

# “Last mile” delivery problem in Chinese electronic commerce logistics and improvement method research

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**Abstract.** In recent years, the rapid development of e-commerce not only benefited the whole Chinese economic, but also changed consumers' attitudes and approaches. As e-commerce developed, the last mile delivery problem has become a key factor in the electronic commerce logistics. The last mile delivery is the only stage which contacts consumers directly. The cost and quality of whole logistics are both influenced by the last mile delivery. In Chinese e-commerce logistics and distribution, the last mile delivery has high distribution costs, and low quality of service, which has been an important issue which impedes the development of electronic commerce. In this paper, last mile delivery problem of electricity commerce logistics distribution is explored by analyzing the operation of the last mile delivery, and proposed solution methods are presented to improve efficiency in “last mile” delivery.

## Introduction

As e-commerce is gradually accepted by people, the e-commerce logistics and distribution developed rapidly. The “last mile” delivery becomes a vital part of the logistics. The last mile delivery describes the movement of goods from a fulfillment centre to their final destination. In other words, the last mile is the last part of product's trip before it arrives on customer's doorstep. Last mile delivery means a final step to complete the whole logistics and distribution, since the last mile distribution services customers directly.

In the research of last mile delivery of e-commerce logistics, the domestic and foreign scholars have contributed lots of works. MikkoPunakivi et al compare and analyze the traditional and innovative modes of reception [1]. Hannu Yrjola et al. analyzed different innovative models and obtained the most competitive models [2]. From the point of operation models, Zhang brought up a suggestion of 24-hour community service on the analysis of difference between last mile delivery and traditional delivery, it serves a small radius, can be used for short delivery node and pick up station, but the difficulty remains how to manage these networks[3]. Fang Xi et al. summarized the weakness and strengths of four common models used to solve last mile delivery in China, which includes courier retail stores, metro mail room, neighborhood mail room and 24-hours intelligent package lockers. But the policy implications are mainly for government[4]. Guo studied the bottlenecks of last mile problems and put forward the solution of the third party community logistics alliance[5], inviting property management company of community to a joint venture with logistics company, given the variety of express and property management company, the practice of this innovation is yet remain concern[6].

## current shortages of the last mile electronic commerce logistics in China

Nowadays, there are some systematic bottlenecks in China that has trapped e-commerce logistics industry from further development. Currently in China, direct home deliver is adopted in almost all B2C commerce, resulting to a sharp increase in e-commerce logistics volume. Faced with Chinese huge market, the lately-developing e-commerce logistics industry seems not sufficient enough to satisfy the market demands, leading to a disproportionate situation between e-commerce and last mile delivery. There some major bottlenecks in last mile delivery in China.

**Lack of competitive logistics companies.** Some major logistics companies are separated into two groups: companies with large networks and small networks. The former ones have nationwide networks but do not provide complex service like scheduled returns, exchanges or collect on delivery (COD). And most of them are franchised and sub-contracted structured, exposing risks of services and financial performance. Shunfeng is one exception; it has more than 2,000 fully-owned high quality services locations and lead in the express market, but the charges is slightly higher than others; government-owned EMS has the largest network with more than 20,000 locations, but the speed and service are incredibly low. The smaller network companies are mostly competing on a regional level but they offer customized services on B2C market. Foreign logistics companies take only a small part of overall market share

**Low efficiency delivery.** Trucks are not allowed in the city because of the overwhelming traffic jams and pollution problems, and the regulations that some type of vans are not allowed to transport goods, the option left to logistics companies are mainly electric tricycle which has a fairly large capacity to transport parcels, but sometimes they also get caught and fined by policy for illegal conversions of tricycle, leading to delay of delivery and huge operational cost to logistics company.

Let alone these unorganized and unpleasant pickup points, the risk of damaging and theft of parcels come along with extensive deliveries are issues that affects the final drop as well. And all these problems have chain effect on last mile delivery, leading to not-on-time delivery and additional deliveries.

**Different points of view of consumers and carriers.** For consumers, the main issues are not on-time; not at home or forced to stay at home; high delivery charge and long delivery time. From the view of carriers, they claimed additional cost for repeated delivery; 12% of delivery has to be done a second time and non-deliverables.

**Not-at-home problem.** The major factor that affects the successful home delivery operation is ‘not-at-home’ problem. Most home delivery services inform the consumer a time range on a day that the products will be delivered, but it is this time that most of people are at work or outside. For parcels that fit the mailbox this does not seem to be problem, while for most parcels that do not fit, this means a delivery failure. As a result reported in an investigation, 30% of small packages dispatched to customer homes fail to be delivered at first time. This long empty window period lead to poor customer services and logistics inefficiencies.

**Time windows.** There are cases as foods home delivery, where online retailers and consumers can make a prior arrangement for a time window of delivery, even this may not guarantee, by the time of delivery, that customer will be at home. And this is not the normal model for most last mile deliver, because such pre-arrangement would increase the inflexibility of carriers’ fleet operation, bringing about a very high cost for both retailers and logistics providers

For summarize, above shortages are listed in Table 1. At the same time, the key points of circumstance of Chinese logistics are listed in Table 1 either.

Table 1, the current situation of last mile delivery in China

| Bottlenecks in last mile               | Circumstance                           |
|--|--|
| Not-at-home problem                    | Unbalanced economic development        |
| Long time window                       | Insufficient technology infrastructure |
| Repeated delivery                      | Short period of internet adoption      |
| Immature e-commerce logistics industry | Large variance in city size            |
| Low delivery efficiency                | Vast population and high density       |
| Lack of professionals                  | Out-dated technology                   |

## Solutions to last mile bottlenecks in China

Based on our finding in section two, there are some alternatives to solve the most mentioned bottlenecks in last mile delivery, therefore we asked consumers about how they have employed different modes in last mile delivery and how they value these modes.

As shown in Figure 1, we found that indirect modes suit specific urban structure in China. Almost every neighborhood is run by a certain management company, in order to execute a organized and satisfying management, property management company usually sets a department that is in charge of collecting and storing residents' parcels on their behave. In some neighborhoods, parcels are directly sent to property management company because carriers are not allowed go inside the residency buildings.

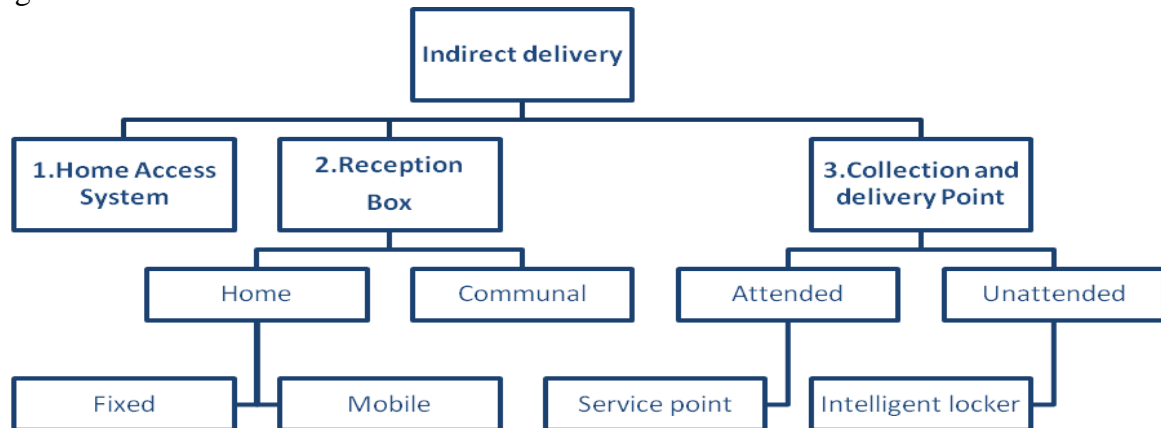


Fig. 1, Main Indirect last mile delivery modes

**Service points.** Service point, which is not so good considering the various advantages we have stated. The reasonable explanations can be that the disadvantages have out weighted advantages in last mile delivery in China.

On average every 400 meters there is a small supermarket or convenient store on the street, in downtown area the density is even higher, one might argue that this is exactly why collaborating with these stores makes it easier for customers to do parcel pick-up, but the result might not exactly so. Think from another side, unlike western countries, supermarket is where people do daily shopping, sometimes even just a bottle of water or bread you may have to buy it in the supermarket. While so does in China, people can purchase the same thing in chain convenient stores, self-owned grocery and cigarette stores as in supermarket, the supermarket for parcel pick up might not be the one that is close to your home, so the advantage of “do shopping while pick up parcel” and “close to home” becomes less obvious. Moreover, there is possibility that customers have to wait to pick up parcels when there are more ordinary consumers in the supermarket. And there are certain opening hours for supermarkets and convenient stores, which refrain consumers to pick up parcels during business hour.

**Property management company.** The Property management company has in fact proved that this mode is widely accepted by consumers. The reasons might be, firstly the risk of parcel theft is avoided; secondly, the density of residents has made non-residents (unless invited guests) are not permitted in the neighborhood a standard regulation of property management, besides residents also feel more comfortable and safer in this way around; thirdly, in residents' eyes, collecting parcels is part of the responsibility of property management because they have paid for the services, and property management should adapt to the fact that more and more people are making online purchase now.

According to China Property Management Institution, the average daily express parcel of an ordinary residential area with resident family of 1000 is 150 to 500, about 5000 parcels or more monthly. This number will increase by 50% to 80% after the peak (discount season) of online purchase. In order to set a standard operation procedure, a serial of agreement that clearly states the obligation, responsibility within this service has been set out and signed by residents who authorize

property management to collect parcels. All in all, this is a win-win choice for both parties, as so for logistics company since it decreases the distributing time.

Consequently with the above arguments we can make two conclusions about the adoption of last mile delivery modes. One is that customers are located in the central of online shopping process; their demand is the leading factor of logistics service. The other one is that intelligent lockers is a suitable solution in last mile delivery because of its inherent advantages such as 24 hours service and security of parcels.

Moreover, even though acceptances of indirect delivery modes in last mile delivery vary to some extent, most Chinese e-commerce consumers agree that using indirect delivery modes bring them convenience and help making their online shopping a better experience. From table 13 we can see what matters most is that by using indirect delivery modes, they have less worry of not receiving parcel while outside home, and they have recognized that indirect modes contribute a lot with respect to this benefit. They also confirm parcel are secured by using these modes, further ‘doing shopping’ scored lower verifies our speculation of why service point is a less preferred choice. Among the few that do not think using indirect modes gives them convenience, the most significant reason is that the purchased goods are valuable that unboxing check and confirmation are required by signee. Overall satisfying feedbacks on using indirect delivery modes can be observed.

## **Conclusion**

In Chinese logistics situation, the services quality is varied between companies; most companies are focusing on wild growth on quantity but not on upgrading service level.

In this paper, we identified the bottlenecks in last mile delivery from consumers’ eyes, where they consider the safety of parcels and delivery speed are of great importance, showing that keeping the parcel intact and sending it to customers as soon as possible is the priority task of logistics company. Decreasing the rate of delivery failure contributes to more efficient last mile delivery.

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