



Exploring Stakeholder Dynamics and Sustainable Development in Hangzhou's E-Commerce Industry Empowered by AI

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Abstract

Background: Centered on Alibaba Group, Hangzhou's e-commerce has developed a distinctive model encompassing B2B, B2C, and C2C frameworks, while integrating advanced technologies such as cloud computing, big data, and artificial intelligence. However, the ecosystem's diverse stakeholders face complex interactions and frequent conflicts of interest, necessitating effective coordination mechanisms. **Objective:** This study aims to analyze the demands and interactions among stakeholders within Hangzhou's e-commerce ecosystem and leverage artificial intelligence (AI) to propose innovative mechanisms for resolving conflicts of interest. **Method:** A combination of literature review, case analysis, and stakeholder analysis was employed, along with the development of an AI-based interest coordination model to simulate and optimize stakeholder interactions. **Findings:** The findings reveal that the primary sources of conflict stem from unequal resource allocation and information asymmetry, while the AI model effectively mitigates conflicts, enhances collaboration efficiency, and promotes win-win outcomes. **Conclusion:** This research provides theoretical and practical insights for fostering a harmonious e-commerce ecosystem in Hangzhou and offers a valuable reference for sustainable e-commerce development in other regions.

Subject Areas

Electronic Commerce

Keywords

Hangzhou E-Commerce, Artificial Intelligence, Stakeholder Dynamics, Win-Win Strategy

1. Research Background

1.1. The Origin and Development of E-Commerce

In 1994, Netscape introduced the first commercialized browser, laying a solid foundation for the popularization of e-commerce [1]. In 1995, the establishment of Amazon marked the official onset of the e-commerce era. With the continuous advancement of internet technology, especially the rise of mobile devices and social media, e-commerce has witnessed rapid growth. By 2020, global e-commerce sales exceeded 4.2 trillion US dollars [2], and mobile e-commerce has gradually become the mainstream form of consumption.

The development of e-commerce in China has been rapid. Platforms such as Alibaba and JD.com occupy a significant position in the global market. The scale of China's e-commerce market ranks among the top in the world. The application of social media and big data technology has driven the trends of social e-commerce and personalized recommendation, significantly enhancing the shopping experience of consumers and the competitiveness of e-commerce. These innovations have brought revolutionary changes to the e-commerce field.

1.2. The Current Development Status of E-Commerce in Hangzhou

The e-commerce industry in Hangzhou is rooted in innovation-driven development, forming an ecosystem encompassing multiple links such as B2B, B2C, C2C, finance, and logistics, and shaping a "point-to-surface" business model. Through in-depth mining of consumer data to achieve precise marketing, it has driven the interaction and co-creation of the e-commerce model. For example, the intelligent recommendation system AIRec (Artificial Intelligence Recommendation) launched by Alibaba Cloud leverages Alibaba's technological strengths in big data and artificial intelligence. It combines extensive expertise in e-commerce, content distribution, news, video streaming, and social networking to provide customized recommendation services to global enterprises and developers [3]. Hangzhou also hosts a large number of small and medium-sized e-commerce enterprises and e-commerce MCN centers, constantly refreshing product categories, quality, and presentation forms, and continuously promoting market development.

Furthermore, Hangzhou's e-commerce has explored areas such as platform architecture, technical layout, innovative logistics systems, and payment methods, and has steadily expanded its global business, demonstrating its "daring to be the first" spirit. These measures have reshaped the shopping habits of global consumers, promoted the evolution of the global digital economy, and made Hangzhou's e-commerce an important component of the global e-commerce ecosystem. In recent years, the Southeast Asian e-commerce market has drawn significant inspiration from Hangzhou's model. For instance, Shopee, a local cross-border e-commerce platform backed by Tencent, has experienced rapid growth in the region, while the emerging short-video platform TikTok has quickly captured the Southeast Asian market. By adopting the "live-streaming e-commerce" model, these platforms have successfully opened markets and enhanced user engagement [4].

Domestically, cities like Tianjin have actively studied Hangzhou's e-commerce ecosystem, proposing strategies such as differentiated development, exploring markets along the Belt and Road Initiative, and fostering or introducing renowned cross-border e-commerce enterprises, injecting new momentum into the industry's sustainable development [5].

2. Research Significance

The Third Plenary Session of the 20th Central Committee of the Communist Party of China emphasized the need to innovate and develop digital trade [6], advocating for "Chinese wisdom" to contribute to global trade through innovation. Supported by big data and cloud computing, the fourth technological revolution, represented by artificial intelligence (AI) as its core technology, is driving society toward digital and intelligent transformation [7]. A key question lies in how to leverage AI to enable the digital and intelligent transformation of traditional e-commerce industries. This includes integrating AI into digital processes (e.g., personalized recommendations and intelligent customer service), advancing data-driven decision-making systems (e.g., merchant selection algorithms and dynamic pricing), and promoting industry-wide transformations through the collaboration of big data, AI, and IoT. These approaches aim to construct a new e-commerce ecosystem that unleashes new momentum for the digitalization of industries.

In recent years, leveraging various opportunities, Hangzhou's e-commerce sector has achieved remarkable progress in applying AI. Against this backdrop, this study focuses on analyzing the intricate relationships among the multiple roles within Hangzhou's e-commerce ecosystem. It employs AI technology to upgrade and balance these complex and interdependent dynamics. Furthermore, it addresses the challenges of inefficiencies and trust crises caused by conflicts of interest within the e-commerce ecosystem. By optimizing resource allocation and enhancing the efficiency of interactions using AI, this study seeks pathways to achieving a balanced resolution of stakeholder interests.

3. AI Empowers Hangzhou E-Commerce Interests Game

3.1. Stakeholder Theory

Stakeholder Theory was first proposed by R. Edward Freeman in 1984. The theory maintains that in the process of pursuing economic benefits, an enterprise must simultaneously take into account all interest groups that affect or are affected by the enterprise operation [7].

In the e-commerce industry, various stakeholders form a closely connected and complex game network, and each link involves interaction and cooperation with specific stakeholders. In order to achieve the sustainable development of the industry, e-commerce merchants must balance and manage the expectations and needs of different stakeholders while focusing on their own interests. Only when the interests of all parties are balanced based on the principle of interdependence and reciprocity, and a solid cooperative relationship is established, can the long-

term and stable development of the e-commerce industry be ensured [8].

3.2. Analysis of Role Interest Demands

In the e-commerce industry in Hangzhou, according to the stakeholder theory, the participants can be divided into two categories: primary and secondary. Key stakeholders include customers, e-commerce platforms, and merchants, who are directly involved in transactions and perform core functions. Secondary stakeholders include promoters, governments, logistics and payment platforms, which play a supporting role in the transaction. The interest demands of each role are shown in **Table 1**.

Table 1. Demands of stakeholders and roles of Hangzhou e-commerce.

Stakeholder role	Interest appeal
Customer	Reasonable price, reliable quality, timely delivery and after-sales quality, convenient shopping, trusted platform, privacy protection
E-commerce platforms	Expand market share, increase user activity and transaction volume, improve platform profitability, precision marketing, and optimize user experience
Merchant	Reach more potential customers through the e-commerce platform, achieve rapid product sales, improve exposure, improve operational efficiency and customer satisfaction, quality customers
Spreader	Effectiveness and revenue of promotional activities, high conversion rate and high return
Government	Promote economic growth, protect the rights and interests of consumers, maintain market fairness, ensure the healthy development of the e-commerce industry, the increase of taxation and the development of the digital economy, and hope to promote the transformation and upgrading of the local economy through e-commerce
Material flow	Improve distribution efficiency, reduce costs, expand market coverage, and optimize logistics network
Payment platform	Ensure the safety of user funds, ensure smooth transactions, higher fee income, expand market share, enhance user activity and trading volume, trust and competitiveness of the platform, and develop new profitable projects through innovative means

3.3. Role Game Relationship Analysis

This study focuses on the core relationship network composed of customers, e-commerce platforms and merchants, and regards promoters, governments, logistics and payment platforms as peripheral relationship networks. The research focuses on the game interaction within the core network and the game impact of the peripheral network on the core network. Although there is also a game behavior of checks and balances among peripheral actors, this study does not carry out an in-depth analysis in view of its relatively limited research value. The game topology of Hangzhou e-commerce stakeholders is shown in **Figure 1**. In the diagram,

the beginning of the arrow represents the requesting side, and the end of the arrow represents the responding side.

The game relationship between them is shown in **Table 2**.

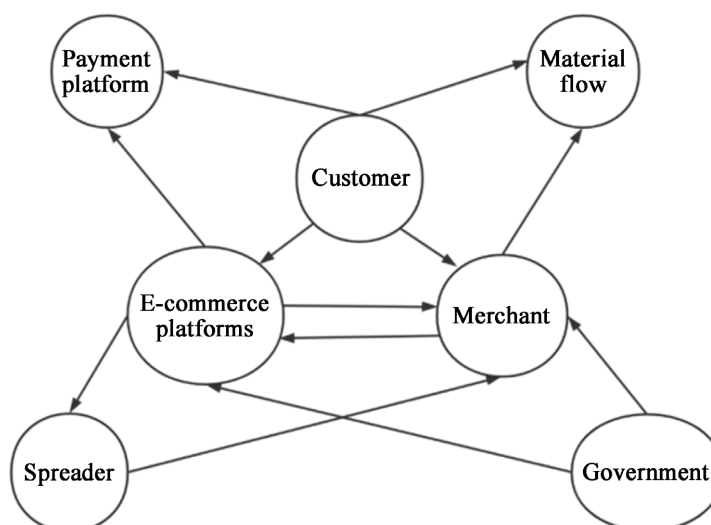


Figure 1. Game topology of Hangzhou e-commerce stakeholders.

Table 2. Game relationship of relevant stakeholders of Hangzhou e-commerce.

Game object	Game relation
Customers vs. E-commerce platforms	Price and quality of service
Customer vs merchant	Pricing and promotion strategies for goods
E-commerce platform vs merchant	Promotion costs and e-commerce platform revenue ratio
E-commerce platform vs promoter	Promotion cost and promotion effect
E-commerce platform vs government	Regulatory policy burden and market order
E-commerce platform vs logistics	Logistics costs and logistics service quality
E-commerce platform vs payment platform	Payment commission ratio and payment service quality

Through in-depth analysis, the essence of game contradictions revealed in **Table 2** is as follows:

1) The deep contradiction between price transparency and platform revenue

The game between e-commerce platform and customers involves price, service quality and market information asymmetry. Using big data and personalized recommendations, platforms can increase purchase intent and influence hidden price movements. For example, the algorithm recommends adjustable commodity prices, and the customer may not know whether to get the best price after choosing the “hidden price”. Information asymmetry and platform control of information flow to increase profits have intensified the lack of “right to know” when customers make choices. While the platform increases revenue, it faces customer

distrust, which may affect user stickiness and market competitiveness.

2) Conflict between price sensitivity and profit maximization

Customers pursue low prices, discounts and other benefits, but their price sensitivity is not only reflected in the product itself, but also affected by merchant brand loyalty, shopping experience, service quality and other factors. Merchants do not simply rely on price competition when pricing, and many merchants use price discrimination strategies to attract different consumer groups through member prices, group buying, limited time discounts, etc., to solve the price conflict to a certain extent. However, over-reliance on low-price strategies may lead to damage to brand value.

3) Conflict between platform fees and merchant cost control

E-commerce platforms affect merchant operations through traffic and cost control, and the core lies in market network effects. Platform rules and fee structures affect merchant profits and market competition. Merchants not only have to deal with expenses, but also the challenge of acquiring traffic. Platforms optimize search, recommendation, and promotion strategies, affecting sales, and merchants need to adapt rules and adjust advertising and pricing strategies, making it difficult to fully control costs and profits. In order to get more traffic, merchants have to bear high advertising and commission costs, increasing the pressure on business, resulting in price monopoly and less market diversity.

4) The contradiction between e-commerce advertising investment return and platform profit

E-commerce platforms rely on advertising revenue to make money, and promoters expect to earn money through advertising investment. This kind of game reveals the fundamental contradiction between the scarcity of advertising resources and the efficiency. Traffic concentration leads to limited advertising space resources, and precise advertising increases the investment risk of promoters. Promoters face the uncertainty between the expected advertising effect and the actual advertising effect may suffer poor advertising effect. In order to increase revenue, the platform optimizes the advertising strategy, and the promoter needs to adjust the investment, select the right AD format, and analyze user feedback to increase the return rate. The core contradiction of the game is whether the increase in advertising revenue can achieve a win-win situation for the platform and the promoter, or lead to “advertising waste” due to unclear returns.

5) Conflict between platform regulation and market freedom

E-commerce platforms seek to avoid excessive government intervention in order to maintain operational flexibility and market innovation. The government aims to ensure market fairness, consumer protection, antitrust and data privacy through regulation. With the globalization of platforms and the development of cross-border e-commerce, government regulation of e-commerce is not only related to domestic policies, but also involves international cooperation and competition. Platforms may tweak their rules to circumvent regulation, particularly with regard to data flows and price transparency, creating “grey areas”. The core

issue is how the scale and globalization of e-commerce platforms adapt to the regulatory framework of various countries and avoid legal gaps, which is not only related to market competition, but also involves social responsibility, legal responsibility and international game.

6) The deep conflict between logistics cost control and service quality

E-commerce platforms reduce logistics costs, but need to ensure that the service does not compromise the consumer experience. Through cooperation with multiple logistics companies to reduce costs, but may cause service differences, affect the overall experience, especially in cross-border e-commerce, logistics timeliness and service quality differences are more significant. The profit goal of logistics companies conflicts with the pursuit of low-cost platforms. In order to increase market share, logistics companies need to provide high-quality services, which often involves higher operating costs. In the game, e-commerce platforms must balance costs and customer experience, and logistics companies need to optimize operations and innovate technology to reduce costs while providing high-quality services.

7) The deep conflict between the distribution of payment fees and platform profits

Payment platforms make money from fees, while e-commerce platforms seek to lower fees to boost profits. The core of the game is the balance between income distribution, technological innovation and user experience. The diversification of payment methods and technological innovation have prompted payment platforms to provide more efficient and secure services to attract e-commerce platforms and consumers, while e-commerce platforms seek to reduce payment costs to optimize profits. The globalization of payment technology and ecology has made cross-border payment and data security cooperation the key to the future game between e-commerce and payment platforms.

4. Game Balance Based on AI

In order to achieve value co-creation in the stakeholder game of the e-commerce platform and achieve a win-win situation, it is not only to solve a single contradiction, but to enhance the utility of each stakeholder through systematic optimization, and realize the integration, open interaction and symbiosis between the stakeholders of e-commerce. The details can be expanded from the following aspects.

4.1. AI helps Maintain Price and Platform Balance

Personalized pricing and transparent management strategies Use AI to deeply analyze customer behavior and purchase history, predict price sensitivity, and provide customized pricing to ensure customer satisfaction at the same time, enabling the platform to optimize revenue and maximize profits through accurate price positioning. In addition, AI is also used to improve the transparency of platform fees and commodity pricing, so that consumers clearly understand the composition of the final price of goods, enhance trust in the platform, and thus enhance purchase

willingness and market competitiveness.

4.2. AI Helps Solve the Conflict between Price Sensitivity and Profit Maximization

Merchants use AI to segment customers, provide personalized offers and pricing models, and precise pricing and promotion strategies based on data analysis to meet customer price needs and maintain profits. At the same time, AI analyzes historical sales data, seasonal changes, and market demand to make accurate sales forecasts, optimize pricing and inventory decisions, and aim to maximize profits and reduce customer dissatisfaction with prices.

4.3. AI helps Balance Platform Expenses and Merchant Cost Control

AI enables precise forecasting of product sales potential and customer demand, intelligently allocating traffic to optimize advertising strategies, thereby reducing customer acquisition costs for merchants while ensuring platform revenue and lowering marketing expenses. For example, Perpetua, a company offering AI-driven advertising optimization services, has helped cross-border sellers improve advertising performance.

In one case, a cross-border seller utilized Perpetua's intra-day time optimization feature to analyze account and ad performance across different time periods, accurately identifying peak sales times. The seller then adjusted their advertising strategy by increasing budget allocation during peak periods and reducing spending during non-peak hours, while minimizing manual intervention. Following this optimization process, the seller achieved remarkable results: their average Advertising Cost of Sales (ACoS) decreased from 23% to 21%, and attributed ad sales increased by 80%. Additionally, the platform leveraged AI to optimize fee structures, providing transparency in commissions and advertising cost forecasts. This allowed merchants to predict and adjust their budget effectively, identifying and eliminating redundant costs within the fee structure, thereby reducing unnecessary expenditures.

4.4. AI Helps Balance Advertising Return and Platform Profitability

AI optimizes advertising strategies through data analysis, realizes accurate advertising delivery and effect evaluation, accurately identifies potential customers to increase conversion rates, and ensures that e-commerce platforms charge reasonable fees while maintaining customer trust. At the same time, the e-commerce platform uses AI to intelligently price advertising costs, optimize delivery strategies in real time, improve advertising returns, and ensure that promoters obtain actual benefits.

4.5. AI Helps Resolve the Conflict between Platform Regulation and Market Freedom

AI enables governments to implement smart regulatory and compliance tools for

e-commerce platforms, monitoring transactions, advertising, and product quality in real time to ensure compliance, while platforms can use the technology to self-check compliance, prevent legal risks, and reduce regulatory impact on innovation. In addition, while meeting regulatory requirements, AI optimizes data protection measures, uses intelligent algorithms to ensure user privacy and data security, and effectively reduces compliance costs. For example, sensitive information can be encrypted using blockchain technology, and multi-layer identity authentication systems can be implemented to enhance data security and transparency. Meanwhile, it is essential to ensure that the entire process complies with the relevant provisions of the *Data Security Law* and the *Personal Information Protection Law*. [9]

4.6. AI Helps Balance Logistics Costs and Service Quality

AI technology leverages big data analysis to optimize logistics routes and delivery methods, enabling precise cost control while ensuring timeliness and service quality. It also helps e-commerce platforms predict logistics demands, optimize inventory management, and refine delivery scheduling, effectively reducing operational costs, inventory backlogs, and air freight expenses.

In practical applications of logistics optimization, UPS (United Parcel Service) developed the ORION system (On-Road Integrated Optimization and Navigation) powered by artificial intelligence (AI). This system employs advanced algorithms, including genetic algorithms and simulated annealing, to intelligently optimize delivery routes. ORION considers multiple variables, such as traffic congestion, real-time traffic conditions, customer-specified delivery time windows, and package priorities, to determine the most efficient delivery paths.

The ORION system has significantly reduced delivery costs while maintaining service quality. According to UPS, the system saves the company over 50 million miles of driving annually, substantially lowering fuel consumption and operational costs. Additionally, by optimizing route planning, the system has shortened average delivery times for drivers, improving overall delivery efficiency [10].

4.7. AI Helps Balance Payment Fees and Platform Profits

AI technology helps the payment platform optimize the payment process in real time, reduce fees, improve payment experience and security, and at the same time, the payment and e-commerce platforms share data through AI and intelligent analysis to optimize the fee structure, reduce costs, ensure payment security, and further reduce operating costs.

5. AI Empowers Hangzhou E-Commerce Stakeholders to Build a Win-Win Mechanism

In traditional e-commerce models, the lack of standardized data flow and low transparency across different processes often leads to the formation of information

silos. In contrast, AI-powered mechanisms promote information sharing and flow through integrated platforms. Whether through decision-making support based on big data analysis or real-time updates and information acquisition, these mechanisms significantly enhance the accuracy of information matching and decision-making.

To drive sustainable development and innovation in the e-commerce industry, this study proposes a series of AI-based strategic initiatives aimed at fostering collaboration among stakeholders, enhancing platform efficiency, and advancing the industry.

Firstly, building information-sharing and collaborative innovation platforms is essential. Through data sharing between e-commerce platforms and merchants, AI can be used to predict market trends, optimize pricing, and improve marketing strategies. This initiative not only boosts customer satisfaction but also enhances platform operational efficiency, fostering healthy market development.

Secondly, the establishment of an AI-driven intelligent traffic allocation system is advocated. E-commerce platforms and merchants can jointly develop such systems to optimize advertising expenditure and traffic distribution, improving promotional efficiency. Data sharing and collaboration deepen long-term partnerships between platforms and merchants, achieving mutual benefits.

In addition, promoting the construction of an intelligent advertising effect-sharing platform is a key focus. By sharing advertising data and using AI to optimize ad placements, platforms and advertisers can maximize returns on advertising investment and increase conversion rates, creating a win-win-win scenario for platforms, advertisers, and customers.

Regarding regulation, a smart regulatory system is proposed. This involves government collaboration with e-commerce platforms to establish AI-powered regulatory frameworks, assisting governments in compliance checks and preventing over-regulation. This ensures market order while fostering platform innovation and sustainable development.

In the logistics sector, the creation of an AI-driven intelligent logistics collaboration platform is a core strategy. Collaboration between e-commerce platforms and logistics companies enables route optimization using AI technology, reducing costs and improving efficiency. Logistics companies can provide personalized services, while platforms leverage efficient logistics systems to enhance market competitiveness, driving mutual growth.

Finally, payment system optimization is critical. Encouraging cooperation between payment and e-commerce platforms to develop AI-powered payment systems can streamline payment processes and fee structures through data sharing. This reduces costs, ensures payment security, improves efficiency, and enables mutual benefit for all parties.

The implementation of these strategies will promote collaboration and innovation across multiple levels in e-commerce platforms, enhancing overall operational efficiency and fostering the industry's health and sustainable growth.

6. Conclusions and Prospect

This study deeply analyzes the status quo of Hangzhou's e-commerce industry, the strategic interaction of stakeholders and the application of AI technology, and discusses the uniqueness and future trends of its e-commerce ecosystem. As an important center for the development of e-commerce in China, Hangzhou has established a world-leading e-commerce environment by virtue of its complete industrial chain, technological innovation and cultural heritage. The ultimate goal of the e-commerce industry is not to be a dominant company, but to use emerging technologies such as AI to achieve innovation, and achieve the goal of "making the cake bigger". A monopolized market often leads to the risks of oligopoly, limiting innovation capacity and market diversity. However, leveraging AI to balance the interests of various stakeholders can create a mutually beneficial ecosystem, enhancing the resilience and sustainability of the industry.

In the future, with the continuous progress of AI, big data, 5G communication and other technologies, Hangzhou's e-commerce industry is expected to continue to maintain its leading position. Through the effective use of AI and other cutting-edge technologies, drive the efficiency of platform and merchant operations. At the same time, Hangzhou's e-commerce industry achieves value co-creation by balancing the relationship between various stakeholders; actively integrating into the national development strategy, taking the initiative to assume social responsibilities, and responding to the call of national policies; expanding the boundaries of the e-commerce industry, enhancing international influence, and maintaining a leading position in the digital intelligence industry.

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Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Jia, W. (2001) EDI and E-Commerce. *Journal of Shanxi University of Finance*, **23**, 104-105.
- [2] Wang, Y.G., Yang, J.R., Zang, X.H., *et al.* (2019) Improving People's Quality of Life and Ensuring and Improving People's Livelihood in Development. *Consumer Economy*, **40**, 3-20.
- [3] Alibaba Cloud (2025) AI-Based Recommendation System: Personalized Recommendation Solutions. <https://www.aliyun.com/product/bigdata/airec?v=47edc66742fe36fc0a839ea5700b8cd5>
- [4] Zhang, X.Y., Liu, M.W. and Liu, M. (2023) Development Status and Strategies of Cross-Border E-Commerce Livestreaming in Southeast Asian Markets: A Comparative

- Analysis of TikTok and Shopee. *Times Business and Trade*, **20**, 94-96.
- [5] Wang, Y.J. and Li, M.L. (2021) Issues and Strategies for Cross-Border E-Commerce Development in Tianjin. *Industrial Innovation Research*, No. 21, 10-14+49.
- [6] Xie, W.F. (2024) The Chinese Path to Building an Intelligent Civilization. *Quest*, No. 5, 72-81.
- [7] Tang, D.P., Yang, Z.Z., Li, Y., *et al.* (2025) Supply-Side Structural Reform of Accounting Education Resources Under Digital and Intelligent Transformation: A Summary of the 2021 Annual Meeting of the Chinese Accounting Society's Accounting Education Committee and the 14th Forum of Accounting School Deans (Department Heads). *Accounting Research*.
- [8] Cheng, G.P. (2015) Research on Stakeholder Theory Based on Supply Network Model. Master's Thesis, Shandong University.
- [9] Li, X. (2024) Collaborative Evolution of Corporate Social Responsibility Fulfillment and Shared Value Creation. Master's Thesis, Inner Mongolia University of Finance and Economics.
- [10] UPS (2025) Application of the ORION System in Route Optimization.