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Intelligent Cold Chain Automation Project of CIMC TianDa Logistics: Technological Innovation, Practice, and Industry Transformation

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Abstract

This study focuses on the Intelligent Cold Chain Automation Project of CIMC TianDa Logistics, analyzing its performance in technological innovation, system application, and industry impact. By constructing an intelligent cold chain storage and transportation system, the project effectively addresses many bottlenecks in traditional cold chain logistics, significantly improving the efficiency and quality of cold chain operations. This paper explores the profound impact of the project on the cold chain logistics industry from multiple dimensions, including technology, management, and policy, aiming to provide practical experience and theoretical support for the intelligent transformation of the industry. The results show that CIMC TianDa Logistics' Intelligent Cold Chain Automation Project not only promotes technological progress but also offers important references for management innovation and policy improvement in the industry.

Keywords: intelligent cold chain logistics, automation technology, technological innovation, CIMC TianDa logistics, industry impact, cold chain storage, transportation optimization, supply chain management, internet of things, big data, temperature control technology, robotic technology, path optimization, information management system, traceability system, technology diffusion

1. Introduction

1.1 Research Background

Cold chain logistics is a crucial link in ensuring the quality and safety of temperature-sensitive goods such as fresh food and pharmaceutical products throughout the processes of production, transportation, storage, and sales. With the rapid development of global fresh e-commerce and the continuous growth of pharmaceutical cold chain demand, the importance of cold chain logistics is increasingly highlighted. However, traditional cold chain logistics models face many challenges, such as unstable temperature control leading to cargo spoilage, low transportation efficiency, lagging information management, and high operating costs. These issues not only limit corporate profitability but also affect the sustainable development of the industry.

In recent years, with the rapid development of emerging technologies such as the Internet of Things (IoT), big data, and automation, the cold chain logistics industry has ushered in an opportunity for intelligent transformation. CIMC TianDa Logistics, as a leading enterprise in the industry, has launched an intelligent cold chain automation project to improve the efficiency and quality control level of cold chain operations through technological innovation. This study takes the Intelligent Cold Chain Automation Project of CIMC TianDa Logistics as a case to analyze its implementation background, technological innovation points, and operational effects, aiming to explore how the project addresses the pain points of traditional cold chain logistics and assess its role in promoting industry development.

1.2 Research Objectives and Significance

The main objective of this study is to analyze the implementation background, technological innovations, and

operational effects of the Intelligent Cold Chain Automation Project of CIMC TianDa Logistics. It aims to explore how the project addresses the pain points of traditional cold chain logistics and assess its role in promoting industry development. Specifically, the study aims to analyze the application of intelligent cold chain automation technology in storage, transportation, and information management, revealing its mechanisms for improving cold chain operational efficiency and quality control. It also explores the implications of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project for technological progress, management innovation, and policy support in the industry. By providing practical experience and theoretical support for the intelligent transformation of the cold chain logistics industry, this study aims to promote sustainable industry development. The significance of this study lies in enriching the research on intelligent transformation in the cold chain logistics field, providing empirical case support for relevant theories; offering references for technological innovation and management optimization for cold chain logistics enterprises to enhance industry competitiveness; and providing a basis for government policy-making to promote the standardization and intelligent development of the cold chain logistics industry. (Oluremi, M., & Olimehin, D., 2024)

1.3 Research Methods

This study employs a combination of literature review, case analysis, field research, and data analysis. The literature review is used to review the development status and intelligent transformation trends of the cold chain logistics industry; the Intelligent Cold Chain Automation Project of CIMC TianDa Logistics is taken as a case to deeply analyze its technological innovation and implementation process; field research and data analysis are used to evaluate the project's operational effects and industry impact.

2. Current Status and Challenges of Cold Chain Logistics Industry

2.1 Definition and Importance of Cold Chain Logistics

Cold chain logistics is a logistics system that ensures the quality and safety of temperature-sensitive goods such as fresh food and pharmaceutical products through low-temperature control and cold chain technology throughout the processes of production, processing, transportation, storage, and sales. Its core is full-process temperature control to avoid cargo spoilage or failure due to temperature fluctuations. With the growth of fresh e-commerce and pharmaceutical cold chain demand, the importance of cold chain logistics in ensuring food safety, drug safety, and reducing losses is increasingly highlighted, but its complexity and high cost make it a key link in the logistics field.

2.2 Pain Points of Traditional Cold Chain Logistics

Traditional cold chain logistics models face many challenges in actual operations, which seriously restrict the sustainable development of the industry. The main pain points include:

- **Unstable Temperature Control and Cargo Losses**: Unstable temperature control systems are the main cause of cargo losses, with frequent cold chain breaks, especially in transportation and storage links. Temperature fluctuations can cause fresh food to spoil and pharmaceuticals to fail, resulting in huge economic losses. The cargo loss rate of cold chain logistics in China is as high as 10% to 20%, far higher than that of developed countries. (Qi, Q., Jiang, Y., & Wang, D., 2020)
- **Low Transportation Efficiency**: There are many problems in the transportation link, such as aging temperature control equipment, unreasonable transportation route planning, and long loading and unloading times, which lead to low transportation efficiency. The real-time monitoring ability of cold chain transportation is insufficient, and problems cannot be detected and resolved in time, affecting the timeliness and quality of goods.
- **Lagging Information Management**: The information management system is backward, lacking real-time monitoring and traceability capabilities. The status of goods, storage information, and temperature data cannot be shared in time, resulting in low supply chain collaboration efficiency, increased operating costs, and reduced customer satisfaction.
- **High Costs**: Cold chain logistics costs are high, mainly reflected in equipment investment, energy consumption, and labor costs. Under the traditional cold chain model, problems such as aging equipment, high energy consumption, and low labor efficiency further increase operating costs, limiting corporate profitability and industry scale development.

2.3 Necessity of Intelligent Transformation

With the increasing market demand for the efficiency and reliability of cold chain logistics, intelligent transformation has become an inevitable trend in industry development, mainly reflected in the following three aspects:

- **Market Demand Driven**: Consumers' requirements for the quality of fresh food and pharmaceutical

products are increasing, and the market is demanding higher efficiency and reliability from cold chain logistics. Intelligent cold chain systems can ensure cargo quality through precise temperature control and real-time monitoring, meeting market demands.

- **Technological Development Opportunities**: The rapid development of emerging technologies such as the Internet of Things, big data, and automation provides technical support for the intelligent transformation of cold chain logistics. Enterprises can achieve equipment interconnection, data sharing, and intelligent management by introducing these technologies, improving operational efficiency and quality control levels.
- **Policy Support Background**: In recent years, the state has introduced a series of policies to support the development of the cold chain logistics industry, emphasizing intelligent, green, and standardized transformation. These policies provide a favorable policy environment for corporate technological innovation and management optimization, promoting the intelligent transformation process of the industry.

3. Overview of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project

3.1 Project Background and Objectives

3.1.1 Company Profile

CIMC TianDa Logistics is a leading provider of cold chain logistics solutions, specializing in providing efficient cold chain services for temperature-sensitive goods such as fresh food and pharmaceutical products. The company owns several modern cold chain storage centers and transportation fleets across the country and is committed to improving service quality and efficiency through technological innovation. In recent years, with the rapid development of the cold chain logistics industry, CIMC TianDa Logistics has actively laid out intelligent cold chain fields to meet the market's demand for efficient and reliable cold chain services.

3.1.2 Project Background

With the continuous growth of fresh e-commerce and pharmaceutical cold chain demand, the cold chain logistics industry faces great development opportunities. However, traditional cold chain models have many pain points, such as unstable temperature control, low transportation efficiency, and lagging information management, which seriously restrict the sustainable development of the industry. To solve these problems, CIMC TianDa Logistics launched the Intelligent Cold Chain Automation Project, aiming to improve cold chain operational efficiency and quality control levels by introducing advanced automation and intelligent management systems to meet the market's demand for efficient and reliable cold chain services. (Oluremi, M., & Olimehin, D., 2024)

3.1.3 Project Objectives and Expected Outcomes

The objective of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project is to create an efficient, intelligent, and reliable cold chain storage and transportation system. The project aims to address the pain points of traditional cold chain logistics through technological innovation and enhance the company's core competitiveness. Specific objectives include improving operational efficiency, reducing manual operations, ensuring cargo quality, reducing losses, optimizing supply chain collaboration, and enhancing customer satisfaction. The expected outcomes include significantly improved storage and transportation efficiency, reduced loss rates, enhanced market competitiveness, and providing replicable experience and models for the intelligent transformation of the industry.

3.2 Project Implementation Scope and Technical Architecture

3.2.1 Project Coverage and Business Scope

CIMC TianDa Logistics' Intelligent Cold Chain Automation Project covers the company's main cold chain storage centers and transportation routes across the country, involving core business areas such as fresh food and pharmaceutical products. The project first pilots in core storage centers, where intelligent storage systems achieve automated storage, sorting, and inbound and outbound management of goods. Subsequently, the project expands to the cold chain transportation link, where intelligent transportation management systems optimize transportation route planning and enable real-time monitoring and scheduling of the transportation process. In addition, the project uses the information management system to achieve data sharing and business collaboration among upstream and downstream enterprises in the supply chain, improving the overall supply chain's operational efficiency.

3.2.2 Technical Architecture and System Design

The technical architecture of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project adopts advanced Internet of Things, big data, automation, and artificial intelligence technologies to build an integrated cold chain management system. The core systems include:

- **Intelligent Storage System**: This system uses automated Stereoscopic Warehouse and robotic sorting equipment to achieve efficient storage and precise temperature control management.
- **Intelligent Transportation System**: This system uses intelligent transportation vehicles and path optimization algorithms to improve transportation efficiency and cargo safety.
- **Information Management System**: Based on the Internet of Things platform, this system enables equipment interconnection and data sharing. It uses big data analysis and cloud computing technologies to optimize supply chain management and establish a complete traceability system.

Through system integration and collaboration, seamless connection of storage, transportation, and information management systems is achieved, improving the overall operational efficiency and management level of the cold chain system.

4. Technological Innovation and Application

4.1 Intelligent Storage System

4.1.1 Design of Automated Stereoscopic Warehouse

CIMC TianDa Logistics' Intelligent Cold Chain Automation Project has introduced an advanced automated Stereoscopic Warehouse design in the storage link, which is one of the key technologies to improve cold chain storage efficiency and space utilization. The center covers an area of about 5,000 square meters, and through the design of the automated Stereoscopic Warehouse, the actual storage capacity has reached more than twice that of traditional warehouses. In actual operations, the goods turnover rate of the warehouse has increased by 70%, and the goods loss rate has decreased by 30%. (Qi, Q., Jiang, Y., & Wang, D., 2020)

According to industry research data, the space utilization rate of traditional flat warehouses is only about 40%, while that of automated Stereoscopic Warehouse can reach more than 80%. The automated Stereoscopic Warehouse of CIMC TianDa Logistics uses advanced racking structures and stacker crane technologies to achieve rapid goods storage and retrieval. The average storage and retrieval time is shortened to less than 30 seconds, which is more than 60% higher than that of traditional warehouses.

Table 1. Efficiency Comparison between Automated Stereoscopic Warehouse and Traditional Warehouses

Item	**Traditional Flat Warehouse**	**Automated Stereoscopic Warehouse**
Space Utilization Rate (%)	40	80
Average Storage and Retrieval Time (seconds)	75	30
Operation Error Rate (%)	2.5	0.5
Labor Demand	High	Low

4.1.2 Intelligent Temperature and Humidity Monitoring System

Technical Details: This system installs high-precision sensors in the warehouse to collect temperature and humidity data in real-time and transmits the data to the central control system through the Internet of Things. The system can automatically adjust the temperature and humidity environment in the warehouse to ensure that goods are stored under suitable conditions.

To ensure the quality and safety of cold chain goods, CIMC TianDa Logistics has deployed an intelligent temperature and humidity monitoring system in its Guangzhou cold chain storage center. The system uses 500 high-precision sensors installed in the warehouse to monitor temperature and humidity changes in real-time. In actual operations, the system has extended the shelf life of goods by 30% and reduced the goods loss rate to below 1%, significantly improving the quality and safety of goods.

Research shows that storing cold chain goods under suitable temperature and humidity conditions can extend their shelf life by more than 30%. The intelligent temperature and humidity monitoring system of CIMC TianDa Logistics can control the temperature fluctuation in the warehouse within ±0.5℃ and the humidity between 40%-60%. This precise temperature and humidity control not only extends the shelf life of goods but also reduces goods losses caused by environmental changes.

Table 2. Effect Comparison of Intelligent Temperature and Humidity Monitoring System

Item	Traditional Monitoring System	Intelligent Monitoring System
Temperature Fluctuation (℃)	±2.0	±0.5
Humidity Control Range (%)	30-70	40-60
Goods Shelf Life Extension (%)	10	30
Goods Loss Rate (%)	3.0	1.0

4.2 Intelligent Transportation System

4.2.1 Intelligent Transformation of Cold Chain Transportation Vehicles

Technical Details: The transformed transportation vehicles are equipped with advanced temperature control equipment, GPS positioning systems, and real-time monitoring cameras. Through these devices, the vehicle's temperature, location, and operating status can be transmitted to the backend management system in real-time. Managers can monitor the vehicle's operating conditions at any time and adjust the transportation plan in a timely manner.

CIMC TianDa Logistics has first carried out intelligent transformation of its cold chain transportation fleet in North China. The fleet consists of 50 cold chain transportation vehicles, each equipped with advanced temperature control equipment and GPS positioning systems. In actual operations, the intelligent transformation has not only reduced the goods loss rate by 40% but also increased transportation efficiency by 25%. Through the GPS positioning system, the average transportation time of vehicles has been shortened by 15%, significantly improving customer satisfaction. (Goyal, S. K., & Sharma, A., 2016)

Table 3. Effect Comparison of Intelligent Transformation of Cold Chain Transportation Vehicles

Item	Traditional Vehicles	Intelligent Vehicles
Goods Loss Rate (%)	2.0	1.2
Transportation Efficiency Improvement (%)	0	25
Average Transportation Time Reduction (%)	0	15
Fuel Consumption Reduction (%)	0	15

4.2.2 Path Optimization Algorithm and Real-Time Monitoring

Technical Details: The algorithm dynamically adjusts transportation routes in combination with real-time traffic data and weather information to ensure that vehicles complete transportation tasks in the shortest time and with the lowest energy consumption. At the same time, through the real-time monitoring system, managers can keep track of the vehicle's operating status at any time and intervene when necessary.

CIMC TianDa Logistics has applied the path optimization algorithm in its cold chain transportation routes in Shanghai. The algorithm dynamically adjusts transportation routes based on real-time traffic data and weather information. In actual operations, the average transportation mileage has been reduced by 10%, fuel consumption has decreased by 15%, and transportation time has been shortened by 15%. Through the real-time monitoring system, managers can keep track of the vehicle's operating status at any time and intervene when necessary, significantly improving transportation efficiency and customer satisfaction.

The following table shows the transportation efficiency comparison before and after the implementation of the path optimization algorithm:

Table 4.

Item	Before Implementation	After Implementation
Average Transportation Mileage (km)	500	450
Fuel Consumption (liters/100 km)	30	25.5
Transportation Time (hours)	10	8.5
Goods Loss Rate (%)	2.0	1.2

4.3 Information Management System

4.3.1 Internet of Things Platform and Equipment Interconnection

Technical Details: Sensors in the warehouse, monitoring devices on transportation vehicles, and terminal devices in various links of the supply chain are all connected to the central management system through the Internet of Things. This equipment interconnection not only enables real-time data collection and transmission but also provides decision-making support for corporate operations through big data analysis.

CIMC TianDa Logistics has deployed an Internet of Things platform in its cold chain storage and transportation network in East China. The platform connects sensors in the warehouse and monitoring devices on transportation vehicles, enabling real-time data collection and transmission. In actual operations, equipment management efficiency has increased by 40%, and the accuracy of data collection has reached more than 99%, significantly improving corporate operational management efficiency.

Table 5. Equipment Management Efficiency Comparison Before and After Internet of Things Platform Application

Item	**Before Application**	**After Application**
Equipment Management Efficiency Improvement (%)	0	40
Data Collection Accuracy (%)	85	99
Data Processing Capacity (data points/second)	500	1000
System Response Time (seconds)	5	2

4.3.2 Big Data and Cloud Computing Applications

Technical Details: Through big data analysis, companies can monitor the status of goods in real-time, optimize storage layout, predict market demand, and adjust transportation plans in advance. Cloud computing technology provides strong support for data storage and processing, ensuring the efficient operation of the system.

CIMC TianDa Logistics has applied big data and cloud computing technologies in its cold chain operations in South China. By monitoring the status of goods in real-time and optimizing storage layout, the company's operating costs have decreased by 20%, and customer satisfaction has increased by 30%. Big data analysis also helps companies predict market demand and adjust transportation plans in advance, significantly improving market competitiveness.

Table 6. Operational Efficiency Comparison Before and After Big Data and Cloud Computing Applications

Item	**Before Application**	**After Application**
Operating Costs (ten thousand yuan/year)	550	440
Customer Satisfaction (%)	75	95
Data Processing Efficiency (seconds/time)	10	2
Prediction Accuracy (%)	60	85

4.4 Challenges and Solutions in System Integration

The technical integration of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project faces many challenges, including compatibility between different equipment, unification of data formats, and system stability. To solve these challenges, CIMC TianDa Logistics has applied modular design and standardized interfaces in its cold chain operations in North China. By introducing advanced middleware technology, the system integration time has been shortened by 30%, and equipment compatibility issues have been reduced by 50%. In actual operations, data transmission efficiency has increased by 15%, and system stability has been significantly improved, significantly enhancing corporate operational efficiency. The following table shows the comparison before and after system integration optimization:

Table 7. Comparison Before and After System Integration Optimization

Item	**Before Optimization**	**After Optimization**

System Integration Time (days)	60	42
Equipment Compatibility Issues (times/month)	10	5
Data Transmission Efficiency (%)	80	95
System Stability (hours)	200	250

5. Project Implementation and Operation

The implementation and operation of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project is a systematic project, covering the entire process from planning to execution and continuous optimization. The following are the key contents and results of the project during the implementation and operation stages.

5.1 Project Implementation Process

The implementation process of the project is divided into three main stages: planning and design, construction and commissioning, and operation and optimization. In the planning and design stage, CIMC TianDa Logistics clarifies the project objectives and technical selections through in-depth market research and demand analysis. The company uses modular design and standardized interfaces to ensure the scalability and compatibility of the system. In the construction and commissioning stage, the company efficiently completes equipment procurement, installation, and system integration, and ensures that the system performance meets the design requirements through multiple rounds of testing and optimization. In the operation and optimization stage, the company continuously optimizes system performance through real-time monitoring and data analysis to ensure the efficient and stable operation of the project.

5.2 Operational Management Strategies

To ensure the efficient operation of the project, CIMC TianDa Logistics has established a comprehensive set of operational management strategies. First, the company has established a sound personnel management system, enhancing employees' professional skills and operational efficiency through systematic training. At the same time, the company focuses on equipment maintenance and management, ensuring efficient equipment operation through preventive maintenance and rapid fault Exclude mechanisms. In addition, the company uses an information-sharing platform to achieve collaborative management of all links in the supply chain, improving overall operational efficiency. Through these strategies, CIMC TianDa Logistics not only improves the operational efficiency of the project but also reduces operating costs and enhances market competitiveness.

5.3 Project Operation Effect Assessment

The operational effects of the project are assessed through several key indicators. First, in terms of efficiency improvement, the application of automated Stereoscopic Warehouse and robotic sorting technology significantly improves the efficiency of goods storage, retrieval, and sorting, while the implementation of transportation path optimization algorithms effectively shortens transportation time. Secondly, in terms of cost control, the project's operating costs are significantly reduced through optimized equipment selection and operational processes. In addition, the establishment of intelligent temperature and humidity monitoring systems and traceability systems effectively reduces goods losses and improves cargo quality assurance levels. Finally, through customer satisfaction surveys and market feedback analysis, CIMC TianDa Logistics' intelligent cold chain services have received high recognition from customers, significantly enhancing market competitiveness.

In summary, the implementation and operation of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project have achieved significant results, not only improving the company's operational efficiency and market competitiveness but also providing valuable experience for the intelligent transformation of the cold chain logistics industry.

6. Impact on Cold Chain Logistics Industry

The successful implementation of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project has brought profound impacts on the cold chain logistics industry, promoting technological progress, management innovation, and policy improvement in the industry. It also provides important insights for industry transformation and future development.

6.1 Promotion of Technological Progress

CIMC TianDa Logistics has introduced advanced technologies such as automated Stereoscopic Warehouse, robotic sorting technology, intelligent temperature and humidity monitoring systems, and Internet of Things platforms, significantly improving the efficiency and quality control levels of cold chain operations. The successful application of these technologies not only sets a new benchmark for the industry but also accelerates the diffusion of intelligent cold chain technologies within the industry. As more and more companies introduce

IoT, big data, and automation technologies, the overall technological level of the cold chain logistics industry has significantly improved. In addition, CIMC TianDa Logistics actively participates in the formulation and improvement of industry standards, promoting the normalization and standardization of intelligent cold chain technologies, and providing strong support for technological progress in the industry.

6.2 Policy Support and Industry Development Synergy

The successful implementation of the CIMC TianDa Logistics project is inseparable from the policy support of national and local governments. A series of policies introduced by the government to support the development of the cold chain logistics industry have provided a favorable policy environment for the project, reducing its implementation costs and risks. At the same time, CIMC TianDa Logistics has actively cooperated with government departments to participate in the formulation and improvement of policies, providing important feedback for the optimization of the policy support system. The guiding role of industry associations and governments has also played an important role in the implementation of the project. Through organizing technical exchange activities and industry exhibitions, the application and promotion of intelligent cold chain technologies have been promoted, driving the healthy development of the cold chain logistics industry.

6.3 Industry Transformation and Future Outlook

The successful implementation of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project has driven the integration and upgrading of the cold chain logistics industry, changing the industry's competitive landscape. With the widespread application of intelligent technologies, the cold chain logistics industry is showing trends towards intelligence, greening, and internationalization. The widespread application of intelligent technologies will drive the cold chain logistics industry to achieve higher levels of automation and intelligent management; greening development will prompt companies to pay more attention to energy conservation, emission reduction, and resource recycling, promoting the sustainable development of the industry; the intensification of international competition will prompt cold chain logistics companies to continuously expand into international markets and enhance their international competitiveness. As a leading company in the industry, CIMC TianDa Logistics will continue to play a leading role in promoting the intelligent, green, and international development of the cold chain logistics industry, providing important references for the future development direction of the industry. (Goyal, S. K., & Sharma, A., 2016)

7. Conclusion and Future Outlook

7.1 Research Conclusions

The successful implementation of CIMC TianDa Logistics' Intelligent Cold Chain Automation Project provides important references and Learn from the intelligent transformation of the cold chain logistics industry. By introducing advanced intelligent cold chain technologies, CIMC TianDa Logistics has achieved significant results in improving operational efficiency, reducing losses, and increasing customer satisfaction. At the same time, the project has had profound impacts on the industry in terms of technological progress, management innovation, and policy support, driving the overall development of the cold chain logistics industry. The research results show that intelligent cold chain automation technology is an inevitable trend for the future development of the cold chain logistics industry, with broad application prospects and great development potential.

7.2 Research Limitations and Future Outlook

7.2.1 Research Limitations

Despite the in-depth analysis of the Intelligent Cold Chain Automation Project of CIMC TianDa Logistics, this study still has some limitations. First, the study is mainly based on the case of CIMC TianDa Logistics, lacking extensive surveys and comparative analyses of other companies, which may affect the universality of the research results. Second, the study mainly focuses on the impacts at the technological and operational management levels, with relatively less analysis of the policy and market levels. Future research can further expand the research scope to comprehensively assess the impact of intelligent cold chain automation projects on the cold chain logistics industry.

7.2.2 Future Research Directions

Future research can be carried out from the following aspects:

- Conduct extensive surveys on cold chain logistics companies of different scales and types to analyze the application effects and challenges of intelligent cold chain automation technologies in different companies;
- Conduct in-depth studies on the impact of the policy environment on intelligent cold chain automation projects and propose more targeted policy recommendations;
- Focus on the development trends of the international market and study the application and

development trends of intelligent cold chain automation technologies in the international cold chain logistics industry;

- Explore the integration of intelligent cold chain automation technologies with other emerging technologies (such as blockchain and 5G) to provide new ideas and directions for technological innovation in the cold chain logistics industry.

7.2.3 Outlook for the Intelligent Development of Cold Chain Logistics Industry

With the continuous progress of technology and the changing market demands, the intelligent development of the cold chain logistics industry will show the following trends:

- The widespread application of intelligent technologies, where IoT, big data, artificial intelligence, and other technologies will be widely applied in various links of the cold chain logistics industry, driving the continuous improvement of the industry's automation and intelligent levels;
- Green development, where cold chain logistics companies will pay more attention to energy conservation, emission reduction, and resource recycling to promote the sustainable development of the industry;
- Increased international competition, where the acceleration of global economic integration will prompt cold chain logistics companies to continuously expand into international markets and enhance their international competitiveness. As a leading company in the industry, CIMC TianDa Logistics will continue to play a leading role in promoting the intelligent, green, and international development of the cold chain logistics industry.

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