

# Research on the Application of Contactless Intelligent Express Cabinet

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**Abstract.** Because of the COVID-19 epidemic situation, the advantages of intelligent express cabinet stand out, compared with the traditional terminal distribution. It can not only solve the problem of terminal delivery difficulty but also that of the user privacy assurance, in which the contactless delivery becomes deeply popular because cross-infection is avoided. This paper studies the domestic present situation of the application of intelligent express cabinet and the existing problems, according to the data of 207 copies of questionnaires, analyses the consumer cognition and attitude towards intelligent express cabinet. In order to expand the application market of intelligent express cabinets, the paper puts forward measures such as integrating resources, improving the utilization rate, investigating the needs, reasonable layout, integrating community services, and enriching the profit model.

## 1 Introduction

In the era of mobile Internet, the rapid development of E-commerce and logistics industry has brought great convenience to consumers. According to the statistics of the State Post Bureau, the national express delivery volume reached 63.52 billion units in 2019, with an incremental scale of more than 10 billion units for two consecutive years, which ranked the forefront of modern service industry and became an important driving force in economic growth. With the increasing volume of express delivery, intelligent express cabinets are more widely used. Because of COVID-19 contactless delivery, intelligent express cabinets have become more popular among consumers.

Scholars have done related research on intelligent express cabinets. E Morganti, L Dabanc, F Fortin(2014)Research on final deliveries for online shopping: The deployment of pickup point networks in urban and suburban areas. The paper shows that at the French national level, PPs are now a well established alternative to home deliveries and their presence covers urban, suburban and rural areas<sup>[1]</sup>. Ying Zheng(2016) Analysis of measures on difficulties of express management to the community property in the environment of online shopping. She thinks that the introduction of intelligent express cabinets can not only improve the quality of express delivery service, but also create a complete community property service platform<sup>[2]</sup>. Yumin Li, LuYang, Xinlu Wang (2017) Research on evolutionary game analysis on cooperation mechanism of express enterprises and third-party smart express cabinet enterprises, an evolutionary game model of express enterprises and third-party smart express cabinet

enterprises was established in this paper<sup>[3]</sup>. Bo Wei (2019) Research on selection and configuration optimization of intelligent express cabinets based on K-Means cluster analysis, he investigates the delivery situation of courier in different regions and uses SPSS software to perform K-means clustering to obtain the size ratio of cabinets for express cabinets in different regions to meet the various demands of customers<sup>[4]</sup>. ZiangMA, Kebin Jia (2020) Research on high performance intelligent express cabinet management system based on WEB, they puts forward the design of Web intelligent express cabinet management system which integrates cabinet management, operation and maintenance personnel management, investor management, advertising plan auditing and advertising plan publishing. The actual application results of the system verify the effectiveness<sup>[5]</sup>. From the point of research literature, domestic for the research of intelligent express ark starts late, still stay in the surface layer of phenomenon description and countermeasures, not thorough, the content is messy, not form a system, the results of the study is relatively loose, research method and theory, quantitative analysis and model is less. In this paper, by means of questionnaire survey data for smart people express the ark of the cognitive and attitude to analyze the application of non-contact intelligent express ark, the study of the intelligent express ark is a kind of supplement.

## 2 Application Status of Intelligent Express Cabinet in China

In 2019, the number of intelligent express delivery cabinets in major cities reached 406000 groups, and the rate of express delivery entering cabinets in 2020 is

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expected to reach 15 percent. In 2019, the top 10 of the intelligent express cabinets are Lejia, Fengchao, China Post Express, Jiangsu Cloud Cabinet, Jinlinbao, Gage Warehouse, Transitive Intelligence, No .1 Cabinet, Postal Treasure. etc. According to the investigation, 74% of users in the country can use the collection service. In general,

the application of intelligent express cabinets can help achieve the purpose of user privacy protection, Free pick-up time and the safer effect without any contact. The figure 1 shows the market application of intelligent express cabinets from 2015 to 2019.

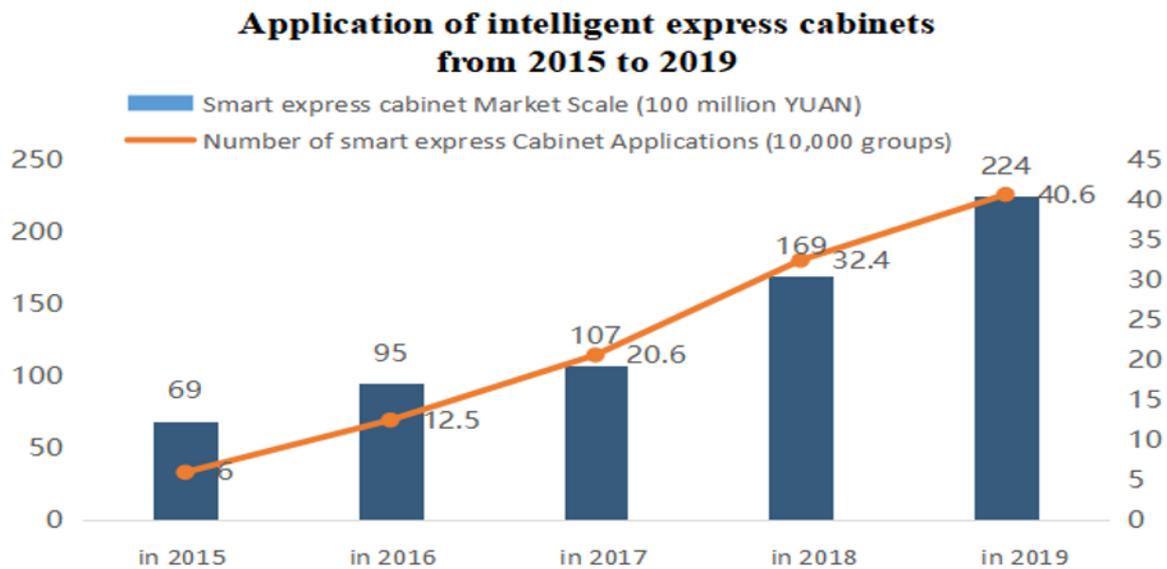


Figure 1. Application of intelligent express cabinets from 2015 to 2019

### 3 Problems of Intelligent Express Cabinet Application

In recent years, the application of Intelligent express cabinets is called a dose of "good medicine" to solve the "last 100 meter gap " between the reality and ideal, but the following problems still exist:

- The utilization rate of the cabinet is not high because of several reasons, one of which is that customer is used to "wait for express delivery ", or take express from Cainiao post station, another of which is that the size and number of intelligent express cabinets are limited, so as to be difficult for the cabinet to cope with large packages and deal with "Double 11" online package volume surge.
- Unstable performance leads to the result that intelligent express cabinet has missed text messages, input verification code does not open the door, wrong door, and a sudden drop can be shown in the customer experience.
- Unreasonable layout can be seen in such several aspects as not taking into account the population density and demand for online shopping, some areas of excessive and some areas of insufficient delivery.
- The convenience is insufficient. The way of sending and receiving parts is not humanized to use the smart

phone whose operation is more complicated and the needs of the elderly retirees are not taken into account.

- The profit model is single. The hardware money investment of intelligent express cabinet is high, so the cost of a group of intelligent cabinet is as high as 18,000 to 60,000. Even more, the cost of maintenance is 5-7 million a year, but the consumer takes the piece free and is charged about 0.5 yuan for express delivery.

- The security can not be guaranteed and it is not convenient for the public to use intelligent express delivery cabinets to collect fragile and valuable items. There is no clear explanation of the responsibility once the items are lost or damaged.

### 4 Consumer's Cognition and Attitude Analysis of Intelligent Express Cabinet

The data of this study are mainly from field survey and network survey. Field investigation is mainly in the population of residential areas and the areas near colleges and universities. The network survey is published on the questionnaire star website. In this study, 207 valid questionnaires have been collected, and the samples are reasonably distributed in the dimensions of sex, age, education level, residence and so on, as shown in Table 1.

Table 1. Demographic distribution

Category	Individual characteristics	Number of persons	Percentage (%)	Category	Individual characteristics	Number of persons	Percentage (%)
Gender	Male	80	38.65	Vocational	Enterprise employees	38	18.36

	Female	127	61.35		Public officials and public institutions	3	1.45
Age	20 and below	32	15.46	Level of education	Freelance	13	6.28
	20-29 years	174	84.06		Other	153	73.91
	30-39 years	1	0.48		College	24	11.59
	40 and above	0	0		Bachelor degree	162	78.26
Income level	≤50,000	98	47.34	Place of residence	Graduate and above	16	7.73
	50,000-80,000	54	26.09		High School and Below	5	2.42
	90,000-12 million	39	18.84		Provincial	43	20.77
	13-16 million	10	4.83		Prefectural level	37	17.87
Marriage No	Married	5	2.42	Town	33	15.94	
	Unmarried	202	97.58	Rural	57	27.54	

Table 1 shows that the ratio of men to women in the sample is close to 1:2. The population surveyed is concentrated in the 20-29 age group and under 20, A total of 99.52% of the survey population. The 20-29 age group is mostly composed of college students and new entrants with more acceptance of new things, at the same time who

are also the main force of online shopping. In terms of income levels, the annual income of the respondents is mainly about 50,000 yuan and below 47.34%. In terms of education, most of them are undergraduates, the proportion is 78.26%.

**Table 2.** Awareness and Expectation of Smart Express Cabinets

Issues	Variable	Number of persons	Percent age (%)	Issues	Variable	Number of persons	Percentage (%)
Have you been exposed	Regular exposure	30	14.49	Willingness to use	Very willing	105	50.72
	Occasional contact	80	38.65		Willingness	91	43.96
	No contact	97	46.86		Not willing	3	1.45
Focus	Cost	142	68.6	Charging attitude	It doesn't matter	8	3.86
	Location of pick-up ease of operation	159	76.81		Not acceptable	45	73.43
		90	43.48		Are acceptable	4	1.93
	Output Speed	91	43.96		Reasonable acceptability	152	73.43
	Other	43	20.77	It doesn't matter	6	2.9	
Prospects	Very	72	35.27	Convenience	Very convenient	114	55.07
	There should be	125	60.39		General	86	41.55
	No	4	1.93		No convenience	3	1.45
	I don't know	5	2.42		It doesn't matter	4	1.93
Recommendations	Safety	148	71.5				
	Simple operation	144	69.57				
	Close pick-up point	165	79.71				
	Free use	98	47.34				

It can be seen from Table 2 that 46.86% of the people have never been in contact with the intelligent express

cabinet, which shows that the intelligent express cabinet has a large development space, and the degree of people's willingness to use the intelligent express cabinet is as high as 94.68%. The survey shows that the people have high expectations for the cabinet.

From the point of view of charging attitude, the proportion of the people that can accept the charge of intelligent express delivery cabinet reaches 75.36%. From the suggestions given by them, we can see that 79.71% want express mail closer, which shows that consumers pay attention to the cost and convenience of using intelligent express delivery cabinet. From the perspective of consumers' attitude towards fees, the proportion of people

who can accept the fees of intelligent express cabinets reaches 75.36%. As for the charge of intelligent express cabinets, 73.43% of consumers think the price is reasonable and acceptable. As can be seen from the suggestions given by consumers, 79.71% of them hope that the pick-up point is near, indicating that consumers are very concerned about the cost and convenience of intelligent express cabinets. The number of consumers who are willing to use and think that intelligent express cabinets have development prospects reaches 85.66%, indicating that intelligent express cabinets have great development potential.

**Table 3.** An Analysis of People's Attitude to Service Evaluation and Willingness to Use Smart Express Cabinets

X\Y	Very willing	Willingness	Not willing	It doesn't matter	Subtotal
Satisfied	9 (56.25%)	5 (31.25%)	2 (12.50%)	0 (0%)	16
Satisfactory	58 (51.33%)	50 (44.25%)	1 (0.88%)	4 (3.54%)	113
General	36 (51.43%)	30 (42.86%)	0 (0%)	4 (5.71%)	70
Not satisfied	2 (25%)	6 (75%)	0 (0%)	0 (0%)	8

As can be seen from Table 3, people who are not satisfied with traditional express service are willing to accept the use of smart express cabinets. 94.29% of those who are generally satisfied with the traditional express service are willing and very willing to use intelligent express cabinet, only 5.71% of the people do not care. Compared with those who are satisfied with the traditional express service and very satisfied, we find that the proportion of the people unwilling to use intelligent express cabinet is only 0.88%, 12.50%. They fully show that intelligent express cabinets have a good development prospects.

To sum up, consumers focus on the stable performance of intelligent express cabinets, the degree of easy operation, whether it is convenient to pick up pieces, the level of fees and so on. The consumers generally think that intelligent express cabinets will bring convenience to life.

## 5 Countermeasures and Suggestions for Accelerating the Application of Intelligent Express Cabinet

In order to solve the problem that consumers just say "yes" to smart express cabinets without taking advantages of them, we can start from the following aspects:

- The first is to integrate resources to increase utilization. In the way that consumers can really benefit from the service, we can change their negative behavior of waiting for the express service. The benefit includes adding some large or valuables cabinets, giving full play to the full effect of the self-lifting model, etc. To build the resource integration platform of intelligent express cabinets is to achieve resource sharing, system arbitrary docking.

- The Second is to set standards and do research on product stability so that we can use norms and standards to monitor quality to improve consumer experience and solve the problems in the process of mailing items. Speed

up the development of better intelligent express cabinets with more stable performance, more complete functions.

- The third is to do research on the needs and reasonable layout. The logistics enterprises in the delivery of intelligent express cabinets should survey consumers' occupancy in the proposed layout of the area, online shopping behavior and intelligent express cabinet demand, layout location and the distance between demanders, and later maintenance or after-sales work.

- The fourth is to apply new technologies to simplify operations. That's to say, fully consider the needs of consumers of all ages, including the especial usage habits of the elderly on intelligent products, simplification of the operation process and sound, or face brushing and other ways to pick up pieces.

- The fifth is to Integrate the new technology into community services so as to enrich the profit model. Such as the innovative commercial mode of express service, the mode of receiving goods under the experience line, the mode of third party substitute investment platform, the mode of drainage of O2O business circle and the mode of public delivery platform. At the same time, it is necessary to further excavate and extend the value-added chain of intelligent express delivery cabinet. We can expand the community comprehensive service business, such as bus card, water, electricity self-service recharge and open temporary storage services, including community E-commerce to buy more food, Meituan excellent selection, Shihui Tuan and all kinds of newspapers, milk delivery business. The next is to add reverse logistics services to meet the needs of consumers self-help return and exchange business. The last one is to develop media services, provide electronic screen advertising, electronic coupons, etc. to increase advertising revenue.

- The sixth is to sound measures in order to ensure safety. The relevant government departments need to improve laws and regulations, establish enterprise "integrity files" and customer "blacklists", enterprises need to improve security measures, improve the security

performance of intelligent express delivery, and ensure the safety of goods, Work together to create a good environment for the development of intelligent express cabinets.

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