Design Process and Recap of Contactless Parcel Service

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1 Introduction

Our group focuses on solving the logistics challenges accommodation residents meet in the pandemic period, consisting the sub-issues of short opening hours of reception and post office because of lockdown, face-to-face parcels collecting, parcel disinfection, etc. After conducting user research and field observation, we proposed a stable, efficient, user-friendly and reliable contactless service for automatic package sending and collecting.

2 Theory

2.1 Last-mile Delivery

Last-mile delivery is defined as the process of goods from a transportation centre to the final delivery destination. The goal of last-mile delivery is to transport an item to its recipient in the quickest way possible. It has been driven by the continuously evolving market and demand for convenient customer experience across industries such as e-commerce, food, retail and many more.

2.2 Present Situation

Currently, there are many issues in last-mile delivery. The most prominent is the low efficiency of package dispatching. 62% of their work time spend on on-foot-delivering because of every home delivery and unfamiliar with the house location (Bates et al. 2018). On the user experience side, there are also lots of complaints. Trustpilot, a customer review website, averages of 7 one-star reviews about terrible Amazon delivery per day.

2.3 Direction of Industry

In recent decades, more terms emerge, like dark grocery (large warehouse facilitate click-and-collect service) and stay-at-home economy (economy pattern based on users' daily routine on the internet). All of them indicate there will be more parcels in the future. Moreover, this trend has been exacerbated recently, because of the COVID-19 and lockdown policy.

UK government has proposed many different technical solutions that could be deployed to provide last-mile delivery (*Position statement on last mile logistics* 2020). For example, the use of autonomous robots and drones for delivering goods is an ideal solution in pandemic situations but which have lower acceptance and

adoption. Facing the same issue, China started to introduce parcel lockers in communities in 2012. Together with the support of the National Post Office, the number of the locker in 2019 is already 406,000 (前瞻产业研究院 2020).

3 User Research

3.1 Method

The purpose of the interview is to find users' pain points and figure out habits and features our potential users might have. As a result, we conducted semi-structured interviews, allowing us to extract more information using follow-up questions while concentrating on our topic. According to Daniel Ling (Ling 2016), 6-8 users could reveal most problems and be efficient for our interview, so we recruited 7 participants including 3 males and 4 females, studying and living in Edinburgh.

Each interview might take around 30 minutes. We will first give an introduction about our project and ask for consent. Then we will begin our interview questions. Our questions are composed of three parts: user basic information, user experience and their comments and ideas. In the first part, we will let participants introduce themselves including age, gender and location. In the second part, questions include experience on online shopping and food delivery, any change due to Covid-19, experience on amazon locker and sending parcels' experience. From the first and second parts, user habits and features could be summarized and user scenarios could be generated. The third part includes inconvenience and expectations on last-mile delivery, which helps us to learn more about users' needs and requirements.

3.2 Data Analysis

During the interview, 6 of 7 interviewees complained about *"reception's opening hours are too short to collect parcels"*. When it came to the issue of contactless issue, 3 of 7 mentioned *"I will spray alcohol on the parcel before taking it home."* Besides, 5 of 7 expected easier parcel tracking, 3 of 7 required instant arriving notifi-

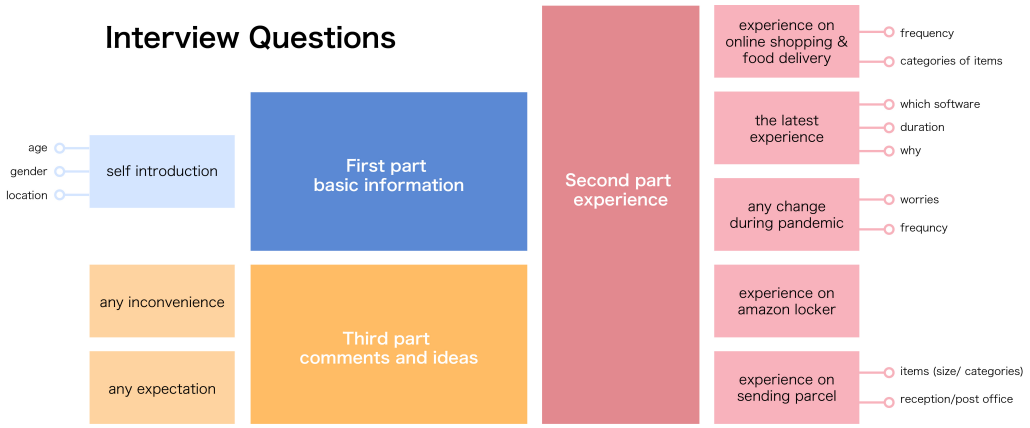

Figure 1: Interview Questions

cation and 2 of 7 wanted a more convenient parcel sending process. In our interview question, we included a question about food delivery. However, all the interviewees said that they would prefer to buy from a shop, concerning about the freshness and safety of the delivery.

3.3 Persona

By summarizing our participants' behaviours and features, we created our persona with some features: living in accommodation with a reception in Edinburgh, paying much attention to own security during the pandemic, and loving online shopping. Then we select four typical scenarios to centre our design focus on: after placing an order, the user is eager to receive parcels, and check logistics information frequently; reception is closed when the user intends to pick up a parcel; the user sterilizes the parcel at the door and throws the packing box away; the user goes to post office to send parcels.

3.4 Purposes and A_tefacts

In that case, it can run 24/7 under CCTV to prevent manually pick-ups may only be accessible when reception is opening. It benefits 3 stakeholders. Students don't have to book a slot or come back early. The deliverymen can self-open the locker and send the message without burdening the reception. The industries see with great pleasure that the delivery efficiency increases.

After user research, we decided to focus on designing a reliable locker to serve parcel delivery. The key functions are: sending, picking and tracking. For the tracking and sending process, our design work as a third-party API to integrate multi-platforms' tracking and sending services. For the picking and sending process, our locker provides a private storage place. It is noteworthy that, to achieve the true contactless, all the locker processes, like open and close the door, can be realized on the mobile phone. Moreover, we developed alcohol spraying module and UV lamp module for the disinfection.

3.5 Product Iteration and User Evaluation

Three tasks associated with our service design were conducted in the user testing: track, pick and send. In this section, we recruited 3 participants according to our persona. Participants were asked to propose an expectation first, they experience the service process and give us feedback. One of the significant iterations is providing an optional disinfectant spray function in the picking process. To explain it further, based on the user feedback, they want to know specifically what action we have done on their package and whether they have an option for it. Therefore, we add a message in the app to alter we will use UV lamp to disinfection and add an optional spray function before the user fetching their parcel.

4 Reflection

In our design process, we learned to identify stakeholders and obtain pain points through observations and interviews. We learned design thinking and user testing. Since our project is about express-related services

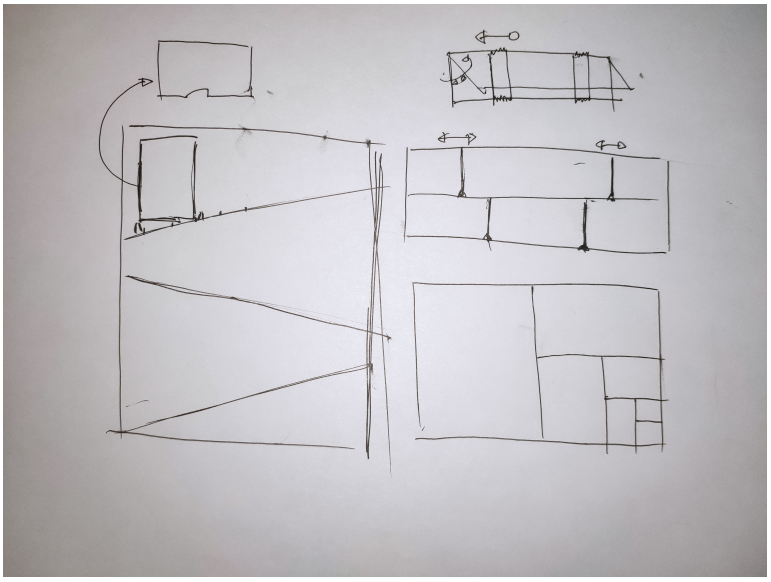

Figure 2: Sketches on different layouts of the locker

and product design, we found through interviews that users may not have a serious and distinctive pain point about the current express services. The current issues raised by users are generally broad. In addition, users have added new requirements for the post-pandemic era. Therefore, we use convergent thinking (Dym et al. 2005) to design a service balancing user needs with the inevitable requirements of the current stage of delivery.

4.1 Current Issues

4.1.1 Locker Ergonomics

During the interview, one interviewee mentioned that there was a problem with unreasonable locker locations. When using lockers in China, the delivery man often put very heavy and large parcels on the top locker and it was difficult for me to get it. When we tried to solve this problem, we found that there wasn't a clear relationship between the size of the parcel and its weight. It is not possible to determine the weight of a parcel simply by its size and therefore the position of the locker. Consequently, in the minimum viable product (MVP) design, we did not include this point.

4.1.2 Space usage of Locker

Since our users are students, locker's placement, space and conditions are stable, leading to the lack of expansibility and limitation of the module. For the user locker placement volume requirements, we can only increase the module internal space utilization rate and the overall volume of the locker as much as possible to meet users' needs. And we try several different layouts of the locker (Figure 2), and according to the parcels standard size regulated by Royal Mail, we choose our final arrangement.

4.1.3 Maleficiaries

In addition to the three beneficiaries we mentioned in the conclusion, one of the Maleficiaries is reception. In the interview, one interviewee mentioned that some of the reception will check the residents' packages to prevent them from using high power appliances. As our design is a third-party service, the question of interfacing with reception was not considered.

4.2 Future Improvement

Based on the adaptation and requirements of future users for contactless services, we designed an intelligent underground locker. The courier can place packages on the above-ground machine and store the package information. The locker will automatically transport the package downward and disinfect the package. Users can use app to collect the package, pay the fee, and print the courier slip. The underground storage area is fully automated to transport the package. This kind of delivery locker reduces manual operation. The underground delivery locker maximizes the use of underground space to increase the capacity and reduce the maintenance cost of the delivery locker (Bobylev 2009). Without considering the construction costs, the underground courier locker is a suitable product that can be applied to the contactless service we designed in the future.

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