

Improvement Path of Express Delivery Service Capability under Covid-2019 Pneumonia Pandemic

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ABSTRACT

The essence of improving express delivery service capability is to solve the contradiction between “demand” and “supply” in the express market. The specific impact of the epidemic on the express industry from two aspects of “demand” and “supply” is analyzed, and a three-tier path model is constructed to improve the express delivery service capability. Some suggestions are proposed including logistics informatization, human resources, optimization of logistics network, and process reorganization.

Keywords: Covid-2019 Pneumonia, express delivery service capability, logistics.

1. INTRODUCTION

Under covid-2019 pneumonia pandemic, e-commerce and express delivery logistics have played an important role in ensuring the supply of daily necessities for Chinese people, preventing and controlling the spread of the epidemic and maintaining social stability. At the same time, some new situations and problems have emerged. On the one hand, the epidemic has directly affected people's psychological expectations and consumption habits. With the continuous innovation of online retail business models, more diversified and personalized express delivery services are needed. On the other hand, the epidemic has directly interfered with the normal operation process of express delivery logistics, and exposed some existing stubborn diseases such as excessive dependence on labor, low intelligence and low operation efficiency. The government responded quickly and released related policy guidance, after the problems were exposed.

In April 2020, Ministry of Commerce, PRC and State Post Bureau, PRC released policy ^[1]. The public attributes of the smart delivery lockers and express terminal integrated service sites were once again clarified, and the relevant construction work was strongly supported. Local governments also issued specific measures and plans according to the actual situation of various regions. Shanghai municipal government required to further expand the scope of intelligent terminal delivery facilities, including smart delivery lockers and multi-functional lockers for drugs, fresh and

other commodities ^[2]. Beijing municipal government planned to set up a pilot project of terminal delivery service facilities ^[3].

The epidemic has not only brought impacts to the express industry, but also brought opportunities ^[4], accelerating the process of industry reshuffle. For express enterprises, to seize opportunities is to improve the service capacity of express logistics, especially the terminal delivery service capacity for consumers, which has important practical significance at present and in the future.

2. CONCEPTS

2.1. Definition of Express Delivery Service Capability

The express delivery in this paper refers to the logistics activities from the destination transfer center (local warehouse or store) to final consumers. The main service modes of the local delivery include direct delivery to the door and self delivery ^[5]. The self delivery modes include smart delivery lockers and post stations. Some scholars equate the logistics delivery capacity with the logistics delivery service capacity ^[6], and believe that it is composed of the delivery network resources and operation capacity of the enterprise, emphasizing the supply capacity of the enterprise itself. However, some scholars ^[7] believe that logistics delivery service capability should not only start from the perspective of enterprises, but should refer to an ability that can meet the

needs of consumers and be perceived and evaluated by consumers. Delivery is at the end of the whole logistics system [8], and in direct contact with consumers. Consumers' experience needs and their satisfaction should be the core index to measure the service ability of logistics delivery.

The demand change of express industry caused by the change of consumer market under the epidemic is complex and far-reaching. Express enterprises should not only increase resource investment from their own perspective, but ignore the effective satisfaction of market demand. Therefore, this study distinguishes "express delivery capacity" from "express delivery service capacity". The former one represents the supply capacity of enterprises, and the latter one represents the ability of enterprises to meet the needs of consumers, and the service that can be perceived and evaluated by consumers is the valuable service capacity.

The concept of "express delivery service capability" is defined: under the limitation of certain delivery cost and service level, express enterprises use various internal and external logistics resources and adopt corresponding operation management methods to meet customers' delivery needs, and the services can be perceived and evaluated by customers. Starting from this concept, the essence of improving the ability of express delivery service is to solve the objective contradiction between "demand" and "supply". Therefore, the improvement path of delivery service capacity under the background of the epidemic from the two aspects of demand and supply of the express industry was studied.

2.2. Impact Mechanism of Epidemic on Express Industry

The impacts of the epidemic on the social economy include the transmission harm of epidemic itself and the impacts of the prevention and control measures formulated for the epidemic. When the epidemic broke out at the end of 2019, the express logistics business first suffered a huge positive impact. In January 2020, the national express business volume decreased by 16.4% year-on-year (data source: State Post Bureau). However, with the launch of resumption of work and production policy and the growth of online consumption, the express industry took the lead in getting rid of the impacts of the epidemic. The business volume increased steadily, and exceeded 100 billion packets for the first time by the end of 2021. In the above process, there are three characteristics as following:

(1) From the perspective of conductive characteristics, the impacts of the epidemic on the express industry have direct impacts and indirect impacts. Direct impacts refer to the direct impacts of the epidemic and relevant policies on various elements of supply chains of the express industry, such as e-commerce platform partners,

transportation fleets, logistics hub facilities, outlets, stores and front-line delivery personnel. Indirect impacts refer to that the epidemic has affected all aspects of the whole socio-economic environment, and finally affects the development of the express industry through various transmission paths.

(2) From the perspective of time characteristics, the impacts of the epidemic on the express industry have short-term ones and medium and long-term ones. Short term impacts include traffic control, inability of personnel to return to their posts, and a sharp increase in the demand for medical protective articles. Medium and long-term impacts include changes in consumers' psychology and habits, technological and business model innovations, industry transformation and upgrading, and the transmission effect of logistics related policies.

(3) In terms of market structure characteristics, the epidemic had different impacts on different business segments, market segments and regions. In areas with severe epidemics, strict anti-epidemic blockade measures have had a negative impact on the scale and quality of express development, but on the other hand have reduced consumer expectations [4].

An impact mechanism model of the epidemic on the express industry is constructed with demand and supply as cores, as shown in Figure 1.

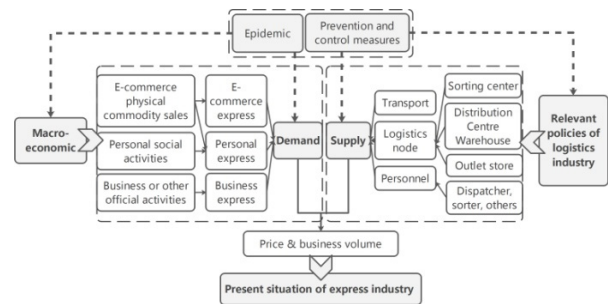


Figure 1 Impact mechanism model of the epidemic on the express industry

3. CHANGES IN CONSUMER DEMAND UNDER THE EPIDEMIC

3.1. Changes in Consumer Scene

Consumption scenarios have changed, with online shopping becoming one of the main consumption scenarios. Due to the requirements of epidemic prevention and control, offline consumption such as catering dine-in, supermarket mall shopping, travel and entertainment was suppressed, and many residents who were previously less likely to shop online also turned to online consumption, with the online penetration rate continuing to climb. From the resumption of work and production in March 2020 until December, China's online shopping users grew by 72.15 million, reaching a total of 782 million [9]. The annual online retail sales of physical

goods in 2020 amounted to RMB 9.76 trillion, accounting for 24.9% of the total retail sales of consumer goods.

3.2. Changes in Online Shopping Platforms

Diversified online shopping platforms provide new growth drivers for express demand. The epidemic has not only boosted the volume growth of e-commerce giants such as Tmall, Taobao, JD Mall and Suning Tesco, but has also given rise to the “fan economy”, “weblebrity economy”, “live economy” and “the geek economy” and other diversified new e-commerce models. For example, the recommendation named “planting grass” in Xiaohongshu based on consumer experience rapid spreads, and the entertainment visits effectively convert to e-commerce traffic on video platforms such as Kuaishou, Tiktok and Bilibili. They have greatly enriched the online shopping platform ecosystem, while also contributing to a large amount of demand for express delivery. According to statistics from the Ministry of Commerce, as of December 2020, the scale of live e-commerce users has reached 388 million, with nearly 66.2% of live users directly transformed into online shopping consumers.

3.3. Changes in Online Shopping Content

Orders of grain, oil, fresh produce, medicine, and other daily necessities increased. Among the online retail sales of physical commodities, food, clothing and daily supplies grew by 30.6%, 5.8% and 16.2% respectively [9]. Among them, commodities such as rice, flour, grain and oil are heavy and not easy to carry, so consumers, especially the elderly people, usually prefer door-to-door (upstairs) delivery, which adds more extra workload to the couriers. Residents are also paying more attention to their own health issues. JD big data shows that during the “double eleven” period in 2020, the orders for online consultation at JD Internet hospital increased six times year-on-year, and the turnover of imported health products increased by over 270% year-on-year. Shunfeng’s pharmaceutical business revenue doubled year-on-year in the first half of 2020. During the epidemic, consumers spent a lot more time at home and had to cook their own meals or order takeaway, thus increasing the demand for fresh food and instant food delivery. Consumers’ “want-it-now” has led to higher demands for the timeliness and freshness of delivered goods.

3.4. Changes in Delivery Needs

Demand for contactless delivery increased. As can be seen from the above analysis, consumers at home prefer immediate door-to-door delivery, but fear of virus makes them worry about couriers’ visit. Contactless delivery has been driven by this ambivalence, with increased acceptance of courier pick-up from express station or

delivery locker. In addition, after several outbreaks caused by courier transmission, consumers have become more demanding of protection of couriers.

4. CHANGES IN DELIVERY SUPPLY UNDER THE EPIDEMIC

The supply of express enterprises refers to the express services provided to the market in a certain period of time, including service quantity and quality. The supply capability is determined by the hardware and software resources of the enterprise. The hardware refers to the logistics network resources, such as the layout of logistics nodes (logistics center, sorting facilities and warehouses), and logistics channels (transportation capacity). The software refers to the operation management ability and human resource management ability of the above hardware resources.

4.1. Shortage of Couriers

The epidemic has led to a growing shortage of express workers. At present, the express industry is still a typical labor-intensive industry, which requires a large number of personnel to complete manual work such as sorting and delivery. In 2019, 3 million couriers delivered 60 billion couriers, while in 2021, 4 million couriers need to deliver more than 100 billion couriers. The increase of personnel is far from keeping up with the increase of express business. After the Spring Festival in 2020, due to epidemic control policies, a large number of express workers could not return to their posts in time, or they still need to be isolated for a period of time even if they return to work, which made the shortage of express workers worse. At the same time, the instant delivery, especially takeaway, has also diverted some express workers. The shortage of couriers has directly led to the backlog of packages. The professionalism of temporarily recruited couriers is uneven, which greatly affects the service quality of terminal distribution.

4.2. Traffic and Regional Controls

The traffic and regional control affect the timeliness of express delivery and the service level. Except for emergency logistics, other express vehicles and personnel cannot pass or enter. In many closed communities, couriers can only stack packages at the community gate and wait for consumers to receive them. Couriers cannot provide door-to-door delivery, which greatly reduces the overall efficiency and service quality.

4.3. Delivery Model Innovation

Express enterprises strengthened the innovation of terminal delivery mode. In January 2020, Meituan carried out “contactless delivery” service in Wuhan, and other enterprises also quickly followed up and upgraded the

service model. The model of “unmanned vehicle delivery” and “unmanned aircraft delivery” were introduced in to meet the needs of epidemic prevention and control. It also provides a new idea to solve the shortage of end distribution personnel by scientific and technological means. For example, in the first half of 2020, Shunfeng provided small batch, multi batch, point-to-point logistics solutions for medical and livelihood materials in Wuhan, Shiyan and other regions by unmanned aircrafts, with more than 20 tons of transported materials.

During the epidemic period, professional fresh food e-commerce such as Meiriyouxian and Dingdongmaicai achieved rapid growth in order volume through the mode of “front warehouse + AI algorithm”. The front warehouse mode closer to consumers can provide a full range of fresh products and realize the delivery of fresh goods in 0.5 to 2 hours. AI algorithm can predict the sales volume in advance and greatly reduce the inventory loss. However, at the same time, technological and commercial innovation require a lot of financial and material resources to be continuously invested, which has caused a certain financial pressure on enterprises and a high entry threshold for competitors. Therefore, only giant enterprises can bear it, which also speeds up the pace of the elimination of second-line express enterprises.

4.4. Increased Competition in Express Industry

The epidemic has intensified the competition in the express industry, triggered a price war, and forced enterprises to reduce costs in various ways, including scale expansion, infrastructure and technology upgrading, cooperation, diversification and mergers and acquisitions. These measures require huge capital, and enterprises that cannot raise funds will withdraw from the market soon. In May 2021, the express enterprise Sure announced bankruptcy and reorganization. From early 2017 to early 2020, the express service brand concentration index CR8 (the market share of the top eight largest enterprises) increased from 75.7% to 86.4%. Shunfeng and Tongda enterprises have a total market share of 72.13% in 2020, and the advantages of leading enterprises are becoming more and more obvious.

5. IMPROVEMENT MODEL OF EXPRESS DELIVERY SERVICE CAPABILITY

The essence of express delivery service capability is the ability to solve the contradiction between supply and demand in the express industry. The specific logical relationship is shown in Figure 2.

Based on the above analysis, a 3-levels improvement model of express delivery service capability is constructed as shown in Figure 3. On the first level, it takes the construction of logistics informatization as the support. On the second level, the service capacity is synchronously improved from three aspects: human

resource construction, logistics network construction and optimization, and process reorganization. On the top level, enterprise strategies are adjusted timely.

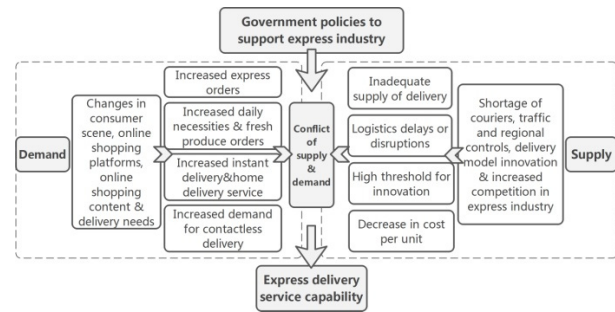


Figure 2 Logical relationships between supply and demand in the express industry

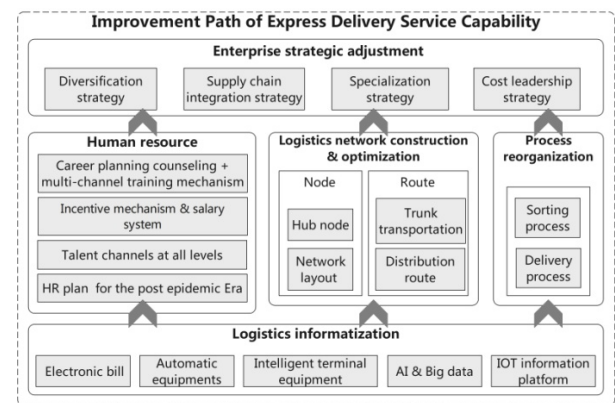


Figure 3 The model of express delivery service capability

5.1. Logistics Informatization

The electronization of express bills is the basis of express process informatization. The “three segment code” in the bill represents the distribution center code, outlet code and courier code, which is the basis for express automatic sorting. Automatic logistics equipments mainly include automatic operation of storage system, conveying system and sorting system. An automatic sorting line in Zhongtong can sort 70000 packets per hour, and only 150 workers are needed at most. In addition, smart delivery lockers have been much accounted because of the epidemic, which not only improve the distribution efficiency, but also meet the requirements of no contact.

5.2. Human Resources

With the application of new technology, the logistics industry is bound to transform from labor-intensive to technology intensive, and has higher requirements for the level of human resources. Enterprises should formulate human resource plans suitable for the post epidemic era, cooperate with various schools and research institutions, and open up channels for talents at all levels and establish talent reserves. Enterprises should retain excellent

employees, especially front-line couriers, with perfect incentive mechanism and salary system to provide better services for consumers, carry out career planning counseling and multi-channel training mechanism to serve the lifelong career development of employees, and cultivate talents and reduce employee mobility at the same time. The short-term goal of human resources construction in the context of the epidemic is to reduce the negative impact of “labor shortage”, and the long-term goal is to serve the transformation and upgrading of the express industry.

5.3. Logistics Network Construction and Optimization

The logistics network includes nodes and routes. Node optimization is divided into the layout optimization of core hubs and terminal outlets. For example, the original Beijing sorting center of Zhongtong is located in Chaoyang District, which is unable to expand its business area due to its geographical location. At the same time, due to the policy of relieving non core functions of the capital, the new Beijing south sorting center of Zhongtong is located in Zhuozhou, Hebei Province. The sorting efficiency can be more than doubled under the operation mode of double sorting centers.

5.4. Process Reengineering

Process reengineering includes sorting process reengineering and delivery process reengineering. For example, in the new sorting center of Zhongtong, the original process of “sorting center → secondary sorting → delivery” was optimized to “sorting in the sorting center → direct delivery”. Using the three-stage code of electronic bills, the automatic sorting system can sort packets to specific couriers. After the packets arrive at Beijing outlets, couriers can load and deliver them immediately, which effectively reduces the sorting pressure of the cooperative network and greatly improves the distribution efficiency.

6. CONCLUSION

E-commerce and express logistics have played an important role in ensuring the supply of daily necessities, preventing and controlling the spread of the epidemic, and maintaining social stability. At the same time, some new situations and problems have been exposed. In order to promote the high-quality development of the express industry, the specific impact of the epidemic on the express industry from the two aspects of “demand” and “supply” was analyzed, a three-tier path model to improve the service capacity of express was constructed, and some suggestions were given. In future, more in-depth theoretical research and case analysis on the feasibility of measures to improve the path will be conducted.

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