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FUNCTIONAL-BASED AND ACTIVITY-BASED COST MANAGEMENT SYSTEMS IN WOODWORKING ENTERPRISES- SPECIFICS AND PERSPECTIVES FOR IMPLEMENTATION

Nikolay Neykov[1], Neno Trichkov[2], Angel Petkov[3], Daniel Koynov[4]
University of Forestry, 10 Kliment Ohridski blvd, 1797 Sofia, Bulgaria
e-mail: [1]nkneykov@gmail.com

ABSTRACT

The role of driver tracing is significantly expanded by identifying drivers unrelated to the volume of product produced. The use of both unit- and non-unit-based activity drivers increases the accuracy of cost assignments and the overall quality and relevance of cost information. Such cost accounting systems are called an activity based cost (ABC) systems. In woodworking exist a great deal of auxiliary processes which require specific costs drivers due to precise the cost allocation. In this paper is made an attempt of modeling and testing of such a methodic for costs tracing and allocation in lumber production.

Key words: activity based costing, cost management systems, woodworking

INTRODUCTION

Cost management systems can be classified as functional-based and activity-based. Both of these systems are found in practice of woodworking enterprises all over the world. Currently, the functional-based cost management systems (called here Traditional) are more widely used than the activity-based systems (Hansen, Don R., Maryanne M. Mowen, Liming Guan, 2009). This is changing, however, as the need for more accurate cost information increases. This is particularly true for enterprises faced with high diversity, more product complexity, shorter product life cycles, increased quality requirements, and intense competitive (Hansen, Don R., Maryanne M. Mowen, Liming Guan, 2009). These organizations often implement advanced manufacturing technology. For woodworking enterprises operating in contemporary economic environment, the functional-based cost management system can be accepted like no more appropriate because the requirements of information. More and more accurate information for time consumption and overhead is sufficient for these enterprises to build a sustainable long-term competitive advantage. Remains the question whether such a complicated system is appropriate for every enterprise in wood working or exist situations and conditions in which Traditional (functional) system is more suitable.

The main purpose of the article is to distinguish and to outline new and innovative cost estimation systems in different economic conditions in wood working enterprise.

Due to achieve the objective here are solved the next few tasks:

- To reveal the nature of the two main cost systems- Functional Costing and Activity Based Costing.
- To model the enterprise and to test the systems into its economic activities.
- To estimate the advantages in usage of the systems in different situations.

A functional based cost accounting system uses only unit-based activity drivers to assign costs to cost objects. This means that

units of wood processed are the main distinguishing units to separate fixed costs between stages of production and units of enterprises, like transportation department and administration. Since unit-based activity drivers usually are not the only drivers that explain causal relationships. A functional-based operational control system assigns costs to organizational units. Performance is measured by comparing actual outcomes with standard or budgeted outcomes. This standard in serial woodprocessing is often the planned productivity and consequently planned fixed costs, transferred to variable in the actual costing process.

The activity-based costing (ABC) method focuses on the cost of activities and then allocates these costs to products using a variety of activity bases (Kesavan, R., C. Elanchezhian, B. Vijaya Ramnath, 2009). Buoyed by early successes, ABC emerged as a powerful profit analysis tool. These successes stemmed from ABC's ability to reveal the hidden sources of profitability and embedded cost, and to serve as a catalyst for decisions to improve profitability (Turney, Peter B.B). Under activity-based costing, factory overhead costs (some authors exclude administrative and marketing costs, but in this research they have been taken into account of overhead or so called total costs for management) are put in activity cost pools. These cost pools are related to a given activity, such as machine usage, inspections, moving, production setups, and engineering activitiesq but all of them are not directly connected to the volumes produced. The role of driver tracing is significantly expanded by identifying drivers unrelated to the volume of product produced (called non-unit-based activity drivers). The use of both unit- and non-unit-based activity drivers increases the accuracy of costing in woodprocessing enterprises. There are some important details. In forest industries ABC cannot be implemented individually without usage of volume based drivers. ABC is based on what really happens, while volume-based costing systems are based on the organizational structure and volume (Turney, Peter B.B). But in the same time what really happens is a matter of expertise and accuracy of experts. In this paper is made an attempt to distinguish advantages of both systems in some random situations.

MATERIALS AND METHODS

Due to reveal the main advantages of both (volume and nonvolume) systems in this article are implemented following approaches:

- for the purpose of deriving appropriate accounting information and desirable simplification an enterprise is modeled;
- during Monte Carlo simulation different market conditions are modeled in terms of different sales volumes.

Modeled enterprise has following parameters in terms of costing:

Production includes boards, planking and beams made of coniferous wood. Direct costs for raw materials and labor per m^3 are 222,66 BGN. Indirect costs (overhead and administrative costs) are 503000 BGN, per year. Prices of the products (ex warehouse) are 340 BNG, 320 BGN and 310 BGN for boards, planking and beams, consequently.

Modeling has following constraints:

- Prices are constant.
- Costs are constant.
- Enterprise has given number of activities due to simplify the modeling and results interpretation.
- Sales are assumed to be equal to production volumes.

The main activities included in indirect costs are shown in Table 1.

Table 1: Enterprise's activities that frame the indirect costs and their units (cost drivers)

Activity	Cost driver
Internal transportation	[t/km]
Inventories control	[number]
Customer service operations	[number]
Stock Placement	[hours]
Administrative activities	[hours]
Inspection	[number]

The main results of enterprise's business are calculated by means of one, of the main ones profitability ratio- profitability of sales:

$$P_s = (\text{gross profits})/(\text{total costs}) \quad (1)$$

RESULTS

ABC costing has appropriate procedure, which has some modifications in the context of firm's policy and practice. The first and second steps are allocation of each activity to each type of costs. Allocation is, at first only connection and secondly determining the individual participation of each cost in each activity (statistically or by expertise). These two steps are shown in table 2.

Table 2: Allocation of indirect costs to activities in ABC

	Cost driver	Administration wages	Warehouse workers-salaries	Quality inspectors salaries	Depreciation	Petrol products	Energy
Internal transportation	t/km				0,4	0,6	
Inventories control	number		1				0,1
Customer service operations	number	0,3					0,4
Stock Placement	hours				0,3	0,25	
Administrative activities	hours	0,7			0,25		0,3
Inspection	number			1	0,05	0,15	0,2
Σ=	%	100%	100%	100%	100%	100%	100%

Third step is to evaluate costs for each activity (Table 3).

	Administration wages [BGN]	Warehouse workers-salaries [BGN]	Quality inspectors salaries [BGN]	Depreciation [BGN]	Petrol products [BGN]	Energy [BGN]	Σ [BGN]
Internal transportation	0	0	0	24000	18000	0	42000
Inventories control	0	35000	0	0	0	30000	65000
Customer service operations	18000	0	0	0	0	120000	138000
Stock Placement	0	0	0	18000	7500	0	25500
Administrative activities	42000	0	0	15000	0	90000	147000
Inspection	0	0	18000	3000	4500	60000	85500

Other steps- allocation of each cost driver to each product and calculation of are shown in Table 3.

Table 3: Cost drivers- norms for each product

	Internal transportation	Inventories control	Customer service operations	Stock Placement	Administrative activities	Inspection
	[(t*km)/m^3]	[number/m]	[number/m4]	[hours/m3]	[hours/m3]	[number/m3]
boards	0,5	4	0,5	0,1	0,044	0,08
planking	0,3	4	0,6	0,12	0,044	0,07
beams	0,2	4	0,5	0,14	0,044	0,05

Cost drivers per unit production again can be calculated statistically or by expertise. All other stages depend on the Monte Carlo simulation, which is shown in Table 4

Table 4: Simulated number for production volumes in m^3

Period	1	2	3	4	5
boards	937,	4304	9880	5507	6467
planking	7328	3177	4825	0	2829
beams	1959	7985	5772	7327	6676

The overall results include profitability of sales for entire enterprise and by each assortment. Differences between ABC and Traditional costing give answer about applicability of both methods in real business. Differences are shown in tables 5–6

Table 5: Total differences between profitability per unit in ABC and traditional costing

Period	1	2	3	4	5	6
Difference	0,16[%]	-0,23[%]	0,05[%]	-0,08[%]	-0,09[%]	-0,19[%]

Table 6: Differences between profitability per unit in ABC and traditional costing by products

	Period	1	2	3	4	5
	boards	-0,65[%]	-0,77[%]	-0,27[%]	-0,93[%]	-0,54[%]
	planking	-0,29[%]	-0,57[%]	-0,20[%]	0,00[%]	-0,42[%]
Difference	**beams**	1,42[%]	0,64[%]	0,63[%]	0,70[%]	0,70[%]

Tables shown above reveal the main characteristics of both costing approaches. They are very small and in the current case for overall enterprise the benefit from implementation of such a complicated system like ABC seems to not be economically valid. But in closer look (Table 6) it is obvious that economic efficiency from ABC is not the same for each product. For boards and planking efficiency is not positive and ABC is not necessary. For beams efficiency is positive and especially in the first period. Searching for answers, in this paper are taken into account

two main statistical indicators, which are easy to be calculated in each enterprise- average volume and standard deviation of sales. Beams have the biggest average volumes and the smallest standard deviation. This result gives the main answer- when to implement ABC. The most efficient way is for production with stable sales and bigger volumes. In the same time there is another constraint for the enterprise. The overall savings of implementation should be higher than costs for it. It is a matter of management decision.

CONCLUSION

Implementation of ABC is not a simple task. In woodworking exist two main situations in which the approach can be used: high diversified production line or stable simple line with large volumes. By means of this research can be made the conclusion that in wood working ABC is very necessary for large and stable productions and for unstable, but much diversified ones. In the first case ABC would transmit indirect costs from unprofitable to profitable products and thereby gives opportunity to enterprise to lower the prices. In second case ABC would give universal method for costing in totally different products. But in the both cases ABC gives information- priceless source for planning and control.

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