The design and ımplementation of reverse logistics management information system

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ABSTRACT

With the development of economy and society's awareness of environmental protection requirements continue to improve, reverse logistics has attracted the attention of the public, so the function of reverse logisticsinformation system more and more attention. This paper discusses the characteristics and significance of reverse logistics, system function module design, logic structure design, the security design, the design of reverse logistics management information system. This paper presents the design and implementation of reverse logistics management information system.

Keywords: B / S mode, reverse logistics, management information system, ASP.NET
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INTRODUCTION

With the rapid development of science and technology, the level of human productivity, continuous improvement, people development and utilization of natural resources has reached an unprecedented level, at the same time, natural resources and ecological environment more and more serious damage. In this scenario, people started to pay attention to reverse logistics, more and more enterprises want to establish an effective reverse logistics information system in order to achieve the conservation of natural resources and ecological environment, and control production costs, increase profits, improve customer service quality and improve enterprise image, and thus to improve the competitiveness of enterprises and brand-building purposes [1]. At present, many of the world-renowned companies such as General Motors, IBM, 3M, Johnson & Johnson, etc., through a series of control measures, the introduction of information systems, effective management of reverse logistics. Very limited due to the logistics industry in China started late, reverse logistics, that may be encountered during the implementation of reverse logistics, reverse logistics management information system design and implementation problems encountered by the lack of understanding of the system. In this paper, reverse logistics management information system design and implementation issues. The paper puts forward the Design and Implementation of Management Information System Based on Reverse Logistics.

2. Meaning and characteristics of the reverse logistics

The meaning of the reverse logistics. Reverse Logistics (Reverse Logistics), the term was first proposed by Stock in 1992 to the U.S. Council of Logistics Management (Council of Logistics, Management, CLM), a research report: reverse logistics that includes return the product, material substitution, goods re-use, disposal, reprocessing, maintenance and manufacturing processes, logistics activities [2]. American Council of Logistics Management (CLM) (2002) definition of reverse logistics: logistics in the supply chain operations to meet customer requirements to achieve high output and in sales between the goods, services and related information for the purpose of efficiency and the forward and reverse flow and storage of low-cost plan, implementation and control process. Relative forward logistics, reverse logistics refers to the recycled product or return the product to move from consumers and other negotiable point in order to make better use of resources, reduce unnecessary losses from the hands of

consumers at a reasonable cost on a flow of a series of points during the move. Simply put, reverse logistics is the final consumers used, expired, or damage to products and packaging a series of processing process. By definition, reverse logistics is divided into Reverse Logistics and Reverse Logistics. Which Reverse Logistics is the end-user waste, expired products to each node of the supply chain upstream return reverse logistics supply chain, the middle and lower reaches of users will be unqualified products returned to the upstream suppliers.

The characteristics of reverse logistics.
(1) Inverse return. That will be recycled or returned products from the downstream of the forward logistics to return to the upstream of the forward logistics.
(2) The value of returned or recalled products decreasing. Products are returned or recalled the process of production, transportation, storage, inspection, processing costs will be offset against the original value [3].

$$\hat{\gamma}^{(\eta)}(m, s) = \hat{\gamma}^{(\eta)}(m, s-1) + \overline{K}^{(\eta)}(m, \mathrm{s})\left[z(m, s) - \Psi_w(m, s)\hat{\gamma}^{(\eta)}(m, s-1)\right] \tag{1}$$

(3) Recovery of product value increment. Has expired or scrap recycling products, for consumers, has no value, if the flow back to the manufacturers takes advantage of the value of recycling.
(4) Increasing the distortion of the transmission of information. When the products from downstream to upstream return process, it is this multi-polar pass will cause a serious distortion of information, "bullwhip effect" or the asymmetry of information.

3 Reverse logistics management information system design
Reverse logistics management information system design, including the function of the system module design, system logic design, and system security design.

Reverse logistics management information system features modular design. The functional modules of the reverse logistics management information system are modules and subsystems of the total system modules [4]. The total system modules, including system management, logistics management, system processing, problem analysis, financial management, customer relationship management, subsystem module is divided on the basis of the total system module from. Reverse logistics management information system functional modules.
(1) The system management module. In order to ensure the safety of the system, customer access to the authentication, and set access permissions, access allowed within the purview of the system information.
(2) Logistics Management module. Recovery or return products for recycling and to test spin-off record of recycled products in a timely manner, for processing and disposal.
(3) Processing module. The direct use of some products on the basis of the inspection, split, some in need of repair and use, these products must be promptly recorded, while others need to be recycled to use or recycling.
(4) Problem analysis module [5]. Recovery or return of materials need to identify recycling the returned material useful for future use, the analysis of waste-owned in order to be effective treatment in order to achieve the purpose of energy conservation to protect the environment.
(5) Financial Management module. Capital is flow in the reverse logistics management information system plays an important role in the financial management module record supplies in the reverse logistics costs, assets, gains and reverse logistics system.

Table 1 Management Information System Based on Reverse Logistics

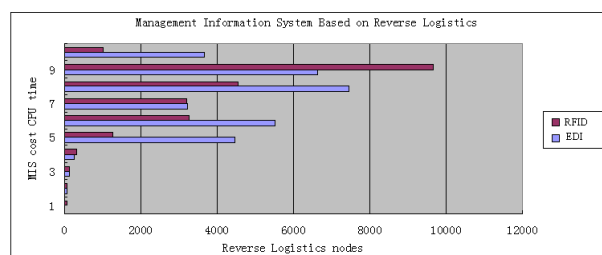| Management module	Logistics Management	Processing module	problem analysis
FCA	852	Product	10.2
Rule set	145	Costs	32.2
Fuzzy set	965	Assets	85.3
FCM	321	Gains	44.2
CRM	774	Time	80.3

Fig. 1 Implementation of Management Information System Based on Reverse Logistics

(6) Customer management module. The client management module including customer name, it can customer demand for products and customer addresses and other relevant information. Customer management can provide fast quality service, not only reduces costs but also to attract new customers and maintain existing customers.

The logical design of reverse logistics management information system
Reverse logistics management information system security, real-time considerations, the C / S (Client / Server, Client / Server) / S (Browser / Server, the browser / server) mode. It overcomes the portability of C / S mode, the system difficult to maintain and exchange information and data processing capability of the B / S mode, real-time high and low security vulnerabilities in a timely manner with the user. C / SB / S mode can the C / S mode of interaction is good, real-time and high security features and B / S model is conducive to the maintenance and upgrading of the system, as well as information retrieval, query and publish a combination of organic up [6]. Users can take advantage of the WWW browser to access the database server through the Web server; each node in the reverse logistics supply chain can use the client application software to directly access the database server and application server and other complex business. Reverse logistics management information system, the logical structure shown in Fig. 1.

From the figure we can see that the database server and user workstations based on the C / S mode intranet (intranet), connected through the firewall and the Web server to enhance security. B / S mode the client browser is in order to access the database server through the Internet.

The safety design of reverse logistics management information system
Security design has a very important role in the reverse logistics management information system design using C / S + B / S computing model, the B / S mode needs to consider from the data access control and access control of the Web page, prevent outside intrusion and attack [7]. In addition, network security and data security technology is also considered priorities.

(1) Data access control, security design. The design of data access security is a core part of the entire management information system security design, according to the characteristics of reverse logistics management information system design, the use of role-based access control (Role-based Access Control, RBAC). The technology, the user is divided into its role in the organization, the visitor's permission to change the course of the visit, in an environment where users assign certain permissions to access system resources in another environment the user can also be assigned different permissions to access the system. RBAC is an effective implementation of business-oriented security policy access control, flexibility, convenience and safety features, and the universal application of rights management of large database systems. Role defined by the system administrator to increase or decrease of the role members can only be executed by the system administrator that only the system administrator has the right to define and assign roles. Users without direct contact with the object only through the role corresponding to enjoy the role permissions to access the corresponding object [8].

$$\hat{\gamma}^{(\eta)}(m|m) = \hat{\gamma}^{(\eta)}(m,M)$$
$$= \Phi_w(m-1)\hat{x}(m-1,M) + \sum_{s=1}^{M}\overline{K}^{(\eta)}\left[z(m,s) - \Psi_w(m,s)\hat{\gamma}^{(\eta)}(m,s)\right]$$
(2)

(2) Web page access control security design. This is the B / S mode of management information systems security issues must be considered. Access control to the page you want to design: First, the user authentication and authorization, certification is to confirm the legality of the user authorization is certified can visit the web page has been authorized in two parts. Pages customized according to user permissions, the user's permissions in the design page, the page each link before the user's authority to judge, if the user does not have permission to access the corresponding page of this link, it is necessary to hide the link [9]. This design can not only prevent the information was leaked and friendly interface.

(3) Network security design. Network Security Firewall technology, the network firewall technology is an isolation technique in order to strengthen the network between the access control, security barrier between the inside and outside the network. The firewall technology to prevent the external network users to illegal means is in order to enter the internal network to access internal network resources, and enhance the security of internal network through the external network. Firewall filter firewall and proxy service firewall two implementations.

$$P^{(\chi)}(m | m) = E\left\{[X(m) - \hat{X}(m | m)][X(m) - \hat{X}(m | m)]^T\right\}$$
(3)

(4) Data security design. Data security technologies are in order to encrypt data. Encryption technology is divided into a symmetric encryption and asymmetric encryption two. Symmetric encryption using a single key to encrypt or

decrypt the data, the computation is very small, but the encryption efficiency is particularly high. Asymmetric encryption is used to complete the encryption and decryption, public key and private key with the encryption technology in the extensive use of the Internet. Used in the practical application, usually a combination of the symmetric encryption and asymmetric encryption. Another use of data backup and recovery technology is in order to prevent data loss.

4 Reverse logistics management information system implementation
According to the characteristics of the C / SB / S computing model structure, using the ASP.NET development technologies, as well as C # as the development language, the SQL server 2000 back-end database management system, Web server using IIS 6.0. ASP.NET has a powerful language support, error handling and debugging features, can provide higher security and more components, and the use of advanced database access techniques. Microsoft launched a Web application development technology [10]. ASP.NET, ADO.NET is. NET Framework, it is specifically for the NET platform data access operation and the establishment of new database access model. ADO.NET DataSet (data sets) using the offline way to access data on the local DataSet data to add, delete, modify and update the data, which can provide a platform for interoperability and scalability of data access.

C # is Microsoft's object-oriented languages, it can quickly develop a variety of applications on the Microsoft.NET platform, while the NET provides the tools and services to take full advantage of the computing and communications functions. C # can improve the development efficiency, while reducing programming errors, and has powerful features and high flexibility.

CONCLUSION

The rapid development of computer technology, communications technology and network technology, provides a good platform for the construction of information to the reverse logistics. Reverse logistics is a new vision of the field of logistics; the development of reverse logistics management information system for many companies is to open up a new "blue ocean". With bar code technology, electronic data interchange (EDI) technology, radio frequency identification (RFID) technology, global positioning system (GPS) and geographic information systems (GIS) is widely used; the design of management information systems will play in the reverse logistics system an increasingly important role. Reverse logistics management information system developed in cooperation with other enterprises in the supply chain and e-commerce standards, this issue remains to be more in-depth study and exploration.

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