Analysis on Application of Intelligent Express Cabinet in Fugu County

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Abstract. As people are increasingly dependent on e-commerce shopping, the logistics express delivery volume brought by e-commerce is also rising rapidly. At the end of the logistics industry, the delivery service of third-party delivery companies is facing great challenges. This is also the "last mile challenge" widely discussed in the industry in recent years. In the logistics industry, nearly 80% of the complaints come from the terminal delivery link. In order to meet this challenge, the traditional logistics giants have two best solutions so far: Express Station and intelligent express cabinet. Intelligent express cabinet is a kind of all-weather self-service equipment, which generally has a collection verification system of code scanning or SMS verification, and it ensures that each collection is independent, private and safe. The emergence of intelligent express cabinet does avoid the problems of delivery delay and delivery error caused by manual delivery, and also reduces the labor intensity and error probability of manual operation to a certain extent. However, the penetration rate of express cabinet in the market is relatively low at present. This paper investigates the use of express cabinets in Fugu County. Through the research, we can understand the consumer satisfaction of the intelligent express cabinet and some problems in the use, and analyze these problems, finally put forward some suggestions for its use in Fugu County. We hope that the research results can improve the utilization rate of the express cabinet, reduce the labor cost, reduce the repeated delivery of the courier, and improve the distribution efficiency.

1. Introduction

With the rapid development of Internet technology, China's e-commerce and logistics industry has witnessed rapid growth. In addition, the development of live streaming e-commerce has entered a fast lane, which has brought China's e-commerce trade to a new level. According to the online data released by major e-commerce platforms in 2020, in the online promotion activities of "Double 11", the transaction volume of "Tmall" reached 498.2 billion yuan, and that of JD.com reached 271.5 billion yuan. Vipshop, which disclosed real-time data for the first time, also had 10.2 billion yuan. The huge transaction volume brought huge express delivery volume. During the Double 11 festival, the average daily express delivery in China was nearly 500 million.

The increasing amount of express delivery has posed new challenges to the terminal delivery service, especially the outbreak of COVID-19, which has greatly promoted the transformation of the traditional express delivery industry to intelligent express delivery, and the biggest problem at present is "the last mile". So far, the best solution is Courier stations and smart delivery cabinets. The smart delivery cabinets are a convenient, punctual, 24-hour self-service service without waiting, which changes the traditional express delivery mode and no longer uses a large number of couristers to deliver the express items to the recipient by bike. With a high security, a cabinet of one yard, 24 hours of self-service open access mode, it is convenient for the main groups of online shopping, such as college students, white-collar workers, etc., and is recognized as an effective way to solve the "last 100 meters" problem of express.

At present, in some areas, the smart express cabinet with its 24-hour uninterrupted service

efficiency, a code of independent cabinet safe storage way, has attracted the attention of a large number of young online shopping groups, such as office white-collar workers and college students in university towns, are loyal fans of intelligent pick-up cabinets, in some popular areas, The turnover times of each independent cabinet of intelligent express cabinet are up to 3-5 times a day, and even there will be no cabinet available in individual time periods. But at the same time the logistics enterprises also found that individual residential intelligent express ark is in a state of idle for a long time, first of all express objects for the life that occupy the home, often in the same home appliance business portfolio to buy in order to obtain the biggest benefits of express delivery charges and the total price discount, so the delivery are relatively large, and size can only express ark cabinet storehouse size 15 * 30 * 45 cm, Quite a number of delivery is difficult to put into intelligent express ark, only by artificial delivery or Courier express post transfer, secondly, different express company based on its corporate strategy, selectively in intelligent express ark and novice station service at the end of the competition, also can lead to the development of intelligent express ark prospects is not clear, Such as yuantong express in the provisions of the latest requirements are strictly forbidden to express in the abundant express nest ark, because of the abundant nest company belongs to along abundant express a subsidiary, based on the requirement of intelligent leading at the same time, is also developing its own Courier ark, this leads to intelligent devices because of the competition and lead to efficiency and use is restricted, the longer term is negative to the development of intelligent express ark. Finally, the expansion of intelligent express cabinets will squeeze the living space of small terminal express companies, so the terminal delivery companies are very resistant to the use of intelligent express cabinets, if not the mandatory requirements of logistics giants. These business or technical bottlenecks have limited the promotion of intelligent express cabinets in the market.

Therefore, through rigorous market questionnaire survey, explore the problems in the application of intelligent express cabinet, and dig the deep reasons behind the problems, for the release and improve the practical application of intelligent express cabinet has a wide reference significance. In this paper, the use of fugu County express cabinet to investigate. Through investigation and research to understand consumer satisfaction situation of intelligent express ark, found some problems in use process, and the analysis of these problems, at the last, our suggestions can improve the utilization of ark of express delivery, reduce the human cost, Reduce Courier's repeated delivery, improve delivery efficiency, so that each user can get their own express in time. And for express companies and daily residential and commercial district express cabinet use to provide advice.

2. Overview of Intelligent Express Cabinet

2.1 Concept of Intelligent Express Cabinet

With Internet penetration depth in every corner of the whole society, e-commerce and complete set of logistics industry are in rapid development in China, and people increasingly rely on electricity shopping, logistics delivery quantity of electronic commerce is rising very fast. In the front of the logistics industry, because the electronic commerce and the logistics industry in big data platform of information sharing and the wide application of artificial intelligence, it is still able to cope with the type and quantity of express delivery. But at the end of the logistics industry, there is a big challenge when it comes to delivery services of express delivery companies. This is the "Last Mile Challenge" that has been widely discussed in the industry in recent years. Because the Courier company capital determines its size, both corporate entities and deliverer liquid grea, in order to cope with the challenges, traditional logistics giant, so far the best solution has two kinds: One is the Courier station, through the way to join the implementation of terminal logistics delivery point, Courier station is a manual terminal, it is responsible for the delivery of nearby communities, but is not responsible for delivery, so it is also commonly known as "manual delivery cabinet"; Another option is smart delivery cabinets.

Smart express cabinet is a self-service device that sends and receives all day long. It generally has

a collection verification system for scanning code or mobile phone SMS verification, and ensures that each collection is independent, private and safe.In 2012, the introduction of intelligent express cabinet does avoid the problems of delivery delay and delivery error caused by manual delivery, and to a certain extent, it also reduces the labor intensity and error probability of manual operation. At the same time, because the ownership of intelligent express cabinets belongs to large logistics platforms, it has advantages that local terminal express companies do not have in terms of equipment maintenance, data update and site laying. The emergence of intelligent express cabinet has broken the bottleneck of the end delivery and realized the intelligence and automation of the overall logistics chain to a certain extent. But at the same time, due to the hard problems of site laying and cabinet design, it also leads to the short board of its use, and can not meet the delivery of all delivery areas and all types of express delivery. Therefore, the industry predicts that in a long period of time, the two self-built logistics terminal services, smart express cabinets and express stations, will coexist, compete parallel, and influence each other and learn from each other. But from a longer point of view, intelligent express cabinets, which are artificial intelligence and automated terminals, will surely become the final form of logistics terminal services.

2.2 Intelligent Express Cabinet Features

2.2.1 Contact Free Delivery

In the traditional logistics and express delivery, a more worrying point is the professional quality and moral level of the Courier. In the past ten years of great development of the logistics and express delivery industry, we can learn from the media and news that there have been vicious incidents of the Courier tracking the householder, stealing and even personal injury after receiving the parcel at home. Courier is a position with high labor intensity, low education level and high employee mobility. It requires terminal logistics companies to improve the quality of Courier, which will increase their operating costs a lot, and the training results are very challenging. And the intelligent express cabinet can solve the Courier and the end customer to completely avoid the possibility of direct contact, so as to achieve contactless delivery. Express company in logistics transit platform for delivery of goods to end customer, will express entry system, to the corresponding community intelligent express Courier transportation tank, near by inputting express ark, brought up the ark of the independence of express check to express the chest, then remind message will be automatically sent to the recipient to register the phones, the function of Courier is over can leave right now, The recipient needs to pick up the express items stored in the express container with the pick-up code within three days to complete the delivery.

During the outbreak of the new champions league, the advantage of the non-contact send charge is huge, throughout the delivery process, Courier and users don't need to do positive contact, epidemic prevention distance is no problem, to consider whether the hair or the user's receipt of Courier, have enough time and safety to complete delivery of disinfection, so between the outbreak of the new champions league, Both express companies and users are eager to use intelligent express cabinets to complete the delivery of express items, which is a security guarantee for both customers and express companies.

2.2.2 One Container Per Yard

In the application of intelligent express ark, in order to avoid mistakes and express with each other, the business model of intelligent express ark is "a thing a yard a ark", because a single express only a pick-up code, so each has independent pieces of code express pieces will only be stored in a separate Courier ark, no more delivery in the case of a ark, Even end users have two Courier arrived at the same time, and by the same Courier express ark into intelligence, because each have two Courier pick-up code, so according to the standard process, the Courier need to send the two to the same two tank storing your deliver the goods to end customer, if the Courier in the same case, Then, the pickup code of one of the packages could not be entered into the system, so the steps and reminder messages

of the next process could not be generated. Although there is a small piece occupying a delivery cabinet on the macro level, the utilization rate of the cabinet is low, but at the same time, this is also a necessary measure to avoid human error in the system.

2.2.3 Small Footprint, High Utilization

In the design of intelligent express ark, it covers an area of small, because express the design of the tank depth of about 45 cm, so small intelligent express the depth of the ark of the ark, the Courier ark corner for use of the space, such as the lobby of the corner wall, or a bulletin board on the back, held by the effective space can be classified as almost zero, greatly increased the utilization rate of residential area. Moreover, some enterprises' intelligent express cabinet is based on its design, and the front of the express cabinet is set up with a rotating and projection advertising area, which has the main function of receiving express, and is also a diversified advertising column. It can advertise goods in the front of the broader express cabinet, and further improve the function of the equipment. Some intelligent express cabinets are also installed together with vending machines. The vending machines are beside the express cabinets, and both the height and depth of the machines form a whole. In this way, the utilization rate of the equipment is further maximized under the condition of the same occupation, and the actual occupation area is lower.

3. Fugu County Intelligent Express Cabinet in the Use of Problems

3.1 Responsibility is Not Clear, User Rights Difficult

For some responsibility from fuzzy tasks, such as customer is not at home can temporarily receive Courier express ark to intelligence, or express ark need second charge details, such as Courier will not be the responsibility, because according to the standard process execution, Courier in customer temporary absence, needs to transfer the Courier to the security station to keep, If unable to retain the need to wait for the next shipment back to company, on the one hand, this will lead to a Courier repeated invalid labor, on the other hand can also lead to buckle the Courier service charges, so they choose not to or agreed to by the customer on the intelligent express ark, is to hope to finish this task and shift the responsibility of the delivery to the intelligent express on the ark, As for whether there will be secondary charges or customers cannot receive them, the Courier and the Courier company are not responsible according to the terms of the company. Therefore, the responsibility of the upstream and downstream logistics chains is unclear in terms of the transfer of express delivery responsibility and the secondary charges of express delivery counters. Due to express especially damage or loss caused by the dispute, the reason is that the lack of the traditional with delivery person face to face inspection to sign for receipt of application, as a result, once appear, express the problem such as damaged or missing, the pursue the responsibility of which side it is hard to define, so many consumers still demanding door-to-door delivery, site acceptance.

3.2 It is Difficult to Handle Large Size Delivery

At present, logistics companies that invest in intelligent express cabinets generally choose express cabinets with the size of 30*15*45cm, which can accommodate the following items:Ordinary documents and books, small components of cosmetics, footwear and clothing and other small electrical appliances, from the above choice, the size of the express cabinet is a bias, take an ordinary intelligent express cabinet for example, in 1.8 meters height, the number of the standard express cabinet in about 40-60, if each cabinet can be turnover twice a day,The daily delivery volume is 80-120 times. A single commercial building in a property community is calculated with 30 floors and 6 units per floor, and there are 180 family units in one building. Therefore, each intelligent express cabinet can meet 70% of the storage needs of the single commercial building within a limited period.And usually 3-4 commercial buildings are configured with a smart express cabinet, so the limit to meet the ability of only 18%. Therefore, in order to ensure that its turnover can be met without occupying more community places and capital investment in control equipment, logistics companies

will try to choose the general size of 30*15*45cm to meet the turnover first.

At the same time, some logistics companies will also put selective express cabinets, for example, 70% of the overall express cabinets are the general size of 30*15*45cm, 30% are the expansion size of 30*30*45cm, but this design has two problems:One is that under the same volume of intelligent express cabinet, the delivery capacity of express cabinet with expanded size is reduced more, and the delivery capacity of express cabinet with 30% expanded size is reduced to 85% of the original general size;Second is more difficult to control the problem, when the Courier will express entry intelligent express tank system, intelligent express ark is unable to distinguish between express size, so it randomly open cupboard door does not necessarily fit the size of the express, and at the time of the entry system if need Courier to confirm size, which involves the Courier professional quality problems and the judgment,Not all the estimates are accurate. It is possible that the express items are large, so the Courier opened the general size. It is also possible that in order to save trouble, the Courier marked all the express items as large when entering the system, leading to the error of recording the large and small items.

3.3 The Number of Smart Delivery Cabinets Installed is Insufficient

At present, smart express cabinets have not formed a scale in the number of installation, and the amount of express items can be stored at each installation point is too small. This problem becomes particularly prominent during the peak of online shopping. During the activity, the huge order volume forms a sharp contrast with the limited storage capacity of smart express cabinets. From the sharp contrast between the two, it can be seen that the current mode is difficult to meet the needs of express enterprises for fast operation.

4. Analysis of the Problem in the use of Intelligent Express Delivery Cabine in Fugu County

4.1 Too Many Parties and Imperfect Contracts

The responsibility is not clear, the user rights protection is difficult because there are too many parties involved, the contract is not perfect; There are many reasons for the unclear responsibilities. The most important reason is that there is no clear division of these responsibilities in the service agreement with express delivery companies and express delivery personnel. As aforesaid, small local Courier company operating pressure, and in the area there are repeated bidding and companies more competitive business situation, with an area to participate in the express delivery suppliers didn't bring too much competition and customer service to upgrade, and it is in competition with each other more inclined to we should carry out a local Courier company, in the big contract logistics company, For timely delivery rate and delivery accuracy is have clear requirements, also for labor cost deductions, as a result of customer complaints have clear requirements, so for local Courier company, Courier in abnormal situation judgment based on the client will be responsible for major premise to sell as far as possible, in the logistics contract, did not specify when the customer cannot take delivery, As long as we ensure that customers do not lose or complain about express delivery, so to be on the safe side, when customers can not pick up the parcel in time, the most secure way is to put it in the smart express cabinet, and almost will not listen to the opinions and dissuasion of customers.

Because smart delivery tank relative to the guard and the supermarket has a higher security and record, if the customer found in when obtaining express Courier is intelligent express ark quadratic charge, most of the time is a customer can only helpless to accept payment, and after a complaint may get to the second fee rebates, but because this is for the customer delivery safety, The company did not breach the contract, as the contract did not specify solutions and action instructions for similar situations.

4.2 The Goods are Packed in Different Sizes

It is difficult to handle large size express delivery. The reason behind the game between size and

efficiency is that the package sizes of goods are different. Different goods in express delivery will inevitably have different packaging specifications, and the outer packaging specifications will be adjusted according to the customer's single order. For example, when a consumer buys an assembly chair from an e-commerce company, the packaging size may be 30*40*10cm, which can be accommodated in the general size cabinet of the smart express cabinet. However, if consumers buy an assembly chair and an assembly children's table from the same e-commerce, their packaging size will inevitably be larger than the general size of the express delivery cabinet. That is, the same e-commerce because customers buy different product categories and varieties of different combinations, resulting in completely different packaging specifications, this situation is everywhere. Therefore, the packaging of goods can not be standardized; From the perspective of e-commerce, in addition to charging by weight, the express cost of goods will also take into account the volume, so it is impossible for e-commerce to adapt to the characteristics of smart express cabinets and fix the specifications of express packages to a few more appropriate types.

On the other hand, the packaging of goods can not be read from the TWO-DIMENSIONAL code of the accurate packaging specification information, so when the Courier receives the express package to the intelligent express cabinet, he can only intuitively judge whether it can be inserted into the express cabinet through personal experience, and there are quite a lot of loopholes and human errors. Therefore, one of the reasons why express workers are not willing to use smart express cabinets is that although they are convenient, they are responsible for all errors and information login when the actual information is input, and the operating pressure is also great.

4.3 The Supervision System of Express Delivery Industry is Not Perfect

The key to the lack of industry standards and supervision is still the imperfect supervision system of the express industry. As aforesaid, in the end of the service industry standards and contract requirements are not specified when to use intelligent express ark or how to define the charging person, because it involves the express and the customer too much subjective factors (such as Courier need to go to the next village, customer calls a temporary I couldn't get through, etc.), the subjective factors directly affect the effective implementation of processes, If standard operating guidelines and procedures are set up to specify when and when the express delivery can be transferred to the use of intelligent express delivery cabinets, there needs to be supervision and monitoring means formed beyond these subjective factors on the scene. Otherwise, under the premise that the current supervision means and systems are not perfect, the operation standards and procedures are forced to be promoted. It will only lead to more resistance of the field delivery staff and even reverse it, which will only lead to the end customers to blame the problem on the application of intelligent delivery cabinets, which is counterproductive.

As aforesaid, in the logistics industry in the development of a few decades, because of the management and teaching for many years, in the national standards and industry standards have obvious progress, but in the end of the service, the standard and regulation does not have full coverage, to express "forced to take off the list" for the case, when the individual express Courier face hands many times without customers receive or there are urgent tasks 8 processing, The Courier will choose to put the express in the doorman or the small supermarket, or forced in the intelligent express cabinet, the choice and process depends entirely on the personal judgment of the Courier, as long as the above units are willing to accept, even if the loss is not responsible in advance, the Courier will still choose to force down to accept, And when these placed during the delivery of the smart delivery cabinet generated two storage fees or accident loss or damage, the Courier is not responsible for the delivery company, as well. In the terminal logistics service, the guarantee of service quality completely depends on the professional ethics of the Courier. The operational monitoring of the logistics company is all punishment after the event, but the problem has already arisen, and the end customer can only pay for the accident. In traditional logistics, due to the small size of regional express companies and high mobility of express workers, it is difficult to implement service standardization and advance supervision, even if there are company regulations and industry recommended standards.

4.4 Construction Funds are Under Great Pressure

The development, investment, maintenance, operation and maintenance of express delivery cabinets require a large capital cost. Each group of smart express cabinets cost about 30,000-40,000 yuan, to pay 1000-2,000 yuan to the property company every year site use fee, but also hire equipment maintenance and handling customer complaints of abnormal parts of the problem maintenance personnel. Investors also need to communicate with e-commerce and express companies, and analyze the purchase scale and frequency of consumers by using the existing logistics data, so as to comprehensively judge the area and number of smart express cabinets. This work also requires a lot of time, manpower and capital cost investment. In addition, the current use of intelligent express delivery cabinets in the trial stage, has not formed a clear charging model. Express cabinet enterprises have tried to implement the first free after the charging model, but express cabinet charging period utilization rate greatly reduced. Nowadays, the mainstream view in society is to rely on the basic and auxiliary functions of express delivery cabinets to make profits, but only relying on these businesses cannot support its high initial cost and late operation and maintenance costs, which also leads to many investors hope to invest in the addition of express delivery cabinets, but also worry about the small profit, it is difficult to return the capital.

5. Improvement Strategy of the Use of Intelligent Express Cabinet in Fugu County

5.1 Choose Quality Delivery Company, Accountability in the Contract

For participants too much, the problem of incomplete contract, key or need to make improvement, start from the bidding of logistics group for bidding orientation determines the regional express company for the contract is the emphasis of the operation in the future, for Courier without user consent will express into the express the behavior of the ark, need to effectively defined in the contract, and write in the terms of service, Such as communication cannot be switched on or after multiple users under the premise of communication failed, need through the application process, after reaching a certain condition, Courier to be able to express in the express ark, so when is in this condition, the user will not have the right not to accept such an arrangement or continue to complain, if do not meet the conditions, then the Courier's behavior is illegal, The Courier company shall be disciplined or warned according to the terms of the contract.

Therefore, if more detailed contract service requirements need to be met, there is a threshold requirement for the service awareness and ability of regional express companies, and such threshold requirements determine their service costs will be higher. When such detailed responsibilities need to be met, Logistics groups need to choose high-quality express companies with higher prices to complete the above work.

5.2 Response Integral Mode to Replace the Second Charge

As for the problem that individual express containers need to be charged twice due to too many parties and imperfect contracts, in addition to the responsibilities and detailed restrictions in the contract, we need to consider another way to solve this problem: The secondary charges of express cabinets are not used to pay for the equipment or operating costs of express cabinets. The price of secondary charges is low and can be almost ignored in the operating costs of express cabinets. Therefore, the purpose of the majority of secondary charges of express cabinets is to reverse stimulate users to "respond and receive express" more promptly and on time. Therefore, most manufacturers of express delivery cabinets will not charge users twice within 24-48 hours after the express delivery enters the cabinet. Only when users do not take express delivery for a long time, which leads to a long delay and affects the throughput efficiency of express delivery cabinets, will they adopt this "punitive charge" mode. However, the punishment of the second charge is poor, which leads to the user's dislike and anger at the use of the express cabinet. So all the logistics group can be used in the tank in set

points, similar to the "immediate response" if the user receives the delivery timely and effective response, its length can prolong delivery place express ark, even timeout can also use a points deduction, thus prompting users receive timely express, common raise the use efficiency of express the ark; This method of exchanging points for fees is more conducive to encouraging users to receive goods in a benign manner, and is also conducive to improving the operation efficiency of express counters.

5.3 More Flexible Delivery Cabinets

Packing sizes it is hard to from the source to solve the problem, because the packaging specifications can't achieve the unity of several models, so powerful, can self-built logistics chain logistics companies need a breakthrough in the design of intelligent express ark, currently there is a kind of design is to convert the fixed pattern of express ark to similar to the pattern of "mobile garage, That is, the express cabinet is no longer set up a separate cabinet warehouse, all the received express pieces in the express cabinet into the mouth, as the mobile garage to achieve compression storage, when the end customer to pick up, the express and as the mobile garage to take the car will be the corresponding number of the express delivery out of the mouth. This design can maximize the volume of express goods and improve the efficiency of storage. But at the same time because of the internal mechanical transmission and other complex equipment response, so in the long-term application, how to achieve stable and effective equipment and equipment maintenance is very critical.

5.4 Design Corresponding Monitoring and Specification

Aiming at the problem of express industry regulatory system is imperfect, in determining the service at the end of the industry standards and relevant articles of association of the use of intelligent express ark details in the contract, more important is to realize the effective monitoring of field work, can refer to the latest model of the drops taxi software, when passengers enter the car, drops software is automatically open monitoring function, the whole process will be recorded in the system. Similarly, when the express delivery enters the receiving stage, the APP of the logistics company can also open similar "receiving service monitoring", record the whole process of the receiving interaction between the Courier and the customer, and ask the Courier to choose the corresponding treatment according to the preset service guidelines in the contract.

5.5 Reasonable Layout Improves Efficiency

Need to maximize the efficiency of the intelligent express ark, one of the key is to reasonable layout, in intelligent express ark instruction, in addition to want to consider the actual demand of area residents express circulation, avoid individual without tank, individual regional express tank no use, also need to express site at the end of the local distribution and single ability also is integrated into consideration, Because Courier ark is not a force, not all the Courier express ark, can be used in the current stage of intelligent express ark cannot completely replace terminal logistics, so in the end of the service should be prepared for the role of "help", express delivery company in the area of efficient delivery convenient place, through the combination of intelligence and artificial reasonable layout to achieve regional win-win situation. For example, manufacturers placing express cabinets can analyze the big data of the storage history of express cabinets, so as to guide the reasonable layout of express cabinets and provide more scientific basis in the operation.

5.6 Look for Multiple Revenue Models

In order to make profits, the intelligent express cabinet business must reject the single self-pickup model and develop multiple profit models. First, cooperate with express delivery companies. Express delivery enterprises shall be charged according to the number of packages or bags. Second, charge the Courier fee. A user fee will be charged to the couristers who use the third-party sharing mode of intelligent delivery cabinets. Finally, cooperate with advertisers. The areas where express delivery cabinets are placed shall be individually classified by the crowd or consumption ability, and different types of advertisements shall be introduced in cooperation with different advertisers according to

different types of areas. Use the screen of express delivery cabinet to advertise and charge advertisers. For example, advertisements about health maintenance, fitness, medical care and other types can be introduced in the elderly community, while advertisements about learning education, counseling and training can be introduced in the children's community.

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