Evaluation and development countermeasures on reverse logistics operations under E-commerce environment

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Abstract

Consumers have been accustomed to undertaking routine logistics activities through e-commerce websites with the expansion of original e-commerce over the past few years. Under this circumstance, people are gradually paying more and more attention to unique operation models of reverse logistics. In this paper, unique environment of e-commerce and outstanding characteristics of its logistics operations were clarified and analyzed. Besides, distinct novel model of reverse logistics was objectively evaluated and a special evaluation model was constructed. Besides, appropriate development strategies were explored according to current market situation as well. Unique evaluation models for reverse logistics are helpful for enterprises to solve multiple difficulties under new frameworks. It is necessary for enterprises associated with reverse logistics to identify consumer demands, properly process real-time information and guarantee quality improvements in logistics.

Keywords: e-commerce environment, reverse logistics evaluation; model evaluation; development countermeasures

1 Introduction

According to special logistics terms of "Chinese National Standards", reverse logistics are divided into returned logistics and distinctive logistics for waste [1, 2]. Through reverse logistics, the resources within an area may be properly recycled and associated waste may be scrupulously disposed of. With clear planning characteristics, reverse logistics integrate the procurement of raw materials, predetermined product preparation, information measurement for consumption characteristics and storage logistics during product flow together. Additionally, it regulates and controls all associated parts of the entire framework [3-6]. European Management Association considers that reverse logistics characterize re-use, including initial planning, product preparation, control over raw materials and inventories as well as product distribution and repair. Relevant American executive committees report that the flow of articles from an area where they are consumed to the place of origin shall be determined to be reverse logistics. Unique flow of reverse logistics may make up hidden defects of products, restore products to have original value and correctly dispose of products. Compared with the models within traditional framework, the novel model upon which the reverse logistics depend has multiple remarkable differences. According to SWOT analysis, characteristics of related operation models may be summed up and objectively evaluated. Enterprises are supposed to clarify changing market conditions to make decisions prudently as long as they accept reverse logistics.

2 Research background

Constructed based on information technologies, e-commerce is an operation model with novel characteristics. It hasn't only changed original yield-related plans, but also affected continuous product circulation in a new stage [7-10], on the grounds that novel and special procedures have been preliminarily determined for online transactions for routine business activities. Nevertheless, some real objects can hardly be circulated through internet. Therefore, logistics system shall be made available in expanding e-commerce so as to guarantee the sources. The trading partners predetermined for e-commerce are somewhat abstract but not intuitive. Consumers can only discriminate performances of commodities according to given pictures during online transactions in case that no real objects are provided for reference. However, there are potential differences between real commodities and the pictures posted on websites.

Consumers get rid of online shopping due to lack of optimum channels for returning goods. In the past few years, people have gradually accepted the re-use of resources because of their increasing awareness of environmental protection. As a result, reverse logistics have been expanded as a unique new model. The interconnected information mechanism is a part of correlative mechanism for reverse logistics and it is indispensible for expanding e-commerce. The reverse logistics shall rely on internet to achieve development as well, or else it will fail to increase its efficiency. This paper clarified how to scrupulously select a proper operation model according to corresponding characteristics under e-commerce environment. Subsequently, development strategies were put forward after evaluation.

3 Clarification of research methods

In this paper, following research methods were adopted, including summing up original theories, summarizing practical characteristics and comparing different models.

In existing research, foreign and domestic scholars have defined reverse logistics from different perspectives. The practices have proven that reverse logistics may cover

collection, inspection, detailed classification, continuous reuse, sorting and disposal of articles. A complete interconnected logistics system needs to be established for reverse and forward logistics. Thus, the reverse logistics shall be relatively slow, uncertain, promiscuous and hierarchical. In addition, its costs are rather high as well.

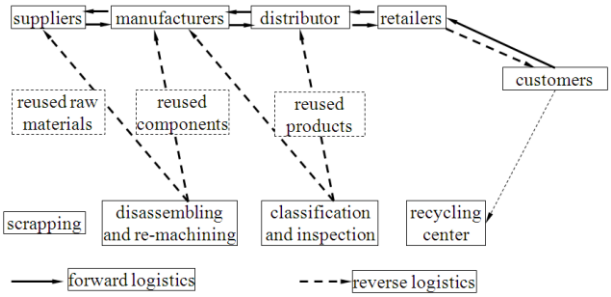

FIGURE 1 A summary of logistics framework

4 Evaluation and analysis of models

4.1 A NEW MODEL FOR JOINT OPERATION

In an e-commerce framework, the joint operation concerning reverse logistics means that an enterprise collaborates with a third party or a relevant enterprise with identical characteristics to establish strategic collaborative relationships. In this way, the enterprises involved shall share the earnings of all stages and hidden risks.

The model proposed in this paper involves following mechanism: A consumer apply for sales return through online customer services. The customer service specialist will submit the application to predetermined recycling center upon the acceptance of the application. Next, the center established under the joint framework will assist the sales return through door-to-door services and deliver collected products for subsequent inspection and acceptance. Meanwhile, the joint center will feed associated information back to corresponding customer service specialists, who will refund the payments due by online settlement through Alipay or other terms of payment.

4.2 FUZZY EVALUATION PROCEDURES

A variety of risks are hidden in e-commerce, a novel environment. The evaluation mechanism for operation models tends to be highly uncertain. Such subjective discrimination is usually vague, so it is necessary to specify boundaries and particularly quantify different factors within the system in different stages of evaluations. Only in this case can the evaluation data be guaranteed scientific to provide clear instructions for subsequent procedures.

First of all, the evaluation objects shall be identified to determine an object set. In evaluating multiple different common things, it is necessary to clarify the total amount of selected objects and set it as L. The overall set of evaluation objects ranges from n_1 to n_l and it may be characterized with a formula, namely N=(n_1 ,..., n_l).

Secondly, associated factor set shall be specified. Reverse logistics are connected with various factors, so corresponding set is determined to be factor set, which includes the indices to be measured within multi-tier frameworks. Assuming the predetermined index set is M, various associated factors may be expressed through a formula as follows, namely M=(m_1,...,m_n).

Thirdly, a set shall be created for comments. The set of comments are subdivided into a subsets according to the actual demands investigated. A pertinent judgment shall be made for all sub-factors, upon which all judgments are represented by b. Thus, the constructed set of comments may be determined to be: a=(b_1,...,b_a).

Fourthly, there is a need to determine a feasible weight set. The importance of an element may be judged according to original concept of weight. In this case, the determined set covers corresponding sets of a multi-tier framework. Then, weight of corresponding indices is identified according to hierarchical evaluation procedures.

4.3 ESTABLISHMENT OF AN ACCURATE MATRIX

The element correlations under fuzzy situation can be transformed into an accurate matrix with evaluation characteristics. For instance, M is used to characterize the comment-related membership. For indices that can hardly be measured, like management measures for different stages, a special path may be preliminarily determined according to fuzzy statistics, so as to identify the membership. In this way, a distinct comment hierarch may be obtained as follows:

$M = \frac{x_m}{\sum x_m}$, where x represents the subdivided index.

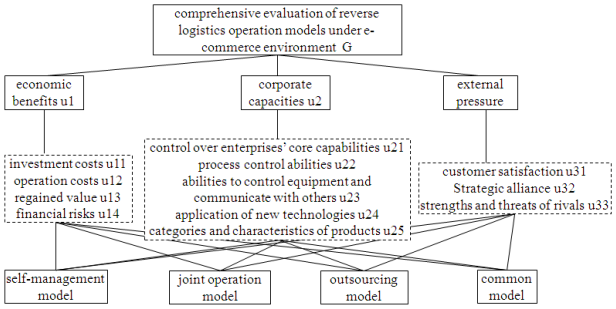

FIGURE 2 Unique network diagram for fuzzy evaluation

5 Research implications

5.1 ORDERLY DECREASE OF SALES RETURN

It is inadvisable to ignore common forward logistics. To limit and reduce return sales, it is necessary to conform to original logistics procedures, guarantee predetermined amount of delivery and keep consistent with planned orders. In a correlative mechanism, the hierarchical responsibilities for sales return shall be clarified as well. Enterprises can release clear indices for sales return through the internet, in order that consumers can check them online conveniently. As a result, online shopping becomes convenient. Besides, convenient buttons need to be set on web pages, for convenient consultation in different stages. Before making purchasing plans, consumers are supposed to make multiple comparisons and scrupulously reflect on their plans, while they shall not make purchases with impulse and then return

the merchandises they've purchased.

Interconnectivity and collaboration shall be highlighted for upstream and downstream supply chains, in order to reduce the probability of sales return. Determined to be an indispensible reverse procedure of selling, sales return is associated with consumers, distributors within the middle hierarchy and providers related to supply chains. In addition, it involves logistics management of different characteristics. Internal and external collaboration shall be enhanced, or else it is impossible to promote effective communication and increase marketing efficiency.

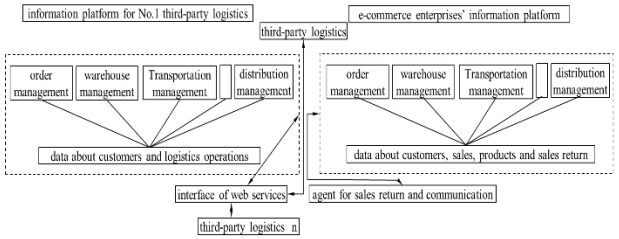

FIGURE 3 Subdivided logistics procedures

5.2 IDENTIFICATION OF FUNDAMENTAL DEMANDS

Under the original e-commerce environment, diversified operation models may be made available by outsourcing through third parties. Above procedures are overall trends in the future. The collaboration and labor division within a specialized framework shall not be isolated from common logistics procedures. Meanwhile, proper information networks shall be constructed according to the information communicated through electronic means. In this way, the sales return and the replacement of goods may be considered as evidences. The new system where the information is communicated has identified consumer needs and accept certain requests for returning and replacing goods.

Relevant commercial enterprises can discriminate dynamic logistics information through a third party. Based on the collected information, it is possible to identify predetermined starting point of logistics, geographical situation and number of platforms. In this way, the platform reduces predicted differences to the largest extent. By orderly combination of delivery schedules, the transport costs and differences of transport paths can be reduced and removed.

Virtual trading environment is clearly characterized by decentralization and heterogeneousness as the platform through which information is communicated. Thus, the reverse logistics system shall be open and have these attributes as well. To guarantee flexible interactions in different stages, enterprises need to clarify changing instructions for consumers and supply commodities with the best quality. They can freely choose appropriate third parties to be their partners.

5.3 PRACTICAL AND EFFECTIVE INFORMATION INSPECTION

Practical and effective information about logistics are helpful for enterprises to establishing a real-time reverse system. Lack of real-time data and information is a difficulty faced by reverse logistics. Thus, an information system shall be added to the overall framework, so as to make accurate information available for routine operations. Collected information about reverse logistics covers common warnings of sales return, recall of hazardous commodities and commodities that are out of the shelf life. Information intercommunication can be promoted through predetermined emails, sales websites within network frameworks or surveys.

The common system for forward logistics is determined to be EDI, whereas the reverse logistics fail to accept electronic data. Therefore, it is necessary to strengthen correlations to acquire useful information. The selected practical and effective information includes predetermined size, color and style of commodities as well as the information about waste and old commodities. Meanwhile, there is a need to orderly control subsequent distribution and dispose of wastes.

6 Conclusion

Businesses about e-commerce are being constantly expanded. Meanwhile, the sales return and corresponding costs are increasing on a nonstop basis within the logistics system. As regards the reverse logistics under e-commerce environment, it is necessary to identify customers' actual needs and randomly check the gathered information about logistics. Furthermore, the quality and quantity of predetermined delivery need to be guaranteed, so as to be consistent with the orders that have been placed. Only in this way can the sales return be reduced. The operation procedures developed for reverse logistics may control costs and improve reputation. In addition, it is favorable for increasing customers' original loyalty and facilitating steady progress by establishing optimum evaluation methods and correlated development measures.

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