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Research and Application of Activity-Based Costing in Drop and Pull Transport Enterprises Cost Management

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Abstract. In order to realize the accurate accounting, accurate tracking and effective control of the cost of drop and pull transport enterprises, this paper established the costing model based on TDABC and combined with relevant cases to explain its implementation process. The cost accounting model makes cost accounting more convenient and economic, resource allocation and activitiy process more intuitive and clear, effectively improves the accuracy of cost accounting of drop and pull transport enterprise. TDABC will avoid the offset of costs and benefits in the traditional cost method, help enterprises to understand the overall development of its own operating characteristics and provide new ideas.

Introduction

In recent years, because energy and artificial resource cost is high, the development of enterprises has faced unknown challenges. Therefore, drop and pull transport enterprises have to strengthen the control of cost of transportation logistics center. If those transport enterprises want to gain a foothold in the fierce market, it must provide customers with differentiated services by all means at the lowest cost. It is worth mentioned that, no matter in what way, transportation enterprises must regard customer demand as the purpose, monitor the whole process cost, and then realize the accurate cost accounting, accurate tracking and control. However, the tradition cost accounting method has been unable to meet the current fierce market competition and the development requirement, TDABC is more imperative and applicable for current drop and pull transport enterprises.

The Problems of the Traditional Cost Accounting Method of Transport Enterprises

The cost calculation based on traditional cost accounting method is not accurate, which cannot reflect the charges brought about by customers' demand differentiation [1]. In drop and pull transport enterprise, fixed cost is very high, and with the increasing mechanization and automation of harbour facilities, the proportion of direct labor costs is more and more small. The current indirect costs are shared averagely, that means much marketing fee produced in the process of meeting different customers' demand will be masked. Besides, the cost accounting is not enough particular and the available results are not sufficient. So the traditional cost accounting method is unfavorable for enterprise's development.

The Contrast of Activity-Based Costing and TDABC

The guiding ideology of activity-based costing concludes that cost objects consume activities and activities expend resources [2].

Activity-based costing treats both direct costs and indirect costs (including the period cost) as the product consumption cost, which broadens the scope of cost calculation and makes the calculation of the product cost more accurate [3].

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Activity-based costing is not only a kind of method to calculate cost, but also organic combination of cost calculation and cost management. Activity-based costing is based on the causal relationships between resource consumption to allocate cost: Based on the conditions of resource consumption of activities, the resources are allocated to the activities; And according to the conditions of activities consumption of the cost objects, activities cost is assigned to cost objects.

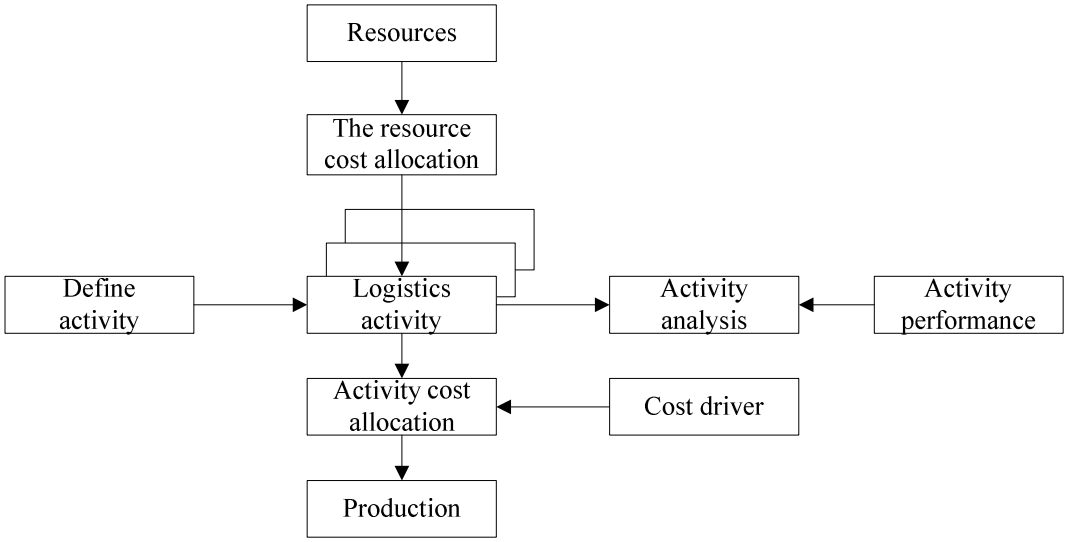

Fig.1 The relationship between the concepts of activity-based costing

However, with the traditional activity-based costing applied more and more widely, its application was increasingly limited [4]. Using the traditional ABC, the steps are as follow:

A. Enterprises ask staff to estimate the proportion of each activities time. While the process of investigation may be subjective, employees tend to distribute the 100% working hour to each of activities, which will cover the phenomenon of time wasted in the work. At the same time, it is difficult to conduct a comprehensive investigation.

B. The traditional activity-based costing asks to identify cost drivers in order to establish the cost pool. However, it takes a lot of manpower and material resources to update and maintain the cost pool due to the diversification of customer demand, which will increase the enterprise investment; If the cost pool is completed without updating, the cost estimation will become inaccurate. So this method can't be widely implemented.

C. Because measuring unit of cost drivers is not unified, it is difficult to correctly identify cost drivers, which will result in cost estimation can not accurately reflect and control the actual operation situation of enterprise.

TDABC combines resource cost drivers with activity cost drive, which takes time as unified metric tool to assess the cost. Through the reliable estimation of unit capacity cost and activity time, we can calculate the Activity Cost Driver Rate, and then get the share of the cost of each activity. TDABC eliminates the defects existing in the application of the traditional Activity-based costing, avoids some identification procedures of resource factors. Using time as the unified measurement tool, enterprise will update and maintain system easily [5].

The Steps and Calculation Model of TDABC

Implementation of TDABC is as follows:

A. Identifying the resource factors involved in activities, at the same time, establishing the resource pool;

B. Estimating the cost of each resource pool;

C. Estimating the real resource capacity which is accounting for 80%-85% of the theoretical resource capacity, it can be computed as follows:

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$$Q_n = 85\%NT_n. \tag{1}$$

In this formula: Q_n is the real capacity provided by a resource pool; N is the number of workers of the department corresponding to the resource pool; T_n is the work time of every worker;

D. Calculating the unit cost of each resource capacity, the unit cost can be computed as follows:

$$C_U = C_T/Q_n. \tag{2}$$

In this formula: C_T is the cost consumed by a department; Q_n is the capacity provided by a resource pool;

E. Determining each work time as follows:

$$T_{jk} = TX_h\, t. \tag{3}$$

$$X_h = \begin{cases} 1 \\ 0 \end{cases}. \tag{4}$$

In this formula: T_{jk} is the time consumed by link j of production activity k; T is the time consumed by an activity; t is the time consumed by the activity h; X_h=1 expresses that the activity h is executed; X_h=0 expresses that the activity h is not executed;

F. Calculating logistics cost as follow:

$$C = \sum_{i=1}^{n}\sum_{j=1}^{m}\sum_{k=1}^{l} T_{jk}C_i. \tag{5}$$

In this formula: C is the total cost of this target; T_{jk} is the time consumed by link j of production activity k; C_i is the unit time cost of resource pool i; n is the number of the resource pools; m is the number of the activities; l is the time of the activity j executed.

Visibly, there are only two parameters that need to be estimated according to TDABC: the resource capacity cost and the time consumed by each work.

Assuming that a department of the drop and pull transport enterprise have 20 people who work 22 days every month. Everyone will work 8 hours a day. This department's indirect costs are 224400 RMB monthly. The department is engaged in the bill of lading, picking work and shipping inspection. In a month, the department finished 4000 bills of lading, including 1000 emergency orders; It finished 1400 times of picking, including 800 times for special goods; It finished 2700 times of shipment inspection, including 1700 times for special goods. The time consumed by the department is shown in table 1 and the cost of accounting based on TDABC is shown in table 2.The calculation process is as follows:

The capacity provided by the resource pool is 20×8×22×60×85%=179,520 min.

The unit cost of each resource capacity is 1.25（224400/179520）RMB.

Table 1 Each activity's time consumption

Activities	T (min)	X_h	Time to change (min)	T_{jk}
Bill of lading	10	X_1=1	8	3000×10+1000×18= 48000
		X_1=0		
Picking	30	X_2=1	20	600×30+800×50= 58000
		X_2=0		

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Shipment inspection	10	X_3=1	20	1000×10+1700×30= 61000
		X_3=0		

(Note: X_1=1 expresses the orders are emergency ; X_2=1 expresses the goods are special; X_3=1 the goods are special.)

Table 2 Each activity's cost estimate

Activities	T_{jk}	The unit cost of each resource capacity	Cost sharing
Bill of lading	48000	1.25	60000
Picking	58000	1.25	72500
Shipment inspection	61000	1.25	16250
Total capacity consumption	167000	1.25	208750
Total capacity	179520	1.25	224400
Unallocated capacity	12520	1.25	15650

We can know clearly the cost sharing of the three activities of a department of the drop and pull transport enterprise from table 2, there are 12520 minutes that has not been effectively utilized, which results in the wasting of resources that have value of 15650 RMB. At the same time, this paper just is to further illustrate how to apply TDABC to calculate logistics cost, thus we only choose the representative activities.

Summary

Firstly, TDABC is convenient and economic. Compared with traditional method, TDABC avoids the complex process of allocating resources to activities and keeps updating the cost pool whenever necessary, so the cost estimation of drop and pull transportation enterprise will be more accurate.

Secondly, the rational allocation of resources is visual. The costing based on TDABC can clearly reflect some phenomenons, such as effective utilization of resources, waste and so on, which is not good for the development of the enterprise. TDABC can help managers for effective decision-making and management.

Thirdly, the operation procedure will realize visualization. TDABC can reflect consumed time of specific activities by equations. For those activities who take more time, enterprise can accordingly improvement these links so as to reduce costs; TDABC can reveal the special activity time consumed for different demand from customers and the profits from these group, so enterprise should adjust strategy to maintain customer relationship.

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