presented to the respondents, such as clear information about delivery charges before purchase, a simple and reliable return process, full visibility on the delivery process and the possibility to select the delivery speed.

<sup>5</sup>With young adults within the age group of 15–35.

<sup>6</sup>Young adults were asked what the reason was for which they made use of a parcel locker. Possible answers were: lower delivery cost, 24/7 availability, delivery speed, environmental considerations and brand confidence.

knowledge about what customers think of parcel lockers, but they appear to remain positive about using them.

In Belgium, a BIPT qualitative consumer study of 2016 revealed that parcel lockers are relatively unknown to Belgian postal end users (BIPT, 2017). The study reported a lack of parcel locker visibility and acquaintance with their use.<sup>7</sup> Postal end users who did use parcel lockers seemed content. In its annual report of 2014,<sup>8</sup> bpost, the Belgian postal incumbent, said that a survey of bpost parcel locker users found 72% of them thought the lockers useful. Many stated that they would be willing to use these lockers in future.

A PostNL pilot carried out in 2014 also indicated that consumers familiar with a system of parcel lockers is satisfied with it. 89% were very or extremely satisfied with the system, and 95% would use the system of parcel lockers again.<sup>9</sup> Nonetheless, PostNL shifted its focus from train stations, with a pilot covering 9 locations in train stations at the end of 2014, to residential neighborhoods.<sup>10</sup> It currently has over 50 parcel locker locations in the Netherlands.

## 4 An Overview of the Operators' Parcel Locker Landscape

### 4.1 Germany

The German incumbent Deutsche Post DHL Group (hereafter: 'DP/DHL') launched a pilot project for "Packstations" in 2001. Packstations, using Radio Frequency Identification technology,<sup>11</sup> are large public parcel lockers where end-users are able to send and receive parcels and oversize letters. Since its launch in 2001, the Packstation network has quickly expanded. In 2014, DP/DHL stated that it had 2650 Packstations in Germany with approximately 250,000 compartments, serving over 5 million registered users.<sup>12</sup> In its annual report of 2017, DP/DHL said that it operated 3200 Packstations in Germany.

<sup>7</sup>BIPT launched in 2017 the [www.postalpoint.be](http://www.postalpoint.be) website displaying the postal access points (including parcel lockers) of all active operators in the Belgian postal market.

<sup>8</sup><http://corporate.bpost.be/~media/Files/B/Bpost/annual-reports/ar-2014.PDF>.

<sup>9</sup>PostNL press release of 29 October 2014: <https://www.postnl.nl/over-postnl/pers-nieuws/persberichten/2014/oktober/postnl-start-installatie-pakketautomaten-op-grote-ns-stations-en-op-sc-hiphof.html>.

<sup>10</sup><https://www.postnl.nl/en/about-postnl/press-news/news/2017/postnl-continues-trial-with-innovative-parcel-and-letter-machine-in-limburg.html>.

<sup>11</sup>Radio-Frequency Identification (RFID) is the use of radio waves to read and capture information stored on a tag attached to an object. A tag can be read from up to several feet away and does not need to be within direct line-of-sight of the reader to be tracked (Source: EPC-RFID Info).

<sup>12</sup>[http://www.dpdhl.com/en/media\\_relations/press\\_releases/2014/dhl\\_packstation\\_success\\_story\\_continues.html](http://www.dpdhl.com/en/media_relations/press_releases/2014/dhl_packstation_success_story_continues.html).

Furthermore, DP/DHL currently has around 800 Paketboxes, which are publicly accessible parcel lockers, similar to curbside collection letterboxes, only usable for sending parcels.<sup>13</sup> In addition to these public parcel lockers, DP/DHL also provides private parcel lockers named Paketkasten.<sup>14</sup> These private parcel lockers can be used for sending and receiving parcels at your premises. Although DP/DHL has an extensive postal parcel network, with 90% of the people in Germany living within 10 min of a DHL Packstation,<sup>15</sup> it does not offer wholesale access to these parcel lockers.

Competitors DPD, GLS and Hermes are currently working out an alternative for the DP/DHL Packstations, named ParcelLock.<sup>16</sup> The ParcelLock system, which is designed as an open access system for all postal providers will offer public parcel lockers (Paketstation) as well as private parcel lockers (Paketkasten), both for sending and receiving parcels. According to the website, the first Paketstations will soon be installed in Hamburg. In 2016, Amazon has launched a pilot project in cooperation with Shell oil company. Amazon will install its Amazon Lockers in 10 Shell petrol stations in Munich.<sup>17</sup>

## 4.2 Spain

Correos, currently undergoing a digital transformation process has offered since 2015 parcel locker services in cooperation with KEBA.<sup>18</sup> The company provides two types of KePol lockers, named HomePaq and CityPaq. The pilot started with around 500 lockers in the Madrid area and then steadily expanded to more areas across Spain. HomePaq lockers are private lockers that are installed in local community areas such as apartment entrance halls. The CityPaq lockers, however, are parcel lockers placed in public spaces such as train stations and supermarkets. Correos now services over 3200 of these CityPaq lockers.

As of 2017, Amazon is also active on the Spanish automatic parcel locker market with over 200 of its own Amazon Lockers.<sup>19</sup> These lockers will be located in 30 cities in 26 provinces. For their placement, Amazon works together with several business establishments such as supermarket chains, gas stations, shopping centers and restaurants.

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<sup>13</sup>Worldwide, DP/DHL has around 7000 Paketboxes.

<sup>14</sup><https://www.dhl.de/de/privatkunden/pakete-empfangen/pakete-zuhause-empfangen/paketkasten.html>.

<sup>15</sup>2014 data. See footnote supra.

<sup>16</sup><https://www.parcellock.de/>.

<sup>17</sup><https://ecommercenews.eu/amazon-tests-amazon-locker-shell-stations-germany/>.

<sup>18</sup><http://www.ejecutivos.es/2018/05/03/correos-recibe-el-galardon-a-la-transformacion-digital-en-la-i-edicion-de-los-premios-ejecutivos-extremadura/>.

<sup>19</sup><https://www.amazon.es/gp/help/customer/display.html?nodeId=201910660>.

### 4.3 Sweden

In 2014, the Swedish incumbent PostNord launched a pilot project of 10 parcel lockers across Sweden, Norway and Finland, with each parcel locker having approximately 40 compartments. These parcel lockers were set up at public transport nodes. PostNord no longer provides parcel locker services due to a lack of demand.<sup>20</sup> It aims, however, to reenter the Swedish parcel locker market in the near future.<sup>21</sup>

Unlike PostNord, some of its competitors in the parcel market provide parcel locker services. Bring, a subsidiary of Norwegian postal operator Posten Norge, has partnered with the Stockholm public transport company SL in order to expand its network of automated parcel lockers in the Swedish Capital. In June 2016, Bring possessed, after less than 1 year since the start of the project, 11 locker locations.<sup>22</sup> With parcel lockers at public transport stations, Bring aims to make it easier for commuters to pick up or drop off their packages on the go.

Another player on the Swedish parcel locker market is DP/DHL. It has partnered with Danish firm Swipbox to install 60 automated parcel lockers at various locations throughout Sweden. Customers who have registered to use the parcel locker service will receive a text message from DHL Express as soon as the item is ready for collection. This will contain a security code that customers simply need to enter at the designated station in order to receive their parcel.

### 4.4 Estonia

The Estonian incumbent, Omniva, manages the largest Estonian parcel locker network, with approximately 130 parcel lockers. Customers can pick up parcels from a locker after receiving an email or short message service (SMS) with a six digit code. Addressees may be required to show their ID and to pay a fee (by bankcard) before collection. To send a parcel, customers have to register for the Omniva parcel service, complete the details for their package, make payment and print out an address card (either at home or at the locker), scan the bar code on the address card, and then place the parcel into the opened locker. Omniva has announced that it aims to extend this service by expanding its parcel locker network.<sup>23</sup>

Parcel lockers are also offered by a number of other postal providers including DPD (32 parcel lockers) and Itella SmartPOST (100 parcel lockers).<sup>24,25</sup>

<sup>20</sup><http://scandinavianretail.se/postnords-parcel-locker-no-immediate-success/>.

<sup>21</sup><https://www.svd.se/dags-gora-om-postladan-till-paketbox>.

<sup>22</sup><https://ecommercenews.eu/nordic-company-bring-invests-more-parcel-lockers/>.

<sup>23</sup>[https://www.omniva.ee/index.php?article\\_id=686&article\\_token=news&page=888&action=article&](https://www.omniva.ee/index.php?article_id=686&article_token=news&page=888&action=article&).

<sup>24</sup>[https://www.dpd.com/ee\\_en/home/pickup\\_network/pickup\\_point\\_locations](https://www.dpd.com/ee_en/home/pickup_network/pickup_point_locations).

<sup>25</sup><http://uus.smartpost.ee/en/parcel-terminal-locations>.

## 4.5 Belgium

In Belgium, bpost, the postal incumbent, started commercializing parcel lockers in 2014.<sup>26</sup> By the end of that year, it had 125 locker locations near well-attended places, such as train stations, grocery stores and large postal offices, which were accessible at any time, day or night. During the following years this network grew to 150 units.

In 2016, bpost took a majority interest in De Buren, a Dutch network of independent parcel lockers. After that, the bpost lockers were rebranded to ‘Cubee’, with an aim to have more than 450 parcel lockers in Belgium by the end of 2018.<sup>27</sup> It is now an open network of lockers, which is also being used by other operators like GLS, UPS and DPD.<sup>28</sup> DHL Express also offers two locations with parcel lockers in the Antwerp province. These lockers can be used only for sending parcels.

## 5 Sustainability and Cost Efficiency of Parcel Lockers

### 5.1 Friction Between Consumer Needs and Spatial Planning

In 1950 approximately one-third of the world population lived in urban areas, and this figure is expected to rise to two thirds by 2050 (United Nations, 2014). This population concentration, with the total number of e-purchases, creates a major challenge for last mile delivery. The preference of most consumers for home delivery, from a city logistics point of view, is a major concern. The growth in e-commerce, together with the preference of home delivery, has led to a fragmentation of shipments in the ‘last mile’ (Morganti, Seidel, Blanquaert, Dablanç, & Lenz, 2014).

At the same time, consumers have become more time-sensitive regarding delivery. This creates pressure on the supply chain management and requires complex forecasting models. Consumers also wish their purchases to be delivered when they are actually at home, meaning they want it mostly in evenings or on weekends. Evening delivery, however, falls during rush hours, creating an extra challenge for on-time delivery.

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<sup>26</sup>Bpost year report 2014: <http://corporate.bpost.be/~media/Files/B/Bpost/annual-reports/ar-2014.PDF>.

<sup>27</sup>Bpost press release (4 October 2017): [http://corporate.bpost.be/media/press-releases/2017/04-10-2017?sc\\_lang=en](http://corporate.bpost.be/media/press-releases/2017/04-10-2017?sc_lang=en).

<sup>28</sup><https://cubee.be/become-partner/>.

## 5.2 Sustainability of Parcel Lockers

24/7 availability of (most) parcel lockers offers a strategic environmental advantage when compared to traditional postal delivery. Delivering and collecting parcel lockers at any time can have a significant impact on urban environmental pollution due to traffic congestion. Night collections or collections outside rush hours might reduce this congestion. According to InPost statistics, around 58% of parcel locker collections occur between 6 PM and 8 AM (Moroz & Polkowski, 2016).<sup>29</sup> Consumers could also be nudged towards night collections through financial incentives such as a price reduction.

A higher emphasis on night deliveries to parcel lockers could decrease environmental pollution from traffic congestion. Proper cost calculations for traditional parcel delivery in urban areas, should incorporate the externalities such as time loss (through traffic congestion), noise pollution (creating cardiovascular effects) and environmental pollution (intensifying respiratory illnesses).

A study of the University of Krakow calculated, for the city of Szczecin, compared CO<sub>2</sub> emissions for a parcel delivered to a parcel locker to those for a parcel delivered at home (Moroz & Polkowski, 2016). The study revealed that a parcel delivered at home creates over 20 times as much CO<sub>2</sub> as a parcel delivered in a parcel locker (300 g vs 14 g). This figure does not, however, incorporate the impact of the consumer-induced CO<sub>2</sub> emitted when collecting the parcel. The study also conducted a poll to explore consumer parcel collection. It turns out that 44% of Polish respondents collect the parcel on foot, while 50% collects their parcel by car, on the way to another location. A mere 6% of respondents takes the car to collect their parcel where the destination was the parcel locker itself.

## 5.3 Cost Efficiency of Parcel Lockers Owned by Postal Operators

The advantages of parcel lockers over traditional home delivery from an operator's point of view, are a near 100% hit rate and shared delivery costs when multiple parcels can be dropped off at the same time and the same location.<sup>30</sup> 24/7 availability also eliminates the need for operators to deal with delivery time restrictions like the opening hours of parcel shops. And, compared to a parcel shop, no fee needs to be paid to a shop owner. Large objects like a television, however, can't be delivered through most parcel lockers.

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<sup>29</sup>InPost is a Polish postal operator with an extensive network of nearly 5000 parcel lockers in over 20 countries (with among them UK, Italy, Canada, Russia).

<sup>30</sup>Fully occupied parcel lockers and oversized parcels are two examples of what can negatively impact the hit rate.



Gevaers, Van de Voorde, and Vanelslander (2014) calculated the last mile cost of home delivery, with on average a 75% delivery rate, versus delivery at a collection point, having a 100% hit rate. The cost savings they computed on the basis of the average Belgian population density were significant. Home delivery would cost €3.87 and delivery in a collection point only €2.91, with delivery of just one parcel. If on average 2.5 parcels are dropped off at the same collection point, the last mile cost per parcel drops to just €1.16. If we compare these cost savings to the installation cost of one parcel locker location, this enables us to calculate the pay-back period of the investment.

With regard to cost, in 2014, bpost, the Belgian postal incumbent, stated that one parcel locker location, with about 70 lockers or cabinets, required an investment of between 40,000 and 50,000 euros. Given that the depreciation period normally used for machines is 10 years, this should imply that the cost savings would ideally be above 4000–5000 euros per year to make sense from an investor's point of view.

For reasons of simplicity, we will therefore assume that the delivery cost of €1.16 per unit, when delivering on average 2.5 parcels at the same location, is the lowest unit delivery cost possible. This would imply that compared to home delivery with a 75% hit rate, a delivery at a parcel locker location could save up to €2.71 in delivery costs per delivered parcel, being €3.87 minus €1.16. To recover an investment of 5000 euros per year needed for one parcel locker location, at least 1845 parcels that would otherwise have been delivered at home, need to be dropped off at that locker location—the equivalent of around 5 parcels per day.

To put that number into perspective, bpost stated in its annual report of 2017,<sup>31</sup> that it handled 190,000 parcels on average per day.<sup>32</sup> This implies that less than 1% of all parcels (5 parcels per day for 150 parcel locker locations versus a daily total of 190,000 parcels) need to be dropped off at a specific parcel locker location before this parcel locker investment would be financially sound.<sup>33</sup> This seems reasonable for an operator like bpost, with a national market share in terms of parcel volume between 25 and 30% (KPMG, 2017).<sup>34</sup>

For smaller operators with a minor market share and inferior volumes, a substantial investment in a parcel locker network will carry a higher financial risk since a higher percentage of consumers that opt for parcel locker delivery would be needed in order to make the investment viable.

<sup>31</sup>[http://corporate.bpost.be/investors/year-in-review?sc\\_lang=en](http://corporate.bpost.be/investors/year-in-review?sc_lang=en).

<sup>32</sup>This daily amount also includes B2B deliveries, which will not be delivered in a parcel locker.

<sup>33</sup> $(5 \times 150)/190,000 = 0.4\%$ .

<sup>34</sup><http://www.bipt.be/en/operators/postal/universal-and-non-universal-postal-services/communication-by-the-bipt-council-of-18-may-2017-regarding-the-results-of-the-study-on-the-belgian-market-for-parcel-delivery-in-the-context-of-e-commerce-activities>.

## 5.4 *Cost Savings of Parcel Lockers Owned by Operators Passed on to Consumers*

Some operators offer a reduced tariff for collection point delivery to encourage customers to opt for it and avoid more expensive home delivery. Cost savings achieved by collection point delivery are partially passed on from the operator to the consumer (sender). In Belgium, bpost offers an online reduction (C2X) for delivery in one of their postal offices, shops or lockers.<sup>35</sup> Shipping a domestic 2 kg parcel can be bought online for €5.5 for a delivery address of choice or €4.5 for delivery to a collection point, a €1 saving for the consumer. This amounts to more than one third of the maximum cost saving of €2.71, achieved by parcel locker delivery as compared to traditional home delivery.

## 6 Potential Regulatory Challenges

### 6.1 *No Legislation, but General Legal Rules*

We found no specific legislation concerning parcel lockers of the countries analyzed in Sect. 5. This may be due to the spontaneous character of the provision of this service or that parcel lockers market is still in its infancy. As a consequence, it is impossible, at this point, to compare their legal frameworks in order to identify elements likely to contribute to the development of this new market.

The lack of specific legislation does not prevent more general legal rules from applying to parcel lockers, such as general rules of competition law. That was the basis on which SmartPost, in Estonia, lodged a complaint with the National Competition Authority against Omniva concerning the provision of parcel lockers, using arguments related to predatory and discriminatory pricing, as well as suspected cross-subsidisation. However, the National Competition Authority ruled that Omniva did not have a dominant position in the parcel lockers market, and thus there was no basis for sanctions against Omniva.<sup>36</sup>

The Spanish postal regulator (CNMC) recently responded to the concerns of certain operators regarding parcel lockers. It stated that the parcel locker service provided by Correos should not be considered part of a universal service obligation. Questions concerning possible competitive advantages arising from the provision of parcel lockers remain open. Installation costs of this type of equipment were not so high as to make it impossible or unreasonably difficult for a competitor to provide this type of service (Cullen International, 2016).<sup>37</sup>

<sup>35</sup>C2X consists of both C2C (Consumer-to-Consumer) and C2B (Consumer-to-Business) parcels.

<sup>36</sup><http://www.konkurentsiamet.ee/index.php?id=23391>.

<sup>37</sup>The CNMC-position remains, however, questionable seen the physical and technological investments which are necessary to develop a parcel lockers network (see Sect. 5.4).

## 6.2 *Anticipations*

### **Current Market State**

The current state of the market for parcel lockers does not seem to require intervention from the national competition authorities or regulatory authorities at this time. This might change in the near future as the market evolves. Changes could result from parcel locker delivery becoming a basic service, similar to home delivery, or by political decisions aiming at encouraging the use of parcel lockers for environmental reasons and decongestion of urban areas. Besides ecological reasons, the search for a solution to prevent or minimize possible net costs related to the last mile of the delivery could also play a role in the political authorities' desire to foster the use of parcel lockers, just like the use of community letter boxes.<sup>38</sup> After the parcel locker market reaches a certain maturity level, a regulatory intervention might become necessary.

### **Competition Law**

A first approach consists in applying the general rules of competition law to the parcel lockers market. This approach leaves it up to competition authorities to assess the existence of possible market entry barriers, resulting from forbidden agreements between competitors or possible abuse of dominant position by one or more market players.<sup>39</sup>

Certain characteristics specific to the parcel lockers market could justify intervention by competition authorities, such as a dominant player that acquires a very wide network of parcel lockers, which might be very difficult or impossible to replicate by a small or medium-sized company, as noted above (see Sect. 5.4). The tendency to enter into exclusivity agreements with the main providers of strategic locations (particularly all the favored passage places: supermarkets, train stations, etc.) may also lead to intervention by competition authorities.

### **Regulatory Approaches**

If competition authorities' interventions do not create conditions for effective competition in the parcel lockers market, ex ante regulation tools might then be considered. A first (radical) approach could consist in entrusting the management of parcel

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<sup>38</sup>Parcel lockers have the potential to significantly reduce delivery costs since parcels can be bundled and the hit rate is much higher as compared to traditional home delivery.

<sup>39</sup>It is noteworthy that, before assessing competition aspects, first one has to define the relevant market. One needs to determine if parcel lockers represent as such a separate market or a simple convenience in complement to the provision of a more general delivery and collection service of postal items.

lockers to a single player, making these lockers interoperable and available to every provider or service postal user. The Swedish postal regulator, PTS, believes that *“different operators establish parallel facilities to meet consumer needs is unlikely to be sustainable.”* and that *“this topic needs to be further analyzed, for example with regard to the possibility of establishing operator-neutral parcel lockers.”* (PTS, 2017).

A second option concerns access to parcel lockers, including transparent, non-discriminatory and proportional operational and tariff conditions, perhaps combined with a cost orientation principle. One should first ask if such a regulatory initiative is possible within the framework of the Postal Directive currently in force. Given the wording of Article 11a of the Postal Services Directive (hereafter: ‘PSD’), this implies addressing whether a parcel locker a service provided within the framework of the universal service or an element of postal infrastructure and, if not, is it an element of the postal network? A reading of Article 11a could suggest that parcel lockers are an element of postal infrastructure, because post office boxes and delivery boxes are listed as elements of postal infrastructure.

The issue is whether a parcel locker could be regarded as a delivery box. As to whether a parcel locker is a service provided within the framework of the universal service, one could answer negatively as the CNMC did in 2016 when it considered whether Correos’ HomePaq service is a specific element of the operator’s network, aiming to provide a value-added service. Another analysis might consider parcel lockers as alternatives to post offices for transit management of parcels. Because parcel lockers both receive and send parcels, they perform a function traditionally entrusted to post offices.

The PSD clearly gives Member States some flexibility concerning the assessment of the notion of element of postal infrastructure. Recital 34 of Directive 2008/6/EC, amending Directive 97/67/EC with regard to the full accomplishment of the internal market of Community postal services, specifies, concerning the elements of postal infrastructure, that *“As the legal and market situation of these elements or services is different among the Member States it is appropriate to only require Member States to adopt an informed decision on the need, extent and choice of the regulatory instrument, including where appropriate on cost sharing.”*

In other words, the range of relevant legal and economic situations in the different Member States justifies a not too rigid approach of the notion of elements of postal infrastructure. Still open is whether this geographical flexibility also influences the definition of postal infrastructure and justifies an evolutionary interpretation, taking into account, among other things, technological developments. Furthermore, this interpretation may not be supported by the mere illustrative nature of the notion of element of postal infrastructure as defined in Article 11a. Finally, it should be assessed whether a parcel locker might constitute an element of the postal network, on which Article 11a allows Member States to offer access. It will be interesting to observe the jurisprudential developments in this area.

## 7 The Future of Parcel Lockers

There are many ways in which the parcel locker market might evolve. Parcel lockers will have, in the next decade, a growing impact on the traditional postal delivery model. Many factors will have an upward pressure on this growth. Continued urbanization will create traffic congestion and (local) environmental pollution. It will be important for legislators to internalize these externalities into the price of mobility (such as the transport and delivery of a parcel).

The development of self-driving cars might change the dynamics of the postal delivery chain. At the moment one can already witness a growing friction between traditional postal operators and large e-retailers or e-commerce platform companies such as Amazon, which might extend its service to the parcel locker or the front door of the customer. Autonomous vehicle providers or tech platforms such as Uber might enter the parcel delivery market as well.

Finally, the financial sustainability of the postal universal service suffers under growing pressure from letter volume decline. One of the possibilities of downsizing the postal universal service might be the partial limitation of the postal universal service network to optimally placed parcel lockers. The last mile burden would be transferred to the postal end-users or, if home delivery is requested, to local postal couriers specializing in last mile solutions.

**Disclaimer** The views expressed in this paper are personal and do not necessarily represent the position of the institution to which the authors belong.

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