

Parcels Sorting Kits and Guidance

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Abstract

[Problem] Low pay, physical work, and long working hours all contribute to a labour shortage in last-mile delivery in both China and the United Kingdom.
[Target Market] The research contains representative logistic companies in the Chinese and UK markets. **[Methodology]** The major findings are based on a review of the literature, 4-day autoethnography and interviews with stakeholders.
[Prototype] A service with 4 prototypes helps couriers lowering fatigue and improving efficiency for parcel sorting.

Methodology

Auto-ethnography

Time
June 2021

3 Micro-depot (3 days)
• Shanghai, China
1 Micro-depot (1 day)
• Hangzhou, China

Representative Company

CAI NIAO 菜鸟
Represents 70% of the market share of last mile delivery in China

Interviews (Online)

Time
June-Aug 2022

3 Leader of micro-depot
• Shanghai, China
• Anhui, China
• Guangxi, China

1 UX designer of Cainiao location
Hangzhou, China

Competitors analysis

Time
June-Aug 2022

Representative Companies
Royal Mail, amazon

Representative Company
EVRI
Represents 61% of the market share of last mile delivery in total in the UK

Background

Design for Chinese Market

The Micro-depot is a store where customers could choose to collect parcels for self-service or ask for home delivery.



Micro-depot

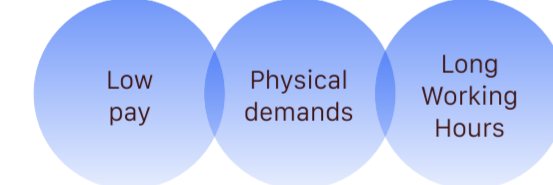
Customers Collect parcels in person

Customers ask Home Delivery by couriers

Problems

40% of the courier quit their job in 1 year Labour shortage is particularly serious in last-mile delivery in China.

"What would prevent you from taking a job in last-mile delivery?"



UX & Service Goals

Save Time

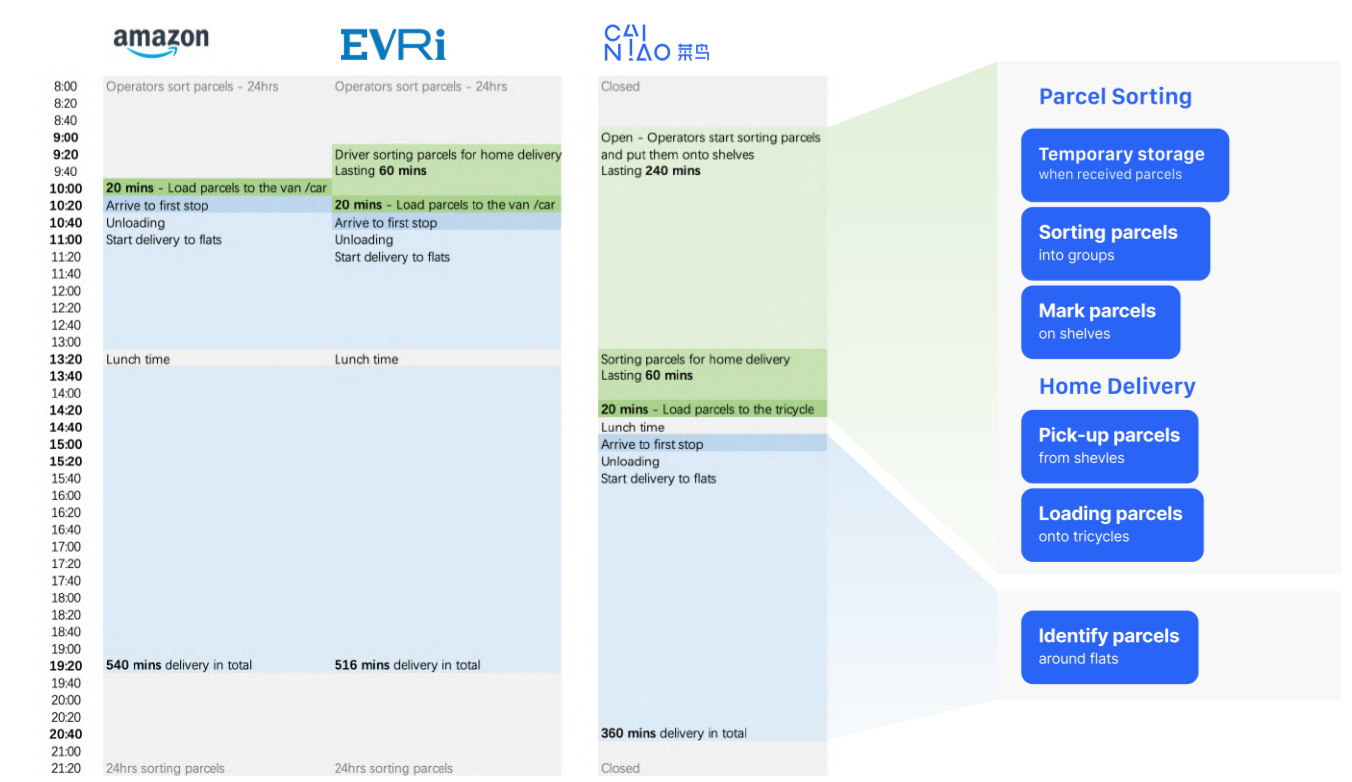
From User Journey
Cut down the time-consuming part.

Save Energy

From Human factors
Reduce physical demand in actual operation to improve job satisfaction.

Define Problems

Compared with competitors, 6 key steps have identified the chances to improve the efficiency of Sorting Parcels, which will increase the available slots for home delivery.



Stage

Temporary storage when received parcels



Pains

Goals
Put bags of parcels onto shelves, mark the place them in a parcels management system

Sorting parcels with hands only
Sorting parcels only by hand are slow, with violently sorting occurs.

Bad working posture
Stoop down working posture causes physical pain.

Chaos when sorting
Too chaos to get through when sorting parcels.

Sorting parcels into groups

Mark parcels on shelves

Pick-up parcels for home delivery from shelves



Goals
Operators need to look for 300 parcels for home delivery from the shelves that match the list.

Invisible parcels sheet with 300 times checking
People need to identify parcels by parcel sheets. However, 43% of parcels are flat, so they covered each other. So operators have to check parcels one by one for 300 times while they pick up Home Delivery parcels.

Loading parcels onto tricycles



Goals
• Sorting parcels into groups if these are the same flat address.
• Loading parcels onto the trolley according to the delivery route.
• Find all the parcels that need to be delivered in 1 stop when arrived at a flat.

Identify parcels around flats

Can't remember all the groups
Can't remember the address for dozen of groups. So they have to closer look before check put them into groups.

Only one hand available for loading
Worrying about the parcels getting wet when loading, they have to hold the waterproof gear with one hand, which means they have one hand operate for loading.

Needs

Big keeping capacity
Temporary space for keeping parcels from delivery companies.

Easily carry dozens of parcels
Carrying dozens of parcels inside of depot in 1 go when operators are available

Big sorting space
Temporary space for sorting parcels into many groups, ready for loading into shelves

Separately usage
The product can be divided into many units. So operators could carry lots of parcels around the shelves separately.

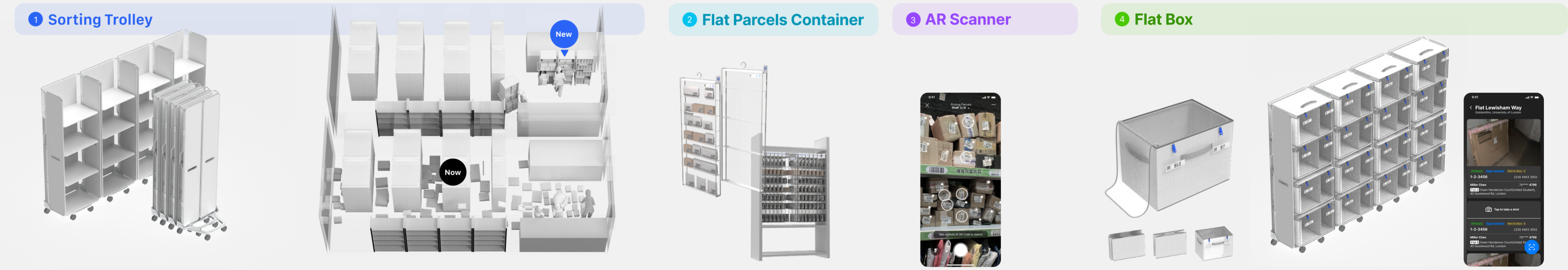
Keep visibility of parcels sheets
Keep the parcel sheets visible all the time, ready for checking by users.

Machine indication
Instead of looking for parcels by humans, the app indicates the parcels you need to get.



25-100mins for unloading parcels
They worry if all the parcels are collected, so they spend 30sec-2 mins to check around to make sure about it. With 50 stops needing to be delivered, it takes 25-100mins in total.

Proto-types



Easy fold small enough
Featured in folding, it is small enough after use.

A temporary space for a variety of sorting
It creates space where operators will not need to sort parcels on the ground anymore.

Carry dozens of parcels in 1 go
It should store dozens of parcels

Keep visibility of parcels sheets
Suitable for all sizes of flat parcels to keep the visibility of parcel sheets.

Scan QR codes, feedback on screen
The app reads the QR code on parcel sheets indicating the parcels you need to get with AR interaction.

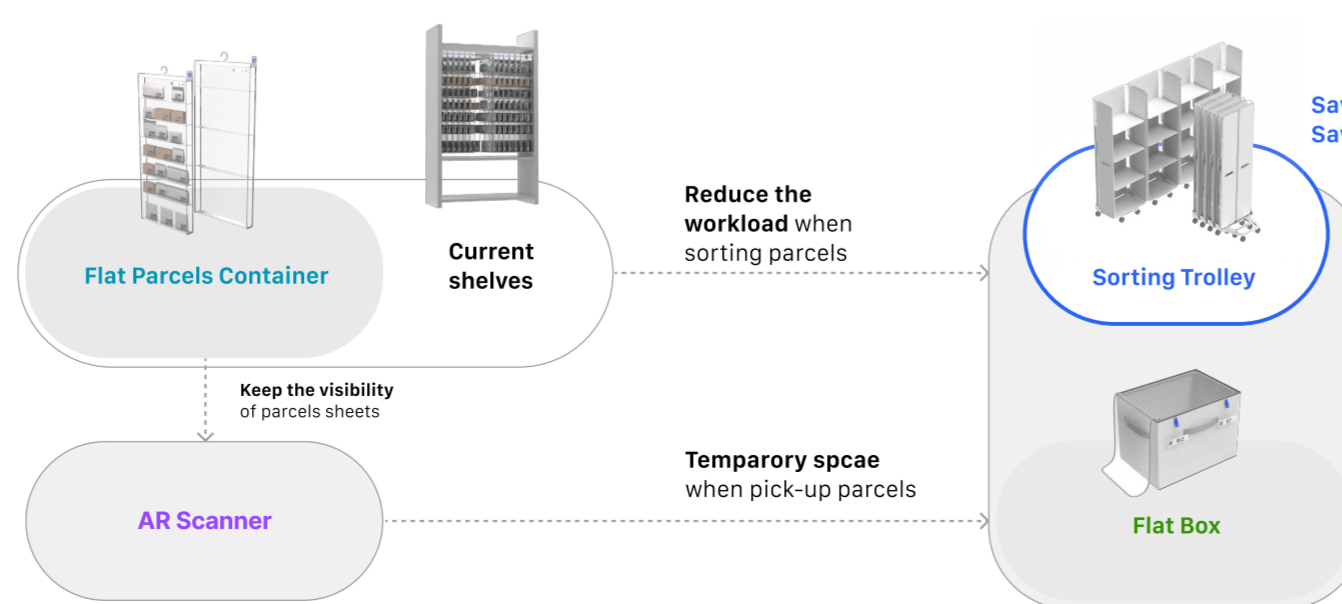
Waterproof box with Address Cards
The QR code on the card allows operators to combine a box and parcels together with an app.

Vertically sorting
Fix all the problems like the 1st prototype

Picture as references for searching
Take some pictures if parcels are too big to put in the box when operators sorting the parcels. Operators can find the parcels with some visual reference.

System Map

Sorting Trolley is the basic product of the whole service. We need to validate its value so that we can continue design for the rest of products.



Experiment

Calculate Calories by measuring heart rate

Task 1

Sorting on vertically space

- Open the bags to get the parcels
- Place the parcels on shelves with 4 groups

Task 2

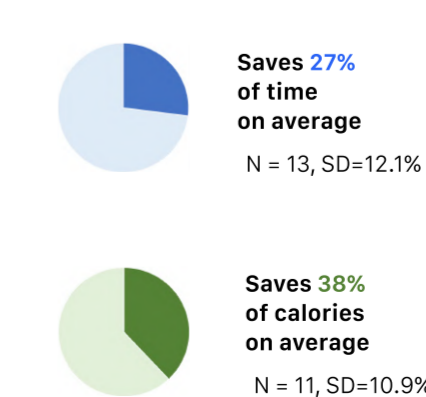
Sorting on the ground

- Sort parcels into 4 groups on the ground by size
- Place parcels on the shelves manually

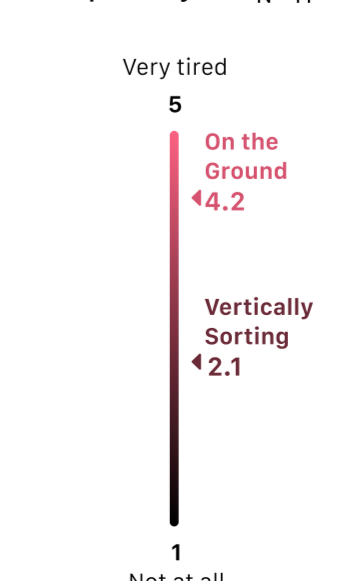
The researcher will place the small and mid-size parcels in bags randomly. The large parcels are placed on the ground.



The difference between Vertically Sorting (df=12) and Sorting On the Ground (df=11) is significant (p < 0.01)



"How would you rate the fatigue for the 2 different processes of sorting respectively?" N=11



Conclusion

Compared with the current process of sorting, sorting parcels with free-style standing saves energy and improves the efficiency when using the trolley and avoids uncomfortable posture.

Future work

The sizes of the 3 products are not clear

The size of parcels will affect the size of the container. We need to analyse the data from the size of the package used so that we can define the volume of containers.

1000 parcels need to be scanned in a quick way

Considering 1000 parcels need to be scanned many times in the whole process. We will need to find a way to scan the parcels without unlocking the smartphone every time.