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Accounting Entries for Activity-Based Costing System: the Case of a Distribution Company

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Abstract

The article describes the case of the realization of the two-stage cost allocation scheme of activity-based costing in Russian accounting system used at a distribution company. In order for the activity-based accounting to be implemented in a Russian company, it is necessary to open one group of accounts for usual responsibility and resource accounting purposes and another group of accounts to record costs by activities. These two groups of accounts are linked through the special temporary reflecting account.

In order to do resource and responsibility accounting, a medium-size distribution company opened three accounts in accordance with its organizational structure: "General Administration", "Warehouse", and "Fleet of Trucks". Each account had subaccounts for the resources consumed in the cost center (personnel, equipment, building, and inventory). To record costs by activities, the following accounts were opened for main business processes: "Take and Process Customer Order", "Complete Customer Order", "Deliver Customer Orders", "Finance Accounts Receivable Balances". Driving resource expenses to activities is recorded on the account "Tracing Costs to Activities", which contains subaccounts for each activity mentioned in the Activity Dictionary. This account also allows accountants to apply standard costing approach in ABC-environment. Finally, to drive activity costs to customers of a distribution company, it is necessary to open subaccounts for major customers or distribution channels to traditional accounts "Sales" and "Income Summary". The article provides the case of preparation of accounting entries for activity-based costing and related customer profitability report at a distribution company.

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1. Main text

A new Chart of Accounts for Business Activity Accounting was enacted by the Russian Ministry of Finance. A number of accounts in this Chart of Accounts are reserved for management accounting purposes. It is now possible to implement the two-stage cost allocation scheme of activity-based costing in Russian accounting system.

In order for activity-based accounting to be implemented in a Russian company, it is necessary to open one group of accounts for responsibility centers and resource accounting purposes and another group of accounts for cost accounting based on activities. These two groups of accounts are linked through the special reflecting account.

The first group of accounts numbered from 30 through 38 corresponds to the organizational structure of a company. A separate account is kept for each division, department or other responsibility center. A department account can have subaccounts that are used for recording the information about transactions and other events related to the resources consumed in the responsibility center. A separate subaccount is used for each resource. Overall, the first group of accounts and subaccounts parallels the traditional responsibility center accounting system.

Resources are tangible and intangible assets used by the company for business operations (manufacturing goods, providing services etc.). They may include personnel, equipment, building, facilities, supplies, inventory and so on. The cost of a resource is comprised of cost elements that usually represent the general ledger accounts associated with the resource. In Russia, cost elements include materials, salaries, social security, depreciation (amortization), and others. For example, the cost of personnel consists of two cost elements: salaries and social security expenses. Most bonuses and benefits are included into the salaries element.

The second group of accounts numbered from 20 through 29 parallels the hierarchy of activities at a company. The hierarchy reflects the way work is organized or performed. In Russia, it is possible to use traditional expense accounts and open separate subaccounts for each business process or activity mentioned in the Activity Dictionary.

Information recorded and classified on activity subaccounts would help Russian companies to adopt the most promising solution to cross-functional barriers: a process management approach. The cost and other performance information on each activity or business process could be reported to business process owners. Based on this information, process owners may concentrate on getting work to move more effectively and efficiently across functions to the benefit of customers. People at all levels in the company would understand how their work fits into the process, produce the demand for resources and practical capacity, and adds value to customers. Business processes and activities would undergo continuous measurement, improvement and redesign. Overall, the information identified on activity subaccounts could secure the adoption of organizational structure based on activities and related new methods of governance. These new managerial tools will help Russian companies improve efficiency and effectiveness of business operations.

With activity and resource accounts structured, it becomes possible to assign the costs of resources to activities using double entry principle. Driving resource expenses to activities being performed is recorded on the account "Tracing Costs to Activities", which contains subaccounts for each activity mentioned in the Activity Dictionary. The debit of the latter account is used for assigning (or allocating) resource expenses to activities. The credit of that account is used for recording the final actual costs of activities (or standard costs in some cases). The account "Tracing Costs to Activities" gets periodically closed.

To determine actual costs of activities, accountants should post the accounting entries of two types. The first type of accounting entries is aimed at collecting expenses from different resource accounts and driving them to activities in accordance with the resource consumption pattern. For example, costs of the General Administration could be traced to activities by the following journal entry:

Tracing Costs to Activities/ Invoice Customers	\$ 7000
Tracing Costs to Activities/ Process Customer Orders	\$ 5000
Tracing Costs to Activities/ Manage External Relationship	\$ 3000
General Administration	\$ 15000
(to trace general administration resource expenses to activities)	

Similar entries are made for other accounts used for resource and responsibility center accounting. All these entries involve the debit of the account "Tracing Costs to Activities".

The second type of accounting entries involve the credit of the account "Tracing Costs to Activities", which is used for recording the total costs of each activity. For example, the costs of Processing Customer Orders are recognized by the following entry:

General Overheads/ Process Customer Orders	\$ 9800
Tracing Costs to Activities/ Process Customer Orders (to record actual costs of processing customer orders)	\$ 9800

The general scheme of making accounting entries involving the account "Tracing Costs to Activities" is presented in Exhibit 1.

Exhibit 1. Accounting Entries involving "Tracing Costs to Activities" Account

#	Debit	Credit	Explanation
1	Resource accounts	Usual general ledger accounts such as Accumulated Depreciation, Salaries Payable and so on	to record the actual consumption of resources
2	Activity accounts and subaccounts	Tracing Costs to Activities	to record the actual or standard costs of each activity
3	Tracing Costs to Activities	Resource accounts	to assign actual resource expenses to activities performed at the company
4	Activity accounts and subaccounts	Tracing Costs to Activities	to close the account "Tracing Costs to Activities" and to recognize (or subtract) the difference between the actual and standard costs of activities

The activity-based accounting cycle could be illustrated in the case study of a medium size distribution company. Suppose the company "Central Trade House" (CTH) is a distributor of home supplies. It operates within a metropolitan area with a small fleet of owned trucks. To attract customers, CTH offers free deliveries to the customers' loading docks as well as free deliveries to individual locations at the customer's site (desktop deliveries in a stockless or just-in-time environment). Loyal customers are allowed to postpone payments, however this practice has led to increased costs of financing the receivables. Recently CTH introduced new ordering channels – electronic data interchange (EDI) and the internet site – that lowered both customers' costs of ordering and CTH's processing costs. Nevertheless, the total costs of operating the business were increased. Managers at CTH knew what their costs were to serve all customers, but they wanted to understand how much it would cost to serve one particular customer. To solve this problem, activity-based costing was initiated.

In developing the activity-based costing system, the following accounts were introduced in order to record resource expenses and conduct responsibility center accounting:

31 "General Administration";

32 "Warehouse", includes resource subaccounts:

- "Personnel" (with second layer subaccounts: "Workers", "Other Personnel");
- "Equipment" (with second layer subaccounts: "Forklift Truck", "Other Equipment");
- "Building";
- "Supplies".

33 "Fleet of Trucks", subaccounts for major types of trucks: "KamAZ", "Gazel";

39 "Tracing Costs to Activities".

The account # 39 "Tracing Costs to Activities" as well as the regular account "Sale Expenses" includes the following subaccounts for each business process and activity mentioned in the Activity Dictionary developed at CTH:

I. Business process "Take and Process Customer Orders" (the cost driver is the number of orders). This business process can be performed manually or through the new electronic ordering channels. The subaccount includes the second layer of subaccounts associated with activities that the process consists of:

1. Take and enter customer order;
2. Customer billing;
3. Cash and payments management;
4. Staging documentation;
5. Inventory management;
6. Office administration.

II. Business process "Complete Customer Order" (the cost driver is the number of line items in customer orders). The process subaccount includes the following second layer of activity subaccounts:

1. Process lines;
2. Handle order items (the cost driver for this particular activity is the weight of goods handled);
3. Warehouse inventory control;
4. Warehouse administration.

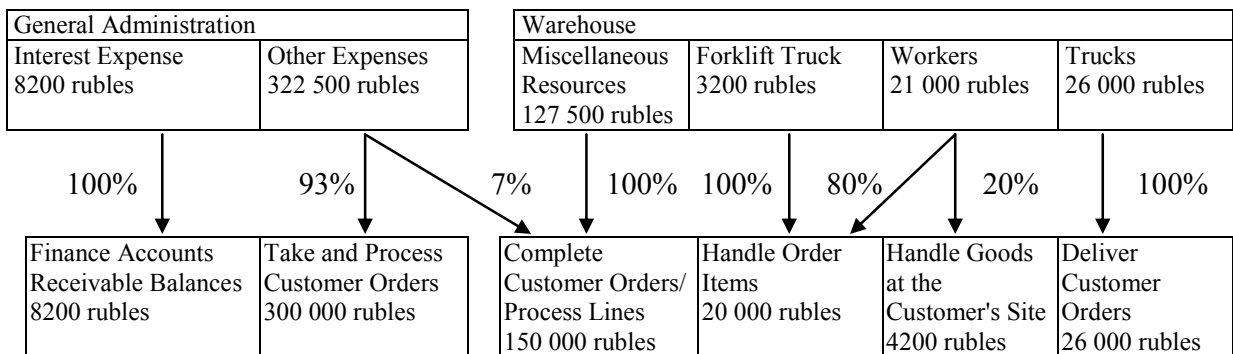
III. Business process "Deliver Customer Orders" (the cost driver is the number of deliveries). The costs of activities are recorded on the following subaccounts:

1. Deliver with "KamAZ" truck;
2. Deliver with "Gazel" truck;
3. Handle goods at the customer's site (the cost driver for this particular activity is the number of desktop deliveries).

IV. Business process "Finance Accounts Receivable Balances". CTH pays interest of 12 % per year on its working capital line of credit.

Managers conducted interviews, asked some people to keep track of their time for several days, performed observations of other people work, conducted some analysis. This study allowed managers to identify the resource consumption pattern which is mapped on the diagram presented in Exhibit 2.

Exhibit 2. Mapping Resource Expenses to Activities



According to the resource consumption pattern, 93 % of all general administration expenses (except for interest expense that relates to the receivables financing) are incurred for taking and processing customer orders. The remaining 7 % of expenses are used to process order items (lines). About 20 % of warehouse workers are involved in the handling of goods at the client's site. Another 80 % of warehouse workers handle order items inside the distribution center. The forklift truck is used to move goods within the warehouse area. The remaining warehouse resources are employed in performing other activities while processing customer orders.

Actual resource expenses incurred in general administration totaled 330700 rubles (including 8200 rubles of interest expense). The warehouse expenses amounted to 151700 rubles (including 21000 rubles of worker labor expense and 3200 rubles associated with the forklift truck operations). 10000 rubles were spent to deliver orders

with a small "Gazel" truck, and 16000 rubles were spent to deliver orders with a large "KamAZ" truck (these amounts include driver's wages, depreciation, fuel supplies, and spare parts supplies). Once the actual resource expense data were identified and the resource consumption pattern was developed, accountants costed activities and business processes and presented the results of the calculations on the diagram in Exhibit 2.

With data gathered so far, accountants estimated standard activity cost driver rates using the practical capacity of the resources supplied and budgeted expenses. The calculations are shown in Exhibit 3.

Exhibit 3. Activity Cost Driver Rates

Business Process/ Activity	Budgeted Expenses, rubles	Practical Capacity	Activity Cost Driver Rate
I. Take and Process Customer Orders Manually	300 000	600 orders	500 rubles/order
I. Take and Process EDI Customer Orders	150 000	1500 orders	100 rubles/order
II. Complete Customer Orders/ Process Lines, Warehouse Inventory Control, Warehouse Administration	150 000	12000 lines	12,5 rubles/line
II. Complete Customer Orders/ Handle Order Items	20 000	40000 kg.	0,5 rubles/kg.
III. Deliver Customer Orders/ Deliver with "Gazel" Truck	10 000	40 deliveries	250 rubles/delivery
III. Deliver Customer Orders/ Deliver with "KamAZI" Truck	16 000	40 deliveries	400 rubles/delivery
III. Deliver Customer Orders/ Handle Goods at the Customer's Site	4 200	40 desktop deliveries	105 rubles/delivery
IV. Finance Accounts Receivable Balances	-	-	12% per year

Exhibit 4 shows the summary of the actual ordering, delivery, and payment statistics for the three customers. There is now sufficient information to estimate a complete activity-based cost model for the "Central Trade House" company. Accounting entries recording all resource expenses and illustrating the recognition of activity expenses related to the operations with the particular customer (home supplies store "Your Dwelling") are presented in Exhibit 5.

Exhibit 4. Services Provided to Customers

Activity Measure	"Your Dwelling" Store	General contractor	Small contractor
Number of EDI orders	50	-	3
Number of orders, manual	100	300	-
Number of line items	3 000	7 500	150
Weight of goods delivered, kg.	3 000	7 000	410
Truck	Gazel	KamAZ	Gazel
Number of deliveries	12	7	3
Number of desktop deliveries	12	-	3
Average accounts receivable	20 000	800 000	-

Exhibit 5. Activity-Based Accounting Entries

Explanation	Account Title		Amount, rubles
	Debit	Credit	
To record miscellaneous administrative resource expenses	31 "General Administration"	02 "Accumulated Depreciation", 10 "Inventory", 70 "Accrued Salaries", 69 "Social Security Transactions", 76 "Miscellaneous Accounts Payable" etc.	322500
To record accrued interest expense	31 "General Administration"	66 "Short Term Debt"	8200
To record accrued warehouse workers' salaries and social security	32 "Warehouse"/ "Personnel"/ "Workers"	70 "Accrued Salaries", 69 "Social Security Transactions"	21000
To record expenses (depreciation, maintenance, fuel supplies) related to the forklift truck operations	32 "Warehouse"/ "Equipment"/ "Forklift Truck"	02 "Accumulated Depreciation", 10 "Inventory", and so on	3200
To record the remaining resource expenses of the warehouse	32 "Warehouse"/ other resource subaccounts	02 "Accumulated Depreciation", 10 "Inventory", 70 "Accrued Salaries", 68 "Taxes Payable", and so on	127500
To record expenses related to "Gazel" truck operations	33 "Fleet of Trucks"/ "Gazel"	02 "Accumulated Depreciation", 10 "Inventory", 70 "Accrued Salaries", 69 "Social Security Transactions", and so on	10000
To record expenses related to "KamAZ" truck operations	33 "Fleet of Trucks"/ "KamAZ"	02 "Accumulated Depreciation", 10 "Inventory", 70 "Accrued Salaries", 69 "Social Security Transactions", and so on	16000
To record the General Administration resource expenses assigned to the activity "Take and Process Customer Orders"	39 "Tracing Costs to Activities"/ "Take and Process Customer Orders"	31 "General Administration"	322500 × 0,93 = 300000
To assign the General Administration resource expenses to the activity "Process Lines"	39 "Tracing Costs to Activities"/ "Complete Customer Orders"/ "Process Lines"	31 "General Administration"	322500 × 0,07 = 22500
To record the General Administration resource expenses traced to the business process "Finance Accounts Receivable Balances"	39 "Tracing Costs to Activities"/ "Finance Accounts Receivable Balances"	31 "General Administration"	8200
To trace the warehouse workers expenses to the related activity "Handle Order Items"	39 "Tracing Costs to Activities"/ "Complete Customer Orders"/ "Handle Order Items"	32 "Warehouse"/ "Personnel"/ "Workers"	21000 × 4/5 = 16800

Explanation	Account Title		Amount, rubles
	Debit	Credit	
To record the forklift truck expenses (depreciation, maintenance and so on) assigned to the activity "Handle Order Items"	39 "Tracing Costs to Activities"/ "Complete Customer Orders"/ "Handle Order Items"	32 "Warehouse"/ "Equipment"/ "Forklift Truck"	3200
To trace the warehouse workers expenses to the activity "Handle Goods at the Customer's Site"	39 "Tracing Costs to Activities"/ "Deliver Customer Orders"/ "Handle Goods at the Customer's Site"	32 "Warehouse"/ "Personnel"/ "Workers"	21000 × 1/5 = 4200
To assign the remaining warehouse resource expenses to other activities related to the business process "Complete Orders"	39 "Tracing Costs to Activities"/ "Complete Customer Orders"/ "Process Lines", "Warehouse Inventory Control", "Warehouse Administration"	32 "Warehouse"/ other resource subaccounts	127500
To assign the "Gazel" truck expenses to the activity "Deliver with "Gazel" truck"	39 "Tracing Costs to Activities"/ "Deliver Customer Orders"/ "Deliver with "Gazel" truck"	33 "Fleet of Trucks"/ "Gazel"	10000
To assign the "KamAZ" truck expenses to the activity "Deliver with "KamAZ" truck"	39 "Tracing Costs to Activities"/ "Deliver Customer Orders"/ "Deliver with "KamAZ" truck"	33 "Fleet of Trucks"/ "KamAZ"	16000
To record actual costs of each activity	44 "Sale Expenses"/ activity subaccounts	39 "Tracing Costs to Activities"/ activity subaccounts	500200
To trace interest expense related to the financing of the accounts receivables generated by the store "Your Dwelling"	91 "Miscellaneous Revenues and Expenses"/ "Store "Your Dwelling"	39 "Tracing Costs to Activities"/ "Finance Accounts Receivable Balances"	200
To trace interest expense associated with the financing of the accounts receivables generated by the general contractor	91 "Miscellaneous Revenues and Expenses"/ "General contractor"	39 "Tracing Costs to Activities"/ "Finance Accounts Receivable Balances"	8000

Explanation	Account Title		Amount, rubles
	Debit	Credit	
To record costs of services and activities provided to the store "Your Dwelling": a) to record cost of taking and processing EDI orders b) to record cost of taking and processing orders manually c) to record cost of processing lines, warehouse inventory control, warehouse administration d) to record cost of handling order items e) to record cost of delivering customer orders f) to record cost of handling goods at the customer's site	90-2 "Sales"/ "Cost of Goods Sold"/ "Store "Your Dwelling"	44 "Sale Expenses", activity subaccounts: a) "Take and Process EDI Order" b) "Take and Process Orders manually" c) "Complete Customer Orders"/ "Process Lines", "Warehouse Inventory Control", "Warehouse Administration" d) "Complete Customer Orders"/ "Handle Order Items" e) "Deliver Customer Orders"/ "Deliver with "Gazel" truck" f) "Deliver Customer Orders"/ "Handle Goods at the Customer's Site"	a) 5000 b) 50000 c) 37500 d) 1500 e) 3000 f) 1260
To record revenue for goods delivered to the store "Your Dwelling"	62 "Accounts Receivable" / "Store "Your Dwelling"	90-1 "Sales"/ "Revenues"/ "Store "Your Dwelling"	1200000
To record cost of goods purchased by the store "Your Dwelling"	90-2 "Sales"/ "Cost of Goods Sold"/ "Store "Your Dwelling"	41 "Goods Available for Sale"	1000000
To post profit from sales to the store "Your Dwelling"	90-9 "Sales"/ "Income"/ "Store "Your Dwelling"	99 "Income Summary"/ "Store "Your Dwelling"	101740
To write down interest expense related to the store "Your Dwelling"	99 "Income Summary"/ "Store "Your Dwelling"	91 "Miscellaneous Revenues and Expenses"/ "Store "Your Dwelling"	200

The activity expense analysis for each customer was combined with revenue data to obtain a new ABC profitability report (see Exhibit 6). The results were quite different from that based on the traditional cost system. The largest customer, which the previous cost system reported as profitable, in fact created losses for the CTH company.

Exhibit 6. Customer Profitability Report

	"Your Dwelling" Store	General contractor	Small contractor
Sales, rubles	1200000	1500000	216960
Cost of goods purchased, rubles	1000000	1250000	180800
Gross margin, rubles	200000	250000	36160
Client's expenses, rubles Including activity costs:	98460	258050	3445
1) Take and process EDI orders	5000 rubles	0 rubles	300 rubles
2) Take and process customer orders manually	50000 rubles	150000 rubles	0 rubles

3) Complete customer orders/ Process lines, Warehouse inventory control, Warehouse administration	37500 rubles	93750 rubles	1875 rubles
4) Complete customer orders/ Handle order items	1500 rubles	3500 rubles	205 rubles
5) Deliver customer orders	3000 rubles	2800 rubles	750 rubles
6) Deliver customer orders/ Handle goods at the customer's site	1260 rubles	0 rubles	315 rubles
7) Finance accounts receivable balances	200 rubles	8000 rubles	0 rubles
Net operating profit, rubles	101540	- 8050	32715
Profitability, %	10,15	- 0,6	18,1
Traditional allocation:			
Total expenses, rubles	359955		
Total sales, rubles	2916960		
Allocation percentage	12,34		
Allocation of expenses	$1200000 \times 12,34 \% = 148081$	$1500000 \times 12,34 \% = 185101$	$216960 \times 12,34 \% = 26773$
Net operating profit, rubles	51919	64899	9387
Client's profitability,%	5,19 %	5,19 %	5,19%

With insights gained, managers at CTH company decided to change the existing "cost-plus" pricing system, which produced a simple markup over purchase price. This pricing system failed to recognize the costs that CTH incurred to serve its varied mix of customers. Consequently, high cost-to-serve customers had been undercharged while low cost-to-serve customers had been overcharged.

With the intent to solve the problems created by cost-plus pricing, the new scheme of activity-based (or menu-based) pricing was introduced. This system aligns fees with services and assumes that the company earns a target margin on its basic product or service, and charges premiums – at or above cost – for special features or services. As a result, customers would see the consequences of the services they demand and be motivated to manage their behavior and business operations more effectively and efficiently. CTH would be able to improve its own process and inventory management practices, increase profitability, and add more value to its customers.

Overall, the new Chart of Accounts enacted in Russia provides great opportunities for activity-based accounting. Based on this Chart of Accounts, each company interested in ABC-information can introduce additional accounts, work out its own internal Chart of Accounts, and develop the internal standard for activity-based accounting. These measures will let the company to significantly enrich its information base used for decision making. Consequently, the competitiveness of such company would be greatly enhanced.

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References

- Atkinson, Anthony A., Banker, Rajiv D., Kaplan, Robert S., Young, Mark S. Management Accounting, 3rd ed. Chart of Accounts for Business Activity Accounting, enacted by the Ministry of Finance of Russian Federation, order # 94n, dated October 31, 2000 (amended on May 7, 2003)
- Kaplan, Robert S. Dakota Office Products. HBS case.
- Kaplan, Robert S., Cooper, Robin. Cost and Effect: Using Integrated Cost Systems to Drive Profitability and Performance (Boston: Harvard Business School Press, 1998).
- Narayanan, V.G., Brem, Lisa. Owens & Minor, Inc. (A). HBS case.