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Yuyan Li

School of Business of BSU, Minsk, Belarus

### CO-DISTRIBUTION MODEL FOR LOGISTICS COMPANIES AND ITS ACHIEVABILITY IN THE CONTEXT OF DIGITAL TRANSFORMATION

*Traditional distribution faces information silos, low efficiency, high cost and other problems. This article reveals the essence of the model of « Collaborative distribution under Digital Transformation», designed to solve these problems for the sustainable development of distribution logistics. A basic scheme of the functioning of distribution logistics participants in the model of co-distribution in the context of digital transformation has been developed. A digital transformation framework has been proposed. It reflects the connections and importance of key digital technologies for the transition from a traditional model to a co-distribution model based on digital platforms. Five main challenges and problems that prevent the creation of the co-distribution logistics system have been identified. Based on the results of world research and industry practice, as well as an analysis of the main challenges of sustainable development of distribution logistics, a strategy for solving them is proposed.*

*Conclusions and recommendations can become the basis for planning the development of distribution systems.*

**Keywords:** logistics, distribution logistics, collaborative distribution model, digital transformation, digital technologies

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Юйянь Ли

Институт бизнеса БГУ, Минск, Беларусь

### МОДЕЛЬ СОВМЕСТНОЙ ДИСТРИБУЦИИ ДЛЯ ЛОГИСТИЧЕСКИХ КОМПАНИЙ И ЕЕ ДОСТИЖИМОСТЬ В УСЛОВИЯХ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

*Традиционная дистрибуция сталкивается с информационной замкнутостью, низкой эффективностью, высокой стоимостью и другими проблемами. В данной статье раскрывается суть модели совместной дистрибуции в условиях цифровой трансформации, призванной решать указанные проблемы для устойчивого развития логистики дистрибуции. Разработана принципиальная схема функционирования участников распределительной логистики в модели совместной дистрибуции в условиях цифровой трансформации. Предложен фреймворк цифровой трансформации, который отражает связи и важность ключевых цифровых технологий для перехода от традиционной модели к модели совместной дистрибуции на основе цифровых платформ. Установлены пять основных вызовов и проблем, препятствующих созданию системы совместной распределительной логистики. На основе результатов мировых исследований и отраслевой практики, а также анализа основных вызовов устойчивого развития распределительной логистики предлагается стратегия их решения.*

*Выводы и рекомендации могут стать основой для планирования развития систем дистрибуции.*

**Ключевые слова:** логистика, распределительная логистика, совместная дистрибуция, цифровая трансформация, цифровые технологии

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## Introduction

Distribution logistics has always existed in the distribution of high costs, low quality of service, and low efficiency problems, seriously restricting the efficient operation of the logistics industry and the process of intensive production [1]. At the same time, in the whole logistics system, the distribution link is the most frequent contact with customers and the most direct impact on customer experience. Each logistics enterprise in the chain has invested a greater degree of attention, which is also reflected in the distribution of logistics costs, which account for 28 % ~ 40 % of the total cost of the supply chain. In view of the large optimizable potential of distribution logistics and its large impact on the logistics industry, its related issues have received extensive attention [2].

With regard to digitalization, it is a technology jointly derived from the market demand in the Internet era, and is not created, most of which is used to transform various information into computer-recognizable information and process, store, analyze, and transmit it [3]. It mainly includes artificial intelligence, big data, cloud computing, the internet of things, blockchain, and 5G technology [4].

Based on this, this paper combines the new requirements, new features, and new developments in the digital era, analyzes the feasibility of distribution logistics enterprises to realize cooperative distribution under digital transformation, investigates countermeasures for the cooperation of distribution logistics enterprises on the basis of the main challenges that may be faced by the new model, and looks forward to the future development prospects.

## Results and discussion

Throughout the existing literature and related cases, whether it is academic research, or industry practice, “digitalization” is not a new topic in the field of distribution logistics and logistics. In China at the Global Intelligent Logistics Summit (September 10, 2024) Alibaba Group announced plans for the development of distribution. CAINIAO Logistics in the next three years to land 1,000 digital and intelligent projects around the world. CAINIAO enterprises said that the delivery time is one of the core competitiveness of the future of logistics. An efficient delivery logistics fulfillment is expected to drive the industry to a large-scale outbreak [5].

In June 2024 Belarusian government considered the effectiveness of the implementation of the national program “Digital Development of Belarus” for the period 2021–2025 [6]. Beltamozhservice believes that today digitalization in the field of logistics is standing out as a way of speeding up the process of documenting, executing transactions, and delivering goods [7].

In Europe, enterprises attach importance to the development and application of information technology, in this field has always been in the global leading position, but also gave birth to a large number of globally renowned digital logistics platforms and digital supply chain management enterprises. For example, the CITYLOG project, with its BENTO distribution box system, small container system and freight buses, is the result of digital transformation.

Based on the results of our research, a *collaborative distribution model* so-called “Co-distribution Model” is offered. The composition of the model’s components is shown in Fig. 1.

“**The Co-distribution under digital transformation Model**” refers to the service and operation in which a certain market entity aggregates and summarizes the distribution services performed by multiple logistics enterprises to a fixed place for re-sorting and then distributing them within the same region. To realize collaborative distribution it is necessary to digitally transform existing distribution systems and integrate them on the basis of digital platforms. Based on the digital transformation perspective, the distribution logistics companies studied in this paper have a high degree of cooperative distribution model fit [8].

It should be noted that the development of a number of digital technologies creates a high potential for the transition to a new model and realize cooperative distribution under digital transformation. We have developed **Digital transformation framework** which reflects the connections and importance of key digital technologies, which will allow you to move from the traditional model to the Co-distribution Model (Fig. 2).

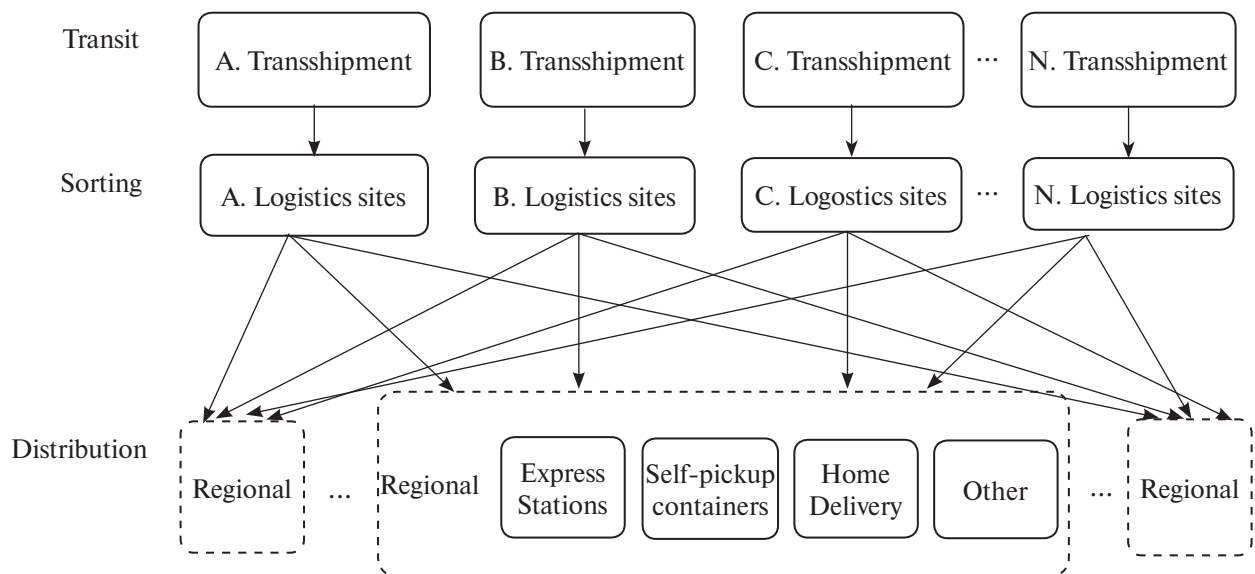


Fig. 1. Distribution logistics functioning scheme  
in Co-distribution Model under Digital Transformation

Source: author's developed.

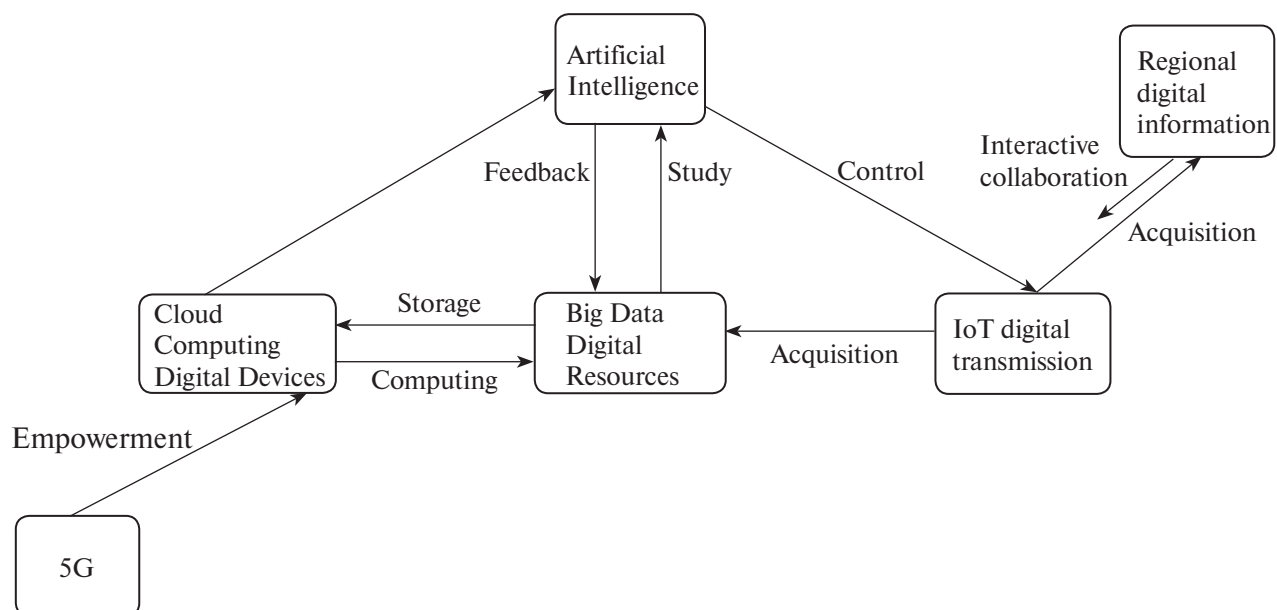


Fig. 2. Digital transformation framework

Source: author's developed.

However, “co-distribution under digital transformation” is facing a number of **challenges**. We consider the main ones.

– *Consensus problem*. At the conceptual level consensus has long been formed, and there are no obstacles in technology and policy, but consensus at the operational level is obviously lagging. And enterprises are confined by the traditional «red ocean» competition thinking. From concept to action results, there are still a lot of difficult hurdles to be overcome, especially the sharing of capital and resources, redistribution of benefits. An implementable roadmap should be developed. The update of a more comprehensive system of risk assessment indexes and other operational level consensus needs to be prioritized to reach, and formulate an implementable roadmap [2].

— *Resources and capital investment problem.* The front-end solicitation and back-end distribution are human resource-intensive links in the distribution logistics industry's own service chain and value chain as well. Also, the front-end solicitation stakes in revenue and growth. The pure management concerns and inputs, technology R&D investment in the application and promotion of innovation are focus on transit and transportation links as the most occupied resource and the costliest links. Of course, these links also create profits and value and are naturally the focus of corporate attention and management. As for the distribution last-mile is purely one of the cost centers [9]. The last-mile distribution of according to the contract can be fulfilled with rather high costs, but resources and capital investment are limited. The innovation nature of the "Co-distribution under digital transformation" model and the multi-enterprise synergy in the actual operation of the ground to aggregate and summarize the distribution services создают not only high costs for mastering technologies, but also for ensuring reliable communication. Concerns are also related to needs to invest a lot of money and resources when the prospect of revenue is not clear.

— *Standardization.* Under the guidance of the relevant national standards, individual logistics companies have no problem with the normality and standardization of their document systems that play a positive and important role in the enterprise's internal information transfer and data interaction. But a group of logistics companies that distribute goods through the common warehouse for automated re-sorting, due to their heterogeneity, will be converted into the conversion rules written into the automatic identification procedures. Due to their heterogeneity, if there is no prior communication between the companies and the conversion rules are written into the automatic identification program, it will become very difficult to read and compile the data information of shipping documents and then turn them into instructions for operation. Also, when the business volume reaches a certain order of magnitude, the automation of re-sorting will become an impossible task, or extremely costly, not cost-effective, and difficult to land.

— *A potential monopoly issues.* Within the same region, one potential reason why it is difficult to work according to the co-distribution model is that the market entity operating this project is likely to form a new market and data monopoly problems in this region. Through the aggregated and summarized data processing the re-sorting warehouse integrator actually masters the data and information of end customers and end channels of all relevant express delivery enterprises involved in co-distribution. The integrator objectively becomes a new comprehensive dominant party in the region of customer and channel information. It will trigger new concerns of various express delivery enterprises, since it is possible the fear of their own customer information is leaked, the end customer and the touch customer channel are segregated or blocked [10]. This is a new data use and possession paradox generated in the digital era. On the one hand, the full sharing of information is conducive to the development of automated re-sorting businesses in co-distribution warehouses and efficiency. On the other hand, it also makes the co-distribution operating body a comprehensive predominant party in the flow of information about the customers and channels through the platform of the relevant enterprises, and the risk of the leakage of customer information has increased.

— *A commercial sustainability issues.* According to the normal investment logic of a single project judgment, measurement period, when the co-distribution project investment-related financial indicators to meet at the same time:

- the project capital after-tax internal rate of return (IRR), investment tax rate, are higher than the industry benchmark (or the company's provisions of the project capital after-tax IRR);
- the payback period is shorter than the industry benchmark payback period, or the project's dynamic payback period is less than the project's operating period;
- after-tax net present value (NPV) of the project capital is greater than zero;
- and the project has a certain degree of risk-resistant ability, that is, when the benefits of reduced and increased investment (or operating costs) at the same time as the proportion of the magnitude of the negative change, the project capital after-tax IRR is still not less than the industry benchmark value.

At this point, the financial evaluation of the project investment is feasible, and the project is commercially sustainable.

Alibaba's existing commercial practice has proved that even without increasing environmental investment, the co-distribution in the intensive use of space, reduce transport capacity investment and other aspects of the effect is still relatively significant.

Through the above analysis, the challenges facing the development of the “co-distribution” project are mainly: consensus, standardization, monopoly, and its own commercial sustainability problems caused by the superimposed synthesis.

“The Co-distribution under digital transformation Model” refers also to the green distribution project. Sharing the site and vehicle operation in the co-distribution and “big”, large-scale, intensive cooperative warehousing in co-distribution project lets to reduce of carbon emissions and gets the effect of carbon reduction. This is obvious the green value or green wealth of the co-distribution project [11].

We can see that the “co-distribution” project has the nature of a third-party platform. To solve the operational level of consensus issues and potential market monopolies, its operating market players can be led by a third party, with the cooperation of express delivery enterprises jointly invested in the composition of the joint investment, co-investment, shared risk, co-creation of value, and shared benefits.

To solve the problem of information dominance caused by data precipitation, as well as the risk problem caused by the leakage of customer information of individual enterprises and the isolation/blocking of end customers and touch customer channels, reference can be made to the practice of internal legislation on the use of data, and the formation of the main body of the operation to regulate the scope of the use of data, the boundaries, as well as penalties for non-compliance.

In order to solve the problem of standardization of multi-enterprise shipping documents, it is recommended that the National Logistics Bureau or Logistics Association take the lead, and join hands with the industry’s head distribution and logistics enterprises to formulate a unified specification and standardized documents with reference to the national standard, draw reference from the European Union’s practice to promote the application within the industry, and implement standardization documents of the receiving goods, so as to clear up the first obstacle for the collaboration of multi-enterprises.

As for other consensus issues, if only the peer as the biggest rival, or essentially a catch-up red ocean thinking mode, in the long run, based on the growth of blue ocean thinking mode of the courier industry facing the real competitors are:

- the world’s economic development is facing a huge uncertainty;
- the impact of multiple factors superimposed on the global production and trade network of the reconstruction of the big;
- resource scarcity and imbalance;
- green development, low/reduced carbon development needs and urgency;
- digital technology on the reshaping of traditional industries and even subversion, etc.

These issues need to crack the constant innovation of express enterprises themselves and the cooperation and synergy between the express enterprises effectively and efficiently. The necessity and urgency of the development of green development, low/reduced carbon; digital technology on the remodeling of traditional industries and even subversion, etc.

These issues need to be cracked courier enterprises themselves continue to innovate and express the effective cooperation and synergies between the enterprises, the only way there will be a common bright future. Obviously, this requires the distribution logistics industry ecosystem of all stakeholders to change their thinking and take immediate action.

## Conclusions

This paper analyzes and introduces the model of the “co-distribution under digital transformation”. The results of global research and industry practice, and analyzes the five main challenges to its sustainable development. On the basis of this, the path selection and problems for the “co-distribution under digital transformation” development are studied, and the conclusions are as follows:

- whether it is inspired by international experience or the need for high-quality development of the distribution logistics industry itself, the “co-distribution” model with green, low-carbon, and cooperative synergy as the core is theoretically sustainable and commercially has great market value and social value.
- within the same terminal area, led by a third party, multiple logistics enterprises to participate in the establishment of the market entity for the operation is a feasible path to choose;
- the government’s policy guidance and precise support can make a difference.



Currently, only from the business operation level, multi-enterprise shipping documents heterogeneity is one of the biggest obstacles for multiple distribution enterprises to achieve efficient automated sorting. The standardization of the shipping documents system and the standardization of the three-segment code and logo need to be unified across the industry. Under the digital transformation, the model offered in this paper can also be front-loaded, and further realization of the synergy between the two warehouses, as well as the synergy between different regions of different operating entities, and these are expected to reshape the service chain of the courier industry chain as well as the industry's level of the development of the pattern, and the follow-up will be dedicated to continue to present the article.

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## Information about the author

**Li Yuyan** — PhD student; School of Business of BSU,  
e-mail: iamyyanplus@gmail.com

## Информация об авторе

**Ли Юйянь** — аспирант; Институт бизнеса БГУ,  
e-mail: iamyyanplus@gmail.com

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