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MANAGING ENTERTPRISES WITH THE ACCOUNT
OF THE REAL TIME FACTOR

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Abstract. It is stated that the basic reason for ignoring the time factor while planning costs of the enterprise is misunderstanding of the "fixed costs' concept. It is proved that the essence of fixed costs is not their dependence on output, but their dependence on time. The way to account this dependence while planning activities of the enterprise is proposed.

Keywords: cost planning, fixed costs, the time factor, the distribution of semi-fixed costs, wages, constant economic indicators.

The main material of the study. Three functions of management – planning, controlling and regulating – play an important role in the management system of any enterprise. That's why it is so important that the planned enterprise performance indexes should be based on the economic processes described by scientifically-grounded dependencies. Otherwise decisions on regulating certain activities can be taken without actual need for this.

But the complexity of the enterprise management is not limited to these three functions (such management functions as "organization" and "motivation" are not implied). It may happen that though the theoretically-grounded plan has been developed there will be no economic mechanism for its implementation. Something similar is now observed in the management of enterprises, particularly in the former Soviet Union countries. We think that this is primarily due to misunderstanding and the incorrect account of the time factor while planning and implementing economic processes. Most negatively this factor affects the planning process and the mechanism of distributing semi-fixed costs.

The purpose of the research is to create a method for planning the fixed costs distribution and the mechanism of this distribution that would account the time factor to the greatest extent.

Consequently, this would create conditions for the objective planning of the enterprise activities.

While studying fixed and variable costs, most economists usually pay most attention only to one feature – their dependence on output. The following characteristic is popular: fixed costs do not depend on output while variable costs do.

We offer the following definitions of these concepts [5, p. 243]:

The semi-fixed costs are the costs that do not depend on the output but *depend on time*;

The semi-variable costs are the costs that *depend on the output* and do not depend on time.

To substantiate the claim that semi-fixed costs depend on time, let us consider two examples.

The first one deals with exploring the nature of the elements that make up these costs. Annual semi-fixed costs consist of the following main elements [6, p.154]:

$$\Pi_{sfc} = \Pi_d + \Pi_{w'} + \Pi_{am'} + \Pi_r , \qquad (1)$$

where Π_d is annual depreciation deductions, $\Pi_{se'}$ is the annual hourly wages, $\Pi_{am'}$ is annual costs of auxiliary materials and Π_r is annual rent.

Depreciation deductions (depreciation rate) depend on the service life of the fixed assets. Annual hourly wages definitely depend on time. Costs of auxiliary materials consist of the following main elements: the costs of workware, labor safety facilities (fire extinguishers, fire boards, etc.), office supplies and energy resources (water, sewage, electricity, heat etc.) that are not used for technological needs. Employees are provided with workware for a certain time (according to the existing standards), irrespective of how much output they produce. Here time factor is important. Fire extinguishers can be used only during the relevant period, and the costs for heating depend mainly on the duration of the heating

period and so on. The total rent cost depends only upon the duration of rent.

The second example deals with the calculation of the cost-effectiveness due to shortening the time of construction.

It should be noted that still in the Soviet period there existed understanding of the semi-fixed costs dependence on time. Most often this dependence was associated with the construction industry. This can be accounted for by the specifics of this industry. The time of producing a particular building product, it being construction of a building or a structure, is quite long (several years). Consequently, the use of semi-fixed costs over time can be seen most vividly here.

To calculate the cost-effectiveness due to reducing the time of constructing an industrial enterprise it was recommended to consider two types of effects [7, p. 516]:

– for the national economy (now this effect should be called "for the owner")

$$E_{ne} = P_e \cdot E_{rf} \cdot (T_n - T_a) = Pr \cdot (T_n - T_a), \quad (2)$$

where P_e is property and equipment (assets) put into operation, E_{rf} is a regulatory factor of overall effectiveness which now can be called "the profitability ratio of fixed assets" for this industry; T_n and T_a are the normative (contractual) and the actual construction periods, Pr is the profit that will be received from the enterprise operation;

– for the contractor (a construction company)

$$E_{CC} = H_{oc} \cdot (1 - T_a/T_n), \quad (3)$$

where H_{oc} is a conditionally constant part of the overhead costs (actually it is the main part of the semi-fixed costs).

The essence of the first effect is obvious, for example, if construction workers build the facility three months earlier than the normative (contractual) term, the owner of the facility (in the Soviet period, the state itself) will receive additional revenue during these three months that actually corresponds to formula (2).

The essence of the second effect is somewhat more complicated. But in a simplified way it can be explained as follows. Let us suppose that a construction company is building only this facility, and only after finishing it will start building another. During the construction all the fixed costs (as well as all the variable ones) in bookkeeping will be referred to this facility. If its construction period is three months shorter, then all the fixed costs (hourly wages, depreciation, non-productive energy etc.) will not be attributed to this facility (as it has already been put into operation), but to the next one. Consequently, we receive the semi-fixed costs savings that include employee hourly wages, depreciation, and other components of the semi-fixed costs for these three months since these costs are part of the cost price of the constructed enterprise.

Let us make a preliminary conclusion: we cannot say that economists have no understanding of how semi-fixed costs depend on time; however, this understanding is unfortunately very limited as in practice the relation between the semi-fixed costs and time is hardly ever used. In modern economic literature description this relation is almost absent.

Ukraine's transition to the international bookkeeping standards introduced many positive elements in the processes of planning and controlling the enterprise activities. For example, the concept of "the normal enterprise capacity" was introduced, relative to which it is proposed to divide fixed costs into "distributed" and "undistributed" ones etc.

However, there are some vestiges introduced from the past that affect the correctness of the decisions taken. The reason of these vestiges misunderstanding is the incorrect account of the time factor. In a simplified form, this can be explained like this. The main measurers of time in economics are a month, a quarter, and a year. This is logical, because financial statements showing the basic indicators of the enterprise performance are prepared according to these scheduled periods of time. Such a reporting system is similar to a system of different gauges that are used by natural sciences to study any process. But this is the only similarity as natural sciences use "a second" as a basic measure of time which is the constant value with respect to time; and months have a different number of working days ranging from 17 (in some years even fewer), to 25 – 27, i.e. they have different duration. This negatively affects the objectivity of the real economic process reproduction.

Theoretically, in Ukraine there are two main forms of remuneration: the piecework payment and hourly wages. The piecework payment depends on the amount of finished work and hourly wages depend on the number of working hours. But actually, hourly wages in the former Soviet Union and now in Ukraine for managers, specialists and employees were not such because they almost didn't depend on the number of working hours. This is due to the fact that they were paid *"position salaries"*. The essence of this method of remuneration is that an employee receives a fixed monthly salary depending on the position he/she occupies [4, p. 379]. Thus, these employees will receive the same wage even for the months that vary in length and have between 17 to 25 workdays. It is obvious that in this case the time factor is almost not taken into account.

In the developed countries remuneration is paid on an hourly-wage basis. A logical question arises, what is the reason of this contradiction? The essence of this lies in the fact that in these countries the salary is paid in accordance with the number of work hours in a week, not in a month. This is because salaries and all other forms of remuneration are paid on a weekly basis. The benefit of this type of remuneration is that a week has a fixed number of days making it an objective indicator of time duration.

The disadvantage of "position salaries", being popular in Ukraine, is that all of these expenses are included in the final cost of the finished product. And even when an enterprise works evenly (conveyer production), some months with few working days may show losses while in the months with excess number of working days there can be observed the excess profits. This is why the transition of Ukraine to weekly wages, as it is in the most economically developed countries, will improve the distribution of the semi-fixed costs, because the time factor will be accounted for more efficiently. However, monthly distribution of depreciation deductions and other elements of semi-fixed costs, has the same impact on the enterprise performance indicators. Therefore, in order to use a theoretically justified distribution of semi-fixed costs with the account of time, in our opinion, it is necessary to apply more radical measures.

We suggest the following methodical approaches to the distribution of semi-fixed costs with the account of the time factor:

1) time measurements are as lollows:

− the basic units of time: "a year" and "a day" (in some enterprises and for more precise calculations "a year" and "an hour" may be used);

− a year consists of the number of working days, while a working day, which has to be constant, consists of the hours worked;

− all other planned periods (a month and a quarter) are calculated, so their length is determined by the number of working days;

b) the following background information is used:

− productivity of manufacturing in natural units per day or per year;

− yearly semi-fixed costs;

− the product price and its components: semi-fixed and semi-variable costs as well as the normal profit.

Knowing these indicators it is possible to perform theoretically-grounded distribution of semi-fixed costs by time. To prove this statement and to show the discrepancies existing between the traditional distribution method and the one proposed, let us consider the example below.

Let us assume that the enterprise daily output is a constant (conveyer production). The key indicators of its activity and the products manufactured are presented in Table 1.

If the indicators in Table 1 are known, then the calculation of the semi-fixed costs distribution with the account of time (and not the amount of work as it is recommended by the National Accounting Provisions of Ukraine) should be done in the following sequence:

1. The initial productivity and the amount of sales for particular months are determined by the following formulas:

$$Q_{mon.i} = q_d \cdot d_i, \qquad (4)$$
$$R_i = Q_{mon.i} \cdot P, \qquad (5)$$

where q_d is a daily productivity in natural units; d_i is the number of workdays in an i-month and P is the product price;

2. The semi-variable costs are calculated for particular months:

$$SVC_i = P_{svc} \cdot Q_{mon.i}, \qquad (6)$$

where P_{svc} is the semi-variable costs included in the product price.

3. The semi-fixed costs are calculated with the account of time (the proposed method)

$$SFC_i = SFC_d \cdot d_i, \qquad (7)$$

where SFC_d is the semi-fixed costs brought to the daily value, and without the account time (the existing method)

$$SFC_i = \overline{SFC}, \qquad (8)$$

where $\overline{SFC}$ is an average monthly value of the semi-fixed costs.

4. The monthly income is calculated by the formula:

$$Pr_{.i} = R_{.i} - SVC_i - SFC_i . \qquad (9)$$

5. The profitability of production for any given month is calculated by the traditional formula, as the income/cost ratio:

$$e_i = \frac{Pr_i}{SVC_i + SFC_i} \times 100 \cdot \qquad (10)$$

All these indicators can be calculated using their values from Table 1. The results of the calculations are shown in Table 2.

Table 1

**Enterprise performance indicators
and prices of finished products**

No.	Indicator	The number		
1		in a month		in a year
		minimum	maximum	
	Workdays	17	23	247
2	Performance indicators	Indicator value		
		per day	average per month	per year
2.1	Productivity in natural units (n)*	100	2058	24700
2.2	Productivity in monetary units (m)*	2000	41167	494000
2.3	Semi-fixed costs (SFC), m	600	12350	148200
3	Price indicators	SFC	SVC	Profit
3.1	Price components, m/n	6	12	2
3.2	Price, m/n	20		

Note: * these units of measurement are used:

n – an abstract natural unit (in reality: pieces, tons, liters etc.);

m – an abstract monetary unit (in reality: euros, dollars etc).

Table 2

**The semi-fixed costs distribution and the profitability calculations
in particular months
(with minimum and maximum number of workdays)**

Factor and unit of measurement	sign	Method			
		existing		proposed	
		minimum number of days	maximum number of days	minimum number of days	maximum number of days
Natural Productivity , н	$\Pi_{мic.i}$	1700	2300	1700	2300
Sales , г	$\Pi_{реал.i}$	34000	46000	34000	46000
УЗВ, г	$\Pi_{узвi}$	20400	27600	20400	27600
УПВ, г	$\Pi_{упвi}$	12350	12350	10200	13800
Income , г	$\Pi_{прi}$	1250	6050	3400	4600
Profitability , %	$R_{прод.i}$	3,8	15,1	11,1	11,1

From Table 2 we see that the traditional distribution of semi-fixed costs, when time is not accounted for, does not correspond to the actual production process. This is explained in the following way. The intensity (productivity) of production in the enterprise considered is a constant because it uses conveyer production. However, the profitability of manufactured products varies between months, by almost 4 times. This does not correspond to its regular, daily flow of production. The contradiction can be eliminated by using the proposed method.

The problem does not lie only in the ability to plan the fixed costs distribution. The next step should be creation of the economic mechanism that would enable implementation of such a distribution. This second stage, in our opinion, is much more complicated than the previous one because it is necessary to change all the norms and methods of calculating wages, depreciation and other elements of fixed costs. Without the documents that are fundamental for creating the economic mechanism the accountants will continue using the old norms. As a consequence, the correct, theoretically grounded plan will not be accomplished. There are going to be observed discrepancies between a plan and its actual implementation.

Conclusions. One of the disadvantages of the existing semi-fixed costs definitions is that the time factor is not taken into account. A month cannot be considered as a time period in planning economic performance indicators because it has a different length (the number of workdays). The

existing methods of the semi-fixed costs distribution that don't take the time factor into account and are based on monthly expenses, do not correspond to the real production process. The biggest errors are observed in determining the profit and profitability of the manufactured products. The proposed method of distributing the semi-fixed costs based on consideration of the time factor eliminates these shortcomings and objectively describes the process of production. To implement this method, it is necessary to create the new mechanism for calculating wages, depreciation and fixed costs in general.

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