UDC 657.6 *Pregledni rad*

MODEL ANALYSIS OF FIXED ASSETS

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Abstract: *Along with the efficient use of labor, the degree of endowment and the use of fixed assets is a basic condition for achieving production targets, improving its quality level.*

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1. INTRODUCTION

The problem of analysis of fixed assets following aspects:

- analysis of the dynamics, structure and condition of fixed assets;
- analyze the efficiency of fixed assets;
- analyze the efficiency of fixed assets reflect the economic and financial performance of the company.

2. ANALYSIS OF THE DYNAMICS, STRUCTURE AND CONDITION OF FIXED ASSETS

To analyze the dynamics, structure and condition of fixed assets, using the data contained in the balance of assets that includes the categories of fixed assets: at the start of the period (value of inventory and depreciation), movements during the period (inputs, outputs) and existing at end of period (value of inventory, wear). Analysis of the dynamics, structure and condition of fixed assets aimed at development of annual average value or input value of fixed assets during a given period by total assets category or using the following indicators:

- absolute change of fixed assets (ΔMfi) and the total (ΔMf) modeled categories:
  $\Delta Mfi = Mfi_1 - Mfi_0$
  $\Delta Mf = Mf_1 - Mf_0$
- relative change of fixed assets $(\Delta rMfi)$ and the total (ΔrMf) modeled categories:
  $$\Delta rMfi = \frac{Mfi_1 - Mfi_0}{Mfi_0}$$
  $$\Delta rMf = \frac{Mf_1 - Mf_0}{Mf_0}$$

An analysis of fixed assets involves using the following indicators:

- *factor structure categories of fixed assets* $c_s = \frac{Mfi}{Mf} \cdot 100$
- coefficient fixed assets in operation $c_s = \frac{Mfa}{Mf} \cdot 100$,

Mfa represents the value of fixed assets in operation (machinery, special construction, transportation, meters and control).

Analysis of fixed assets involves the calculation and interpretation of the following indicators useful in decision making:

- renewal coefficient, calculated as the ratio between the value of fixed assets investment entrants (Mf_{inv}) and the total value of (Mf): $c_r = \frac{Mf_{inv}}{Mf}$
- wear coefficient, ratio of the amount accumulated depreciation (A) the total amount of fixed assets (Mf): $c_{uz} = \frac{A}{Mf}$

The dynamics of this indicator reflects the company's investment policy, reducing wear coefficient reflecting the renewal of fixed assets, while their aging is associated with the growth of this coefficient.

- modernization coefficient, calculated as a percentage of fixed assets fixed assets modernized (Mfm) in total: $c_m = \frac{Mfm}{Mf} \cdot 100\ (\%)$

3. ANALYSIS OF EFFICIENCY OF FIXED ASSETS

Evaluation of efficiency of fixed assets involves correlation effort, measured by the average value of fixed assets with effect obtained showed that value added figure doings, operational net profit. As a peculiarity in the trade and tourism, is part of the expression effort by many accommodation places, sales area, commercial area. The system of indicators used in the analysis of efficiency of fixed assets is presented in Table 1[1, 121].

- Exemplify a methodology for analyzing the effectiveness of the use of fixed assets using the model:

$I = \frac{CA}{Mf} \cdot 1000 \quad (‰)$, I represent turnover of 1,000 lei assets.

Change indicator compared to the projected (Δ):

$$\Delta = I_1 - I_0 = \frac{CA_1}{Mf_1} \cdot 1000 - \frac{CA_0}{Mf_0} \cdot 1000$$

The main influencing factors are the average annual value of fixed assets (Mf) and average turnover of the firm (CA): $\Delta = \Delta Mf + \Delta CA$.

Table 1: System efficiency indicators used in the analysis of fixed assets

Effect \ Effort	Fixed (Mf)	Fixed assets (Mfa)	Commercial area (Sc)	Sales area (Sv)	Nr. accommodation places (N)
Turnover (CA)	$\frac{CA}{Mf}\cdot 1000$	$\frac{CA}{Mfa}\cdot 1000$	$\frac{CA}{Sc}$	$\frac{CA}{Sv}$	$\frac{CA}{N}$
Value added (VA)	$\frac{VA}{Mf}\cdot 1000$	$\frac{VA}{Mfa}\cdot 1000$	$\frac{VA}{Sc}$	$\frac{VA}{Sv}$	$\frac{VA}{N}$
The result of the operation (Rex)	$\frac{\mathrm{Re}x}{Mf}\cdot 1000$	$\frac{\mathrm{Re}x}{Mfa}\cdot 1000$	$\frac{\mathrm{Re}x}{Sc}$	$\frac{\mathrm{Re}x}{Sv}$	$\frac{\mathrm{Re}x}{N}$
Net profit (Rn)	$\frac{Rn}{Mf}\cdot 1000$	$\frac{Rn}{Mfa}\cdot 1000$	$\frac{Rn}{Sc}$	$\frac{Rn}{Sv}$	$\frac{Rn}{N}$

Quantifying the influence of each factor on the change of turnover to 1000 lei fixed assets leads to the following results:

$$\Delta Mf = \frac{CA_0}{Mf_1}\cdot 1000 \quad -\frac{CA_0}{Mf_0}\cdot 1000$$
$$\Delta CA = \frac{CA_1}{Mf_1}\cdot 1000 \quad -\frac{CA_0}{Mf_1}\cdot 1000$$

In practice, there are three possible situations:

- $I_{CA} > I_{Mf} \Leftrightarrow I_1 > I_0 \Leftrightarrow \Delta > 0$, favorable situation that highlights the increased efficiency of fixed assets
- $I_{CA} = I_{Mf} \Leftrightarrow I_1 = I_0 \Leftrightarrow \Delta = 0$, constant efficiency of fixed assets
- $I_{CA} < I_{Mf} \Leftrightarrow I_1 < I_0 \Leftrightarrow \Delta < 0$, situation which reflects the reduction efficiency of fixed assets.

$$E_{CA/Mf} = \frac{\Delta CA}{CA_0} / \frac{\Delta Mf}{Mf_0} = \frac{I_{CA} - 100}{I_{Mf} - 100} = \frac{\Delta rCA}{\Delta rMf}$$

Contribution of technical endowment of labor efficiency indicator is highlighted on the model [2,253]:

$$I = \frac{CA}{N} / \frac{Mf}{N} \cdot 1000 = \frac{Wa}{H} \cdot 1000$$

N = number of workers

$Wa = \frac{CA}{N}$ = average annual labor productivity

$H = \frac{Mf}{N} =$ degree of technical equipment of labor (labor capitalistic intensity)

Increasing the efficiency of fixed assets is subject to higher evolutionary rate of annual productivity of labor, compared with the pace of providing technical ($I_{Wa} > I_H$):

$$E_{CA/Mf} = \frac{\Delta Wa}{Wa_0} / \frac{\Delta H}{H_0} = \frac{I_{Wa} - 100}{I_{Hf} - 100} > 1 \cdot$$

- An analysis of the indicators operation result 1000 lei assets and the net result 1000 lei assets: $I = \frac{R_{ex}}{Mf} \cdot 1000 \quad (‰)$ $I = \frac{Rn}{Mf} \cdot 1000 \quad (‰)$

Increasing the efficiency of fixed assets is the result of compliance correlations $I_{\mathrm{Re}\,x} > I_{Mf}$, $I_{Rn} > I_{Mf}$ or in terms of elasticity $E_{\mathrm{Re}\,x/Mf} > 1,\ E_{Rn/Mf} > 1.$

To highlight the contribution of each activity or sector on the effectiveness of using fixed asset model is used:

$I = \frac{R_{ex}}{Mf} \cdot 1000 = \frac{\sum Si \cdot R_{ex\,i}}{100} \quad (‰)$, Si, $R_{ex\,i}$ represents the share of fixed assets,

respectively, the operation result 1000 lei fixed on activities or sectors.

Another model capable of proving efficiency reserves available to the Company as follows:

$I = \frac{R_{ex}}{Mf} \cdot 1000 = \frac{CA}{Mf} \cdot \frac{R_{ex}}{CA} \cdot 1000\ (‰)$, $\frac{CA}{Mf} \cdot 1000$ is the efficiency of sales (turnover of 1000 lei fixed assets) and $\frac{R_{ex}}{CA}$ is the commercial rate corresponding operation.

Based on data from Table 2 we achieve efficiency factor analysis using fixed assets using the following template:

$$I = \frac{Q}{Mf} \cdot 1000 \quad (‰)$$

I = 1000 lei indicator output value of fixed assets
Q = production value
Mf = average value of fixed assets

Table 2: Data analysis for calculating the value of output indicator 1000 lei assets

Indicators	Symbol	Values		I (%)
		provided	actual	
Average value of fixed assets	Mf	812550	814059	100,18
Production value (thousand)	Q	1036700	1056648	102,75
Nr. average workers	N	2136	2130	99,72
The production value of fixed assets 1,000 lei	I	1275,85	1297,99	101,73
Working Time Machine (hours)	t	417528	398804	95,52
Average annual productivity (thousand / worker)	$\overline{Wa}$	485,35	496,08	102,21
Average production per hour (lei / hour)	$\overline{Qh}$	2483	2650	106,73
The availability of equipment (thousand / worker)	H	380,41	382,18	100,46

Change the value of output indicator 1000 lei assets in the period under review:

$$\Delta = I_1 - I_0 = \frac{Q_1}{Mf_1} \cdot 1000 - \frac{Q_0}{Mf_0} \cdot 1000$$

$$\Delta = 1297,99 - 1275,85 = 22,14 \quad (‰)$$

Increased production value of 22.14 lei lei every 1,000 consumed fixed line is a positive aspect efficient use of fixed assets as a result of the influence of two main factors (Q output value and the average value of fixed assets Mf) and factors secondary (working time and production equipment t hourly average), which is found on the second level factorial index decomposition analysis (figure 1).

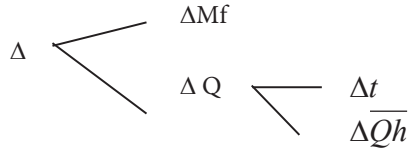

Figure 1: Factors that influence output indicator 1000 lei assets

Quantifying the influence of each factor on the analyzed indicator leads to the following results:

$$\Delta Mf = \frac{Q_0}{Mf_1} \cdot 1000 \quad - \frac{Q_0}{Mf_0} \cdot 1000 \quad = 1273,49 - 1275,85 = -2,36 \ (‰)$$

$$\Delta Q = \frac{Q_1}{Mf_1} \cdot 1000 \quad - \frac{Q_0}{Mf_1} \cdot 1000 = 1297{,}99 - 1273{,}49 = 24{,}50\ (‰)$$

- Because the working time of the machine:

$$\Delta t = \frac{t_1 \cdot \overline{Qh_0}}{Mf_1} \cdot 1000 \quad - \frac{t_0 \cdot \overline{Qh_0}}{Mf_1} \cdot 1000 = 1216{,}41 - 1273{,}49 = -57{,}08\ (‰)$$

- Because the average production zones:

$$\Delta \overline{Qh} = \frac{t_1 \cdot \overline{Qh_1}}{Mf_1} \cdot 1000 \quad - \frac{t_1 \cdot \overline{Qh_0}}{Mf_1} \cdot 1000 = 1297{,}99 - 1216{,}41 = 81{,}58\ (‰)$$

Increase production value obtained at 1000 lei fixed effect of the increase in consumption is faster than production value (102.75%) compared to the average annual value of fixed assets (100.18%). In other words, subtracting the analyzed indicator of 2.36, due to rising average value of fixed assets of 1,509,000 lei was surpassed by the influence of the contrary, more pronounced due to increased production value obtained (with 19.948 million lei).

Among the secondary factors, it is noted positive influence exerted by the increase in mean hourly production compensating the negative impact due to reduced operating time of the machine with 18724 hours, thus there immovable reservations in this regard.
Based on a model of efficient use of fixed assets can determine the influence of the work of providing technical degree (H) and average productivity, knowing that the availability of equipment is the main factor productivity growth.

$$I = \frac{Q}{Mf} \cdot 1000 = \frac{Q/N}{Mf/N} \cdot 1000 = \frac{\overline{W}}{H} \cdot 1000 \quad (‰)$$

$\overline{W}$ = annual average productivity (thousand / worker)
H = the availability of equipment work (thousand / worker)
The condition of efficiency of using fixed assets is $I_{\overline{W}} > I_H$.

$$\Delta = \frac{\overline{W_1}}{H_1} \cdot 1000 - \frac{\overline{W_0}}{H_0} \cdot 1000 = 1297{,}99 - 1275{,}85 = 22{,}14\ (‰)$$

In this sense, increased production to 1,000 lei assets is due to the influence annual average labor productivity and the availability of equipment work (figure 2).

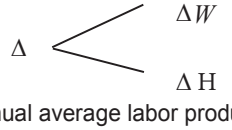

Figure 2:Influence annual average labor productivity and the availability of equipment work

$$\Delta H = \frac{\overline{W}_0}{H_1} \cdot 1000 - \frac{\overline{W}_0}{H_0} \cdot 1000 = 1269{,}95 - 1275{,}85 = -5{,}90\ (‰)$$

$$\Delta \overline{W} = \frac{\overline{W}_1}{H_1} \cdot 1000 - \frac{\overline{W}_0}{H_1} \cdot 1000 = 1297{,}99 - 1269{,}95 = 28{,}04\ (‰)$$

Increasing availability of equipment from thousands lei / 380,410 lei worker / laborer has the effect of reducing production value of 5.9 for every 1,000 lei lei assets used. In contrast, average labor productivity growth of 10,730 lei / worker determines an increase in value of production 28.04 (‰).

Due to the fact that productivity growth outpaced the availability of equipment work ($I_{\overline{W}} = 102{,}21\% > I_H = 100{,}18\%$) ,under the joint action of the two factors analyzed indicator of an upward trend.

4. CONCLUSION

Efficiency and sustainability of the company in the current economic climate is influenced, in addition to other factors, such as material for its potential to contribute to a competitive and efficient production.

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