

## DIAGNOSE OF HUMAN RESOURCES OF SMALL AND MIDDLE SIZE ENTERPRISES (SME)

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**Abstract:** *The paper presents the main elements of human resources diagnose as part of small enterprise resources analysis. Starting from general knowledge regarding human resources, the diagnose objectives and specific demands for small and middle size enterprise, this paper synthesizes a model to be used in diagnose analysis process. According to this model, we established a method of evaluation for each of the three topics of human resources analysis: structure, efficiency and behaviour. For each of these we have tables with the main financial indicators.*

*A scoring evaluation method is associated to this diagnose model to facilitate setting the business level in accordance to human resources criterion. The score function with variables, coefficients and the main coordinates of their choice is also presented. Following the diagnose score, the business level is established and we suggest the main methods of improvement regarding technical resources.*

*Finally, the paper presents a case study of a company in the field of production, we assessed the business rate and set the main conclusion following diagnose. We added the tables containing values of indicators for the three topics and also the justification for the choice of coefficients significance and conventional score assigned for each domain of analysis.*

**Key words:** *human resources, personnel, diagnose analysis, professional competences, labour productivity, labour efficiency, salary.*

### 1. INTRODUCTION

Humans are the most important category of SME resources that can increase the business competitiveness.

According to some specialists [3], human resources is the main company fortune. Diagnose of human resources is focused on quantitative factors and it has as main goal the analysis of the organizational chart and its ability of carrying out the company's needs. In their opinion the importance of diagnose of human resources increases as the company results are influenced by the methods of organization and personnel management.

Others specialists [2] consider human resources as a key factor in company's performance that conditions the acquisition and preservation of competitive advantage in the market economy. In their opinion, diagnose analysis focuses on effectiveness and efficiency of human resources.

Atamer T. [5] appreciates the human resources by their level of integration in the company's strategy. The diagnose shows the managerial and motivational aspects of management of these resources.

Colasse B. [8] in the analysis of business, starts from the principle that competitive potential of a company result from the manner of articulation of business strategic position, available resources and the quality of their worth.

In our opinion, the diagnose analysis of human resources is aimed at the global situation of this internal resources and how its use conjugates to the strategic interests of the company. In this respect, the objectives of the diagnose analysis are:

- to establish the temporal evolution of human resources' performance;
- to establish the kinship between personnel needs (quantity and quality) led by the company's strategic objectives and current situation;
- to determine the human resources perspectives in terms of the strategic program and its management.

Human resources specific elements of SME are:

- high degree of staff responsibility;
- high degree of involvement in the decision making of the leadership management and the key personnel;
- high level of professional effort;
- high degree of attachment and loyalty of employees;
- lower base salaries than in large enterprises;
- greater differentiation of pay wages;
- the importance of multi qualification of work processes;
- high degree of staff turnover in executor personnel and low turnover in key personnel.

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A lower significance, but not negligible, has the conflict level determined by low employee organizations (unions, associations of employees) in such companies.

In Romania, in terms of entrepreneurship, the key determinant factors in assessing human resources are [6]:

- experience (66.4 %);
- knowlwdges and skills (54.92 %);
- responsibility (47.02 %);
- competences (45.94 %);
- level of involment (41.61 %);
- conscientiousness (40.25 %).

So we consider a correct diagnose of human resources, that will match company interests, may be obtained only through a complete evaluation: structural, professional (efficiency) and behavioural all based on the strategic objectives of the enterprise.

Important in these analyzes is the timeline for the research, knowing that the systems' response is usually delayed and the effects are often visible long after making changes.

**2. DESCRIPTION OF METHOD**

We propose a specific method for assessing resources that uses financial indicators. The evaluation is done through a diagnose score.

$$\overline{DRU} = \frac{\sum_{i=1}^3 P_{ru_i} \cdot c_i}{\sum_{i=1}^3 c_i} \tag{1}$$

$P_{ru_i}$  is a conventional score assigned for each domain of analysis. Its value represents the state of domains going on a scale of five steps between total inadaptability and perfect adaptation.

$c_i$  is coefficient significance of domains. The values are given by experts, based on the level of significance in business, according to Table 1 [4].

According to the values of  $\overline{DRU}$  experts set the business level according to the human resources criterion and the improvement plan as following Table 2.

**3. ANALYSIS OF STRUCTURE**

The analysis of the personnel structure uses two types of methods: quantitative and qualitative [7].

The quantitative study is focused on actual problems according to the following criterion:

Table 1

**Coefficients' significance of domains**

Level of significance	Consequences of mismatch on enterprise activities	Value
Very high	Grave, at the level of whole activities	5
Major	Grave, at the level of single activity	2
Secondary	Isolated	1

Table 2

**Conclusions following diagnose**

$\overline{DRU}$	Business level	Improvement plan coordinates
0..1	Non adaptation	Major restructuring: redistribution suitable personnel, dismissal inappropriately, hiring competent persons in key positions
1..2	Adaptation insufficiency	Important restructuring: redistribution and dismissal personnel, change staff, reorganization of work process
2..3	Adaptation to limit	Reorganization: redistribution personnel according to individual competences, remuneration and promoting systems according to results.
3..4	Adaptation good	Up scaling use of human resources: remuneration system according to distinguished competences, personnel training in communication and behavior.
4..5	Adaptation very good	Human resources development: remuneration system according to creativity and involvement, promotions based on emerging competences.

- the correlation between the staff number and the planned needs (planned production) or actual (realized production);
- the mobility of staff in view of business fluctuations ;

The quantitative analysis is thus an assessment of the distribution of staff in relation to the strategic program of achieving planned production (human resource needs) followed by evaluation of the staff (human resource consumption) in relation to achieved production and the assessment of the stability of human resource.

Staff mobility is one of the problems faced by SMEs and even large enterprises. Staff fluctuation generates significant financial losses through additional costs of preparing, employment and education of new staff.

Staff stability analysis is performed when there is significant variation from year to year in the fluctuation indicators (turnover ratio and average age) and it is focused to determine the main causes of staff mobility.

Qualitative analysis is aimed on particular aspects of the professional competence of staff and on how they harmonize with the requirements of positions filled. Qualitative analyzes are difficult to realize on the entire staff so they are limited to key people or eventually to groups of people.

Structural evaluation of human resources is not justified in all cases. Making it is subject to company specific factors and to the number of personnel or labour turnover.

According to the method of structural assessment of human resources in SMEs, selecting the areas of analysis is based on preliminary indicators, following the logic of Fig. 1 [1].

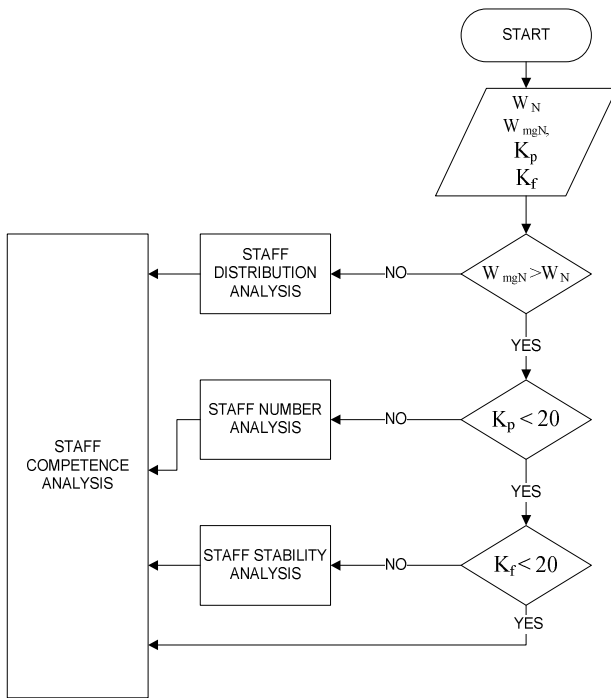


Fig. 1. Selection of domain of analysis.

Basic information on human resources structure is collected from the Human Resources Department (HRD).

The proposed method achieves a financial perspective on structure using both quantitative and qualitative indicators. Quantitative indicators on structure and dynamic factors are presented in Table 3.

Evaluation of individual or group skills of staff relates to the key competencies required for each post (person or department), listed in the job description or task, which by their nature can be [2]:

- “normalized” skills (minimum);
- “differentiated” skills (competitive);
- “emerging” skills (perspective).

The information is collected through questionnaires applied on evaluated people and responsible (directors, heads of departments). Following analysis of the questionnaires we identify the competencies and grouped them in the three categories. We scored for each person / department the level of competence ( $P_{ci}$ ) as such:

- 5 – excellent; the person has all the necessary skills;
- 2 – enough; the person has only certain skills necessary for the job;
- 1 – insufficient; the person does not have the requisite job skills.

For evaluation of a group of staff we calculate the average score of skills.

$$\bar{P}_c = \frac{\sum P_{ci}}{\sum P_i} \quad (2),$$

where  $P_i$  = individuals belonging to the group

Final interpretation of results is made by including in one of the five areas using a grid of skills [2] as seen in Table 4.

Table 3

Indicators of structure

Indicators	Determination
Total production ( $Q_e$ )	Production statements
Total number of scheduled personnel ( $N_p$ )	HRD statements
Number of personnel resigned in the period ( $N_r$ )	$N_r$
Individual number of days worked ( $Z_i$ )	HRD statements
Maximum number of working days ( $Z_{max}$ )	Calendar of period (without legal holidays)
Total number of scheduled days ( $Z$ )	$Z = N_p \cdot Z_{max}$
Average number of personnel $\bar{N}$	$\bar{N} = \frac{\sum Z_i}{Z_{max}}$
Average personnel productivity	$W_N = \frac{Q_e}{N}$
Marginal personnel productivity	$W_{mgN} = \frac{\Delta Q_e}{\Delta N}$
Personnel difference coefficient ( $K_p$ )	$K_p = \frac{ \bar{N} - N_p }{N_p} \cdot 100$
Personnel flow coefficient ( $K_f$ )	$K_f = \frac{N_r}{N} \cdot 100$
Number of personnel entered into the period ( $N_i$ )	HRD statements
Number of personnel left in the period ( $N_e$ )	HRD statements
Personnel entries coefficient ( $K_i$ )	$K_i = \frac{N_i}{N} \cdot 100$
Personnel left coefficient ( $K_e$ )	$K_e = \frac{N_e}{N} \cdot 100$
Personnel movement coefficient ( $K_m$ )	$K_m = \frac{N_i + N_e}{N_p} \cdot 100$

Table 4

Scale of competencies

Competences type $\Rightarrow$	Ordinary	Distinguished	Emerging
Competences degree $\Downarrow$			
Sufficient $\bar{P}_c \geq 2$	Survival area	Area of excellence	Area of innovation
Insufficient $\bar{P}_c < 2$	Maximum risk area	Area of unexplored advantages	

The significance of the five areas is as follows:

- Area of survival: a sufficient number of normalized skills that ensures the performance;

- Area of excellence: the presence of differentiated skills that provides a competitive advantage;
- Area of innovation: the person being assessed is a leader in the business of the enterprise;
- Area of maximum risk: the person / department have not assessed the minimum skills necessary for the job which gives a high risk in business;
- Area of unexplored advantages: insufficient differentiated benefits hinder complete usage of the created competitive advantage.

Company’s human resources structure is perfect adapted to strategic activities when  $K_p$  and  $K_f$  are close to zero, fitted to production program ( $W_{\bar{N}} = W_{mg\bar{N}}$ ) and very stable ( $K_i, K_e, K_m < 5\%$  in the last three years,  $K_m$  is decreasing in the last two years). Personnel competences are in the area of innovation. Situations correspond to 5 conventional points assigned to domain.

A total misfit of human resources structure, scored with 1 point, assume maladjustment of personnel to strategic plans ( $K_p > 30\%$ ), oversized of production program ( $W_{\bar{N}} > W_{mg\bar{N}}$  indicators decreasing) and very high mobility ( $K_f, K_i, K_e, K_m > 50\%$ ). Competences are in the maximum risk area.

**4. ANALYSIS OF EFFICIENCY**

Human resource efficiency is expressed by comparing the results obtained from the use of labor.

In the preparation of the diagnose analysis of the effectiveness of staff in SMEs we used a selection model of key indicators based on specific criteria, as:

- specific of the business or department assessed;
- method used to highlight in accounting the results;
- method used to quantify and pay per labor unit;
- relevant records of extra management accounting.

The group of indicators we recommend for manufacturing departments is presented in Table 5. Following the specifics of the company one of indicators can be

Table 5

**Indicators of human resources efficiency to manufacturing departments**

Indicators	Determination	Details
Total production	According to production statements	$Q_e$
Average cost of salary	$\bar{S} = \frac{S_t}{N}$	$S_t =$ total cost of salary $\bar{N} =$ average number of personnel
Productivity of personnel	$W_N = \frac{Q_e}{N}$	
Productivity of working day	$W_Z = \frac{Q_e}{\sum Z_i}$	$Z_i =$ Individual number of days worked
Productivity of salary	$W_S = \frac{Q_e}{S}$	

adapted, completed or removed from the evaluation as to improve the significance of the group.

A company of 5 points, according to the method, has performance in human resources which increases their efficiency performance both quantitative ( $W_N, W_Z$ , up in the last three years) and qualitative ( $W_S$ , rises above the rate of salaries over the last three years).

Adaptation to limit, in terms of method and three conventional diagnose points, assumes the increasing of quantitative indicators and decreasing of those qualitative.

A non adapted company, a diagnose score of 1, has total inefficiency of human resources highlighted by decreasing of all indicators.

**5. ANALYSIS OF BEHAVIOR**

Usually, in diagnose analysis, behavioral analysis refers to the way of use of available working time and the conflicts in labor relations [2].

To most SMEs, conflicts in labor relations are smaller than large companies and have no effect on economic activity (protests, stops working, strikes). Therefore, our method of behavioral diagnose will be limited to the way of use of working time in relation to companies income.

The indicators of human resources behavior which we take into consideration according to the proposed method are presented in Table 6.

Table 6

**Indicators of human resources behavior**

Indicators	Determination	Details
Individual worked time ( $t_i$ )	HRD statements	hours
Justified not worked time ( $t_{Ni}$ )	HRD statements	hours
Maximum working time in the period ( $t_{max}$ )	$t_{max} = Z_{max} \cdot 8$	hours
Individual net salary ( $S_i$ )	Accounting department	
Average net salary	$\bar{S} = \frac{\sum S_i}{N}$	$\bar{N} =$ average number of personnel
Total available working time	$T_a = t_{max} \cdot \bar{N}$	
Effective time worked	$T_e = \sum t_i$	hours
Justified time not worked	$T_n = \sum t_{Ni}$	hours
Additional time worked	$T_s = T_e + T_n - T_a$	hours
Working time use coefficient	$K_T = \frac{T}{T_a} \cdot 100$	
Elasticity of working time to wage	$K_{T/S} = \frac{\frac{T_{e_n} - T_{e_{n-1}}}{T_{e_{n-1}}}}{\frac{S_n - S_{n-1}}{S_{n-1}}}$	

Based on the trend of indicators a diagnose score is assigned to personnel behaviour.

A company is very well adapted and receives a 5 diagnose score if human resources increase their worked time ( $Z_i, T_e, K_T$ , increase,  $Z_{Ni}, T_n$ , decrease in the last three years), the average net salary rises above the inflation rate and effective time worked depends less on the salary ( $K_{TS} < 1$  and decrease in every of three years analyzed). At the opposite side are companies where human resources decrease their worked time ( $Z_i, T_e, K_T$ , decrease,  $Z_{Ni}, T_n$ , increase in the last three years) due to the low level of salary and their misalignment with inflation rate. Staff ties strongly their work to the level of salary ( $K_{TS}$  is increasing up to 1). These companies will receive a 1 diagnose score in personnel behavior.

**6. CASE STUDY**

Case study refers to a SME operating in the field of production. Company’s main activity, production of plastics packaging, achieved 50% of its turnover but company has other secondary activities such as water bottling, commercials and renting. Human resources are involved in all activities and require the full range of competences, high efficiency and excellent behavior.

Diagnose of human resources is focused on the production activity which is half automatic. The Analysis covers a period of three years from 2008 to 2010. During this period, company has scheduled between 3 and 4 employees in production activity. There were no entries of new personnel in the analyzed period and a single person left company by restructuring in 2009.

Coefficients significance of domains is as follows:

- HR structure,  $c_1 = 1$ ;
- HR efficiency,  $c_2 = 2$ ;
- HR behavior,  $c_3 = 5$ .

**Analysis of structure.** Table 7 presents the values of indicators of structure and their trend followed over for three successive years.

As seen,  $W_{mg\bar{N}} > W_{\bar{N}}$  and  $K_p, K_f < 20\%$  and in accordance to the method of selection of domains of analysis

Table 7

Indicators	2008	2009	2010
$Q_e$	987 805	655 033	789 660
$N_p$	4	3	3
$N_r$	0	0	0
$\Sigma Z_i$	879	775	816
$Z_{max}$	235	233	236
$Z$	940	699	708
$\bar{N}$	3.74	3.32	3.46
$W_{\bar{N}}$	264.119	197 299	263 220
$W_{mg\bar{N}}$	–	792 314	961 621
$K_p$	6.5	10.7	15.3
$K_f$	0	0	0
$K_i$	0	0	0
$K_e$	25	0	0

Analysis of competences

Competences type	Ordinary	Distin-guished	Emerging	$P_{c_i}$
Person 1	Yes	Yes	No	5
Person 2	Yes	No	No	2
Person 3	Yes	No	No	2
Group of pro-duction	Yes	Yes/No	No	3

Table 8

(Fig. 1), we proceeded to analyze the competences. Analysis results for the three persons and aggregated for the group, are presented in Table 8

Following the values of indicators as presented in Table 7 and competences analysis summarized in Table 8, the human resources structure is scored with 3 conventional points ( $P_{n_1} = 3$ ).

Justification is as follows:

- personnel is undersized in relation to production and intensively used in activity ( $K_p > 15\%$ );
- productivity rises and is moving away from the optimum value by increasing the working time;
- stability is high ( $K_f, K_i, K_e = 0$ );
- competences are limited to the survival area.

**Analysis of efficiency.** As seen in Table 9, staff efficiency is maximum in 2008. After the fall in 2009, efficiency rises slightly in 2010 but without touching the level of 2008. This is still remarkable because it happened in the context of decreasing average salary. Following this, staff efficiency is scored with 4 conventional points ( $P_{n_2} = 4$ ).

**Analysis of behaviour.** Using a small number of personnel, its behavior is one of the company main competitive strength.

Because the company did not reveal aspects of conflicts in relationships of the personnel, analysis of behaviour is focused on the use of working time. Indicators of behaviour in the analyzed period are presented in Table 10.

Table 9

Analysis of efficiency

Indicators	2008	2009	2010
$Q_e$	987 805	655 033	789 660
$S$	12 985	12 497	10 907
$W_N$	264 119	197 299	228 225
$W_Z$	1 124	845	968
$W_S$	76	52	72

Table 10

Analysis of behavior

Indicators	2008	2009	2010
$t_{max}$	1 880	1 864	1 888
$S$	12 985	12 497	10 907
$T_a$	7 031	6 188	6 532
$T_e$	6 911	6 168	6 624
$T_N$	120	80	0
$T_S$	0	60	92
$K_T$	98.3 %	99.7 %	101.4 %
$K_{TS}$	–	2.86	–0.58

Considering the evolution of indicators we observed an improvement of employees behavior ( $T_N$  decrease,  $K_T$  increase) and also their level of involvement in activity ( $T_S$  increase). It is also remarkable the detachment behaviour of salary ( $K_{TS} < 0$ ) characteristic to family companies with strong personnel attachment.

Following all this, the human resources behaviour is scored with 4 conventional points ( $P_{n_3} = 4$ ).

Diagnose score of human resources computed with equation (1), is

$$\overline{DRU} = \frac{3 \cdot 1 + 4 \cdot 2 + 4 \cdot 5}{5 + 2 + 1} = 3.9. \quad (2)$$

According to Table 2, situation corresponds to good adaptation of human resources to company needs and the main elements of the improvement plan are:

- increase with one the number of working personnel;
- assure professional training to upscale distinguished competences;
- stimulating remuneration system to promote emerging competences;
- increase of salary to reward personnel attachment and avoid a possible change of attitude.

## 7. CONCLUSIONS

In the case study we analyzed a company in which human resources were high intensively used in the production activity. In fact, the company used human resources to balance the negative effects of crisis.

The analysis main objective was the assessment of human resources level after the crisis period. In this sense we established the main areas of analyze, those who were most affected by strategic plan of overcoming the crisis: number of employees, salaries, responsibility, level, conscientiousness.

The second problem was to provide a more complete approach to phenomena but without complication of the analysis. For these reasons three domains of analysis where defined by default in the diagnose method of human resources: structure, efficiency and behaviour. Each one of these may affect diagnose, their weight in the result being determined by the value assigned to the coefficient of significance according to Table 1.

The third problem we had to solve was the short time available to analyze. In this sense we chose to use a simple mathematic model to evaluate variables trends. That allows synthesizing the statement in one single diagnose score. There are two variables that determine the score: the conventional score assigned for each domain of analysis,  $P_{n_i}$  and the coefficients significance of domains,  $c_i$ .

$P_{n_i}$  is assigned by experts based on the evolution of a group of indicators established for each domain of analysis depending on its specific activity. In Tables 8, 9,

10 and 11 we presented the indicators selected in this case study. Rating scale used has five steps.

Using conventional score and coefficients of significance assigned for each domain, we aggregate a diagnose score  $\overline{DRU}$ , according to Eq. (2), whose value is 3.9. Based on this value we set to “good adaptation” for the the business, according to the human resources criterion (Table 2).

Finally we set the main coordinates of the improvement plan.

The proposed method is neither exhaustive nor exclusive to all SME. According to specifics of the company evaluated and the available budget for analysis, experts can improve or simplify the method by taking into account a larger or smaller number of domains and indicators. The main goal of the method is to plan and coordinate the diagnose as to avoid any omissions with significant influence on phenomenon.

Our method as described allows obtaining the correct diagnose in terms of time and budget limited. In the presented case study we estimated the reducing of time with 50 % and the budget with 30 %.

As future developments of research in the field of diagnose of human resources, we mention:

- designing specialized models for specific human resources: managers, performers, specialists;
- designing specific forms to facilitate the collection of dates;
- make specific guidelines to evaluate the results and assign the conventional diagnose score in terms of high objectivity;
- training experts in communication field.

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