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## Application of the technology of the internet of things in the management model of enterprise supply Chain

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### ABSTRACT

With the aggravation of the market competition, if the enterprises want to improve competitiveness in the market and achieve the sustainable development of its own, they should pay attention to the supply chain management. And the great achievements made by enterprises of the supply chain in the practice also confirm that supply chain management can make the enterprise adapt to the global competition development. The Internet of things established a worldwide system on tracking and monitoring goods. The principle and mechanism of the development implement the supply chain process of traditional enterprises and the traditional means of management innovation and change. establishing innovative enterprises supply chain management.

### KEYWORDS

The Internet of things; Supply chain; Management model of enterprise.



### THE INTERNET OF THINGS

#### Brief introduction

The Internet of things, as the name suggests, is things connected with each other. It includes two aspects: for one thing, the Internet of things use computer Internet as core and foundation. In essence it is extension and expansion of Internet. For another, internet users can extend to any goods. It builds the exchange of information and communication system<sup>[1]</sup>. The Internet of things use the advanced sensing technology, wireless transmission technology and extends to all aspects of social development. For example, the architecture of Internet of things is shown in Figure 1.

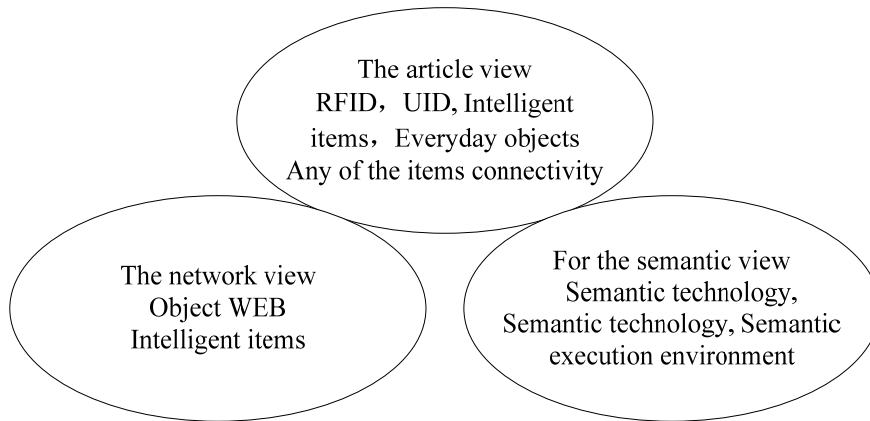


Figure 1 : The architecture of Internet of things

#### The definition of the formula of the Internet of things

The Internet of things= (Cloud computing+ Sensor network) \*AI

After the realization of complex sensor network, Cloud computing provides technic support for centralized operation. Without the development of AI, Internet of things is not too big effective, but only realize the industrial automation.

Cloud computing= (Data + software + platform + infrastructure) \* service

The technology of the Internet of things = Internet technology + recognition technology and Intelligent Execution System

#### Three kinds of functional components of Internet of things

Thus, the Internet of things may be defined as the radio frequency identification (RFID), infrared sensors, GPS, laser scanners and other information sensing device<sup>[2]</sup>. There are three kinds of functional components of Internet of things. Here is the connection of them in Figure 2.

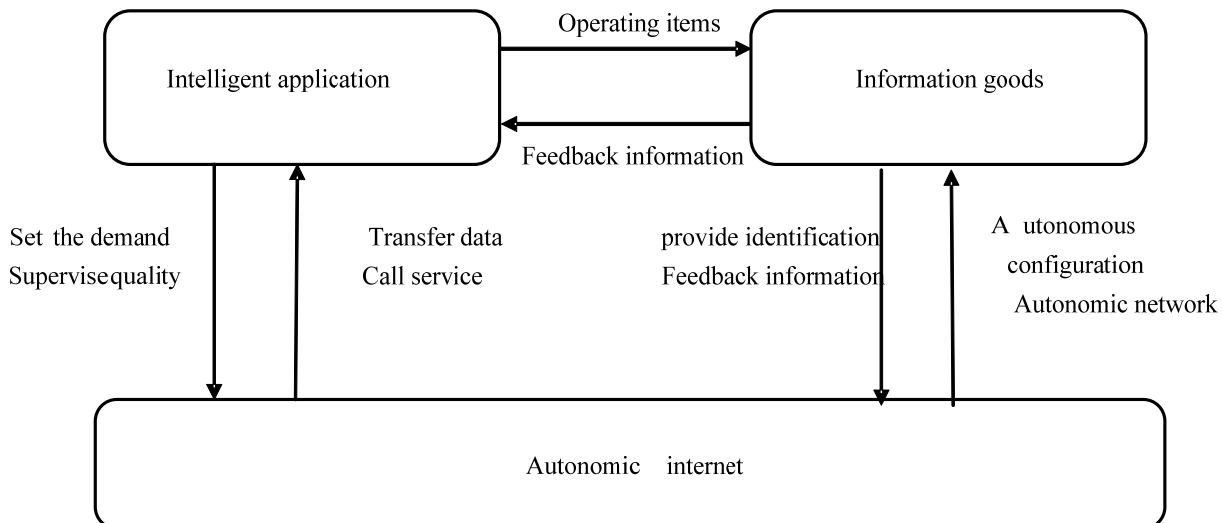


Figure 2 : Interactive relationship between three kinds of function of the internet of thing

### LOGISTICS INDUSTRY APPLICATION

With the economic develops continuously, the Internet of things has been developed greatly. But because the industry has characteristics of its own, So its application and demand are not identical. The Internet of things has not formed the unified technical specification and requirements. But it also connects different industries and industry system.

#### Supply chain

Supply chain is around the core enterprise. Through the control of information flow, logistics, capital flow, from the beginning of the procurement of raw materials, making intermediate products and final products. Finally transporting to the hands of consumers by the sales network products. A supply chain is a series of processes, in which a process of supply for the next process. It is not only a connection to a user's logistics supplier chain, and it is a value chain. The material in the supply chain raises its value by packaging, transportation process, give benefits to the related enterprise. There are four core of process through the supply chain in Figure 3.

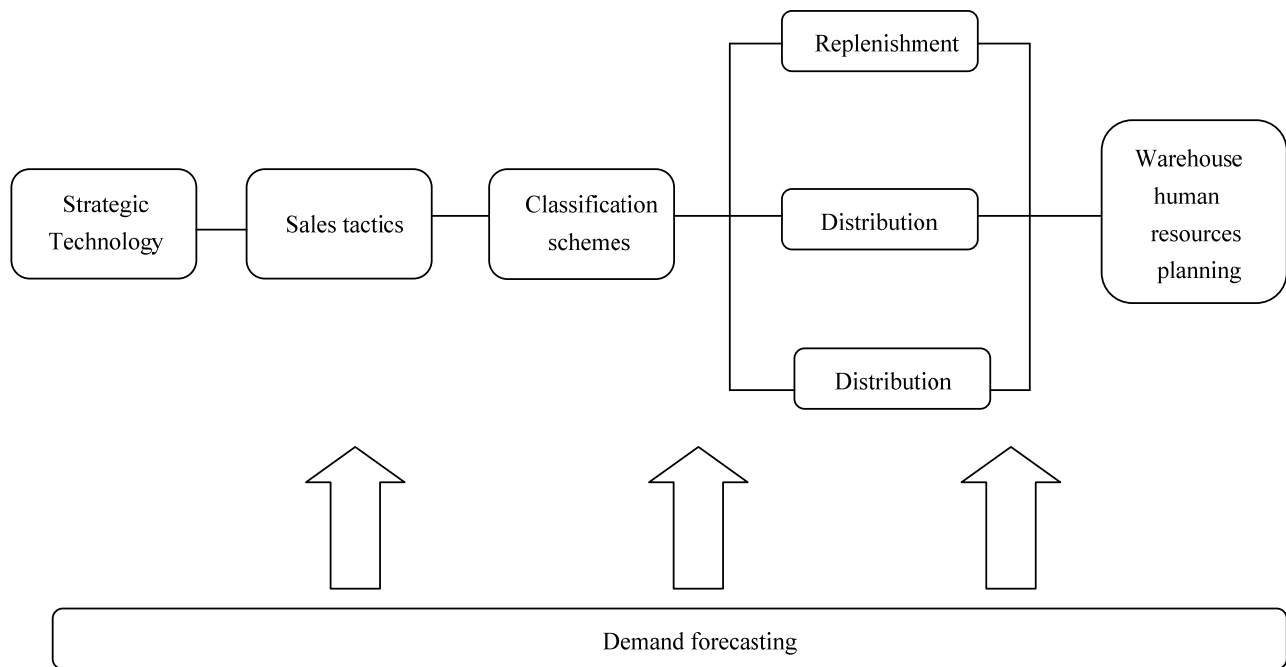


Figure 3 : Four core of process through the supply chain

#### Supply chain management

Supply chain management is the coordination of internal and external resources to meet consumer demand. When we put each link in the supply chain of the enterprise as a virtual enterprise alliance, and see any enterprise as a division of the virtual enterprise alliance, internal management alliance is supply chain management. But the alliance is composed of dynamic, according to the needs of the market changes<sup>[3]</sup>.

Effective supply chain management can help to achieve the four goals: Shorten the cash turnover time; Reduce the risk of enterprises; Realize profitable growth; Provide a predictable income

Supply chain management is the effective management of enterprises. It shows the optimization of enterprise of the whole operation process in the strategy and tactics. It integrates and optimizes the efficiency of the supplier, manufacturer, retailer, making the number of goods to be sold and produced of the right quality, at the right place, in the right time, with the best production and marketing costs.

A company with the aim of supply chain management has three meanings: Improve customer satisfaction; Improve the delivery reliability and flexibility; To reduce the company's cost; To reduce inventory, reduce the cost of production and distribution; The whole enterprise "process quality".; Remove the error cost, eliminate abnormal events;

#### Three kinds of “flow” in supply chain

To make a supply chain become the value-added chain that has a strong market competitiveness, the key is to make the products in the supply chain flow, information flow and cash flow and combine them through quality service, so as to make the cooperative enterprises strong and unite. Solide circulation logistics is a kind of material behavior. In the process of circulation, supply chain management combines transport, storage, handling, packaging, distribution processing, and related logistics information functional activities, to create value, customer satisfaction and social needs. It is also connected with the calculation of common days of supply. Its algorithm is expressed as:

$$DS = \frac{A_j + \sum^n I_j}{\sum^n D_j} \tag{1}$$

DS: Common days of supply of distribution Center Inventory

$A_j$ : Inventory number distribution from the warehouse

Calculate the number assigned to each distribution center:

$$A_j = (DS - \frac{I_j}{D_j}) \times D_j \tag{2}$$

Information flow refers to the related personnel, a continuous structure and procedures to collect, sort, analysis, assessment and distribute relevant information. It is to provide policymakers important, timely and correct information in order to improve its marketing planning, implementation and control. Information flow is between supply chain and participants, a two-way communication to perform data exchange and strategic planning. The most typical example of this is, prediction, promotion plans, orders, orders, get understanding of transportation and inventory information, invoice and complementary needs.

Cash flow and its added value include through "marketable" product sales, promotions and the improvement of conditions to adjust the speed of funds and improve the efficiency of resource use, in order to improve the whole performance of the supply chain. Naturally, even when the supply chain is not integrated, the four flow will occur in the supply chain. There relation is showed as follows in Figure 4:

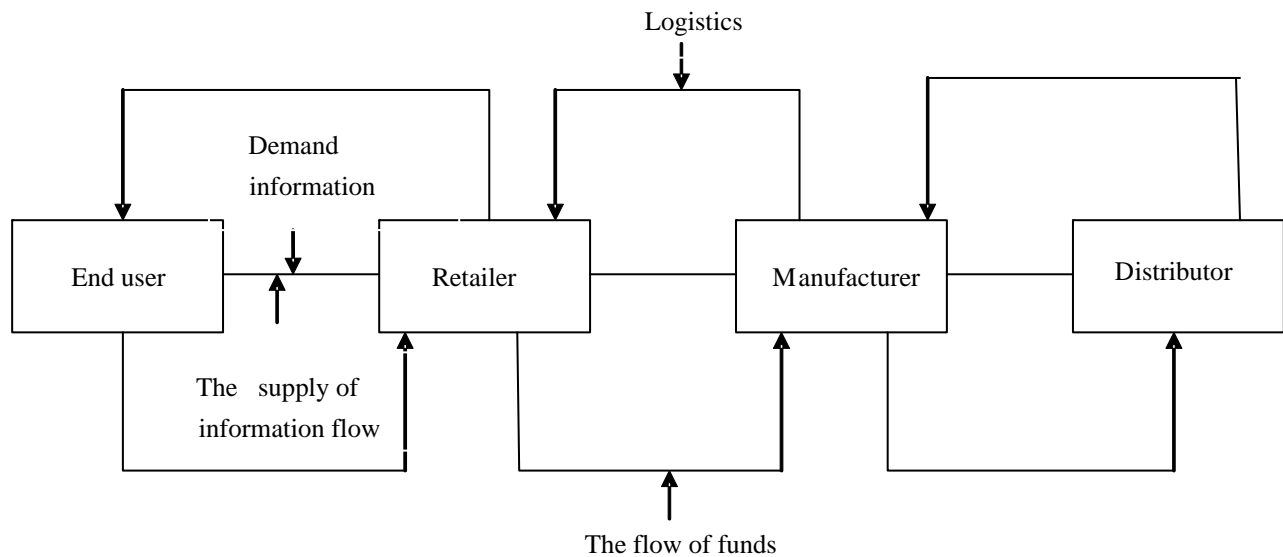


Figure 4 : The relation among three kinds of“ flow ”in supply chain

**BASIC REQUIREMENTS**

Share information resources. Information is the main supporter of modern competition. Supply chain management use the modern scientific method, With the optimal circulation channel to transmit information quickly, accurately, and realize the sharing of resources. Improve service quality, expand the customer demand. In the supply chain management, it takes action around the "take the customer as the center" concept. Consumers are required to provide products and services. Supply chain management cooperate together to through the external and internal, process production. It shortens the product circulation cycle greatly and speed up the logistics and distribution of velocity in order to make customers personalized needs met in the most short time. Achieve a win-win situation. Supply chain management connects suppliers, distributors, retailers together, make all the relevant enterprises form a fusion through the whole network. In this network, the company still maintains the individual characteristics. But they work together for the benefit of the whole, to realize win-win results. In the development of supply chain management, some people predict that the future production and circulation, we will not see enterprise and only see the supply chain. Supply chain production and circulation will become the main way of modern

production and circulation. Following is the logical model of supply chain management. Logical model of supply chain management is shown as Figure 5.

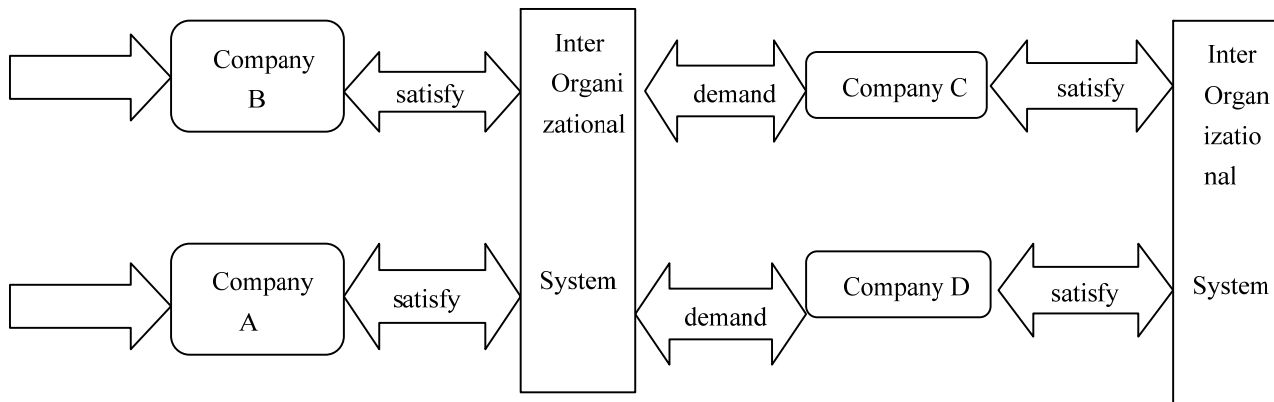


Figure 5 : Logical model of supply chain management

**THE IMPACT OF INFORMATION FLOW IN SUPPLY CHAIN LOGISTICS SERVICE**

Information is the decision of logistics service supply chain. If information is symmetrical or not directly related to the entire logistics services supply chain performance. Information flow is the logistics service supply chain in the media and is the basis of logistics and supply chain solutions for design, logistics capability and logistics service process<sup>[4]</sup>.

The use of the Internet of things, meets the various participants in logistics service supply chain requirements for information, realizing the faster flow of information transfer, the intelligent information processing, reliable information. Because the feature information networking transmission level shows a flat, a higher degree of information sharing<sup>[5]</sup>.

The degree of information distortion is greatly reduced and overcomes the bullwhip effect in the supply chain logistics services. Each of the logistics service supply chain members can get accurate information of logistics capability demand of customers, avoiding the waste of logistics resources, and improve the customer satisfaction. Below is their connection.

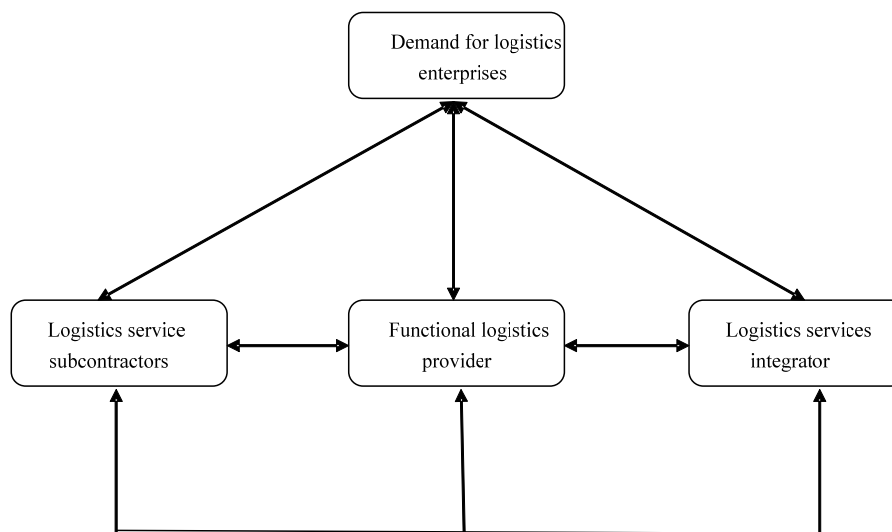


Figure 6 : Connection between information flow and the internet of things

**SUPPLY CHAIN INTEGRATION IMPACT ON ENTERPRISE PERFORMANCE**

In recent years, with the globalization of the market competition deepening, the consumer demand diversification, the progress of information technology have increased. The competition between enterprises has been gradually transformed into the supply chain and supply chain competition. Therefore, to strengthen the supply chain management has become an important strategy for enterprises to gain competitive advantage<sup>[6]</sup>. While promoting the integration among the members in the supply chain and process information is the key to successful supply chain management. Through strategic cooperation with the members in the supply chain, the integration of supply chain integration of the supply chain members on different

relationships, activities, operations, processes and location management. The aim is to meet customer needs and maximize the value of the customer

### LOGISTICS SERVICE SUPPLY CHAIN ARCHITECTURE BASED ON INTERNET OF THINGS

Logistics service supply chain uses networking operation, enhancing the logistics service supply chain information sharing, making the logistics service supply chain of information flow, capital flow and logistics / service flow to form a unified whole<sup>[7]</sup>. Information flow is the core of the logistics service supply chain management, with in the course of the operation of capital flow and logistics / service flow. The connection of logistics service supply chain architecture based on Internet of things is expressed as follows in Figure 7:

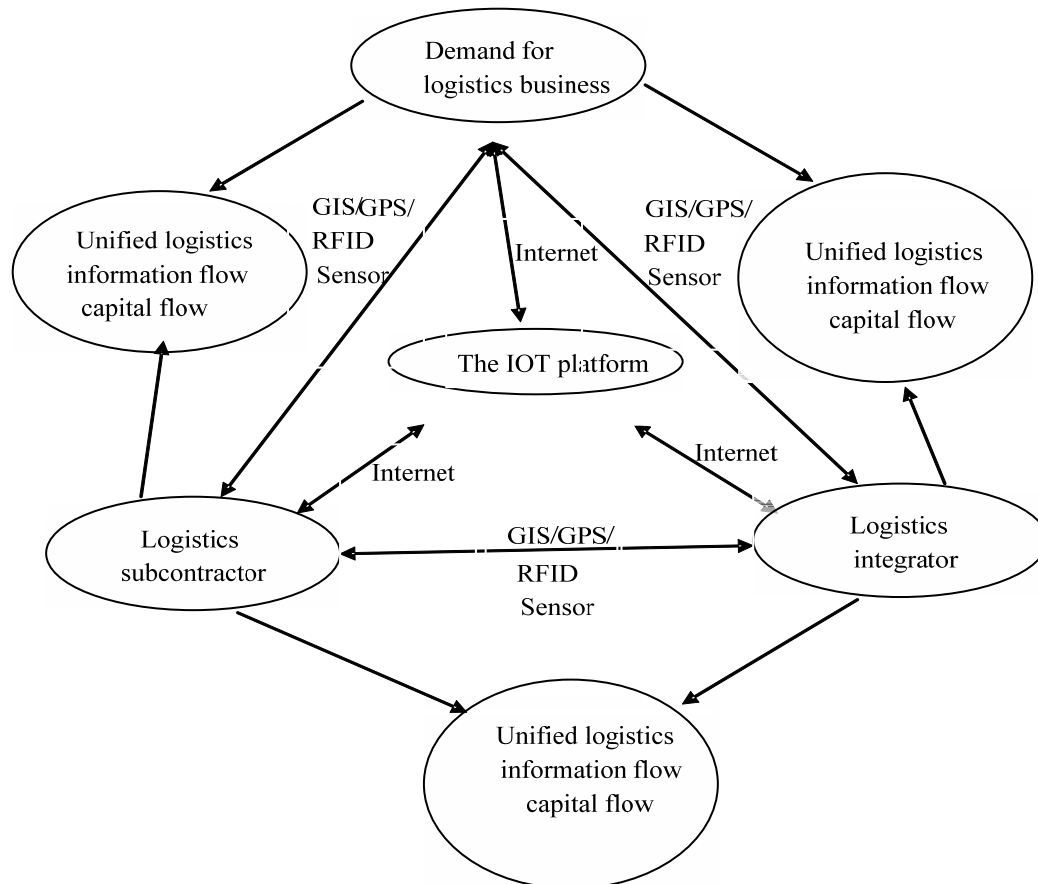


Figure 7 : The connection of logistics service supply chain architecture based on internet of things

### APPLICATION OF INTERNET TECHNOLOGY IN THE ENTERPRISE IN SUPPLY CHAIN MANAGEMENT

It is of great significance to develop the technology of the Internet of things on the enterprise supply chain management scientific and standardization<sup>[8]</sup>. By analyzing the existing problems in the management of enterprise supply chain analysis, the action of the Internet of things in the supply chain management is clear<sup>[9]</sup>. Combined with the analysis of specific link application status in the supply chain management network, the development trend of Internet of things in supply chain management is clear. In order to meet the development demands of the customer, enhance the entire supply chain value, so that the network management to play an effective role in promoting. Although the supply chain integration is paid more and more attention in the application and practice of community, but the empirical study on supply chain integration and performance is not much.

### SUPPLY CHAIN MANAGEMENT SYSTEM RESEARCH AND DESIGN BASED ON THE INTERNET OF THINGS

Using network technology, enterprises can optimize the supply chain management system management process and structure, improve the information transmission speed and accuracy and matching, improve the operation of the supply chain. In the logistics technology development at the same time, between the employee and the associated equipment changes, leading to the logistics management mode change<sup>[10]</sup>.

## SUMMARY

The current research networking concepts and application of widespread are concerned by the industry, development and extensive application of the Internet of things can be predicted. The use of the Internet of things in the enterprise in the supply chain can achieve supply chain management accurate tracking and positioning at any arbitrary in the supply chain of goods can achieve transparent management in supply chain enterprises. The application of enterprise supply chain management can achieve a high degree of integration of the supply chain network. At the same time, it also improves the efficiency of the whole supply chain management.

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