QUANTITATIVE AND QUALITATIVE ASPECTS REGARDING THE ANALYSIS OF THE HUMAN RESOURCE OF AN ECONOMIC ENTITY

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Abstract: *Human resources regard, on the one hand, the physical and psychic capacity of the human organism and, on the other hand, the ability of the enterprise, concerning every individual's capacity to set up new businesses, to launch new products and technology on the market and to improve management techniques for existing ventures, shortly – it concerns every individual's skills and capacities to adapt within conditions imposed by the organization. The proper development of the activity of an economic entity and the achievement of the anticipated performance depend to a great extent on providing the entity with the necessary work force, from a quantitative, structural, but also qualitative point of view.*

Key words: human resources, structure of personnel, indicators of analysis, efficiency, coefficients of qualification

JEL classification: J21, O15, O12

1. INTRODUCTION

The factors of production are identified with those resources that an economic entity disposes of and which are to be used in the process of production of new goods and services. The factors which determine the formation and the modification of production don't act in isolation, but are connected and strongly depend upon the volume of production. Resources optimally combined and advanced in a process of transformation create value, if the products and/or services obtained (the outputs) have a market value superior to the value of consumed resources (the inputs) (Mironiuc, M. 2006). The human capital represents the principal wealth of the enterprise, being the single factor capable to creatively capitalize on all the other resources of the macromedium and of the enterprise itself. At the same time, as key-issue in the restructuration of the enterprise, the human capital can generate major effects on the performances of the enterprise (Petcu, M.: 2003). Changes taking place in the global society ask for "investments in intelligence". Such an investment brings results in time, so it must be realized continuously.

2. THEORETICAL AND PRACTICAL ASPECTS REGARDING THE PROVISION OF THE ECONOMIC ENTITY WITH PERSONNEL IN TERMS OF NUMBER AND STRUCTURE

From a **quantitative** point of view, the analysis of provision with personnel points out the dimension of the personnel necessary to perform the activity. The number of the personnel is directly related to the volume and structure of the activity of an economic entity. The demand of personnel depends on the volume of activity and on the productivity of work, while the establishment of the number of personnel depends on the concrete conditions in which the enterprise develops its activity. The sources of information used with this purpose are: the register of employees, the collective work contract, individual work contracts, revenue accounts, payment declarations of the economic entity at the social insurances budget, post accounts, other accounting data. In fact, the Explanatory Note 8 of the Financial Situations titled "Information about employees, administrators and directors" provides details

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about: the mean number of employees corresponding to a certain exercice, on the whole, on categories (workers, TESA) and according to the level of professional training expenses with salaries; obligations concerning the income tax and other salary contributions; payment of administrators and directors.

The characterization of the degree of provision with personnel of an economic entity results from the correlative analysis of the dynamics of three indicators, namely: the production obtained and destined to release (production of manufactured goods) (Q_f), the mean number of personnel (especially workers ($\overline{N}$) and the productivity of work ($\overline{W}$). The correlative analysis of indices of these indicators can reveal either favorable situations, regarding the provision with personnel of the entity, or unfavourable situations, when the entity is not provided with personnel. The two situations are represented by the following relations:

a). The situation in which the economic entity is provided with personnel

$$I_{Q_f} > 100\%,\ I_{\overline{N}} < 100\%,\ I_{\overline{W}} > 100\% \quad or \quad I_{Q_f} > 100\%,\ I_{\overline{N}} > 100\%,\ I_{\overline{W}} > 100\%, \quad I_{\overline{W}} > I_{\overline{N}}$$

In the first case, the entity has been provided with workers, even if the enterprise included a smaller number of workers, and the growth of production obtained was determined by the efficient use of workers. This situation leads to a relative economy of the working personnel represented as such:

$$\Delta\overline{N} = \overline{N_1} - \overline{N_a} = \overline{N_1} - \overline{N_0} \cdot I_{Qf} = \overline{N_1} - \overline{N_0} \cdot \frac{Q_{f1}}{Q_{f0}} = \overline{N_1} - \frac{Q_{f1}}{\overline{W_0}} < 0$$

where: $\overline{N_1}$ - represents the mean number of workers from the current year; $\overline{N_0}$ - represents the mean number of workers from the previous year; $\overline{N_a}$ - represents the allowable mean number of workers

The second case reflects the fact that the entity has been provided with workers, while the growth of production was obtained on the account of increasing the efficiency of their (the workers') intensive use.

In the case when: $I_{Q_f} > 100\%,\ I_{\overline{N}} > 100\%,\ I_{\overline{W}} > 100\%, \quad I_{\overline{W}} < I_{\overline{N}}$. then the growth of production recorded is mainly due to the extensive use of employees (increase of the number of workers), in which case insufficiently exploited intensive reserves still exist.

b). The situation in which the economic entity is not provided with personnel

$$I_{Q_f} < 100\%,\ I_{\overline{N}} < 100\%,\ I_{\overline{W}} < 100\%$$

It thus results that unachievement of anticipated production can be explained, on the one hand, by the lack of personnel and, on the other hand, by its less efficient use.

$$I_{Q_f} < 100\%,\ I_{\overline{N}} > 100\%,\ I_{\overline{W}} < 100\%$$

This relation shows the fact that, even if the economic entity had been provided with personnel, it did not reach the anticipated level of production, because of the low level of productivity of work.

From a **structural** point of view**,** the analysis of provision with human resources is meant to ensure optimum relations between the different categories of personnel, has the role of verifying and ensuring structural balance in the enterprise in what regards: the work seniority, the age, the categories of personnel, the level of professional training, in relation to current needs of personnel and to possible changes in the activity of the economic entity.

One of the basic aspects taken into account by the analysis of human resources concerns the time tracking of the change of relations between directly productive and auxiliary workers (*the structure on categories of personnel*), on the whole of the economic entity and on shifts. The change of the relation, in the case of the increase of the number of

workers, in favour of directly productive workers, represents a favourable aspect, if the process of work place assignment is not endangered by the decrease of the number of auxiliary workers (indirectly productive).

The age structure of the personnel regards the consistent tracking of the personnel by age, the maintenance of a balance between experience and creativity, the ensurance of promotion in a natural process of retirement-promotion; it will ensure collaboration and trust, as any strong imbalance in the pyramid of ages of the personnel would affect the psychosociological balance and hinder the management in what regards the recruitment and the promotion of personnel. A massive hire of young people might create difficulties in promotion, by setting a disadvantageous relation between the number of aspirants and the possibilities of promotion.

The analysis of the *gender structure* should reflect the relatively constant national structure and the nature of activities that can determine feminine or masculine predominance. The analysis of the nature of activities of an enterprise, the requirements of the various posts, as compared to the gender structure of the personnel, can all reveal causes of certain disfunctionalities linked to particular practices which are counterproductive for the economic entity.

The analysis of the *professional structure* provides information about the technicality, the performances and the perspectives of an enterprise. The professional structure at the national level is elaborated and analyzed by the Ministry of Work. This structure allows the distribution of personnel in: operative, administrative and management personnel, data which are necessary for the analysis of the efficiency of its use.

The analysis of *the structure of personnel on functions* provides useful information concerning the comparison with other enterprises, the estimation of the foreground domain etc. The most dynamic and efficient enterprises, those which reached extraordinary performances in an extremely short time, also rely on the multispecialization of their personnel, in parallel with the decentralization of their functions. It is very possible that the same person should perform research-development works, as well as works of effective production.

The table no.1 presents the evolution and the structure on categories of the personnel of an economic entity, together with the correlations that can be set between the dynamics of the number of employees, of indicators of the volume of activity and of the productivity of work.

Table 1. **Evolutional and structural analysis of the personnel**

Crt.No	Indicators	Period		Indices (%)	Structure (%)	
		2011	2012		2011	2011
1.	The mean number of employees, of which:	606	647	106,77%	100%	100%
2.	I. Workers in sections of production, of which:	334	362	108,38%	55,12%	55,95%
3.	→directly productive workers	206	228	110,68%	61,68%	62,98%
4.	→indirectly productive workers	128	134	104,69%	38,32%	37,02%
5.	II. TESA personnel, of which:	224	237	105,80%	36,96%	36,63%
6.	→superior studies (engineers, subengineers, jurist economists)	114	120	105,26%	50,89%	50,63%
7.	→medium studies (masters, technicians, commodity experts, CTC-laboratory, etc)	89	94	105,62%	39,73%	39,67%
8.	→personnel of general service (administrative, firefighters, security, firemen etc.)	21	23	109,52%	9,38%	9,70%

9.	III. Management personnel	48	48	100%	7.92%	7.42%
10.	Production obtained destined for release or Production of manufactured goods (Qf = Qv ± ΔQs)	67.353.339	87.534.719	129,96%	-	-
12.	Productivity of work related to the total of employees	111.144,12	135.293,23	121,73%	-	-
13.	Producţivity of work related to the total of workers	201.656,704	241.808,616	119,91%	-	-

Source: Personal arrangement following the real data from the Explanatory note 8 "Information regarding employees, administrators and directors" at the level of the economic entity analyzed

On observing the data from the table, we can assert that the economic entity analyzed has been properly provided with the number of personnel, which increases from one period to another, namely by 6,77% on the entire personnel. All categories of personnel recorded an increase, as follows: the effective workers from the sections of production increased by 8,38%, with a significant growth at the level of directly productive workers (by 10,68%). In addition to that, the TESA personnel increased by 5,80% in 2012 as compared to the previous year, while bigger increases were recorded by the personnel of general service, which grew by 9,52%. The only category of personnel that remained constant as number is the "Leading personnel". The increase of the total number of employees will bring forth changes in the structure of the categories of personnel, more or less significant according to the distribution of personnel on different categories of employees.

The characterization of the degree of provision with personnel of the economic entity can also be acquired by the correlative analysis of the dynamics of three indicators, namely: the production obtained and destined to delivery (production of manufactured goods) (Q_f), the mean number of personnel (especially of workers) ($\overline{N}$) and the productivity of work ($\overline{W}$). Thus, the following relation can be stated at the level of the entity analyzed.

$$I_{Q_f} > 100\%,\ I_{\overline{N}} > 100\%,\ I_{\overline{W}} > 100\%, \quad I_{\overline{W}} > I_{\overline{N}}$$

This situation brings forth a relative economy of personnel determined as follows:

$$\Delta\overline{N} = \overline{N_1} - \overline{N_a} = \overline{N_1} - \overline{N_0} \cdot I_{Qf} = \overline{N_1} - \overline{N_0} \cdot \frac{Q_{f1}}{Q_{f0}} = \overline{N_1} - \frac{Q_{f1}}{\overline{W_0}} =$$

$$= 647 - 606 \cdot 1{,}2996 = 647 - \frac{87.534.719}{111.144{,}12} = 647 - 788 = -141\ salariati$$

In what regards the structure of the number of employees, we can observe that every period records the greatest coefficient in the total number of employees within the category of workers in the sections of production (by over 55% in each period), especially directly productive workers (by 61,68% in 2011 and by 62,98% in 2012), which is a favorable aspect for the entity analyzed because this category of employees participates directly and actively to the achievement of the object of activity of the enterprise.

Although the number of employees grows (with 41 on the whole) from one period to another, modifications of the structure are insignificant, because the increase of the number of employees distributed proportionate to the categories of personnel (28 workers in the sections of production and 13 TESA staff), thus determining a growth in the extent of workers within the sections of production from 55,12% to 55,95%, a slight decrease of the TESA staff from 36,96% to 36,63% (because of the stronger rhythm of growth of the number of workers in the sections of production) and a slight decrease of the extent of the mangement personnel from 7,92% in 2011, to 7,42% in the following year (due to the fact that the number of the management personnel didn't record any changes, but its extent decreased because of the changes appeared within the other two categories of personnel).

3. THEORETICAL AND PRACTICAL ASPECTS REGARDING THE ANALYIS OF THE QUALITY OF the PERSONNEL OF THE ECONOMIC ENTITY

The quantitative and structural provision with personnel of the economic entity should be accompanied with a certain **qualitative** and qualification level. As a consequence of that, complete and pertinent conclusions concerning the provision with personnel of the economic entity should be formulated by considering, on the one hand, the qualification of the personnel, and on the other hand, its quality. The level of the qualification and quality of the staff is an essential criteria for the assessement of the capacity of the enterprise to achieve performances. However, it is quite difficult to assess the qualitative level of the personnel, as there are certain methodological difficulties of evaluation. The employer has to take into account both the diploma/certificates obtained and the experience, which remains a rather complex, difficult and hard to quantify notion.

An important aspect followed in the analysis refers to the preoccupation of every enterprise to improve the qualification of its personnel, on which depends its efficiency, as well as to certain issues regarding the ensurance of the social protection and the requalification of the unemployed (Buşe, L., 2007).

The preoccupation of enterprises in what regards the line of continuous professional formation, materialized in the expenses previously cited, can be reflected through the following indicators (Niculescu, M.: 2003): the sum of expenses for continuous formation; the extent of expenses for continuous formation in salary expenses or in turnover; the number of employees that benefitted from a specialization course (on the whole and on categories); the number of promoted/retrograded employees in a superior/inferior category over the course of one year; the number of interns on types of internships; the extent of time alloted to continuous formation (man-hours) within the total work time (expressed as man-hours);

The analysis of human resources from a qualitative point of view refers to the way in which the enterprise is provided with qualified workforce in relation to the degree of technicity or complexity of operations and works that need to be done in order to obtain goods, to execute works or to provide services (Vâlceanu, Ghe., et al., 2004). The analysis of the qualification of the personnel can be realized through the following indicators:

- ***the mean coefficient of qualification***, set as an arithmetic balance between the number of employees from the category of qualification "i" (N_i) and the category of distribution "i" (k_i). $\overline{K_c} = \frac{\sum N_i \cdot k_i}{\sum N_i} = \frac{\sum s_i \cdot k_i}{100\%}$ *and* $1 \le k_i \le 7$

where: N_i – represents the number of employees from the category of qualification "i" ;k_i – represents the category of distribution (qualification) "i"; s_i – represents the structure of workers on the category of qualification "i"

If from one period to another $\overline{K}_{c1} > \overline{K}_{c0}$, it results that the economic entity recorded an increase of the mean level of qualification.

- ***the mean coefficient of complexity (distribution) of works performed*** is calculated as a balanced arithmetic mean between the work time (expressed as man-hours) corresponding to every category "i" of distribution of works (th_i) and the category of distribution of works (k_i). $\overline{K_i} = \frac{\sum th_i \cdot k_i}{\sum th_i} = \frac{\sum s_i \cdot k_i}{100\%}$ *and* $1 \le k_i \le 7$

where: th_i – represents the work time (expressed as man-hours) associated with the category "i" of distribution of works; k_i – represents the category "i" of distribution of works; s_i – represents the structure of works on the category of distribution "i"

The comparison of the two coefficients (the mean coefficient of qualification and the mean coefficient of complexity of the works executed), reveals the following situations,

which reflect the degree of accordance/discrepancy between the level of qualification of the personnel and the degree of qualification imposed by technologies of fabrication.

These discrepancies bring forth the following consequences: the insufficient use of the professional capacity (of the degree of qualification of the workforce); the unrational increase of the cost of products (since workers need to be paid by their degree of qualification, according to the Code of Work and the principles of remuneration); the increase of expenses with salaries, as well as of other debts to the state calculated as percentage from the salary fund; loss of desire to improve qualification, in the conditions that workers have to work under the level of their training. These coefficients are completed by the analysis of the total mean coefficient of accordance which reflects, for the entire economic entity and on category of qualification, the ways to use workers of a certain qualification in order to execute works improper to that qualification. Therefore:

- ***the total mean coefficient of accordance*** $\overline{K_{ct}} = \dfrac{\sum_{j=1}^{m} th_{ij} \cdot k_{li}}{\sum_{i=1}^{n}\sum_{j=1}^{m} th_{ij}}$ while $k_{li} = \dfrac{th_i}{\sum_{j=1}^{m} th_{ij}}$

where: i – represents the category of qualification of workers; j – represents the category of distribution of works; th_{ij} – represents the working time effected by the workers of the "i" category in order to realize the works of the "j" category; k_{li} – represents partial coefficients of accordance on categories of qualification "i"; th_i – represents the working time effected of workers from the "i" category in order to realize the works from the same category "i"

The value of the coefficient falls within the interval [0 ; 1]. If $\overline{K_{ct}}$ gets close to the value 0, that means that workers of various "i" categories are used for the achievement of "j" works that are different from their qualification. If $\overline{K_{ct}}$ is close to the value 1, that means that the degree of accordance grows, so workers of a certain qualification are used for the achievement of works close to their level of qualification. If $\overline{K_{ct}}$ =1, that means that there is an accordance of plans between the level of qualification and the category of the works. This coefficient shows the mean degree of accordance at the level of the entire entity, but also on categories of qualification, through partial coefficients of accordance (k_{li}).

The table no. 2 presents the distribution of workers and working hours on the 7 categories of qualification, over the two years analyzed

Table 2. **The analysis of the qualification of the personnel**

Crt.No	Category of distribution of workers and works (k_i)	The number of workers on categories of qualification (N_i)		The distribution of hours on categories of works (t_{hi})		t_{hi0} *k_i	t_{hi1}*k_i
		2011	2012	2011	2012	2011	2012
1.	I	39	41	53426	64587	53426	64587
2.	II	54	60	66789	78456	133578	156912
3.	III	63	68	78978	103789	236934	311367
4.	IV	67	71	85543	101123	342172	404492
5.	V	55	56	84378	96243	421890	481215
6.	VI	36	43	72756	95476	436536	572856
7.	VII	20	23	63866	67931	447062	475517
8.	***Total***	***334***	***362***	***505736***	***607605***	***2071598***	***2466946***

The mean coefficient of qualification over the two years analyzed is calculated, according to data from table no. 2, as follows:

$$\overline{K_{c2011}} = \frac{39 \cdot 1 + 54 \cdot 2 + 63 \cdot 3 + 67 \cdot 4 + 55 \cdot 5 + 36 \cdot 6 + 20 \cdot 7}{334} = 3{,}70$$

$$\overline{K_{c2012}} = \frac{41 \cdot 1 + 60 \cdot 2 + 68 \cdot 3 + 71 \cdot 4 + 56 \cdot 5 + 43 \cdot 6 + 23 \cdot 7}{362} = 3{,}72$$

Considering the fact that the value of this coefficient does not change significantly from one period to another (3,70 in the previous period and 3,72 in the current period), we can assert that the mean level of qualification on the entire enterprise is close to the category of qualification 4 (the best being 7). We can also point out that the enterprise still possesses reserves in what regards the level of qualification of the working personnel, considering the fact that it has not changed from one year to another.

The mean coefficient of complexity (distribution) of works executed in the two years analyzed is calculated, according to data from the table no. 2, as follows:

$$\overline{K_{i2011}} = \frac{2.071.598}{505.736} = 4{,}09 \qquad \overline{K_{i2012}} = \frac{2.466.946}{607.605} = 4{,}06$$

At the level of the entity analyzed, we can observe a mean level of complexity (distribution) around the value of 4. Moreover, this mean level of distribution does not change significantly from one year to another (4,09 in the previous year, respectively 4,06 in the current year), which means that the degree of complexity of works has remained constant.

The comparison of the two coefficients (the mean coefficient of qualification and the mean coefficient of complexity of works executed) points outs the following situation, which reflects the degree of accordance/discrepancy between the level of qualification of the personnel and the degree of qualification imposed by the technologies of fabrication, namely: $\overline{K_c} < \overline{K_i}$; that means that works of superior complexity are performed by workers with an inferior degree of qualification, which case will affect the productivity of work, the quality of products and/or services, the profit and the relations of the enterprise with clients. This situation is unfavourable for the entity analyzed for the reasons cited, however we can observe the value of the two coefficients is getting close. The economic entity has to take measures regarding the increase of the level of qualification of the working personnel, even if the level of complexity of the works executed has remained the same, an aim which the entity had not reached in 2012.

More detailed information about the analysis of the quality of personnel are provided by ***the total mean coefficient of accordance*** which reflects, on the whole of the economic entity and on every category of qualification, the ways of use of workers of a certain qualification for the execution of works associated with that qualification (observe the data from the Table no.3)

Table 3. **The analysis of the coefficient of accordance**

The category "i" and "j"	I	II	III	IV	V	VI	VII	Total volume of works th_{ij}	Partial coefficients of accordance k_{li}
I	46.537	14.238	3.812	-	-	-	-	64.587	0,72
II	2.368	35.587	35.231	5.270	-	-	-	78.456	0,45
III	-	33.276	48.765	12.345	9.403	-	-	103.789	0,47
IV	-	-	21.768	67.458	10.367	1.530	-	101.123	0,67
V	-	-	-	14.568	71.076	10.599	-	96.243	0,74
VI	-	-	-	-	8.548	82.346	4.582	95.476	0,86
VII	-	-	-	-	-	15.986	51.945	67.931	0,76
TOTAL	48.905	83.101	109.576	99.641	99.394	110.461	56.527	***607.605***	-

By calculating and analyzing the partial coefficients of accordance (the last column from the Table 3) we can observe that on categories of qualification "i", the biggest

discrepancies are recorded at the levels of qualification II and III. Better levels of accordance on categories of qualification record the categories of qualification VI, VII, V. At the level of the whole economic entity, the total mean coefficient of accordance can be obtained as follows:

$$\overline{K_{ct}} = \frac{64.587 \cdot 0,72 + 78.456 \cdot 0.45 + 103.789 \cdot 0,47 + 101.123 \cdot 0,67 + 96.243 \cdot 0,74 + 95.476 \cdot 0,86 + 67.931 \cdot 0,76}{607.605} = 0,66$$

The values of the total mean coefficient of accordance fall within the interval [0 ; 1]. At the level of the entity analyzed, the value of this coefficient is far from 1, due to certain discrepancies recorded at the level of the categories of qualification, as we have already pointed out on calculating the partial coefficients of accordance. We have, moreover, observed the biggest discrepancies at the level of categories II and III, whose workers hold significant extent from the total of workers distributed on the category of qualification (60 and 68 workers from the total of 342 workers in 2012). Compared to the other two coefficients (the mean coefficient of qualification and the mean coefficient of complexity of works executed), this coefficient shows the mean degree of accordance at the level of the entire entity, as well as on categories of qualification, through partial coefficients of accordance (k_{li}).

4. CONCLUSIONS

Although we currently witness a continuous process of introduction of authomatization, robots and informatics in all domains, the human factor still has the decisive role in developing the performant activity of an economic entity. The human factor represents the essential coordinate of the dimension and especially of the quality of activity. The provision of the enterprise with the necessary specialty personnel, its efficient use in the operative and management activity is the premise of enhancing material and financial resources and of valorizing to the advantage of the enterprise the conditions offered by the natural and social environment.

The retechnologization of production, the creation of new products, the permanent improvement of the qualitative level of products, the increase of the market competition and the diversification of clients'/consumers' demands all require higher levels of professional qualification, experience and competences. In consequence, the process of formation of the human resource should develop continuously. The formation of the personnel can be regarded, on the one hand, as an expense (an effort), as an investment for maintenance when it comes to keep pace with current state of facts, but also as an investment for increase when it comes to enrich knowledge, while on the other hand, a high level of qualification of the personnel can be considered a source of competitive advantage.

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