Design and Implementation of Data Integration and Exchange in Digital Warehousing System

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Abstract: Existing warehousing systems are located in different areas of the logistics process, making them discrete, incompatible, and poorly integrated. Tobacco industry companies have implemented the entire process management of excipients through storage systems, and are unable to directly obtain information about abnormal batches of products from the information system while dealing with product quality anomalies, and cannot achieve traceability management of product informatization. In response, this article has designed the data integration and exchange of the digital warehousing system. The collection equipment tracks each item of material in various stages of logistics and storage, and summarizes and submits the collected data to the warehousing system to form relevant business documents, ensuring the accuracy and timeliness of inventory data. The design realizes the data management of auxiliary material warehousing. The data platform extracts data based on the provided data list, and then routes and distributes the data packets to the target system or directly stores the extracted data to the target data source, achieving horizontal data access and data exchange functions between various application systems and internal business application systems.

1. Introduction

With the further deepening of the tobacco industry system reform and the "overall promotion and overall improvement" of cigarette sales network construction, the construction of modern cigarette logistics distribution system as the "third profit source" has become one of the key tasks of cigarette sales network construction in commercial enterprises. The existing warehousing system is in different fields of logistics process, which makes it separate, poor in mutual compatibility and integrity. The tobacco industry company has realized the whole process management of auxiliary materials through the storage system, but when the auxiliary materials products are abnormal in the production process, they can only manually understand and obtain the information such as warehousing, putting into use and inventory of batches of auxiliary materials. When dealing with the abnormal product quality, they cannot directly obtain the relevant information of abnormal batches of products from the information system, and cannot realize the traceability management of product information [1]. That is to say, the current construction of logistics system is "a little without network", with poor resource utilization, poor coordination and control ability, unable to share information, and lack of trace, process and refined management. Warehouse management mainly adopts the traditional manual operation mode, and the degree of informatization is not high. Data collection mostly follows the traditional management mode of manual bookkeeping and sticking handwritten cards on the shelves. Employees are busy with the tedious work of receiving and sending materials all day, so they can't shift their focus to the statistical analysis of data, and the management benefit is difficult to improve [2-3].

Building a digital warehouse management system is an effective way to cross China tobacco industry from traditional commerce to modern circulation. Reduce the inconsistency between data and enhance the reliability of data; Adopt an extensible system framework to facilitate adding new data sources at any time; At the same time, publish and subscribe mechanism and database cache technology are used to speed up data access and improve the response speed of combat command system. Although the warehouse management module has realized the online delivery of documents, the work of material inventory, storage and maintenance, use and adjustment in warehouse

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management is still traditional manual operation, which is not only intensive but also prone to errors, especially the physical management and data collection of materials have not been informationized [4]. The collection equipment tracks each material in all aspects of logistics and storage, and at the same time summarizes the collected data and submits them to the warehousing system to form relevant business documents, so as to ensure the accuracy and real-time of inventory data and realize the data management of auxiliary materials warehousing [5]. The optimal allocation of logistics resources is the key to the logistics construction of tobacco industry at present and in the future, which is of great significance for promoting the sustainable and healthy development of tobacco industry in China. How to meet the requirements of the complex work links in the distribution center and realize the horizontal access and data exchange between the application systems and the internal business application systems has become the main purpose of this research.

2. Demand Analysis for Data Integration in Tobacco Commercial Enterprises

2.1. Positioning of data integration and exchange platform

Starting from the development and current situation of business reform and informatization, considering the high integration of informatization with business models and management reform, and enhancing the integration of informatization, the data integration and exchange platform project is positioned as "industrial innovation application based on modern enterprise management" [6]. Its positioning can mainly be divided into forming enterprise management applications and improving management decision-making applications.

2.1.1. Forming enterprise management applications

Enterprise management applications not only emphasize "predictive analysis" of results, but also focus on "control" of processes and "planning" in advance. After the master database receives the submitted data, if the actual arrival quantity exceeds the order limit or there is no material code collected in the order, it is not allowed to submit [7]. Compared with other information application construction, the data integration and exchange platform has irreplaceable advantages in realizing modern enterprise management applications in the tobacco industry. In order to improve the efficiency of handling abnormal auxiliary materials business and meet the management requirements of modern lean logistics to reduce labor, time, and other waste, a complete enterprise management process includes "planning and organization, execution control, and result feedback", often requiring cross platform process support.

By building an information resource standard system and data exchange service system, the project provides a way to achieve cross platform process support. Through the combination of barcode scanning of materials and actual business operation processes, enterprise management applications are no longer limited to analysis within a specific topic domain, but often involve joint analysis across topic domains. For example, in the current benchmarking management of the 15 indicators, the calculation of most indicators requires access to cross topic domain data such as finance, marketing, or tobacco.

2.1.2. Improve the application of management decision-making

The application system of tobacco e-commerce and e-government has gradually become perfect, and at the same time, tobacco has actively explored the management decision-making system. The construction of this project will improve the application system of management decision-making, which is another important aspect of building the application system of management decision-making. At present, it can more effectively support the needs of industry reform and development and meet business needs [8]. If the material is set to enable batch management, the batch file and batch inventory will be automatically created. If the destination warehouse type is automatic warehouse, the system will automatically generate an elevated warehouse receipt and invoice. Based on the analysis and understanding of the current situation of tobacco informatization, the construction of this project has the following four aspects of value and significance to tobacco, as

shown in Figure 1 for details.

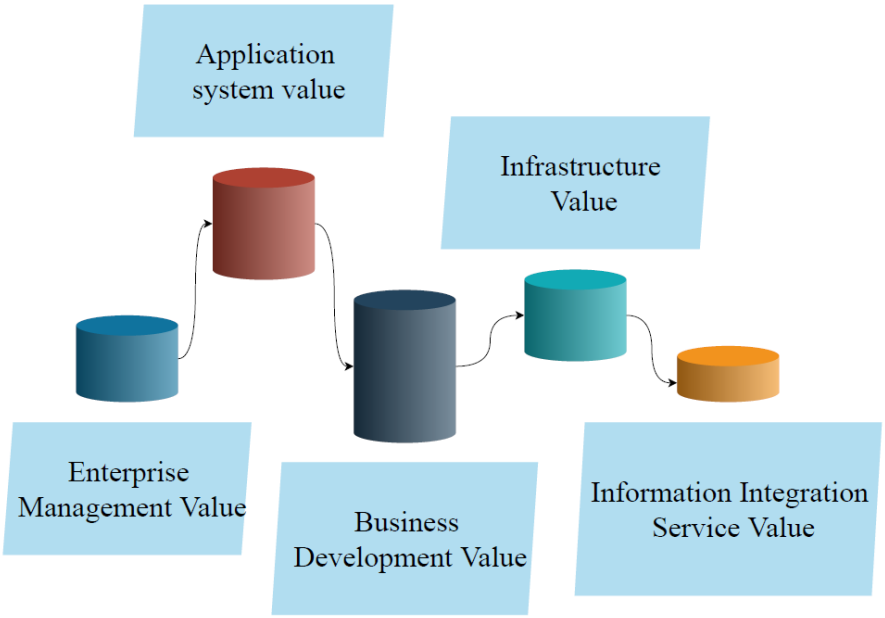

Figure 1 Current situation of tobacco informatization

The modern logistics construction of tobacco industry should follow the principle of "high informatization and moderate automation". The construction and operation of digital storage system is a favorable support for improving the overall logistics level of tobacco commercial enterprises, but at the same time it puts forward higher requirements for the standardization and standardization of basic logistics data. The data in the data warehouse is obtained by systematic processing, summary and integration on the basis of extracting and cleaning the original scattered database, which eliminates the inconsistency in the data and ensures that the information in the data warehouse is consistent with the global information. Therefore, the construction of digital warehouse management system is an effective way to cross China tobacco industry from traditional commerce to modern circulation.

The information infrastructure that has always been followed can no longer meet the needs of information development at this stage, and has even become the further development of information at present. If the inspection result is concession and the treatment method is selection, the unqualified products will be selected by the receiving staff, and then re-inspected by the inspector. If the re-inspection is qualified, it will be put into storage, otherwise it will continue to be selected [9]. A new enterprise information architecture characterized by "integration" has emerged as an obstacle or bottleneck to greater business value.

2.2. Overview of Data Integration and Exchange

Data integration is mainly aimed at solving data sharing and exchange requirements between different systems and databases. It mainly includes three parts: information sharing management, model sharing management, and data operation management. The warehouse keeper collects the barcode for the outer label of the material piece by piece. If there is moisture or wrinkles, select the actual arrival quantity of the barcode and select the reason for the decrease. After the barcode collection is completed, generate an arrival note and check the information, and submit it to the main database [10]. For external systems whose data sources can be read by the data platform, when the external system wants to send data to other systems through the data platform, the sender system provides the sending data list and receiving unit code.

The data platform extracts data based on the provided data list, and then routes and distributes the data packets to the target system or directly stores the extracted data to the target data source. After receiving the submitted data, the master database is not allowed to submit if the actual arrival quantity exceeds the order limit or if there is no material code collected in the order. Information

sharing management accomplishes the sharing of data and information generated during the operation of the integration platform by defining a unified integration service model and shared information access mechanism.

3. Design and Implementation of Data Integration and Exchange Platform

The digital warehouse management business of tobacco logistics distribution center is analyzed in detail, and the data integration and exchange are summarized. When data is sent to the target system, the data platform sends a data notification message to the target system, and then the target system calls the query service interface to query the received data, or the data platform directly packages and sends the data to the target system. At present, the digital warehousing system is mainly deployed at the municipal company level, and the business systems where data interaction mainly occurs are marketing, monopoly and ordering systems, as well as the necessary data interaction with the warehousing and warehousing of the No.1 project. These systems have not yet been interconnected.

Call that data query service interface of the data platform engine; The data platform engine query data according to that filter conditions and returns the data; Receiving system analysis data, calling corresponding adapter to convert data and save data. As shown in Figure 2, the functional design of the master data management system covers the whole life cycle of master data, from formulation, management, release and finally monitoring. Among them, the formulation and release of master data need to rely on the foundation provided by the unified platform to support the data integration platform, data exchange management system and service management system, so that master data can be collected and consumed.

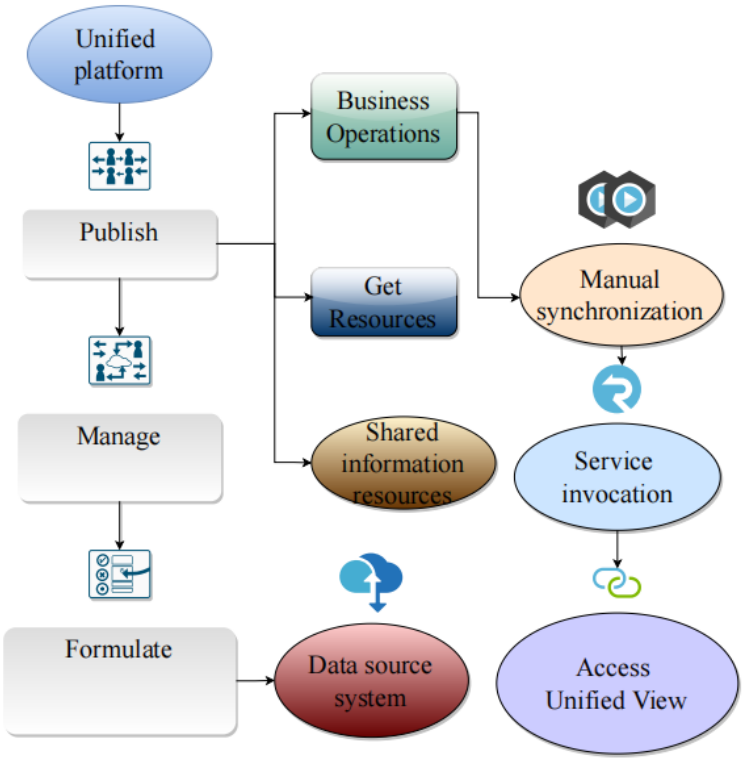

Figure 2 Functional Design

Taking retail head data as an example, defining a data element is to define a data pattern for a unified customer view of an enterprise, then analyze the source of each data item, and establish a connection to relevant data sources using a data integration platform to form a virtual retail head data. The function list is shown in Table 1, which manages the formulated master data, including permission management, version management, and publication subscription management.

Table 1 Function List

Functional module	Function Item	Describe
Formulate	Master Data Maintenance	By copying, independent master data is formed.
Administration	Publish Subscription and Permission Management	Through the platform, unified publishing and subscription are carried out.
Release	Data service publishing	Static publishing in the form of unified view through data integration platform.

Use the data integration platform to establish a connection to relevant data sources to form virtual retail head data. Its purchase order management mainly implements operations such as modifying, unapproving, enabling, and deactivating supplier purchase orders, and mainly checks whether the order is overdue and whether the order is consistent with the arrival. Its receipt/shipment summary and receipt/shipment details provide summary or obvious query functions based on the arrival time, supplier, location, actual receipt, book receipt, actual issue, book issue, actual inventory, and book inventory of auxiliary materials. If it is necessary to establish an independent master database, the data exchange management system can be used to replicate and form physical retail head data.

4. Conclusions

In this paper, the bar code technology is introduced into the digital storage management system of auxiliary materials in tobacco industry limited liability company, and the data of materials' arrival inspection, warehousing, warehousing, allocation, warehouse transfer and inventory counting are automatically collected. Through the establishment of data exchange management system, the connection to each business application system at the same level is established to provide unified data exchange and access services for the business application systems at the same level of the municipal company. Ensure the efficiency and accuracy of data input in each operation link of auxiliary materials warehousing management, ensure timely and accurate grasp of the real data of inventory, and reasonably maintain and control inventory. The data exchange management system provides various interfaces for support. Through the construction of information resource standard system and data exchange service system, the project provides a way to realize cross-platform process support. Apply requirements by combining barcode scanning of materials with actual business operation process. Try not to reform the existing system. For functional requirements such as incremental replication, or non-functional requirements such as mass data processing performance, the existing system support can be transformed to the minimum extent. At the same time, through the application of bar code, the batch and shelf life of auxiliary materials can be managed informationally, and the traceability of auxiliary materials quality can be realized, so as to meet the management requirements of information logistics of auxiliary materials warehouse.

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