

# A Study on the Profit Model of Cainiao Logistics Based on Resource Sharing Pattern

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## Abstract

The fourth-party logistics (4PL) based on resource sharing pattern is inevitable trend, so the implementation of Cainiao Logistics Plan has aroused the discussion of whether the development of 4PL will make resource sharing pattern popular in logistics industry. The purpose of this study is to investigate the profit model of 4PL represented by the Cainiao. So what kind of role does Cainiao play? Is the profit model sustainable? The research is based on single case study of Cainiao Logistics, which can be considered as a best practice when it comes to 4PL competition. The results identify the main aspects that explain why Cainiao will be efficient. It found that Cainiao not only created new ecosystem of E-commerce, but integrated most resources available in the supply chain.

## Keywords

Profit Model, 4PL, Resource Sharing, Big Data

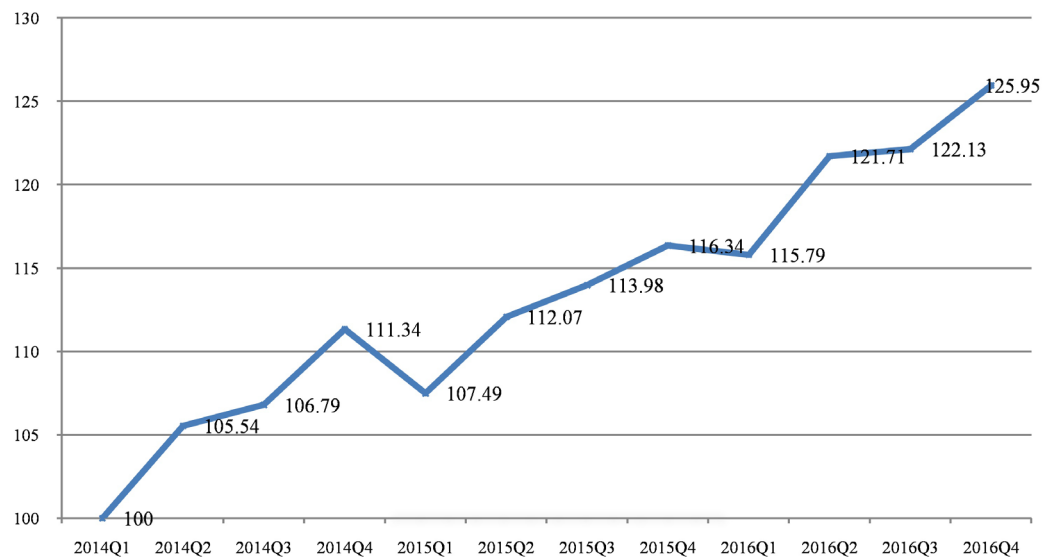
## 1. Introduction

In January 5th, 2017, the National Postal Management Work Conference proposed “get through the downstream, expand the industrial chain, drawing a bigger concentric circle, build ecological industry system”. Express industry development will focus on seizing online and offline interactive mode of vigorous development opportunities in 2017, continue to consolidate collaborative work with e-commerce development, changing from simple pattern to undertaking upstream services and value-added services.

According to the research center of China's e-commerce statistics, the total volume of retail sales of network economy in China reached 1131.5 billion Yuan in 2012, accounting for about 5% of total retail sales of social consuming goods. While in the third quarter of 2016, online retailing sales totaled 3465.1 billion

yuan, with an increase of 26.1%. Since the beginning of 2015, online retailing has shifted gear from the previous high speed to a medium-to-high speed growth, into the “new normal”. With the “Internet +” deepening, online consumption structure experienced optimization and upgrading. In the fourth quarter of 2016, national online retailing development index made 125.95 with an increase of 8.26%, which rate 3.77 percentage points higher than the same period last year (Figure 1). The “double eleven” shopping day turnover broke one billion record takes only less than 1 minute, the turnover compared to the same day last year increased by 40%. E-commerce and express industry depend on each other, the future market competition is no longer a single enterprise or industry competition, but the overall competition based on the supply chain [1]. When considering scientific research, the profit model of Cainiao is still in its infancy. Behind the concept sit the inevitable market pressures: speed of both response and delivery, flexibility and global reach. According to the value co-creation logical, in response to fierce competition, companies need to work with users, partners to create new competitiveness [2].

In the face of massive information, modern enterprises must change the industrial era of enterprise organization model, and actively develop data-driven, open platform-based information logistics. That is to integrate social logistics resources to carry out social logistics services. Acknowledging the dramatic changes in the economy, which has become more information intensive, more global and more dependent on technology, several authors, both inside and outside the logistics discipline, have indicated the importance of logistics as a source of sustainable competitive advantage (SCA) [3] [4] [5]. Increasingly, companies are now considering collaboration across their logistics systems to integrate manufacturing, planning, and warehouse management, sharing risk and reward.



**Figure 1.** National online retailing development index of 2014-2016 quarterly. Source: China international electronic commerce network.

According to Analysys data, TAOBAO occupies 60% share in China's C2C market. In the past, as most E-commerce companies, it has paid no attention to logistics leading to the relative lack of e-logistics development. Such a situation restricts the development of EC [6]. Cainiao logistics can be traced to same origin of Alibaba e-commerce business, as collaborative logistics platform, which relies on the data-driven social logistics resource sharing pattern, conforming to the huge growth in demand for social logistics services caused by the Alibaba C2C business.

The objective of this paper is to present the general idea of implementing 4PL service provider into a service (planning) process, to clarify the different functions between 3PL and 4PL and to introduce the Cainiao logistics modified profit model as artefact. The article is organized as follows. We first consider the connotation of 4PL and make contrast with 3PL. We further examine the pattern of 4PL based on resource sharing. Taken together, we devote our effort to uncover the mechanisms of 4PL with Cainiao Logistics as an excellent example.

## 2. The Connotation of 4PL and Contrast with 3PL

### 2.1. The Connotation and Characteristics of the Fourth-Party Logistics

4PL has evolved as a breakthrough supply chain solution, comprehensively integrating the competencies of 3PLs providers, leading edge consulting firms and technology providers [7]. It manages a full scope of logistics services by aggregating and coordinating the services of multiple logistics service providers. In another, more strategic role, the 4PL serves as the integrator that brings together the needs of the client and the resources available through the 3PL providers, the IT providers, and the elements of business process management [8].

4PL is the backbone of the communication among related entities, it is characterized as follows (**Table 1**):

**Table 1.** 4PL and 3PL Comparatively Analysis.

	3PL	4PL
Object	Reduce the external logistics costs of individual enterprises	Reduce the operating costs of entire supply chain , improve service capabilities
Contract	Almost one year contract, contractual relationship	Long-term strategic cooperative relations
Supporting Skills	Processing ,storage, transportation, distribution, information transmission and other value-added service skills	Management consulting, enterprises information system constructing, logistics business operation
Logistics design perspective	Single enterprise	Supply chain
Operational characteristics	Specialization, less multi-functional integrated	Multi-functional integration

Source: By author.

1) 4PL not only plans transportation and warehouse management, but also includes management consulting, logistics operation, resource technology integration.

2) 4PL emphasizes the entire supply chain optimization, in order to reduce costs and improve performance. Treated as a strategic partner instead of a tactical one, a 4PL serves as a supply chain integrator that synthesizes and manages the resources, capabilities and technology of the organization.

3) 4PL is a collaboration, which is the combining of both vertical and horizontal collaborations. Collaboration reduces inter functional and inter organizational conflict and promotes the development of a distinctive relational advantage [9] [10]. Vertical collaborations occur when business units are of the same supply chain, while horizontal ones refer to business units outside the supply chain, most of which are competitors.

## **2.2. 4PL and 3PL Comparatively Analysis (Table 1)**

Often, the merger of systems and scope enables the 3PL to perform helpful functions such as regulatory compliance and determining the total delivered cost of goods for sale. A 4PL is neutral and will manage the logistics process, regardless of what carriers, forwarders or warehouses are used. As a result, 4PLs have become logical alternatives for business process outsourcing by providing visibility and integration across multiple enterprises [11]. Each model, outsourcing 3PL and 4PL, has its part to play. Any organisation considering one should consider the alternative, and compare and create benchmarks for the two models using the organization data.

## **3. Toward the 4PL at the Base of Resource Sharing Pattern**

### **3.1. Integration of Logistics Resources**

Logistics resources mainly refer to various resources related to logistics activities. The broad concept includes all supporting systems involved in modern logistics activities, while narrowly, they mainly refer to logistics operation resources such as transportation resources, storage resources and distribution resources [12]. According to the form of resources, they can be divided into tangible resources and intangible resources.

The logistics resource sharing platform integrates the logistics organization, information, facilities and equipment resources of each express enterprise to eliminate the boundary between the enterprises in the platform and reach seamless connection and facilitate cooperation among the enterprises. Based on the integration of logistics resources, it may achieve resource sharing. The integration of logistics resources in general means to merging and acquisition, strategic alliances and resource sharing platform. As for express market, the express enterprises network, facilities and equipment resources remains large overlap, mergers and acquisitions approach were not applied; and this market stays in a high degree of homogeneity, the chances of strategic alliances are slim; resource

sharing model adapts to industrial specificity, with optimize resource allocation to benefit community.

### 3.2. 4PL Operating Pattern

The pattern of 4PL provider involves the search, selection and qualification of materials and services suppliers. This process continues throughout the period of collaboration with potential customers and leads to creating a database of qualified suppliers [13]. The supply chain means new resource sharing platform, which confirm the connection location of resources in the new resource network (*i.e.* the location of the structure hole), so different stakeholders can find resources to reduce the structure the amount of holes. As logistics business fluctuate time to time, the gap between the peak and valley can reach several times. If organizations use the conventional line room input, they need to buy a lot of resources, which maintain very low daily utilization, bringing a lot of waste of resources. In 4PL case, uploading logistics enterprise information system to cloud, the use of cloud flexibility to achieve the efficient use of resources, can effectively reduce the enterprise information system TCO (Total cost of ownership), improve the level of enterprise information services and quality.

## 4. Case Study

### 4.1. Overview of Cainiao Logistics

Since 2013, there is increasingly fierce competition in domestic e-commerce logistics. The establishment of Cainiao logistics means that the domestic e-commerce business has a systematic planning of logistics background, and accelerates the e-commerce business logistics industry reshuffle. May 28th, 2013, Alibaba Group, Yintai Group joint with Fosun, Forchn Holdings, China Post, S.F. Express, TTK Express, STO, ZTO, YTO, YUNDA, Home delivery and related financial organizations jointly announced, “China Intelligent Logistics Backbone Network” project was officially launched, the joint establishment of “Cainiao Network Technology Co., Ltd.” was formally established [14]. The Chinese smart logistics backbone network (CSN), represented by Cainiao, hopes to fully stimulate the enthusiasm of all parties through the integration of industry resources and provide.

“Rookie” seems like a small concept, aimed at through 5 to 8 years to improve a nationwide logistics infrastructure, and its open, social operation of “smart backbone network” aims to support the future average of 30 billion yuan every-day, 10 trillion yuan per year in network retail sales, and to ensure that within 24 hours of delivery to any region of the country. Not only will Cainiao save waiting hours, it also improve the precise of the match between express and network nodes. In the near future (three to five years), CSN’s physical structure will be built and made into a platform, which covers all manufacturers, e-commerce providers, 3PL providers.

Combined with a number of well-known express delivery business, Cainiao

aims to create intelligent logistics network without express business operation. Some people think that this model will subvert the traditional logistics model. So how does Cainiao operate?

#### 4.2. Logistics Warehousing Construction—Taobao Big Logistics

In Alibaba, logistics data integration, code-named “Skynet”, focused data analysis and tracking; Cainiao pay attention to physical storage coding “Ground network”. CSN continues to improve its logistics information system, the establishment of the entire supply chain management system, and promote business flow, information flow with the realization of big logistics development strategy. Infrastructure is mainly divided into two parts: 1) through the “self-built + co-operation” construct physical storage facilities in 250 cities at home and storage area more than 1 million square meters; 2) the use of Internet of things (IoT), cloud computing technology for these storage facilities to establish data application platform, sharing to all online cooperative enterprises.

Land, funds are essential for the construction of warehousing logistics. Alibaba Group, relying on its powerful background of e-commerce business, have obvious advantages negotiating with local governments about land using rights.

Taobao big logistics plan will consist online platform and offline logistics as well as distribution system of comprehensive docking, the front display effect combined with corresponding logistics management in the background, to promote internal and external business data and logistics warehousing distribution channels to get through, to provide overall logistics solutions. Big logistics project plans to improve the cross-store purchase payment experience, just pay once logistics costs, thereby reducing the total cost of logistics, and ultimately reduce unit logistics costs to help businesses save 20% to 30% cost.

#### 4.3. Disruptive Innovation—Big Data Intelligently Collaboration

Logistics processes highly rely on the available logistics resources and technologies [15]. Cloud computing enabled big data applications in modern logistics provide the opportunities for the global logistics processes across. Observing the recent changes in the express industry, Cainiao includes big data and intelligent logistics; while Jingdong solve the large logistics problems through the expansion of manpower. Additionally the technology level supports the development of future services for the 4PL approach which do not depend on the core competence of one actor so that administrative processes can be bundled and improved resulting in a win-win situation [16].

As of the end of 2016, 70% of China’s daily express parcels are running on the Cainiao logistics system, which process 7 trillion data messages, including: 180,000 express outlets information, data generated after global 200 warehouses through informatization, 40,000 Cainiao site information, including 1500 campus sites, 1.7 million courier and a total of 6.09 million logistics distribution routes [17]. Therefore, with the data available, Cainiao logistics use collaboration

to make everything become intelligent. The same-day delivery, next-day delivery and upgrading service of order do require a lot of accurate data support. The application of big data technology distinguished Cainiao from industry competitors. The most direct effect is the improvement of whole link efficiency and cost reduction.

#### 4.4. Commercial Ecology—Intelligent Logistics Real Estate Model

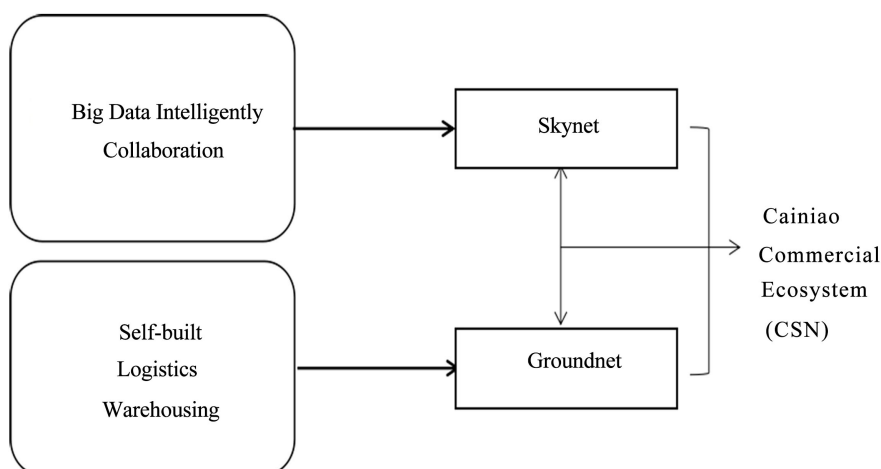
Different from Suning, Jingdong and other self-built logistics, “Skynet + Groundnet” indicates a clear standard for social division of labor. Alibaba’s e-commerce business ecosystem and financial ecosystem can derive more business models—the most realistic significance of the e-commerce supply chain financial model: to provide a package of financing solutions to solve the platform for sellers, buyers financing problems; secondly, relying on CSN (Figure 2), to carry out a new round of business incubator mode; thirdly, the open logistics platform and big data of supply chain operations provide support for 3PL providers and application software. Cainiao real estate business model that acts as an application software development base of 3PL, is worth learning.

#### 4.5. Analysis of Profit Model

The business model answers why partners will choose Cainiao and its operation advantages. To provide a meaningful framework for both scholars and managers, we propose a new profit model integrated with Cainiao characteristics for 4PL contexts. This framework generates 4 propositions that shaped the Cainiao model.

P1. Self-built logistics warehousing integrates goods storage and distribution.

Different from Jingdong Mall, Cainiao did not buy transport fleet or plan self-built distribution team. It focused on investment in warehousing business and rent them to Taobao sellers and other electricity companies for rental income.



**Figure 2.** The business model of cainiao logistics. Source: By author.

The domestic independent logistics cost is 4.5 to 5 yuan, while the cost of 3PL is 10, of which the customer experience is difficult to control. This is a huge hit for e-commerce providers, so many companies choose to build self-electric logistics warehousing.

Considering the standard specifications of a modern warehouse, the cost of self-built warehousing is about 2200 - 2500 yuan per square meter. Accordingly, if Cainiao in the first phase invest 80% out of 100 billion yuan funds into self-built storage, it can build about 32 million to 36 million square meters. It hopes to improve self-storage, leveraging the country's investment of tens of billions yuan in logistics infrastructure, to play a greater utility.

Construction of physical warehousing is one means, while the virtual storage is the core investment for realization of its national 24-hour delivery. Virtual warehousing means: e-commerce business application of intelligent means to manage their own warehousing, put the industry data, inventory information all into the CSN platform, with the final control by Cainiao.

P2. Reconstruct business relationship under "Skynet" to complete transformation and upgrading.

Cainiao business plan to reconstruct the relationship, including: 1) adjust the business relationship between Taobao/Tmall and the sellers, the key of which is sellers undertaking the package price; 2) through a clear logistics cooperation and postage price cost settlement, improve the cooperation between Cainiao and sellers; 3) determine the cooperative relationship among Cainiao, Alipay and logistics partners. These initiatives can make the profit model more clearer.

In addition, reengineer the business process of e-commerce ecosystem: firstly introduce partners into the existing e-commerce business ecosystem, so express delivery companies and related logistics enterprises are no longer separated from Ali supplier ecosystem, and become important parts instead; secondly the new system structure required for business process reengineering, establishing and improving the online payment and cash on delivery.

P3. Comprehensive utilization of resources with big data may reduce labor costs and facilitate the informationization and modernization.

Logistics has an increasingly important role in the organizational learning process, because of its exposure to important customer data and information that can severely impact the firm's activities and performance [18]. 4PL providers have to integrate the right resources, including all types of logistics data that may generated from network design, operational capacity planning, route planning and optimisation, risk evaluation and customer relationship management. Safe and stable cloud computing products and logistics components enable Cainiao offer professional logistics cloud services and professional logistics cloud services as well as large scale data centers all over the world.

By the end of 2015 Cainiao has staff of about 1000 people, but every day nearly 200 million people coordinated through the big data route by Cainiao, which can complete about 35 million packages delivery. Revenue surge in Jingdong is



mostly ascribed to self-logistics, but the sharp increase in the cost can also attributed to this. But for Cainiao, the introduction of new data exchange, the underlying development environment for big data applications, which contains some open data for specific part of industry may create data value through calculations.

P4. Electronic document promote no-cost docking, reducing operating costs.

Cainiao joint with 14 express enterprises launched an electronic document platform. There are also more than 100 independent software developers, with whom to provide programs together. This helped establish a unified industry standard format. Electronic document is an efficient, environmentally friendly information-based way. Official data shows that the use of electronic document can improve more than 30% the speed of delivery. The electronic document costs at 0.1 yuan/list, far lower than traditional paper list at 0.2 - 0.3 yuan. This will save about 1.2 billion yuan of paper consumption annually. Besides, the development of the whole set of “intelligent packaging algorithm” technology which is based on the characteristics of goods, quantity, volume, quality and packaging location for a comprehensive calculation, can quickly match the box analysis with how to package. At the same time, the cancellation of a single draw and handwritten pen significantly reduced operating costs, so the efficiency of freight can be improved more than doubled.

In order to promote the popularity of electronic document, Cainiao provides that if customers use the electronic document, they can hire the Cainiao warehouse without rent, one square meter warehouse rent can be offset by one package. Cainiao will support in the process of popularization and guide the price for balance without participating in the bargaining process. As a service terminal, it can earn 6 cents when receive a package and can earn 2 to 3 yuan when helping send a parcel. There are no additional charges to pay for the station. However, in order to guarantee the quality of service and interests of the users, a certain amount of service deposit shall be frozen.

Electronic document accelerate the overall structure of the Cainiao by attracting more express partners and integrating their extant resources. In addition, online orders, intelligent logistics choosing and Chengnuoda (means promising delivery on time) are the convenience for business services. routing-planning algorithms, address library, Cainiao logistics world are developed for logistics providers. So the whole industry and social related fields would benefit, not need to invest in basic data facilities. Although there is no clear profit targets in short-term, for future CSN will create greater profit margins through the unified rules.

## 5. Conclusions

Self-built warehousing, reconstruct business relationship, utilization of resources with big data and electronic document application, all of which Cainiao has done made what it looks today. Digital operation is a pedometer for Cainiao to

keep up with the tide of the times. Leading the collaboration to participate in the competition is a typical strategy to become the industry leader. It will not become a revolutionary, but will follow the wave of the times spawning a large number of Internet-based development of new traditional business. Projects in the future will establish a unified industry standard, and realize supply chain management visualization, platform for further coordination of interests.

The study has proposed a new framework and new agenda for researchers and practitioners. However, single case study may apply to specific contexts, such as the impact of a specific period, policy guidance, economic development cycle and so on. So the future research may explore more different contexts and should focus on generalized applications. It is also a preliminary and conceptual framework that needs further development and validation. The field also demands more qualitative and quantitative work to refine the model.

### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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