

# The Empirical Research on Enterprise Logistics Cost Based on Activity Based Cost

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**Abstract**—With the rapid development of social economy, the importance of logistics has become increasingly prominent, effectively control the logistics cost accounting has become an important source of profit for the enterprise. The rapid development in science and technology today, it is difficult to improve profits from improving efficiency, saving resources and so on. However, emergence of activity based costing makes it possible to obtain accurate cost information, but also provides a powerful tool for enterprise logistics management. This article focuses on present situation of nowadays enterprise logistics cost management, through the comparison and analysis the difference between traditional logistics cost accounting method and the activity based cost method, and explain the contents, formula and related models of ABC, then we can see the advantages of ABC in logistics cost management. The application of ABC makes logistics cost accounting and control system more clear, reasonable and clear, so as to improve the accuracy of enterprise logistics cost information. Activity based cost can not only provide a clear and accurate cost information, improving the profitability of the enterprise; at the same time also is the powerful tool for implementing a comprehensive logistics management and optimization of logistics activities. Therefore, the application of ABC in enterprise logistics cost accounting is very important and meaningful.

**Keywords**—Logistics Cost; Activity Based Cost; Business Logistics Management

## I. INTRODUCTION

Since the 1990s, the logistics has gradually become an important source of economic growth, especially with the strong intervention of information technology. The logistics field gradually shows its strong power and potential infinite business opportunities. In a globalizing world, enterprise logistics has more and more tended to be networked, specialized and standardized, and effective logistics cost management has become the key factor for enterprise to obtain competitive advantage.

In the production and operation activities of enterprise, there are a lot of links belonging to the logistics activities. We can say that production and operation activities can't be normally completed without logistics activity in any enterprises, thus logistics plays an important role in enterprise production and operation activities. However, due to the limitations of the current accounting system, business accounting of logistics cost contains only external payment for warehousing and transportation in enterprises; internally generated logistics costs are classified into sales, management and other fees, and it is hard to separate the

logistics costs from the mass of the cost of enterprise management.

In this context, activity-based costing emerges at the right moment. Enterprises adopt the activity-based costing in checking the costs in order to get more accurate cost information, and control the logistics cost effectively. This article provides some references for enterprises logistics cost accounting through the introduction of the content, advantage and accounting methods of activity-based costing, and applies to the specific case of logistics cost analysis.

## II. OVERVIEW OF LOGISTICS COST

The concept of logistics cost has broad sense and narrow sense. Narrow sense of logistics cost refers to the monetary expression of a variety of living and materialized labor consumed due to spatial displacement and time occupancy of product. Specifically, it is the spending aggregation of human, material and financial resources in the process of product physical movement, such as packaging, handling, transportation, storage, distribution processing and other activities.

The so-called broad-sense of logistics cost, covers the narrow sense of logistics costs and customer service costs. Logistics activity is the key elements and important guarantee to increase customer satisfaction and enhance the customer service level. Every component of the logistics system will affect whether the customer can receive the appropriate products with proper conditions at the proper time and place. In reality, it happens quite often that enterprises lose existing customers and potential customers because of low logistics service level, which leads to customer's dissatisfaction. The losses caused by this kind of situation are the customer service costs.

## III. BASIC CONCEPTS OF ACTIVITY-BASED COSTING

### A. Concept and development of activity-based costing

The paper by Professor Eric Kohler, a scholar of accounting in America, published in the Journal of <Accounting Forum> in 1941, first discussed activity, activity account settings and other problems. Then professor George Staubus expounded the concept of "activity", "costing", and "activity-based costing" in the influential book <activity-based costing and input-output accounting>, which initiated the comprehensive introspections on traditional cost accounting system in western accounting scholars after the 1980s. Thus the

activity-based costing is gradually recognized by society, and widely used in the enterprises.

The so-called activity-based costing refers to treating activity as indirect cost binding objects, and binding resources costs to activity through recognition and measurement of resource driver, through recognition and measurement of activity cause, binding activity costs to cost accounting objects such as product, customer service and others, which is an indirect cost allocation method.

#### *B. Content of activity-based costing*

##### *1) Concept system of activity-based costing*

###### *a) Activity*

Activity refers to the cost of resources for a certain purpose within an organization, which is a necessary part of forming product and service, a bridge to connect resources and cost objects, and a core element in activity-based costing management.

###### *b) Resource*

Resource is essentially the cost that spent for making products and providing services, i.e., that resources are all the expenses. The enterprise resources include direct labor, direct material, indirect manufacturing costs and cost for outside the production process.

###### *c) Activity center*

Activity center is a collection of a series of relevant activities; it provides information on the cost of each activity as well as activity execution.

###### *d) Activity cost pool*

Activity cost pool is also known as the pool of activity cost. Every kind of resources assigned to the activity becomes a cost element of the activity cost pool. Activity cost pool is the monetary form of activity, and the sum of all the cost factors related with an activity.

###### *e) Cost driver*

Activity cost management believes that cost driver decides the cost incurred and resource consumption. Activity-based costing provides two kinds of cost drivers: resource driver and activity driver. The so-called resource driver is the reason and way of consumption by all kinds of activities, which describes the status of resource consumption in one activity or a group of activities, and is the standard of resource cost distributed to the activity center.

#### *C. Principle of activity-based costing*

Activity-based costing was first put forward by Cooper and Kaplan, aiming to improve the accuracy of enterprise cost accounting and decision-making relevance. The core of activity-based costing can be summarized as "activity consumes resources, product consumes activity". It refers to an accounting method, of which on the basis of the activity, distribute the resources consumed by the enterprise according to resource driver and distribute the activity costs to cost objects according to activity driver.

#### *D. Accounting procedure of activity-based costing*

Analyze and determine the resources;  
Analyze and determine the activity;  
Determine the resource driver;  
Distribute the resources to the activity cost pool;  
Determine the activity driver;

Distribute the activity cost to cost objects.

#### **IV. APPLIED ANALYSIS OF ACTIVITY-BASED COSTING IN LOGISTICS COST ACCOUNTING**

##### *A. The necessity of activity-based costing in logistics cost accounting analysis*

Logistics management serves two purposes: the first is to maintain and improve the level of logistics services; the second is to significantly reduce the logistics cost. In the past, enterprise adopted the traditional accounting method in calculating the cost of logistics enterprises which made the calculated logistics cost lack of reliability, but activity-based costing check the cost of all the "activity" based on "activity", which can get accurate cost information and be applied into the logistics management, having certain advance and practicability.

At present, activity-based costing is more and more applied in enterprises both at home and abroad, and achieves good results. Through activity-based costing, we can analyze the cause of logistics activity, understand the factors causing logistics cost, seize the key elements of logistics purposefully and selectively, thus effectively control the logistics cost; we understand the efficiency of the activity through the analysis of attribution of the cost, improve the activity and eliminate non-value-added activities.

##### *B. Accounting process of enterprise logistics cost based on activity-based costing*

Introducing the activity-based costing to enterprise logistics cost accounting can eventually break through the boundaries of logistics business, and make cost accounting go deep into logistics activity level; collect costs in logistics activity and distribute the cost of "logistics activity cost pool" to each logistics service according to the logistics activity driver. Generally speaking, logistics operation cost accounting needs to go through the following stages: analyze and determine the logistics activity, and establish activity cost pool; analyze and determine the logistics resources, and establish database; determine the resource driver, and distribute resources consumption to activity cost pool; identify cost drivers, and distribute activity cost to cost objects; calculate total logistics cost.

###### *1) Determine the logistics activity*

Activity refers to the processes or procedures requiring operation coupled with resources consumption. Logistics activity is the physical transfer of material entity in organization activities, including the actual operation process of the transfer of location and time occupation. Logistics activities include transport operations, storage and safekeeping, loading and unloading handling, packaging, circulation processing, and information processing, which make up of the whole logistics activity and realize the function of logistics operation. The division of logistics operation is not necessarily consistent with the traditional enterprise departments. Some activities are cross-departmental, and sometimes a department can complete several different operations. Activities should be divided properly, and follow the principle of cost effectiveness in the determination of activities. Activities are scattered in the enterprise organization, and differs by

the size of the enterprise, the process and the organizational structure. There is a great diversity of activity classification and recognition, and drawing the activity flow chart is widely used. The flow charts express all kinds of business process in the form of network and determine the activity unit hereby. After confirming the logistics activity, establishing logistics activity center by merger and consolidation.

#### 2) Determine the logistics resources

Logistics resources are the basis of the logistics activity and the source of cost consumptions. The logistics resources of an enterprise include: labor cost, materials, maintenance expenses, depreciation and maintenance costs, etc. Definition of resources is conducted on the basis of logistics activity; each logistics activity is inevitably involved in related resources, and resources unrelated with logistics activity should be removed from the logistics cost accounting. has nothing to do with the logistics operation of resources from the logistics cost accounting. The amount of logistics resources cost can be worked out from the general ledger and subsidiary ledger or its processing. Common activities and resource consumptions of enterprise in the following table:

Logistics activities	Resource consumptions
Purchase	processing fee of PO, travel expense
Transport	The third party traffic expense, road toll, vehicle depreciation, fuel bills
Storage	inspection fee of in-put and out-put of warehouse, warehouse rent, depreciation cost
Handling	handling fee, equipment depreciation cost
Distribution processing	packaging material fee, equipment depreciation cost, process cost
Delivery	Sorting fee, depreciation cost, traffic cost

Figure1. Enterprise resource consumptions

#### 3) Driver of distributing resources

Driver of logistics resource reflects the causal relationship between resource consumption and quantity of logistics activity, explain the reason, mode and quantity of the resources consumption by each activity, and is the standard of logistics resources distribution into the activity. The following table lists the several specific resource drivers.

Cost elements(resource)	resource driver
labor	consumption of labor time
Power	consumption of electric power
House rent	usable area
Traffic cost	travel distance

Figure 2. Instance for resource driver

According to resource driver, distribute the logistics resources to each logistics activity center, and form logistics activity cost pool. The actuarial formula of distribution rates during resources decomposition is: A logistics resource distribution rate = total cost of the logistics resources ÷ total quantification of resource driver; Among them, quantification of cost driver is determined by logistics resource driver, which gets the total quantification by adding the crew size, travel distance, etc. After calculating the resource distribution rate of each logistics, multiply the rate by the total resource quantification of corresponding logistics activity center in order to get the consumption cost of each logistics activity center.

#### 4) Driver of distributing activity

Driver of logistics activity is the reason and mode of final cost object consuming logistics activity, reflecting the frequency and intensity of cost objects using logistics activity. Two principles should be followed in the choice of activity driver:

the difficulty of the measurement of activity driver, namely to consider whether the data of cost driver is easy to achieve. The cost is not too high if achieved in the existing cost system, whereas the cost increases if collecting data by setting up new system.

The relevance of activity driver and real resource consumption cost. If the differences between activity consumption calculated on the basis of a logistics activity driver and real consumption are too big, reselect the activity driver with high correlation.

Apply the formula to calculate the distribution rate of logistics activity cost pool after determining the activity driver:

Distribution rate of a logistics activity cost pool= the total cost of a logistics activity pool ÷ the total quantification of cost driver of the cost pool;

#### 5) Cost calculation

After determining the activity cost drivers, accumulate the cost to product or service through calculation. The distribution of activity cost of each activity cost pool between objects of cost calculation should calculate the logistics activity cost of objects by determining the distribution rate of cost driver. The formula of distribution calculation is as follows:

Cost driver distribution rate= the activity cost incurred in a logistics activity center÷ the activity volume supplied by the logistics activity center;

The allocable logistics activity cost by objects of cost calculation=number of cost driver of the activity consumed by the objects of cost calculation× distribution rate of cost driver;

The indirect cost of logistics activity by the objects of cost calculation is equal to the sum of the allocable each activity cost of the objects of cost calculation;

Through the above formula, we can calculate the indirect costs of enterprise logistics operation precisely and clearly, and then get the direct consumed cost by subsidiary. The enterprise logistics cost is the sum of the two.

## V. CONCLUSION

Logistics cost has been regarded as "the third profit source", from which enterprise's attention and concern to logistics cost can be seen, but the current accounting system, to a certain extent, restricts the enterprise logistics cost management. With the development of social economy, science and technology, more scientific method will gradually be introduced into the cost management field.

This main research content of the paper is on the basis of the achieved research results in theory and practice, and the paper introduces specific cases for analysis, which is

more convincing through the comparative analysis of the advantages and disadvantages of traditional accounting method and activity-based costing.

Activity-based costing fundamentally solves the defects of traditional cost method. However, some common cost problems which are inevitable applying the theory of activity-based costing to the practical operation, and the subjectivity in choosing the cost drivers are all the imperfections need to be overcome in the future development. With the in-depth research and development of technology, the enterprise will be increasingly strict with the requirement for cost information, and the application areas of activity-based costing will be increasingly wide.

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