

Unattended Collection and Delivery Points: Exploring the Concept and Physical Dimensioning

Popular Science Summary by Marcus Hoon Halbauer (2018)

You order something online. You go to the post office to retrieve it. Sadly, the post office is either closed or the queue is exhaustingly long. Is there a remedy to this problem? Yes, namely the unattended collection and delivery point (UCDP).

The UCDP is more commonly known as the parcel locker. The UCDP concept is a stationary delivery solution for online customers to retrieve their orders. Once the order has arrived to the UCDP, the customer is notified. Most of the time, the UCDP is accessible to the customers 24/7. This way, the customers do not face either the problem of closed post offices or long queues. Inter IKEA Systems AB (IISSAB) is implementing the UCDP concept in some of its stores. This Master Thesis is thus done in collaboration with IISSAB. While the UCDP is effective to deliver online purchases to the customers, one conclusion of this Master Thesis is that the UCDP is not suitable for all products or all online orders. Large products and orders should be handled by other delivery methods.

While the parcel locker is the more used term for the UCDP, both in research and in industry, it is misleading. This is because there are other solutions with different designs that serve the same purpose as the parcel locker. This finding is also the answer to one of two the main research questions of this Master Thesis. Four different solutions to the UCDP concept were identified. The traditional parcel locker has already been mentioned and this solution resembles a large electronic gym locker. A customer order is stored in one or several lockers until retrieval. A similar solution is the automated box design. This does not however have any lockers. Instead, it resembles a large box with only one opening. Inside the box, there is an automatic system handling the storage of all the products. Similarly, there is the automated pillar design. It has the same automated storage handling system as the automated box design, but instead of resembling a box, it resembles a large pillar. A very different solution is the cart design. This uses carts to store the online purchases. Once the customers arrive to retrieve their products, they can use the cart to transport the ordered products to their cars. Each of these solutions have their advantages and disadvantages. The use for each of these solutions is therefore circumstantial.

The research done in the field of UCDPs is limited. It has also mostly focused on the preferences from the customers' perspective. Little research has been conducted from the company perspective. In this case, the pay back time and operational cost savings of UCDPs compared to other delivery methods were studied. To add to the company perspective, the Master Thesis studies how five factors affect the physical dimensioning of the UCDP. This is the focus of the second research question. To clarify, the physical dimensioning of the UCDP can be divided into two parts: the utilization of storage containers, and the dimensioning of the storage containers. Three factors heavily affected the utilization of the storage containers. These were the number of orders, the composition of the orders and the customers' mean time to retrieve their orders. Furthermore, the order composition had an impact of the dimensioning of the storage containers. The two other factors, the localization of the UCDP and the schedules of the UCDP service provider, did not have a significant impact on the physical dimensioning of the UCDP. However, they created regular peaks of storage utilization. An interesting finding was also observed: an increase in number of orders leads to a higher increase in storage container utilisation.

To provide the answer for the first research question, a thorough examination of academic and non-academic sources was made. For the second research question, a simulation model of the flow of products to and from the UCDP was developed.