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A Study on the Application of Activity Based Costing in Chinese Logistics Enterprises

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Abstract: With China's sustained economic growth, China's domestic industry development environment has been greatly improved. Scientific and technological level of Chinese society today has got a substantial increase; domestic logistics industry has also achieved a rapid development. However, compared with the logistics enterprises of other countries, Chinese logistics enterprises costing system is still lagging behind and cost management awareness is relatively weak. This study is aimed at discussing the practical application of the Activity Based Costing (ABC) system in the logistics business enterprise based on the analysis of cost management status of logistics from the microscopic point of view. First, the study analyzes the current development of Chinese logistics enterprises, discusses the current status and problems of Chinese logistics enterprise cost management. Then it gives an introduction of ABC, an analysis of its necessity and feasibility and accounting procedures for China's logistic enterprises. Finally, based on a case study, the study gives some solutions and suggestions for the application of ABC in China's logistic enterprises.

Key words: Activity based costing; logistic enterprises; cost management

INTRODUCTION

Current development of Chinese logistics enterprises:

According to statistics, in the first half of 2012, there was continued growth in demand for logistics in China, which directly led to a series of problems, such as the growth of logistics industry, the increase of logistics costs and ultimately the tension in the entire business environment.

The current China's logistics business has the following characteristics: (Cooper, 1988) Stable and relatively rapid growth of logistics demand. Compared to 2012, the logistics consumption in China maintains about 1.4% increase (Cooper and Kaplan, 1988). The rise of total logistics costs. Compared to the last year, today's social logistics total costs increased by 18.5% (Cooper, 1991). The normal drop of growth speed of fixed asset investment in the logistics industry. Compared to last year's asset value, it fell by 6.5% (Hussain and Gunasekaran, 2001). The significant shrink of profits of logistics enterprise. Although this year's profits had showed an upward tendency, compared with last year, its growth speed still fell by 33.2%.

CURRENT STATUS AND PROBLEMS OF CHINESE LOGISTICS ENTERPRISE COST MANAGEMENT

Current status of Chinese logistics enterprise cost management: Since the reform and opening up, the

economic growth rate of China has been faster and faster, which directly promoted the development of Chinese logistics industry. However, the logistics costs of Chinese logistics enterprise are much higher than that of the developed countries, between which there is an obvious gap.

Activity Based Costing Federation of Logistics and Purchasing indicated in 2012 that Total Cost of Social Logistics divided by GDP equals Total Social Logistics costs divided by GDP, which was 18%, both with a year-on-year growth of 0.1%. Per the statistics, Total Social Logistics Costs of last year were up to 3.7 trillion RMB and compared with the growth rate of last year, this year raised by 0.7%. The ratio of logistic cost to GDP is the indicator to measure whether the logistic level of one country is developed and whether the operation efficiency is up to the standard. Compared with the ratio of logistic cost to GDP of Western countries 8-10%, the ratio of China is obviously too high, from which it shows that the logistics system efficiency of our country is lower than developed countries.

Problems existing in logistics cost accounting in China: China's logistics cost management in exploratory stage still faces many problems, which include the following aspects.

Poor awareness in logistic cost accounting: For years, the logistic enterprises have been highly focusing on the

management of cost through stipulating effective measures or policies. However, little research on the cost during the logistic process has been made. Therefore, the poor awareness of logistic cost, blindness to its role and insufficient and ineffective management on the whole process of logistic have made poor financial results to the logistic system.

Inappropriate methods on the traditional cost management: The traditional system of cost management in logistic is no longer able to provide useful cost data for enterprises to check the operation flow, neither able to meet the demands of managers. It has been wrongly ignoring the relation between cost distribution and consumed resources. The recent monotonous distribution mode where an indirect operation fee takes a relatively high proportion is likely to provide wrong information to logistic enterprises. Recently, most logistics enterprises have not adopted advanced ways of cost accounting.

Confusion in cost management in logistic enterprises: The logistic enterprises in China have not built an exclusive cost management mode. Without accurate and clear cost materials, the accounting on cost is already a serious issue, let alone its budget, analysis and management. Therefore, the cost management should be based on cost accounting. Unfortunately, China's logistic enterprises still focus on the decline on logistic costs, instead of the cost-effectiveness.

Distortion and deficiency on accounting information of logistic costs: The existing financial and accounting system for China's enterprises has not established independent subject to check the logistic cost, which means there is no standard for the accounting. Meanwhile, credible statistics are short of for the calculating and management on logistic cost are conducted by enterprises. This has brought a serious issue that the calculating data concerning logistic cost are deficient in all the industries and the logistic enterprises have to calculate and control logistic costs based on their own understanding. Two reasons are behind the problem, first, the defaults in accounting system; second, deficiency of accounting system on logistic cost.

AN OVERVIEW OF ACTIVITY BASED COSTING

First, we should follow the guidance that Activity Based Costing is our accounting subject and that "resources are consumed for production and production

brings activities and costs". Activity based costing is produced when resources assigned to activity and resource driver identified through measurements. Then costs on service products emerge through the analysis on resource driver. That is the overview of Activity Based Costing.

An accurate cost on service products is obtained through the verification and computation on activity and activity based costing. Furthermore, all the activities related to service products should be analyzed and reviewed so as to optimize the "activity chain", improve the "value-added activity" and eliminate "no-value-added-activity" as soon as possible. It is nature that the plan, management, polices and decisions should be more effective and science-oriented in order to increase the benefits of enterprises, its competitiveness and value. Besides, more information should be provided and consumption and damage brought to a lowest point. Therefore, compared with other accounting methods, Activity Based Costing is more precise and credible in the operation of enterprises as it is a distribution for ancillary resources and indirect costs.

NECESSITY OF ACTIVITY BASED COSTING FOR CHINA'S LOGISTIC ENTERPRISES

Since the traditional logistic enterprises have not paid enough attention on the management of logistic costs and surely large quantity of inappropriate and no value added activities are existed in the process of logistic, it is an urgent to conduct research on logistic activities and the values it brings. Recently, the traditional accounting methods on costs are still adopted in most logistic companies. However, the specialty of logistic enterprises and various defaults in their cost accounting system have made the application of Activity Based Costing a necessity, which reflects as follows:

High indirect costs and various service products: Traditional allocation of costs is quite simple as only one standard for allocation is adopted and only the simple factors are considered in the allocation of indirect costs that it cannot precisely reflect the information of costs and leads to decision failure. In this sense, this method is only available for the case when indirect cost is of small quantity. However, in recent cases in logistic companies, the products are assorted and the indirect cost takes a big proportion in the total cost which is difficult to trace. That is to say the traditional method is no longer able to meet the demands of cost accounting in modern logistic enterprises. And the Activity Based Costing proves to be quite effective.

Difficult pricing on service products and inaccurate information on costs: It is difficult to price the service products for the specialty of logistic service itself. Hence, Activity Based Costing is adopted to solve the problem. It focuses on the reasons of costs and obtains the information of costs on service products through the analysis on activities. The information will be quite helpful to price the service products appropriately. Besides, while traditional method often provides wrong information goes against reality and thus confuses the profits and leads to decision failure, the Activity Based Costing increases the accuracy of cost information, ensures the reasonable decisions and makes the enterprise more competitive.

Cooper (1991) fierce competition for logistic enterprises: Activity based costing has been popularized in many western countries. Ninety percent of American enterprises have been adopted the method and the number is still climbing. With the advancement of economic globalization, competition in China's logistic field is increasingly fierce. Therefore, if these logistic enterprises still adopt the traditional accounting method with plenty of defaults, they will lag behind in international market and face illicit competition. In this sense, in order to meet international standard and stand firmly in the fierce competition, these companies must adopt Activity Based Costing to obtain effective cost management.

ACCOUNTING PROCEDURES OF ACTIVITY BASED COSTING IN LOGISTIC ENTERPRISES

Logistics service products give birth to logistics operation and the later finally leads to the resources distribution and contract cost in the process of logistics operation. Generally speaking, logistics enterprises have to follow the following steps when implementing Activity Based Costing.

Confirm the main activity and build the operation center: Activity is the core element in the activity cost management; the basic unit in the accounting of Activity Based Costing; the bond connecting resources and cost object. In order to avoid the complexity of calculating the activity cost, we should combine the activities and build an activity center after confirming and understanding them. While building the centers, we need to build an exclusive cost center for the activity if it is quite important. Otherwise, we will consider to combine those activities which similar and of little importance. Besides, it also needs to be mentioned that all the activities under the same center should have the same cost drive and allocation rate.

Ascertain and calculate costs on resources: Resources are the items that will be paid to provide service and produce products. Expect direct materials, labors and indirect costs on manufactures, it also includes the costs on maintenance and other areas besides production. In the accounting of logistic costs, resources and activities are closely bonded. It is the usual case that activity is confirmed through resources and those unrelated ones are supposed to be ignored. In the process of accounting, a resources base should be build first and meantime an account base integrating the same or similar accounts. Then calculate the accounts related to different activities independently and fill these numbers into account base accordingly.

Clarify the resource drives and allocate the costs to different operation centers: Resource drives are the basis of allocating resource costs, mainly referring to the modes and reasons that resources consumed. The research on the drives will be conducive to clarify the activities and make targeted improvements, which can be catalogued into three parts, integrate activities reasonably to build operation centers; allocate resource costs on the basis of centers, which means assign the costs to activities accordingly; ascertain the effectiveness of activities, analyzing the consumption of resources by activities.

Generally speaking, if expenditure is spend on different activities and then a resource drive should be confirmed based on the mode of consumption. In the logistic accounting, the drives that have been frequently used are times, distance, acreage, figures and so on. Enterprises may allocate resources based on the drives or other factors to make sure the costs assigned to activities centers will be authentic and reliable. The formulate as follows:

- Costs of resource assigned to an activity Cost of resources Resource drive coefficient
- Costs of resource assigned to all activities Cost of resources Resource drive coefficient

Ascertain the activity drive and calculate allocation ratio of center costs: The resource cost should be assigned to activity based cost center after it is confirmed. However, it is a big issue to allocate the assigned costs to the objects. And that's the time when activity drive should be brought in. Activity driver mainly refers to the mode and reasons the final products produced and its main purpose is to uncover the dynamic cost driver.

The formula of cost rate as follows:

- Factor rate Total profit/ Activity driver number

Allocate the activity costs to service contracts: After the factor rate is worked out, the next step is to calculate the activity spend on cost object and assign the activity cost accordingly. The indirect logistic cost is obtained after accumulating all the activity costs, through which the indirect cost of service contract is worked out which plus the direct cost, a total cost is reached. The formula of activity cost as follows:

The supposed activity cost of a cost object = The used
cost driver number×the factor rate

Activity cost of a cost object = Sum of all the activity
costs assigned to the cost object

That's the five steps the total cost of a cost object worked out through Activity Based Costing. The purpose of logistic enterprises adopting Activity Based Costing is to ensure the accuracy of cost information and improve their competitiveness and management through the pricing of service products, control on costs and analysis on profits.

CASE STUDY OF THE IMPLEMENTATION OF ACTIVITY BASED COSTING

Case background: A logistics company in Jiangxi province Nanchang city is a large private logistics service corporation. For a long time, the logistics company to provide comprehensive service for the enterprise modern logistics business.

The company has A, B two major customers. Recently the logistics company found that the two customer has different satisfaction of logistics services, A customers think the price is too high, while the B has no opinion. The logistics companies and two customers have the same distance. Previous companies have adopted the traditional cost method to calculate the logistics cost, recently the company to make a reform in cost accounting, under the direct leadership of leadership, all using ABC cost method to calculate the logistics cost.

The logistics company and the AB company signed the contract, the logistics service process consists of the following three conditions:

- The logistics company signed only A, B two in the month of service contract, contract for a period of one month
- Cooper and Kaplan (1988) A, B two companies in two locations in the same distance from the logistics company

The specific requirements of customers with services companies signed contract A, a one-time 30000 pieces of goods to the company's warehouse for safekeeping, then every three days to a group of 3000 pieces of goods in country B in enterprises.

The specific requirements of customers and company B signed a service contract is, in three times there will be 30000 pieces of goods to the company's warehouse for safe keeping and then transported daily 1000 to B in the enterprises.

In distribution of the logistics company warehouse A contract need to lease warehouse 800 sq. m, while the B contract to lease 600 sq. m. Because the material cost in the tag can be ignored, the goods itself tray, warehousing and customs clearance documents are electronic, so A, B two copies of the contract do not need direct materials, enterprises need only included in the operation of indirect costs of enterprise in accounting, namely wage costs and the cost of materials, so that is all operating costs only in direct cost of this part.

Activity-based costing method in the implementation and analysis of logistics enterprise: The company has just opened near the activity-based costing, activity-based costing model still uses the basic model According to the application of Activity-Based Costing in logistics enterprises of general accounting procedures the logistics companies using activity-based costing two logistics contract cost procedures are as follows.

Cooper (1988) identify the main operation, set up operations center. The AB two copies of the contract related to the job category separately finishing, can draw a clear operation chain, is mainly the following six operations, transportation, customs operations, warehousing, storage, a library operations and distribution operation.

Cooper and Kaplan (1988) the recognition and measurement of various resource consumption Indirect working expense can be obtained from the logistics company's finance department and general ledger. (in all labor indirect cost of logistics company, comprising only three most salary costs, material costs and depreciation costs. Among them, material cost of land handling equipment of automobile consumption in the transport process of the consumption of costs and depreciation costs, the Lord is depreciation vehicles handling equipment and warehouse) after finishing as shown in the following Table 1.

Cooper (1991) Confirm the causes of resource, the resource cost is assigned to each work center cost pool. In the logistics company, six operations associated only

with more than three departments, transportation and distribution work belongs to the company's Department of transportation, storage and warehousing operations and custody work belongs to the company's warehouse, in the logistics company, set up specific professional responsibility to work. After confirmed the causes of resources, the resource cost allocation below.

The allocation of labor costs. In wage costs, wages total cost of this month's transportation sector is 9000 yuan, resource driver wage costs is the total percentage of personnel involved in the operation. In the company transport department, transport operations personnel probably accounted for the total number of transport sector 1/3, distribution operations personnel probably accounted for the total number of transport sector 2/3. Because the number of inbound and outbound is the same, so the cost is engaged in the import and export business resources are the same, namely wage costs in the warehouse operation in the average distribution, each accounted for 1/2. Wage costs known customs declaration for 3000 yuan, responsible for submitting homework. Warehousing department responsible for custody business personnel wage is 2000 yuan. All data is calculated as follows:

- **Allocation of material cost:** The ledger shows this month material costs 20000, use material cost is very simple, just arrived after the logistics companies in the goods in warehouse operations but also for the two process, the quantity of goods, the handling equipment is the same, so these two operations are symmetric operation

So, the material cost should be the average allocation in storage and warehousing operations, the occurrence of the warehouse storage and warehousing operations material costs were 10000 yuan.

Is the allocation of depreciation expense: Is the allocation of depreciation expense. In the logistics company, the logistics service, the total depreciation expense is 56000 yuan, occupy the proportion of working

equipment is the resource driver depreciation expense. Through the investigation on the company, the general ledger shows the transport sector depreciation expense is 38000 yuan, of which, for vehicle depreciation expense distribution operation is 28000 yuan, for transportation vehicle depreciation costs 10000yuan, used to maintain operations in warehouse depreciation expense is 5000 yuan. The rest of the 13000 yuan for the use of equipment in the process of storage and distribution of depreciation, the warehouse equipment are exactly the same, then some costs are evenly distributed among the storage and warehousing operations, each accounted 50%, according to computation, warehousing and storage operation depreciation costs are for the $13000 \times 50\% = 650000$ yuan.

Hussain and Gunasekaran (2001) confirm that the job motivation, calculated the cost center cost rate: In the previous chapter, we mentioned, job motivation reflects the consumption of products work, confirmed the activity driver will be able to get the operation cost spent on each object in the. In the allocation of work motivation, attention should be paid to the activity driver to reaction is a logical relationship between object and operation cost and the cost of consumption demand on the job object (in the logistics company example, two parts of AB logistics service contract for cost object, the six assignment collection cost is cost. Transportation cost, operation cost and custom clearance operations in distribution and the number of transportation, customs clearance times and delivery times, warehousing and storage operation successively and handling cargo quantity related and keep working area associated with the warehousing used in finishing, as industry center in the cost rate Table 2 is shown as follows.

In this case, according to the activity-based costing six assignment, dynamic factor based on the above calculated the cost rate and AB two contract, they can come to AB two contract cost (assigned amount = operation factor cost rate). Cost quota and the

Project	Staff wages	Material cost	Depreciation expense
Cost	RMB 28000	RMB 20000	RMB 56000

	Transportation	Customs operations	Warehousing	Storage	Library operations	Distribution operation	
Labour	RMB 3000	RMB 3000	RMB 7000charges	RMB 2000	RMB 7000	RMB 6000	
Work center cost	Transportation center	Customs operations center	Warehousing center	Custody work center	Library operations center	Distribution operation	Total
Labour charges	3000	3000	7000	2000	7000	6000	28000
Material resource consumption		10000		10000		20000	
Depreciation expense	10000		6500	5000	6500	28000	58000
Total	13000	3000	23500	7000	23500	34000	106000

Work center name	Job motivation	Work center cost	Work factor	Cost allocation rate
Transportation Center	No. of transportation	13000	4	3250.00
Customs operations center	Customs clearance times	3000	4	750.00
Warehousing Center	Warehousing handling cargo quantity	23500	60000	0.39
Custody work center	Warehouse area	7000	1400	5.00
Library operations center	From the loading and unloading cargo quantity	23500	60000	0.39
Distribution operation center	Delivery times	34000	40	850.00

Work center name	Cost allocation rate (%)	A service contract		B service contract	
		Work factor	Quota (RMB)	Work factor	Quota (RMB)
Transportation On Center	3250.00	1	3250	3	10750
Customs operations center	750.00	1	750	3	2250
Warehousing Center	0.39	30000	11700	3000	11700
Custody work center	5.00	800	4000	600	25500
Library operations center	0.39	3000	11700	30000	64900
Distribution operation center	850.00	10	8500	30	30000

total number of the divided by the goods, it is the unit cost (cost = assigned amount/number of goods).

In this case, as shown in the table below cost quota and the unit cost of the results.

Roth and Sims (1991) the cost assigned to A, B logistics service contract.

According to the calculation of AB of two logistics cost, we calculated the cost calculation details, the unit cost for each operation, as shown in the following table.

Compared with the traditional costing and activity-based cost method: In this case, from the contract the surface, AB two contracts is almost no difference, except the way of delivery and rented warehouse area is not the same, other factors are the same. But from the table above can be seen, for the same amount of goods, the requirements of AB two contracts are all reach the same destination from the same location in the same period, according to common sense, AB two contract costs should be there won't be much difference but is calculated on the basis of activity-based costing, finally two of the contract cost is not the same, the indirect cost of A contract for 39900 yuan, the unit cost of 1.33 yuan, the total cost of the contract of the indirect B for 64900 yuan, the unit cost of 2.16 yuan, the total cost, indirect B contract is greater than the A contract the total cost and accordingly, the unit cost B contract is also greater than the unit cost of A contract.

Before implementation of the traditional cost accounting method, the calculation process, standard of distribution units operating motivation is single, calculation method which is based on the number of costs, in this case, if the accounting according to the traditional cost method before, then according to the product quantity allocation of indirect cost, because the number of the two copies of signed AB service contract for 30000 yuan, so the AB final contract allocation of

indirect cost is the same. In the traditional cost method, the AB two of the contract cost calculation steps are as follows.

The first to calculate the indirect costs of the total, in this case the artificial costs 28000 yuan, 20000 yuan for the material costs, depreciation costs 5800 yuan, so the total cost is 28000+20000+58000 = 106000 yuan. Then the allocation of indirect costs to AB two contract product total quantity is 30000+30000 = 60000 yuan, so the traditional cost method to calculate, A contract cost allocations for (106000/60000)30000 = 53000 yuan, B contract cost allocations for (106000/60000) ><30000 = 53000 yuan, it can be drawn, the unit cost of AB contract in the traditional cost method to calculate the 53000/30000 = 1.77 element

Previous logistics public used is the traditional cost method and in accordance with the general pricing method, pricing for cost plus 15%, so in this case, AB two of the contract price was 1.77 (1+15%) = 2.03 yuan. According to this data, AB two contract in any case are profitable but in the above analysis we calculated with cost accounting method of AB two contract real unit price of 1.33 and 2.16 yuan, respectively, thus, A contract for profit contract, B contract for the loss contract.

From the analysis of the application of activity-based costing in logistics company can be seen in the enterprise, the use of activity-based costing to calculate the cost, can be a reasonable allocation of resources, can accurately calculate the cost allocation but the activity-based costing method is suitable for the high indirect cost proportion of enterprises, to improve the operation process through analysis, distinguish value-added operations and non value added activity, that is to say you can analyze contract which is profitable and which contract losses, only clear these, can optimize enterprise system, to enable enterprises to better achieve the cost control.

SOLUTIONS AND SUGGESTIONS FOR THE APPLICATION OF ACTIVITY BASED COSTING IN CHINA'S LOGISTIC ENTERPRISE

While logistic business is flourishing, problems begin to emerge. The big issue that recent logistic companies need to deal with is to control the logistic cost, which requires its authentic information. The analysis on the necessity and feasibility of Activity Based Costing for logistic enterprises has convinced that its application has become a practical option. While under current circumstance, several points need to be mentioned for the adoption by China's logistic companies.

Establish an accounting system on logistic costs: First, the settings of document should fully mark the procedure of Activity Based Costing, which means a resource document should be made based on the catalogue of resources and an activity document based on the records of activity. Second, the settings of account should be reached to the curricular of logistic cost, displaying the mode that resources consumed in activities. Meanwhile, the logistic cost should be subdivided to show its structure and classification, the secondary subject is set on cost objects and the tertiary subject on cost items; subjects below third tier are for activities, divided further according to the classification of activities. Finally, a general account of logistic activity and activity cost should be made to reflect the consumption of activities in different service contracts.

Consider the feasibility of activity based costing: Most logistic companies in China are small in size, poor in management and insufficient in equipments, far from reaching the basic standard of applying the method. For enterprises like this, it would be better to adopt the method in some links and then consider the possibility of further application. Since the cost of adopting the method is high and small-and medium-size companies may still find it difficult to generate profits even considering the cost effectiveness. Therefore, enterprises should seriously consider a full implementation of activity based costing should be adopted based on their own condition and external environment. Only in this way can the method play its full strength.

Improve the information system of logistic activity cost: Activity Based Costing is more advanced than the traditional accounting methods, which in return, requires the cooperation of professional software in its implementation. Hence, we need to invent accounting software according to the characteristics of enterprises and integrate it with computer technology to realize digital

data analysis and cost accounting, improve the system of activity costs and increase the effectiveness of enterprises.

Strengthen personnel training to improve their quality: Since Professionals and management experts are the guarantee of the successful implementation of Activity Based Costing, it is a necessity to provide training and educational courses to employers. All the personnel should understand the accounting method of activity costs; and for the accountants, statisticians and computer professionals, a further education should be guaranteed to avoid artificial obstacles and build a sound foundation for the implementation of Activity Based Costing.

Obtain support from all levels of staff: The implementation of activity-based costing requires the support of all levels of staff, including senior leaders and staff. To use activity-based costing effectively, the first is to get the recognition and support of senior leaders, so that the enterprise can unify their thinking, the implementation of activity-based costing can proceed smoothly too. In other words, leadership attention and support provide basic conditions for the promotion and implementation of ABC in-house. Also, make the entire staff get consensus on ABC and its implementation methods.

Strengthen management: To better implement ABC method, the enterprise must strengthen basic management work; make a reasonable division of responsibilities of various departments to ensure the accuracy of cost information

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