

## Revisiting the Application of the Abc System in the Packaging Industry Companies

Nurmuhametov I.F.

Kaspina R.G.

Davletshina N.N.

Kazan Federal University, Institute of Management, Economics and Finance, Kazan, 420008, Russia

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### Abstract

*This article discusses issues related to the characteristics of the application of cost systems by activities at the packaging industry companies. Special attention is paid to the ability of ABC accounting system usage and its practical adaptation at the one of the fastest growing packaging market sectors – the flexible packaging production. The paper presents a method of presentation of information for the purposes of managerial decision making in terms of activity-based accounting method.*

**Keywords:** cost system by the type of activity, cost driver, type of activity, costs.

### 1. Introduction

The packaging market is one of the fastest growing industries in the Russian Federation. This situation is directly related to the situation on the markets with adjacent consuming industries, primarily in the food industry, which accounts for about 50% of the packaging market in general, and about 70% of consumer packaging market [1].

We would like to highlight the flexible packaging among all kinds of packaging, as it is the most common packaging material, and most widely used type of packaging.

Flexible packaging production is one of the fastest growing sectors in the packaging market and is quite different from a number of other sectors. Together with the large number of features in common, flexible packaging sector differs from other sectors of the packaging industry by the fact that the creation of the finished products involves a large amount of raw materials. Also the production of modern flexible packaging requires the use of equipment, which is the state-of-the-art technology. Therefore, the flexible packaging production is a complex process involving a variety of information and material flows, providing the process [2, 3, 4].

To succeed in the competitive global environment a careful analysis of the company in order to reduce unnecessary or duplicate functions is required. Companies are pursuing the goal of reducing costs; accept the total cost cutting policy. This type of policy reduces the performance of the main work, which leads to a deterioration of the overall quality of the company. Of special importance is the use of advanced forms and methods of work organization and production management, applied in different countries [5, 21, 22].

The methodology of cost systems by the type of activity (Activity-Based Costing, ABC), combined with an analysis of the value delivery chain, allows the company to not only cut costs, item by item, but also to identify and reallocate potential reserves and excess resource consumption [6].

Currently ABC system is increasingly being used in management accounting and in the domestic market production analysis at Russian companies [7].

### 2. Methods

Implementing the concept of cost systems by activities at the flexible packaging producing enterprises overhead costs should be allocated to homogeneous groups. Each group gets a cost driver (cost driver - an indicator of a causal relationship between the cost and the object of calculation), the most correlates with the cost of the group. For example, the equipment repair expenses are distributed to the number of repairs base. Supply department expenses are recommended to distribute proportionally to the number of orders placed for the purchase of raw materials, sales department expenses are distributed to the number of purchase orders. Costs of production operations monitoring are

allocated according to the number of control checks, etc. [8].

Before selecting the individual operations, as well as classification the overhead activities, we consider the process of flexible packaging materials production and highlight the main steps to be carried out. All operations (activities) can be divided into direct production, indirect production and non-production [9, 10].

The structure of the production process of flexible packaging materials production, depending on the method most widely used for printing on packaging material - flexographic or rotogravure printing - requires a certain sequence of actions and equipment to ensure the implementation of these actions [11]. Thus, the process of flexible packaging materials production is subdivided, typically by several stages:

- Packaging design development and the layout file prepress;
- Production, assembly and disassembly of printing forms;
- Overprinting;
- Lamination;
- Cutting, marking-out and packaging.

Thus, depending on the purpose and the composition of the finished product, the production process may include some or all of the above steps [12, 13]. For example, in the certain products manufacture, one or another laminating method may be applied, or this stage may be completely omitted [14, 15, 16].

Therefore, depending on the application and customer requirements manufactured products can be monolayer or multilayer film material (consisting of several polymer layers and manufactured by the coextrusion method), or a multilayer composite material (consisting of layers of different origin and manufactured by the lamination). In connection with this, the structure of the cost of packaging materials and the cost level is strongly influenced by characteristics of the products.

### 3. Results

In and of itself, all of these stages of flexible packaging materials production are separate activities and can be, without enlargement in homogeneous groups, used in the practice of ABC system.

On the author's opinion, the use of peer groups, combining the operation with the same cost drivers as the activities is more cost-effective and appropriate (see Table 1).

The selection of each cost driver is due to the presence of a causal relationship between the costs of the activity and the distribution base [17].

**Table 1.** Cost drivers to the production activity types

Types of activity	Cost driver
Packaging design development	Amount of man hours of prepress area employees
The layout file prepress	Amount of man hours of prepress area employees
Printing form production	Hours of the equipment operation
Ink dispensing	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Mixing of ink volatiles	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Preparations of the ink combination at the ink mixing station	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Preparations roll raw material to the sealing	Amount of man hours of print area employees
Preparation of PCA to printing	Amount of man hours of print area employees
Preparation and approval of the first impression	Hours of the equipment operation
Print	Hours of the equipment operation
Image quality control through a system of surveillance	Amount of man hours of print area employees
Monitoring compliance with the technological parameters	Amount of man hours of print area employees
The lamination process (solventless, solvent, wax or waxing)	Hours of the equipment operation
Quality control of the finished product	Amount of man hours of employees
Cutting the packaging material webs ready	Amount of man hours of employees, hours of the equipment operation
Marking-out and packaging	Amount of man hours of employees

Production and organization management servicing expenses form a non-production and indirect production activities. For example, most of the administrative and management costs can be grouped into homogeneous non-production operations.

With the introduction of cost systems by the type of activity production overhead costs should be collected by type of activity but not by support unit or the main production departments (Table 2).

**Table 2.** The use of ABC system for production overheads classification

Types of activity	Overheads content by the type of activity	Cost driver
Equipment maintenance	Equipment depreciation Supporting materials expenses Salaries expenses Energy consumption expenses	Equipment operation hours
Equipment setting up	Supporting materials expenses Salaries expenses	Fettling hours
Current repair of equipment	Items expenses Salaries expenses	Repair hours
Transport service	Equipment depreciation Supporting materials expenses Salaries expenses Outsourced services	Orders for transportation according distance
Repair of vehicles	Replacement part expenses Salaries expenses Maintenance department service expenses	Orders for transportation according distance
Units management	Salaries expenses	Direct labour costs
Potential trouble measures	Salaries expenses Supply and coveralls expenses	Direct labour costs
Loss	Shortfall and material damage	Relate directly to the product
Units maintenance (mains, heating systems, water supply maintenance)	Salaries expenses Supply expenses Maintenance department service expenses Outsourced services	Proportional to the special coefficient by regard to the volume, complexity of the work, the power of the used equipment, type of equipment, and other factors

As long as a consistent flow of products through the production areas and units is customary for the flexible packaging materials producing companies, the management units' expenses should be taken in account with the cross-sectional areas [18].

General business expenses as a part of ABC system are also considered by activity. For companies, producing flexible packaging materials, the following overheads group and cost drivers for them can be offered (Table 3).

**Table 3.** Overheads cost drivers in the ABC system-wide usage.

Overheads classified by the type of activities	Cost driver
Production and Technology department	Operational time
Department of Logistics	Direct hard cost
Quality control department	Checkout time
Personnel department	Direct labour costs
Labour and wages department	Direct labour costs
Accounting	Direct labour costs
Planning department	Direct labour costs
Maintenance department	Accrued fees
Marketing department	Sales
Pricing department	Sales
Engineering services	Accrued fees
Chief Technologist office	Equipment operation hours
Chief Power Engineer office	Equipment operation hours
Warehouse	Direct hard cost

Safety department	Direct labour costs
Legal department	Direct labour costs
The Security Service	Direct labour costs
Secretariat	Direct labour costs
The overhead	Relate directly to the product
Management staff expenses, non-functional units	Direct labour costs

The complexity of determining the cost drivers of the system is due to the fact that not all general expenses can be traced back to the product. Therefore, the distribution of most of them we propose to carry out with the help of cost drivers such as direct labour costs. And it should be noted that the costs of such cost drivers should be distributed immediately on shipment of goods, bypassing productive activities, since the distribution both through productive activities, as well as directly on the product gives the same results. In addition, the use of a large number of cost drivers increases the cost of implementing the ABC system [19].

Here is an example of calculation the cost of packaging for confectionery. Primary costs of production activities are labour costs and hard costs (Table 4).

**Table 4.** Overheads related to the cost of packaging for confectionery, ths. Rub.

Types of activity	Hard cost	Labour costs
1. Packaging design development	19,72	11,57
2. The layout file prepress	47,88	26,12
3. Printing form production	133,04	22,90
4. Preparations of the ink combination at the ink mixing station	453,70	94,50
5. Print on the flexible packing	1431,65	290,03
6. Cutting the packaging material web and receiving finished product reels	239,00	54,87
Total	2324,99	499,99

Overhead costs are classified by the type of activities and are distributed in a certain sequence. It is rather difficult to present cost-sharing arrangements productive activities graphically, as well as production and non-overhead costs separately, as they are very closely linked.

First of all, the cost of such activities as the content of electricity, heating and water supply network should be classified; then the transport service expenses are allocated to activities consumed transport services; further the administrative department services are distributed; then production overheads are allocated, and finally, the cost of production activities and non-production costs are grouped by operations.

The results of the last stage of the apportionment of the cost of packaging for confectionery products are shown in Table 5.

**Table 5.** The distribution of costs of confectionery packaging collected by activity.

Types of activity	Full costs, rub.	Distribution base size, rub.	The magnitude of the cost drivers for the production of packaging for confectionery products, rub.	The amount allocated to the cost of the package, rub.
Packaging design development	11220,21	97	1,18	136,49
The layout file prepress	34000,90	97	1,8	630,94
Printing form production	68760,43	140	2,3	1129,64
Preparations of the ink combination at the ink mixing station	261000,60	432	16,1	9727,11
Print on the flexible packing	440007,30	2996,02	21,03	3088,55
Cutting the packaging material web and receiving finished product reels	51745,36	424,10	1,40	170,82
Production and Technology Department	41990,33	23240,99	1980,00	3577,34
Personnel department	12640,43	3190000,73	499,99	1,98
Labour and wages department	26000,55	3190000,73	499,99	4,08
Accounting	90431,01	3190000,73	499,99	14,17
Planning department	41700,30	3190000,73	499,99	6,54

Marketing and pricing department,	32000,88	19000788,00	220000,00	370,52
Engineering services	40200,23	17760,00	0,00	0,00
Chief Technologist office	21450,66	4110,00	17,00	88,73
Chief Power Engineer office	24478,11	4110,00	17,00	101,25
Safety department	8090,00	3190000,73	499,99	1,27
Legal department	27150,00	3190000,73	499,99	4,26
The Security Service	9100,00	3190000,73	499,99	1,43
Secretariat	17790,00	3190000,73	499,99	2,79
Management staff expenses, non-functional units	112794,00	3190000,73	499,99	17,68
Total				4362,83

Thus, the cost of the confectionery products packaging instalment using the ABC-system is 4,362.83 rubles. Using the traditional system of calculation, the cost of the confectionery products packaging instalment is 4832.91 rubles. In our opinion, the effectiveness of the implementation of the ABC system is obvious [20, 21, 22].

It should be noted that the introduction the ABC system in this case does not imply a complete rejection of the accounting system for the structural subdivisions. Grouping overheads by the activities generally coincides with the group on structural divisions.

#### 4. Conclusion

The use of the ABC system allows determining ways to reduce overhead costs. Reduction of product tends to reduce the amount of cost drivers, which turns to reducing the overhead data expressed by drivers.

Each stage of the flexible packaging material manufacture has the proper cost structure, depending on the level of mechanization and automation of production processes, the used materials. Besides, the range of flexible packaging materials is constantly changing; the products differ in the complexity of manufacturing.

Of course, the process of separation a significant amount of peer groups from the set of overhead costs, selecting its driver costs and calculation of the corresponding rate allocation is very laborious. Even using only the basics of ABC systems requires a lot of calculations to determine the cost of products or services. However, the necessity of a reliable analysis of costs and profitability of individual products and making a management decisions based on the results of the analysis makes this approach economically feasible.

#### References

- Garrison R.H. and E.W. Noreen, 1994. *Managerial Accounting: Concepts for Planning, Control, Decision Making*, 7th ed., IRWIN: 190.
- Korshunov, I. A. and A. A. Trifilova, 2008. *Modern Innovation Management*. Innovations, 2: 85.
- Shneidman, L.Z., 2012. *Review of Consolidated Reporting Structure in Russia Accounting*, 11: 6-9.
- Boyeva, N. A. and A. I. Nazarova, 2013. *Generation of Business Models by Means of Conduct of an Innovative Audit for Small and Medium-Sized Enterprises*. Educational Researches, 2: 10-21.
- Needles B.E., Powers M., Mills S.K., Anderson H.R. "Managerial Accounting" 5th ed. – Boston, N.-Y.: Houghton Mifflin Company, 1999. – 603 p.
- Cooper R. Activity-based systems: Measuring the costs of resource usage / Cooper R., Kaplan R. // *Accounting Horizons*. – 1992. – September.
- Kaspina, R.G. and L.A. Plotnikova, 2014. *Accounting of external economic activity of Russian companies: Experience and difficulties*. Life Science Journal, 11 (11): 108-111.
- Babad, Y. and B. Balachandran, 1993. *Cost Driver Optimization in Activity-Based Costing*. The Accounting Review, 68 (3): 563-575.
- Hambrick, D. C. and J. W. Friedrickson, 2001. *Are you sure you have a strategy?* The Academy of Management Executive, 4 (November): 48.
- Chesbrough, H., 2008. *Open Business Models: IP-Management; Translation into Russian by V.N. Yegorova*. Moscow: Pokoleniye, pp: 167.
- Bossidy, L. and R. Charan, 2001. *Confronting Reality. Doing What Matters to Get Things Right; Translation into Russian*. Moscow: Williams P.H., pp: 288.
- Porter, M. E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press, pp: 592.
- Brugemann, W., P. Everaert, S. R. Steven and Y. Levant, 2005. *Modeling Logistic Costs using TDABC: A Case in a Distribution Company*. University Ghent, Faculty of Economics and Business Administration. Date Views 13.08.2013 [www.ideas.repec.org/p/rug/rugwps/05-332.html](http://www.ideas.repec.org/p/rug/rugwps/05-332.html).
- Kaplan, R. S. and S. R. Anderson, 2004. *Time-Driven Activity-Based Costing*. Harvard Business Review, November: 45.

- Armstrong, P., 2002. The costs of activity-based management. *Accounting, Organizations and Society*, 27: 99-120.
- Johnson, M., C. Christensen and H. Kagermann, 2009. Reinventing Your Business Model. *Harvard Business Review*. March: 63-72.
- O'Guin, M. and A. S. Reischke, 1996. Customer-Driven Costs Using Activity Based Costing. *Handbook of Cost Management*. NY, Waren, Gorham & Lamont: B5-1-B5-29.
- Markaryan, S.E., T. A. Snetkova and D. V. Khairullina, 2014. Administrative aspects of accounting organization. Russian experience and problems. *Life Science Journal*, 11(8): 107-111.
- Kaspina, R.G., L. S. Khapugina and E. A. Zakirov, 2014. Employment of activity-based costing in the process of company business model generation. *Life Science Journal*, 11 (8): 356-359.
- Kotelnikov, Y. V., 2007. *New Business Models for Era of Swift Changes Moved by Innovations*. Moscow: Eksmo. pp: 256.
- Shigaev A.I., Needles B.E., Powers M., Frigo M.L. Operating characteristics of high performance companies: strategic direction for management // *Performance Measurement and Management Control: Behavioral Implications and Human Actions*. Studies in Managerial and Financial Accounting, Volume 28. Edited by: Antonio Davila, Marc J. Epstein, Jean-François Manzoni. – Emerald Group Publishing Limited, 2014. – p. 25-51
- Shigaev A.I., Needles B.E., Powers M., Frigo M.L. Strategy and integrated financial ratio performance measures: A longitudinal multi-country study of high performance companies // *Performance Measurement and Management Control: Innovative Concepts and Practices*. Studies in Managerial and Financial Accounting, Volume 20. Edited by: Marc J. Epstein, Jean-François Manzoni, Antonio Davila. – Emerald Group Publishing Limited, 2010. – p. 211-252.[]