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Mode Study on the Circulation Sharing of Logistics Turnover Box on New Agricultural Products

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Introduction. In terms of ecological environment protection, the to-circle-box circulation sharing model responds to national policies, meets the requirements of energy conservation and emission reduction in the “Twelfth Five-Year Plan”, and conforms to the theory of low-carbon economy. From the perspective of market development, the demand for totes in the cyclical sharing model will increase. The prospect of tote leasing is very broad, as there are no special large toll collectors in the current market. This paper analyzes the development trend of Chinese logistics turnover box cycle sharing, proposes the operation process of the new logistics turnover box cycle sharing mode, and builds the agricultural information logistics container rental sharing information platform. The economic benefit and social benefit of the cycle box circulation sharing mode and ecological benefits are analyzed.

1. Introduction

The economic feasibility of the tote circulation sharing mode has more advantages than the current tote operating mode. Besides, in the current background of large tonnage enterprises, it is necessary to invest in the construction of a new logistics turnover cycle, due to its good market prospects and broad development space. Based on the development concept of “green, efficient and low-carbon”, it is consistent with the low-carbon economy and green economy development strategy advocated by the state. At the same time, the new logistics turnover box recycling sharing model can reduce the loss rate of goods, the usage of disposable items, and the environmental pollution. In addition, the construction of the new to-turn cycle sharing mode is a favorable mode for integrating logistics resources and achieving high-efficiency and low-cost logistics. It is also a favorable mode for promoting green, standardized and shared logistics. Therefore, the new logistics turnover box cycle sharing mode is in line with the major environmental policies and policies and can fully exert its own value in promoting economic development, optimal allocation of social resources, improving logistics efficiency, energy conservation and environmental protection, etc. Thus, it is feasible for constructing a new logistics turnover box cycle sharing model.

2. Standard logistics turnover box cycle sharing development trend

Container unitization is a sign of logistics modernization. With the continuous advancement of science and technology, production technology has developed rapidly. Various transportation facilities, transportation vehicles, and transportation networks have been continuously developed, and the market capacity has been gradually expanded, providing a good development environment for mass production. Therefore, bulk and long-distance transportation is becoming more and more important. In order to achieve high-volume and long-distance transportation, it must rely on the assembly unit technology. The development of agricultural product logistics turnover box can greatly reduce the



logistics cost and make a fundamental change in the traditional packaging methods and loading and unloading tools. The practice of packaging, loading, unloading, storing, transporting, etc. is an effective way to make comprehensive plan and improve logistics functions.

The lease sharing of the totes is a logistics turnover box sharing system or a turnover box joint system. It is a tote circulation sharing mode in which the totes are provided to the target customers in a leasing mode and undertakes recycling work. The mode involves multiple logistics links, such as storage, transportation, remote recycling, repair and renovation, and revolving sales. The “box sharing” of the turnover box can reduce the packaging cost of logistics enterprises as well as improving the turnover rate of logistics packaging and promoting the development of green recycling of logistics packaging transportation.

3.The operation process of the new agricultural product logistics turnover box cycle sharing mode

The logistics turnover box cycle sharing mode is that the upstream and downstream enterprises in the supply chain share the same unitized appliance. The intermediate goods transfer does not need to replace the unitized equipment, eliminating the intermediate operation procedures such as unpacking, consolidation, sealing, and reverse boxing. Besides, this model reduces the direct contact with the goods, lowering the loss of the goods due to frequent backlogs. Its operation form is roughly as shown in Figure 1.

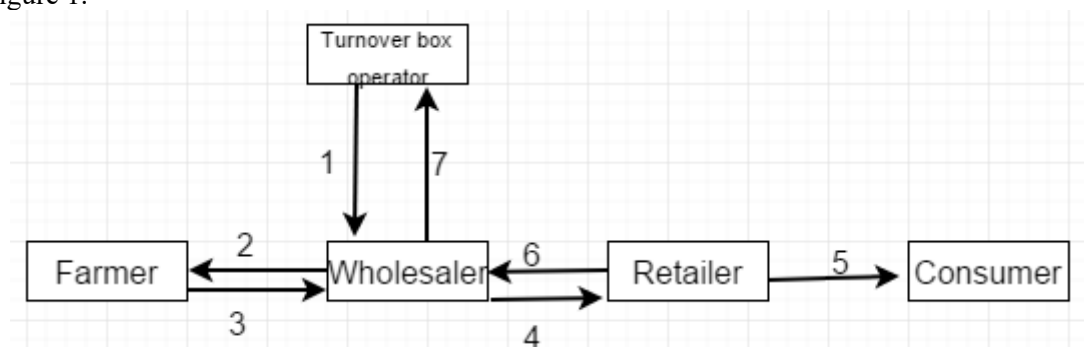


Figure 1. A new cycle sharing pattern diagram of a revolving box

- (1) The wholesaler rents the tote box corresponding to the agricultural product to the tote operator to pay the deposit or rent.
- (2) The wholesaler uses the rented totes to go to the field to acquire the agricultural products of the farmers.
- (3) Wholesalers use the totes to transport agricultural products to the wholesale market.
- (4) The retailer purchases the agricultural products with the turnover box from the wholesaler and agrees to return the date. If the payment is overdue, the retailer is required to pay liquidated damages.
- (5) Retailers sell agricultural products to consumers.
- (6) The retailer returns the empty totes by date.
- (7) The wholesaler refunds the excess and damaged turnover box to the tote operator

In the construction of the new agricultural product logistics turnover box cycle sharing mode, a third-party turnover box operator is added to manage the rental, recycling, maintenance, cleaning, procurement and other work of the turnover box. This means that The turnover box has a dedicated manager, which not only saves human resources but also makes rational use of the turnover box in reducing the cost, lowering the financial pressure brought by the user to purchase the equipment, improving the comprehensive benefits of the use of the enterprise funds, leasing the equipment as needed, and avoiding idle waste of resources. In addition, this is also a supplement to its traditional sales model for the tote box suppliers, and it is a new business growth point, which helps them to break through in the fierce homogenization competition.

In addition, the new agricultural product turnover boxes have different requirements transporting different retailers. When transporting to large supermarkets, we require the totes produced by the tote

operator are easy to handle, fold, stack and stack, due to the expensive booth fees and clean and tidy environment of large supermarkets. So, it is convenient to place directly on the shelves and reduce the land occupation resources. The type of the turnover box used is specially designed according to the type of agricultural products. We draw on the operation mode of foreign logistics turnover boxes. The design of the new turnover box we proposed is roughly as shown in Figure 2. The design of the turnover box is based on the nature of the agricultural product, and the appearance is convenient to watch, and the whole is neat and clean. For the vegetable market and small convenience stores, due to the relatively embarrassing and relatively large flow of people, the required totes must be strong, durable, and easy to handle.



Figure 2. New turnover box direct to supermarket shelves

The recycling of the new tote realizes a “one-touch” packaging solution, from the farm to the store, from the beginning to the end, using only one packaging basket, without turning over the basket. The operator only touches the fruits and vegetables once, reducing fruit and vegetable loss and packaging costs.

4. Construction of agricultural product logistics turnover box rental sharing information platform

4.1 The importance of building a shared information platform for the tote rental

With the rapid development of information technology, the trend of informatization is imperative. Building an information platform will play an important role in every enterprise. The construction of an information platform enables enterprises to achieve information exchange through a shared information platform, accelerate the exchange of information between enterprises, and integrate relevant logistics information resources and social resources so that resources can be rationally utilized. At the same time, the construction of the information platform plays a positive role in the recycling of new agricultural products logistics turnover boxes.

4.2 The structure of the toll box rental sharing information platform

The newly added tote operator will encounter many problems in the process of operation, so a complete information platform system must be established to help standardize and manage the leasing and recycling of the totes. The tote is rented by the wholesaler and finally returned to the retailer. During this whole cycle, the quantity and quality assurance of the totes are not to be ignored.

For the construction of the information platform, it is generally preferred to adopt a three-layer structure mode, that is, a data information layer, a service management layer, and a user application layer. Among them, the data information layer collects, organizes, stores, updates and maintains related data of various logistics information, and manages the corresponding access rights of the data. The service management layer is based on the logistics service information application on the data.

information platform. The connection between data information layer and service management layer relies on the logistics common information platform, using EDI system and Internet technology. The user application layer is designed for users. Platform users can use the user application layer to connect to each destination information platform site through Internet technology to get the corresponding platform information and improve processing efficiency. The information platform architecture diagram is shown in Figure 3.

There are a large number of wholesalers and retailers nationwide, and the distribution is scattered. In order to facilitate the leasing and recycling of the totes, the tote operators need to set up outlets throughout the country according to the actual situation. The headquarters distributes the number of totes according to the demand. The distribution of outlets should be close to wholesalers and retailers. Combined with the Internet of Things technology, the rental and recycling information of the totes can be integrated into the system to facilitate the management of the turnover box. When the wholesaler or retailer finds that the tote is damaged in the process of using the tote, it is necessary to register in time to explain the situation. According to the damage occurred in which section of the tote, the holder of the time compensates the relevant expenses. For reputable customers, operators can adopt certain incentive policies, preferential rental fees, and inclusion in the list of good customers. For customers who intentionally damage the tote or return it on time, a certain penalty policy will be adopted. In severe cases, the rental qualification will be cancelled.

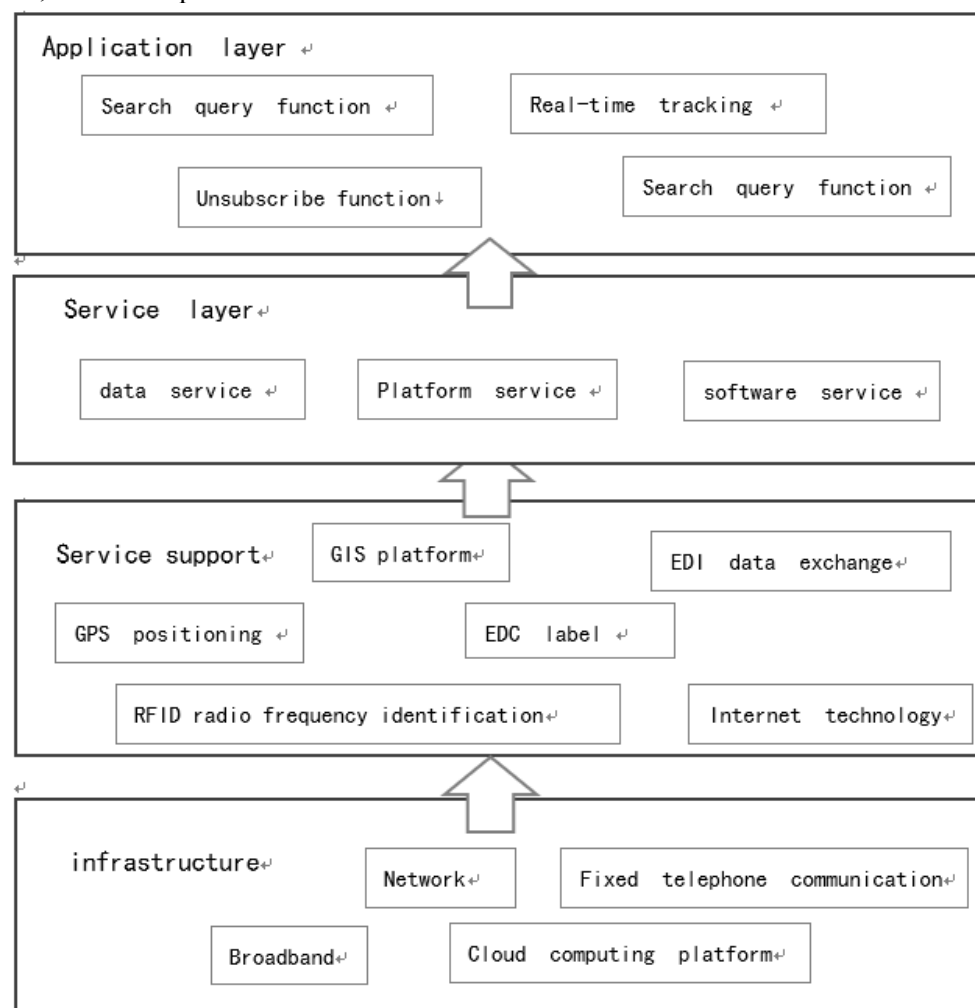


Figure 3. Platform structure diagram

5. Turnover Box Cycle Sharing Mode Benefit Analysis of

5.1 Economic Benefit Analysis of Turnover Box Cycle Sharing Mode

The new to-turn box circulation sharing mode adopts the tote box rental mode and the self-purchasing turnover box. The rental turnover box does not need to invest a large amount of purchase cost at one time, and the enterprise or individual can use this saving fund to invest in other projects. On the other hand, in the mode of renting the totes, the enterprise or individual does not need to pay for the maintenance and storage of the totes. The user only needs to ensure the complete type of the totes. For the leaser, the large-volume purchase production can greatly reduce the cost of the tote, and the maintenance of the unified batch can also reduce his maintenance costs. Therefore, the new to-turn cycle sharing has achieved a win-win situation for both users and leasing companies.

5.2 Social Benefit Analysis of Turnover Box Cycle Sharing Mode

In the traditional tote utilization model, each company or individual has its own turnover box. When the number of totes is too much, it will cause the turnover box to be idle. This is a waste of social resources for the society. The low-carbon economy advocated by the state is contrary. Compared with the new type of turnover box circulation mode in this scheme, the tote box service provider uniformly holds the totes, and uniformly distributes and manages the demand boxes of the market. From a social perspective, it achieves the recycling of the totes, in line with the theory of circular economy, while avoiding the waste of social resources. Therefore, the new to-turn box circulation sharing mode is superior to the original tote box operation mode in terms of social value. In addition, the new to-turn box circulation sharing mode is uniformly recycled by the third-party service providers. The wholesalers are no longer required to return them one by one, which not only saves time costs for the wholesalers, but saves human resources for the whole society.

5.3 Ecological Benefit Analysis of Turnover Box Cycle Sharing Mode

In the current society, wholesalers often use transport packaging for disposable packaging or plastic and nylon packaging with lower packaging costs. However, these packages will cause different levels of cargo damage and produce vegetable waste and white garbage. In the new logistics turnover box cycle sharing mode, due to the reduction of the use cost of the turnover box, the wholesaler is more willing to use the tote box for cargo transportation than before. And the use of the turnover box package can reduce the crushing collision of the goods in the box and reduce the loss rate of the goods. At the same time, due to the light and convenient characteristics of the turnover box, the efficiency of logistics handling can also be improved. In addition, the extensive use of the turnover box can reduce the use of disposable packaging skin, and then, reduce the generation of white garbage, save social resources, protect the ecological environment, and have higher ecological value.

6. Conclusion

By analyzing the circulation sharing mode of the tote, we can find that this logistics mode is more reasonable than the traditional logistics mode. This logistics mode is consistent with the characteristics of modern logistics with high efficiency and low cost. At the same time, the operation mode of this agricultural product has higher social value and ecological value and is more in line with the current circular economy and low carbon theory. In addition, it plays an important role in protecting the environment and people's health. In this regard, we must fully promote this green packaging and turnover box cycle sharing mode to create a new green life.

References:

- [1] Liao L., (2018) Application Status of Turnover box. Printing technology, 725:52-54.
- [2] Express., (2018) China Logistics and procurement, 552:18-19.
- [3] Fang W., (2018) Development of green packaging materials in the new Era. Shanghai packaging, 280:48-50.
- [4] Sun H., (2018) To the coming era of modular logistics. China storage and transportation, 213:61.