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The Study of Cost Accounting in S Company Based On TDABC

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***Abstract*—**Third-party warehousing logistics has an important role in the development of external logistics. At present, the third-party logistics in our country is still a new industry, the accounting system has not yet been established, the current financial accounting system of third-party warehousing logistics is mainly in the traditional way of thinking, and only able to provide the total cost information of the entire enterprise during the accounting period, unable to reflect operating indirect cost information. In order to solve the problem of third-party logistics industry cost information distortion, improve the level of logistics cost management, the paper combines theoretical research and case analysis method to reflect cost allocation by building third-party logistics costing model using Time-Driven Activity-Based Costing(TDABC), and takes S company as an example to account and control the warehousing logistics cost.

Based on the idea of "Products consume activities and activities consume resources", TDABC put time into the main cost driver and use time-consuming equation resources assigned to cost objects. In S company, the objects focuses on three warehouse, engaged with warehousing and transportation (the second warehouse, transport point) service. These three warehouse respectively including five departments, Business Unit, Production Unit, Settlement Center, Security Department and Equipment Division, the activities in these departments are classified by in-out of storage forecast, in-out of storage or transit and safekeeping work. By computing capacity cost rate, building the time-consuming equation, the paper calculates the final operation cost so as to reveal the real cost.

The numerical analysis results show that the TDABC can accurately reflect the cost allocation of service customers and reveal the spare capacity cost of resource center, verifies the feasibility and validity of TDABC in third-party logistics industry cost accounting. It inspires enterprises focus on customer relationship management and reduces idle cost to strengthen the cost management of third-party logistics enterprises.

***Keywords*—**Third-party logistics enterprises, TDABC, cost management, S company.

I. Introduction

FROM 2004 to 2011, logistic operation maintains good posture in our country, the total amount of social logistics had increased from 38.4 trillion Yuan to 38.4 trillion Yuan, played an important supporting role for the steady and rapid development of national economy. However, our country is a manufacturing powerhouse; the main power of promoting our total social logistics is industrial logistics. For reducing logistics costs, some manufacturing is looking for third-party companies to achieve product non-core business such as transportation, storage, which greatly promoted the development of the third-party logistics in our country.

At present, the third-party logistics in our country is still a new industry, the country has not yet been established the accounting system of the third-party logistics enterprise, the financial accounting system is mainly in the traditional way of thinking, and only able to provide the total cost information of the entire enterprise during the accounting period, but unable to reflect operating indirect cost information. With promotion of manage mental model, such as lean production, zero inventory management pattern, and greatly increasing the proportion of small order logistics and so on, the logistics cost accounting system in practice do not have reference for unified pattern, also lack of comparability between industry. It puts forward challenges in third-party logistics enterprise cost management; also seriously affect the cooperation between enterprises with the customers. Obviously, to subsist and develop under the environment of the increasingly fierce competition, it must be correctly measure the logistics service cost, strengthen the logistics cost control; explore the effective method of cost accounting. Based on this background, the paper propose to through summarizing the domestic and foreign related researching results, build working cost method of time model driven, explore the third-party logistics cost accounting methods by the reality of the third-party logistics company cost, also provide third-party logistics enterprise cost accounting reference.

II. Theoretical Overview

A. Time-Driven ABC Theory

Based on "Products consume activities and activities consume resources", TDABC put time into the main cost driver and use time-consuming equation resources assigned to such departments, products, services, customers and other cost objects. Typically, by settling a linear time equation, TDABC plus the estimated additional resources for different jobs to increase productivity time, Kaplan defines the time equation is [1]:

$$\text{Process time=sum of individual activity times=}$$
$$(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \cdots + \beta_i X_i)$$

where β_0 is the standard time for performing the basic activity, X; is the quantity of incremental activity.

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B. Time-Driven ABC Models [2]

Suppose the number of resource center collected by the third-party logistics company is d. Due to the proportion of direct cost in the third-party logistics company is very small, the department cost can be perceived as all indirect cost, the provide resources can be regarded as indirect expenses consumed resources. The number of activities aggregated is m, and the number of cost objects is n. M and n are all positive integer.

1) The calculation of capacity cost rate. Capacity cost rates is equal to recourse costs divided by practical capacity. The recourse costs can be measured by different operations center consumption. Here, Resource centers equal departments of company. Suppose the resource cost of resource centers is $C_i (i = 1,2,\cdots,d)$, then

$$C = \begin{bmatrix} c_1 \\ c_2 \\ \vdots \\ c_d \end{bmatrix}$$

The practical capacity is equal to the theoretical capacity multiplied by the practical capacity rate. Suppose the theoretical capacity in recourse center i is P_i , the practical capacity in recourse center i is $P_i^{'}$ and the practical capacity rate is g_i . Then

$$p_i^{'} = g_i p_i$$

$$P^{'} = \begin{bmatrix} g_1 p_1 \\ g_2 p_2 \\ \vdots \\ g_d p_d \end{bmatrix}$$

Suppose the capacity cost rate in resource center is v_i, then

$$v_i = \frac{c_i}{p_i^{'}}$$

That is

$$V = \frac{C}{P^{'}} = \begin{bmatrix} \frac{c_1}{g_1 p_1} \\ \frac{c_2}{g_2 p_2} \\ \vdots \\ \frac{c_d}{g_d p_d} \end{bmatrix}$$

2) The calculation of the cost driver rate. The cost driver rate is equal to the unit time capacity multiplied by the capacity cost rate. Suppose the unit time capacity of the jth activities in recourse center i is $ut_i (i = 1,2,\cdots,d;\ j = 1,2,\cdots,m)$, then

$$UT = \begin{bmatrix} ut_{11} & ut_{12} & \cdots & ut_{1d} \\ ut_{21} & ut_{22} & \cdots & ut_{2d} \\ \vdots & \vdots & & \vdots \\ ut_{m1} & ut_{m2} & & ut_{md} \end{bmatrix}$$

Suppose r_i is cost driver rate in the jth. Then

$$r_j = \sum_{i=1}^{d} ut_{ji} v_i$$

$$R = \begin{bmatrix} ut_{11} & ut_{12} & \cdots & ut_{1d} \\ ut_{21} & ut_{22} & \cdots & ut_{2d} \\ \vdots & \vdots & & \vdots \\ ut_{m1} & ut_{m2} & & ut_{md} \end{bmatrix} \begin{bmatrix} \frac{c_1}{g_1 p_1} \\ \frac{c_2}{g_2 p_2} \\ \vdots \\ \frac{c_d}{g_d p_d} \end{bmatrix}$$

3) The calculation of indirect cost. The amount of cost drivers means “How many times” or “How many numbers”. According to the different cost objects, we statistic the different cost drivers amount. Assume that the cost drivers amount of the jth activities in xth objects are aq_{xi} , then

$$AQ = \begin{bmatrix} aq_{11} & aq_{12} & \cdots & aq_{1m} \\ aq_{21} & aq_{22} & \cdots & aq_{2m} \\ \vdots & \vdots & & \vdots \\ aq_{n1} & aq_{n2} & & aq_{nm} \end{bmatrix}$$

The indirect cost in the xth objects is

$$oh_x = \sum_{j=1}^{m} \sum_{i=1}^{d} aq_{xj} ut_{ji} v_i$$

$$OH = \begin{bmatrix} oh_1 \\ oh_2 \\ \vdots \\ oh_n \end{bmatrix} = \begin{bmatrix} aq_{11} & aq_{12} & \cdots & aq_{1m} \\ aq_{21} & aq_{22} & \cdots & aq_{2m} \\ \vdots & \vdots & & \vdots \\ aq_{n1} & aq_{n2} & & aq_{nm} \end{bmatrix} \begin{bmatrix} ut_{11} & ut_{12} & \cdots & ut_{1d} \\ ut_{21} & ut_{22} & \cdots & ut_{2d} \\ \vdots & \vdots & & \vdots \\ ut_{m1} & ut_{m2} & & ut_{md} \end{bmatrix} \begin{bmatrix} \frac{c_1}{g_1 p_1} \\ \frac{c_2}{g_2 p_2} \\ \vdots \\ \frac{c_d}{g_d p_d} \end{bmatrix}$$

4) The analysis of idle capacity cost in departments. The idle capacity cost is equal to the resource idle capacity multiplied by resource capacity cost rate. Assumed that the used capacity in the ith is u_i , the idle capacity is l_i , the idle capacity cost in the ith is cl_i , that is

$$L = P^{'} - U = \begin{bmatrix} g_1 p_1 \\ g_2 p_2 \\ \vdots \\ g_d p_d \end{bmatrix} - \begin{bmatrix} ut_1 \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{m1} \sum_{x=1}^{n} aq_{xm} \\ ut_{12} \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{m2} \sum_{x=1}^{n} aq_{xm} \\ \vdots \\ ut_{1d} \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{md} \sum_{x=1}^{n} aq_{xm} \end{bmatrix}$$

Therefore,

$$CL = V \times L = \begin{bmatrix} \frac{c_1}{g_1 p_1} \\ \frac{c_2}{g_2 p_2} \\ \vdots \\ \frac{c_d}{g_d p_d} \end{bmatrix} \left(\begin{bmatrix} g_1 p_1 \\ g_2 p_2 \\ \vdots \\ g_d p_d \end{bmatrix} - \begin{bmatrix} ut_{11} \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{m1} \sum_{x=1}^{n} aq_{xm} \\ ut_{12} \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{m2} \sum_{x=1}^{n} aq_{xm} \\ \vdots \\ ut_{1d} \sum_{x=1}^{n} aq_{x1} + \cdots + ut_{md} \sum_{x=1}^{n} aq_{xm} \end{bmatrix} \right)$$

III. Case Study

S company is a subsidiary of state-owned enterprises in Jiangsu Province. It makes an effort to create a professional fair trade to Yangtze River for steel users. Currently, the company has three leased warehouse and three railway lines for normal operation. There are three forklifts, eighteen bridge cranes and seventy-six warehousing operations employees. During the research, S company provides warehousing and transit services for ten customers.

The warehouse processes can be decomposed clearly into in-out of storage forecast, storage or transit and storage [3]. The partition is conductive to accurate operating costs research and TDABC application. In current business, related processes, the directly costs including staff salaries, equipment depreciation, maintenance cost, etc., the auxiliary costs including rail lines, utility, requisitioned materials cost, etc. These are all indirect costs in warehousing and logistics operation. The manager is wish to adopt more advanced and effective methods to manage cost. TDABC can calculate for each unit costing objects to help company get more realistic cost information by measuring in accordance with the actual processes of actual consumption.

A. Application of TDABC

Because the research is associated with process, the cost accounting embody in Business Unit, Production Unit, Settlement Center, Security Department, Equipment Division except Administration. The directly costs in company is accounted for a small percentage, so the paper assumes all three warehousing cost, the indirect costs.

1) Computing Capacity Cost Rate

The sector capacity cost rate equal to indirect cost divided by actual capacity of staff. According to payroll, material tables, depreciation tables and statistics of each database tables or relevant information in November 2012, the total cost of the business unit is the ¥30,392.56 per month, the production unit is the ¥641,723.71 per month, the settlement center is the ¥18,376.21 per month, the security department is the ¥13153.36 per month and the equipment division is the ¥37,578.59 per month [4].

Practical capacity of staff equal months minus weekends and other times do not work. Each employee of departments works an average of 22 days per month and is paid for 8 hours of work except the second warehouse employees that are paid for 8.5 hours. One employee is arranged on duty on the weekend and the second warehouse staff in two shifts on 22 workdays. For example, 3 employees in the business unit are paid for 8 hours, other 2 employees work for 8.5 hours and one member on duty weekly. In fact, the business unit is devoted to in-out of storage or transit forecast and administrative work of internal communication, so business manager estimates the time to forecast is 25%, the theoretical capacity is 13176 minutes. Similarly, 12 employees work for 8 hours and 39 employees work for 8.5 hours of production unit, the theoretical capacity is 576060 minutes. 2 employees work for 8 hours and 4 employees work for 8.5 hours of settlement center, the theoretical capacity is 77760 minutes. Actually, the security department which does not belong to the second warehouse has 4 employees, the theoretical capacity is 53760 minutes, at the same time, the theoretical capacity of equipment division which has 10 members is 117120 minutes. Not all the time paid is available for work. Employees in each department spend about 100 minutes every week in breaks, lunch, rest and meeting, so the practical capacity rate in each department is 80%, 65%, 80%, 80% and 70%, therefore, the capacity cost rate is 0.630, 1.714, 0.295, 0.306, 0.458.

2) Time Equation

a. In-Out of Storage or Transit Forecast

The forecast involves business unit and production unit workers. During the customers' one year contract, they can notify business staff cargo information ten to fifteen days in advance. The forecast is following:

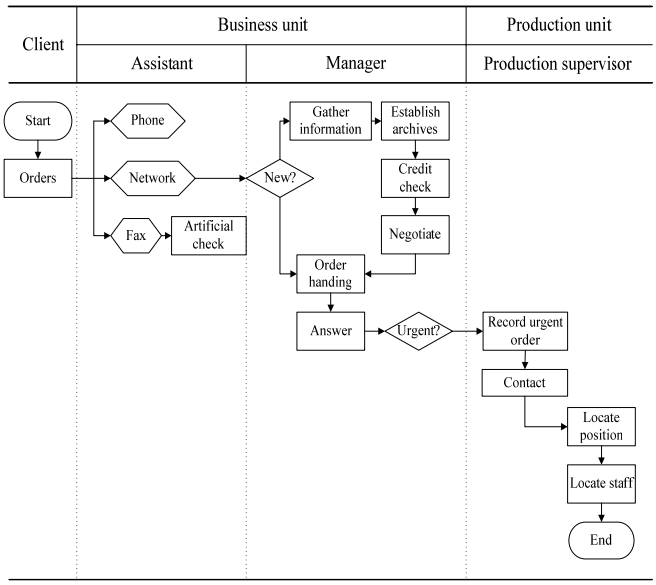

Fig. 1 In-out of storage forecast procedure

The time equation is:

$$\text{Forecast processing time}= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Symbolic representation:

β_0 : Order apply time

β_1 : If phone order

β_2 : If network order

β_3 : If fax order

β_4 : Artificial audit time

β_5 : If new customer

β_6 : If urgent order

X_i : the quantity of β_i activities

b. In-Out of Storage or Transit

The employees of production unit, settlement center security department and equipment division are devoted to in-out of storage or transit work.

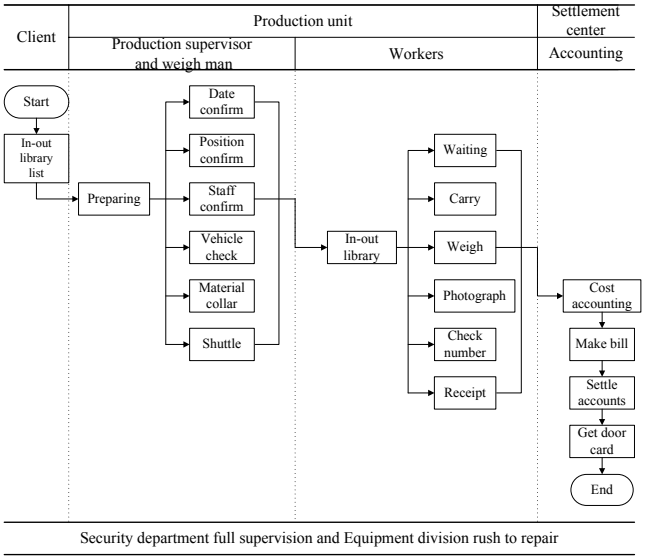

Fig. 2 In-out of storage procedure

In the warehouse operation process, the work of safety officer in security department, include supervision of goods, equipment operation safety. The equipment division employees are responsible for standby emergency repair. The time of these departments activities equals to frontline workers, as same as weighter.

The actual operating time of in-out of storage can be divided into two parts: the operating time of frontline workers and the delivery time of bridge crane or forklift. Assumed that the actual operating time of in-out of storage is $t_{in/out}$, β_1 means the time of bridge crane or forklift operators lift one cargo, the total number of the goods is k, m means the number of cargoes when bridge crane or forklift workers operate one time, A total number of operator operation is n, then

$$n = \frac{k}{n}, n = \begin{Bmatrix} [k/m], \ when\ (k-m)\times[k/m] = 0 \\ [k/m]+1, \ when\ (k-m)\times[k/m] \neq 0 \end{Bmatrix}$$

Assumed that i(1,2,…,N) means the ith warehouse position, j(1,2,…,n) stands for the jth time for putting goods stacking to the ith position. The number of warehouse position is N. β_{1in} means the round trip time from bridge cranes or forklifts take operators orders to carrying the nth goods to the ith position. X_{in} equals 1 when bridge cranes or forklifts operating the nth goods to ith position, otherwise, 0. Therefore, the actual operating time equation is

$$t_{in/out} = \beta_1 n + \sum_{j=1}^{n}\sum_{i=1}^{N}\beta_{1in}X_{in}$$

In addition to the actual operating time is different, some activities time like taking pictures, checking, signing should be according to the standard process. Out of the storage, the settlement center settle all accounts. So,

$$\text{In-out storage processing time} = \beta_0 + t_{in/out} + \beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 X_1$$

β_0 : In-out storage preparation time

β_2 : Photograph time

β_3 : Check goods time

β_4 : Signing time

β_5 : Accounting time

β_6 : If submit to accounting

X_1 : the quantity of β_5 activities

Transit in the second warehouse is slightly different from storage service except the forecast. Because of the railway lease contract, S company should enforce the terms of contracts.

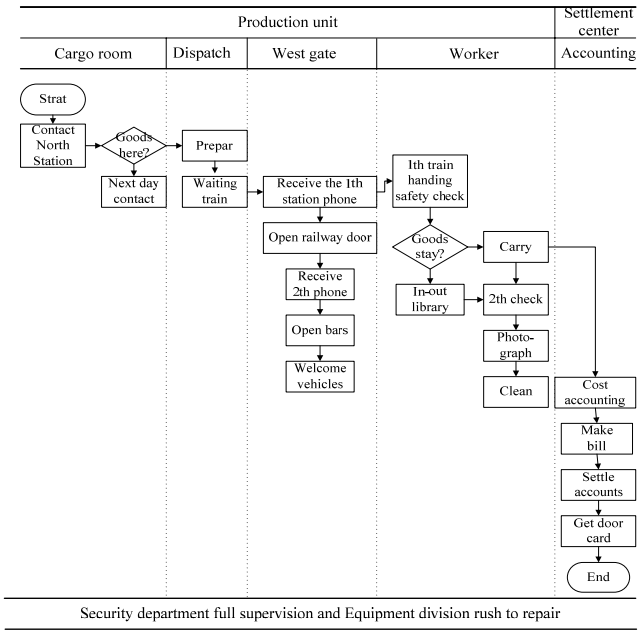

Fig. 3 Transit procedure

$$\text{Transit processing time} = \beta_0 + \beta_2 Y_1 + \begin{Bmatrix} t_{in/out} + 2\beta_3 q + \beta_4 q + \beta_5 q \\ t_{out} + 2\beta_3 q + \beta_4 q + \beta_5 q + \beta_6 + \beta_7 X_2 \end{Bmatrix}$$

β_0 : Contact North Station time

β_2 : Team preparation time

β_3 : Railway wagon security check time

β_4 : Railway wagon photograph time

β_5 : Railway wagon clean time

β_6 : Accounting time

β_7 : If submit to accounting

q : Railway wagon number

$$Y_1 = \begin{Bmatrix} 1, Today \quad the \quad goods \quad there \\ 0, Or \end{Bmatrix}$$

X_2 : the quantity of β_7 activities

c. Safekeeping

The employees of security department and equipment division are devoted to safekeeping work including keep the goods, maintenance of equipment and safety meeting.

Keep processing time=

$$\beta_0 + \beta_1 + \beta_2 + \beta_3 X_1 + \beta_4 X_2 + \beta_5 X_3 + \beta_6 X_4 + \beta_7 + \beta_8 X_5 + \beta_9$$

β_0 : Check time

β_1 : Daily Inspect time

β_2 : Equipment maintain time

β_3 : If equipment repair

β_4 : If equipment service

β_5 : If rush to repair

β_6 : If equipment check

β_7 : Vehicle inspection time

β_8 : If vehicle repair

β_9 : Security conference and fire drill time

X_i : the quantity of β_i activities

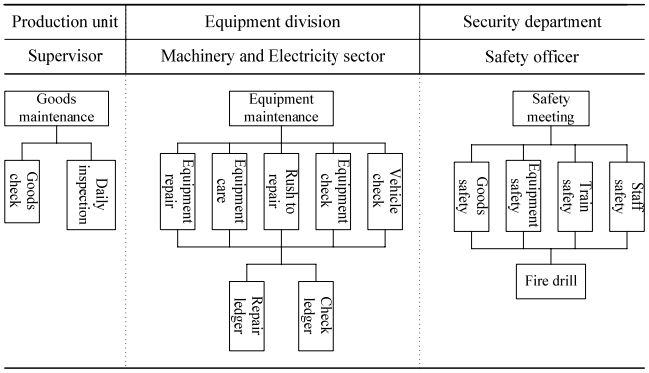

Fig. 4 Safekeeping procedure

3) The Calculation of Final Operation Cost

The survey found S company process 229 orders for 10 customers in November is following:

TABLE I
IN-OUT STORAGE FORECAST INFORMATION QUANTITY

Client	Orders apply	Network	Phone	Manual review	New client	Answer	Urgent orders	Contact	Urgent arrangement
A	4	2	1	4		20	2	2	2
B	10	2	4	10		50	4	4	4
C	36	5	21	36		60	10	10	10
D	51	8	33	51		100	22	22	22
E	29	7	13	29	√	100	13	13	13
F	15	1	10	15		40	7	7	7
G	10	1	7	10	√	80	11	11	11
H	2	0	2	2		10	2	2	2
I	34	2	22	34		80	16	16	16
J	38	0	18	38	√	60	19	19	19

By a field study with observation interviews and artifacts collection, S company takes about 20 minutes from order request by fax to finish process in the forecast. If the order requires network receiving, this takes an additional 2 minutes, if the order requires phone receiving, this takes an additional 5minutes. The artificial examination time is 15 minutes. If the order requires that a new customer file be set up, it takes an additional 200 minutes to perform credit check. Before the storage activities, it takes about 5 minutes for answering customer inquiries once time, plus the additional time for special services such as a rush order, it takes more 5 minutes for business unit notifies the production unit to records urgent information, the time for production supervisor to contact customers is 3 minutes, personnel and position arrangement is 6 minutes. So the practical capacity in business unit is 12856 minutes, the practical capacity in production unit is 954 minutes. In-out of storage or transit time is:

TABLE II
IN-OUT STORAGE OR TRANSIT GOODS INFORMATION

Client	Needs	Product	Number	Weight (T)	Measure
A	In	Wire rod	1204	2484.11	Weigh
B	In	Strip steel	1594	2902.10	
C	In	Coil	29	501	
	Out	Coil	33	615	
D	In	Aluminum rod	246	546	No weigh
		Aluminum ingot	3371	3532	
	Transit	T ingot	1714	1503	
	Out	Aluminum rod	156	363	
		Aluminum ingot	3741	3652	
E	In	Silicon manganese	3382	3424.51	Weigh
	Transit	Silicon manganese	1020	1010	No weigh
F	Transit	Strip steel	1159	3474	
G	Out	H shape steel	430	321.77	
H	Out	Coil	17	261.06	Weigh
I	Out	Slab	7	66.48	
		Strip steel	1979	3241.48	
J	Transit	Steel pipe	52	3155	No weigh

In the process, the time of different loading and unloading goods is following:

TABLE III
DIFFERENT LOADING AND UNLOADING TIME OF DIFFERENT GOODS INFORMATION

Goods	Operating Time	One run time	Run number	Stevedore quantity	Total time
Wire rod	1	6	301	5	10535
Strip steel	1	6	992	5	34720.83
Coil	2	8	79	6	4740
Aluminum rod	1.5	6	134	6	6030
Aluminum ingot	1	6	1016	5	35560
T ingot	1	5	343	6	12340.8
Silicon manganese	1.5	5	2201	6	85839
H shape steel	1.5	6	86	6	3870
Slab	2	8	7	7	490
Steel pipe	2	6	52	7	2912

In the process of the in-out of storage or transit, the extra working time is showing:

TABLE IV
EXTRA WORKING TIME INFORMATION

Client	A	B	C		D			E				F	G	H	I		J
Needs	In	In	In	Out	In		Transit	Out		In	Transit	Transit	Out	Out	Out		Transit
Name	Wire rod	Strip steel	Coil	Coil	Aluminum rod	Aluminum ingot	T ingot	Aluminum rod	Aluminum ingot	Silicon manganese	Silicon manganese	Strip steel	H shape steel	Coil	Slab	Strip steel	Steel pipe
Number	1204	1594	29	33	246	3371	1714	156	3741	3382	1020	1159	430	17	7	1979	52
Weight	2484.11	2902.1	501	615	546	3532	1503	363	3652	3424.51	1010	3474	321.77	261.06	66.48	3241.48	3155
Dock (times)	2	5	5	8	8	4	6	7	4	17	8	9	6	1	2	18	21
Preparation time	80	200	200	320	320	160	600	280	160	680	800	900	240	40	80	720	2100
Dock (min)	10535	11468.33	1740	1980	3690	16855	12340.8	2340	18705	65949	19890	10141	3870	1020	490	13111.25	2912
Check time	40.13	53.13	0.97	1.10	8.20	112. 37	57.13	5.20	124.70	112.73	34.00	38.63	14.33	0.57	0.23	65.97	1.73
Wagon	-	-	-	-	-	-	30	-	-	-	17	60	-	-	-	-	52
North Station	-	-	-	-	-	-	981.81	-	-	-	1309.09	1472.72	-	-	-	-	3436.35
Photograph and clean	4	10	10	16	16	8	450	14	8	34	255	900	12	2	4	36	780
Accounting	40	100	100	160	160	80	120	140	80	340	160	180	120	20	40	360	420
Total cost	0	0	0	60	0	0	60	60	20	0	80	90	40	10	20	100	210
Bill	2	8	9	14	16	10	7	31	16	33	17	22	10	1	2	44	64
Network bill	10	40	45	70	80	50	35	155	80	165	85	110	50	5	10	220	320
Manual bill	120	480	540	840	960	600	420	1860	960	1980	1020	1320	600	60	120	2640	3840
Forecast (min)	40	100	100	160	160	80	120	140	80	340	160	180	120	20	40	360	420
Report (min)	16. 49	41. 22	41. 22	65. 95	65.95	32. 98	49. 47	57. 71	32. 98	140.15	65. 95	74. 20	49. 47	8.24	16. 49	148.40	173.13

With one employee in the security department and equipment division on standby supervision, the in-out of storage and transit time in production unit, settlement center, security department and equipment division are 215347.75 minutes, 26960 minutes, 35452.42 minutes, and 35452.42 minutes. Safekeeping work including keep the goods, maintenance of equipment and safety education. It takes 40 minutes (880 minutes per month) for production supervisor daily inventory. There are 8 forklifts and 3 bridge cranes usually used for three warehouses, the standard examination time is 30 minutes (7260 minutes per month). The time of two employees in equipment division are devoted to do the maintenance work is one hour once week (5280 minutes per month). According to equipment division ledgers in November, two workers rush to repair 27 times, get to use accessories 59 times, the total time-consuming 4060 minutes. It takes 2400 minutes for two employees to analyze the equipment and put forward to rectify and reform measure. It takes 2400 minutes for storekeeper to check the goods per month. So the maintenance time is 22280 minutes. In November, security department hold a meeting and fire drill, consuming 640 minutes, two safety officer supervise the equipment safety, consuming 1980 minutes. So the safekeeping time is 2620 minutes. So the total cost is following:

TABLE V
DIFFERENT CUSTOMERS AND DIFFERENT DEPARTMENTS TIME INFORMATION

	Business Unit	Production Unit	Settlement Center	Security Department	Equipment Division	Total
A	259.000	10729.753	226.490	2147.000	2447.153	15809.396
B	644.000	11837.129	761.220	2393.666	3144.048	18780.063
C	774.395	1986.853	826.220	390.000	1140.382	5117.850
	950.605	2373.927	1355.950	490.000	1690.611	6861.092
	146.571	4099.573	1425.950	775.000	1975.611	8422.704
	948.148	17310.017	842.980	3451.000	4051.305	26603.451
D	403.473	14545.620	804.470	2176.800	3077.258	21007.621
	97.446	2693.811	2412.710	530.000	1580.534	7314.501
	980.362	19188.519	1252.980	3821.000	4421.305	29664.166
E	1435.596	67003.108	2965.150	11331.500	13882.798	96618.151
	423.404	22370.111	1570.950	3475.000	4675.611	32515.076
F	812.000	13566.007	1954.200	2208.200	3558.887	22099.294
G	1042.000	4254.124	979.470	765.000	1665.458	8706.052
H	140.000	1081.313	123.240	190.000	340.076	1874.629
I	35.853	588.936	246.490	110.000	410.153	1391.432
	1748.147	14149.316	3828.400	2982.250	5683.624	28391.738
J	2015.000	9403.633	5383.130	836.000	3987.603	21625.366
Total	12856.000	217181.75	26960.000	38072.416	57732.416	352802.582

Multiply the above table data by capacity drive rate equal to the department total cost, ¥426378.946.

B. The Logistics Cost Behavior Analysis

1) The Customer Cost Analysis

TDABC shows the resource cost of different custom service, so the company can analyze profit margins by the existing pricing to maintain and build long-term relationships. According to the present in-out storage and transit fee scale which on the basis of different goods, different needs in S company, the table shows the date of each customer cost, company income, earning and profitability.

TABLEVI
THE COST AND COMPANY PROFIT INFORMATION

	Needs	Name	Weight	Total cost	Goods cost (¥/T)	Charge (¥/T)	Income	Profit
A	In	Wire rod	2484.110	20397.281	8.211	18	44713.980	24316.699
B	In	Strip steel	2902.100	23090.431	7.956	15	43531.500	20441.069
C	In	Coil	501.000	4778.882	9.539	18	9018.000	4239.118
	Out	Coil	615.000	5992.507	9.744	18	11070.000	5077.493
	In	Aluminum rod	546.000	8682.066	15.901	20	10920.000	2237.934
		Aluminum ingot	3532.000	33424.942	9.463	20	70640.000	37215.058
D	Transit	T ingot	1503.000	27496.671	18.295	16	24048.000	-3448.671
	Out	Aluminum rod	363.000	6277.365	17.293	20	7260.000	982.635
		Aluminum ingot	3652.000	37068.525	10.150	20	73040.000	35971.475
E	In	Silicon manganese	3424.510	126440.732	36.922	22	75339.220	-51101.512
	Transit	Silicon manganese	1010.000	42275.131	41.857	25	25250.000	-17025.131
F	Transit	Strip steel	3474.000	26645.065	7.670	18	62532.000	35886.935
G	Out	H shape steel	321.770	9233.763	28.697	20	6435.400	-2798.363
H	Out	Coil	261.060	2191.747	8.396	18	4699.080	2507.333
I	Out	Slab	66.480	1326.369	19.951	20	1329.600	3.231
		Strip steel	3241.480	29998.609	9.255	18	58346.640	28348.031
J	Transit	Steel pipe	3155.000	21058.861	6.675	22	69410.000	48351.139
Total	-	-	31052.510	426378.946	13.731	-	597583.420	171204.474

The results show that, different customers have different needs lead to different consuming time and different cost. Form the recourse cost perspective, in 10 categories of products' cost, steel is the lowest, wire rod and strip steel are followed by it, silicon manganese is the most time-consuming, slab and H type steel are followed by it. So S company can put on lower time-consuming goods, improve the handing process for the high cost of goods, reduce non value service and raise the price to cut the cost.

Based on the existing pricing methods, TDABC shows total cost of customer, to reveal the profit. Figure shows the cumulative contribution rate of customer [5], which is calculated by 10 customers profit descending sort. In November 11, customer D, J, F, make the greatest contribution on the accumulated profit growth, they are high quality customers, customer G and E which are poor customers, swallow 39.8% profits of company. At the same time, the goods of customer G and E are H shape steel and silicon manganese which are time-consuming more. Under these circumstances, S company should take measures to improve customer relationship, strengthen quality customer non business contact, reduce unnecessary links in expenditure and shift the pricing strategy, to ensure effective long-term contract signed, to increase the number of business.

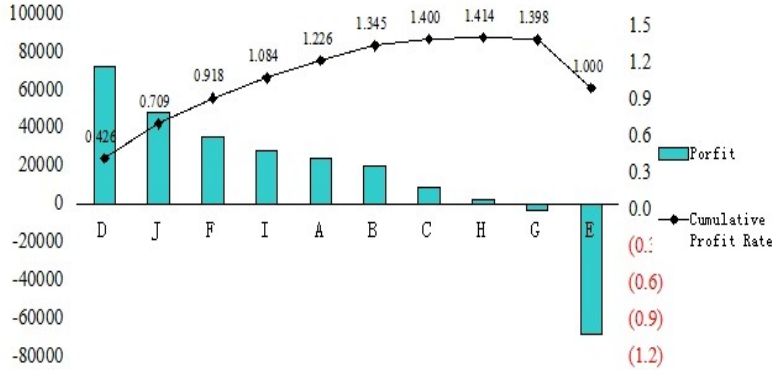

Fig. 5 Profit and cumulative profit rate

2) Analysis of Departments Cost

TDABC can not only accurately reflect the goods cost and profit, but also can reveal the spare capacity cost of resource center. The idle production capacity is not immediately used by S company, so it's unable to create value in the production process.

In November, the idle capacity rate of five departments respectively are 2.429%, 41.998%, 56.662%, 11.476% and 29.581%. Usually, between 5% and 15% , the idle capacity rate is normal in logistics enterprises. The dates shows that the resource allocation of S company, the excess resource allocation lead to low utilization rate in production unit, settlement center and equipment division, especially the storage of production unit, idle cost is ¥269511.732, accounting for 92% of total idle cost, almost all idle capacity.

TABLE VII
THE RESOURCE UTILIZATION

	Business unit	Production unit	Settlement center	Security department	Equipment division	Total
Number of employees	5	51	6	4	10	76
Capacity cost rates	0.630	1.714	0.295	0.306	0.458	-
Used capacity	12856.000	217181.753	26960.000	38072.420	57732.420	352802.593
Provide capacity	13176.000	374439.000	62208.000	43008.000	81984.000	574815.000
Capacity used rate	97.571%	58.002%	43.338%	88.524%	70.419%	62.223%
Unused capacity	320.000	157257.247	35248.000	4935.580	24251.580	222012.407
Provide cost	8298.139	641723.707	18376.212	13153.361	37578.591	719130.009
Used cost	8096.606	372211.975	7963.970	11643.887	26462.517	426378.955
Unused-capacity cost	201.533	269511.732	10412.241	1509.474	11116.074	292751.055
Idle resource rate	2.429%	41.998%	56.662%	11.476%	29.581%	37.777%

IV. SUMMARY

Through the case of S company application results show that, TDABC model can reveal the cost information of the third-party logistics enterprises, in terms of customer cost, TDABC can distinguish between profit and nonprofit service and customers, inspire managers pay attention to improve service content and customer relationship management; in terms of department cost, TDABC allocate idle capacity to the various departments, it helps managers clear lines of responsibility, take measures to increase efficiency. Therefore, TDABC has a certain application in the third-party logistics enterprise, the key to implementation of model is operation process clearly, time equation establishment and application process quantification.

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