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ALLOCATION OF A BONUS WAGE FUND ACCORDING TO PERSONNEL PERFORMANCE

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РАСПРЕДЕЛЕНИЕ ПРЕМИАЛЬНОГО ФОНДА ОПЛАТЫ ТРУДА ПО РЕЗУЛЬТАТАМ ВЫПОЛНЕНИЯ ЗАДАЧ ПЕРСОНАЛОМ

The paper pays special attention to the development of an economic and mathematical model to allocate the bonus fund when the company tries to encourage fulfillment of specific tasks as soon as possible. The economic and mathematical model in question is brand-new and represents a model of nonlinear optimization of allocating financial resources of a bonus fund throughout subdivisions according to the periods of task fulfillment by the company's personnel.

PERSONNEL FLOW; EMPLOYEE CREATIVE POTENTIAL; EMPLOYEE MOTIVATIONAL AND ETHICAL POTENTIALS; COMPANY'S BONUS FUND; OPTIMAL ALLOCATION OF REWARDS TO EMPLOYEES.

Рассматривается экономико-математическая модель распределения премиального фонда. Разработка является оригинальной и представляет собой модель нелинейной оптимизации распределения финансовых ресурсов премиального фонда по подразделениям в зависимости от сроков выполнения задач персоналом компании.

КАДРОВЫЙ ПОТОК; ТВОРЧЕСКИЙ ПОТЕНЦИАЛ СОТРУДНИКОВ; МОТИВАЦИОННЫЙ И МОРАЛЬНЫЙ ПОТЕНЦИАЛЫ СОТРУДНИКОВ; ПРЕМИАЛЬНЫЙ ФОНД КОМПАНИИ; ОПТИМАЛЬНОЕ РАСПРЕДЕЛЕНИЕ ВОЗНАГРАЖДЕНИЙ СОТРУДНИКАМ.
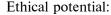
The movement of manpower (personnel flow), being an active part of the socio-economic system, is related to various organizational, managerial, financial, and informational aspects of a company's performance and development [1, 2]. It can be shown that the allocation of an organization's bonus fund should be effected allowing for the company's goals, traditions and available financial resources. It can be shown that the company's management is interested in determining the extent of participation for each employee, which determines his/her contribution into the firm's development. First of all, the firm can evaluate the contribution of each subdivision into the increase of the company's economic potential, which will allow evaluating the size of the bonus fund for a particular subdivision. Then the obtained amounts of the bonus fund can be allocated by potential priorities of the firm's employees who participated in implementing specific tasks. Enterprise management, targeted at enhancing its efficiency, requires a skill from the executives and managers to evaluate properly and to allocate optimally the enterprise's manpower in accordance with the given tasks [3, p. 105].

In the opinion of the Russian specialist in the sphere of economic analysis L.N. Molchanov, the process of analyzing manpower allows for a complex of generalized indices, such as manpower potential, labor activity of the personnel, motivation, creative potential etc. [4, p. 46—47]. Creative potential implies detection and evaluation of the following aspects:

− the number of rational proposals and inventions submitted by the workers, participation in developing innovations, professional contests, etc.

− the size of unused reserves;

− level of education, qualification, work culture;

− employee's aspiration to extend the professional profile, career;

− involvement in taking economic decisions, running the enterprise, operation of public organizations.

Motivational potential:

− labor satisfaction;

− labor attitudes;

− socio-psychological climate in the team;

− personnel turnover.

Ethical potential:

− labor discipline.

The following is referred to indices of the manpower potential:

− average headcount, real numbers of the personnel;

− integral labor utilization rate;

− balance of jobs and employees at an enterprise;

− professional and qualification potential;

− personnel's structure according to education;

− personnel's structure according to labor record;

− functional structure etc.

Psycho-physical potential is evaluated by the following values:

− personnel's gender-age structure;

− intensity, severity of labor;

− disease rates (general, occupational);

− performance indicators.

On the basis of analyzing labor indices it is possible to evaluate economic efficiency of labor at the level of an enterprise and its subdivisions, formulate guidelines to improve personnel management, forms, methods, procedures of cooperation with the personnel, and the corresponding changes in the functions and services ensuring personnel policies. Special attention should be paid to measures which increase labor efficiency, rational use of working time, efficient use of the wage fund, and monitoring of overall indices.

One of the factors to increasing efficiency of a personnel management system is optimal planning the manpower allowing for a need in personnel, variable costs of personnel, its development, and through the evaluation of labor efficiency activities for each employee.

An economic and mathematical model, which allocates optimally the bonus fund, can be built in accordance with the priorities of the employees economic potential and the use of the manpower (personnel flow) to ensure fulfillment of managerial tasks by the criterion of minimal time spent by subdivisions. Let us take P as a matrix of order $m \times n$, in which the value p_{ij} is at the position (i, j).

$$P = \begin{Bmatrix} p_{11} & p_{12} & \cdots & p_{1n} \\ p_{21} & p_{22} & \cdots & p_{2n} \\ \vdots & \vdots & p_{ij} & \vdots \\ p_{m1} & p_{m2} & \cdots & p_{mn} \end{Bmatrix}.$$

A matrix element p_{ij} denotes the time for task fulfillment assuming the i-th subdivision of the company (department sector, department, directorate) of the j-th task, including the time spent to compile respective documents (such as business plans of investment projects, various managerial reports and various documentation). It is required to draw up a plan of allocating the personnel flow, with the time to fulfill a managerial task is minimal.

Assume x_{ij} as the size of the bonus fund of the i-th subdivision (the size of financial resources included in the budget of the i-th subdivision paid as a reward to employees for the fulfillment of the j-th task. The total size of financial resources which can be directed at the payment of bonuses to the i-th subdivision amounts to d_i units, $i = 1, 2, ..., m$; the size of bonuses directed at the disbursements (without linking to any subdivision) for the fulfillment of a specific j-th task equals b_j units, $j = 1, 2, ..., n$. Then, d_i of the units is the size of the bonus budget allocated according to task significance.

The target function reflects the company's aspiration to award bonuses to those employees particularly who fulfill the tasks in the most efficient way. A set of tasks can be fulfilled by any subdivision of the company and is fulfilled by each subdivision over the time p_{ij}. Bonuses are allocated by subdivisions that fulfilled the set tasks as soon as possible. The competition of subdivisions (affiliates, employees' teams, workgroups) is implied a set of tasks within the shortest time. The moment, when the most time-consuming task of those which have been set is completed, must be minimal, when the bonus fund may be allocated by subdivisions. In this case the target function f with the time minimum criterion must be equal to the highest value of all time values which were spent on task fulfillment, i. e. $f(x_{ij}) = \max p_{ij}$, where the maximum is taken for those p_{ij} only with positive values of funds allocated for bonuses.

The formally considered task is written in the following manner:

$$f(x_{ij}) = \max p_{ij} \xrightarrow[x_{ij} > 0]{} \min;$$

$$\begin{cases} \sum_{j=1}^{n} x_{ij} = d_i, & i = 1, ..., m; \\ \sum_{i=1}^{m} x_{ij} = b_j, & j = 1, ..., n; \\ \sum_{i=1}^{m} d_i = \sum_{j=1}^{n} b_j, & i = 1, ..., m; \ j = 1, ..., n; \\ x_{ij} \geq 0, & i = 1, ..., m; \ j = 1, ..., n. \end{cases} \quad (1)$$

The composed model is not a linear programming model. Similar tasks are solved by Mathcad tools in [5].

Assume that a certain company needs to make a plan of allocating the bonus fund by subdivisions to encourage fulfillment of managerial tasks so that the maximal time spent on the task fulfillment should be minimal. The time for task fulfillment, capacities of financing sources (subdivision's budget), and the amounts of bonuses for task fulfillment are given in tab. 1.

This task can be written in a mathematical expression as follows:

$$f(x_{ij}) = \max p_{ij} \xrightarrow[x_{ij} > 0]{} \min$$

with observance of the following restrictions:

$$
\begin{cases}
x_{11} + x_{12} + x_{13} + x_{14} + x_{15} + x_{16} + x_{17} + x_{18} + \\
\quad + x_{19} + x_{1,10} = 190; \\
x_{21} + x_{22} + x_{23} + x_{24} + x_{25} + x_{26} + x_{27} + x_{28} + \\
\quad + x_{29} + x_{2,10} = 180; \\
x_{31} + x_{32} + x_{33} + x_{34} + x_{35} + x_{36} + x_{37} + x_{38} + \\
\quad + x_{39} + x_{3,10} = 205; \\
x_{41} + x_{42} + x_{43} + x_{44} + x_{45} + x_{46} + x_{47} + x_{48} + \\
\quad + x_{49} + x_{4,10} = 210; \\
x_{51} + x_{52} + x_{53} + x_{54} + x_{55} + x_{56} + x_{57} + x_{58} + \\
\quad + x_{59} + x_{5,10} = 215; \\
x_{11} + x_{21} + x_{31} + x_{41} + x_{51} = 113; \\
x_{12} + x_{22} + x_{32} + x_{42} + x_{52} = 88; \\
x_{13} + x_{23} + x_{33} + x_{43} + x_{53} = 110; \\
x_{14} + x_{24} + x_{34} + x_{44} + x_{54} = 91; \\
x_{15} + x_{25} + x_{35} + x_{45} + x_{55} = 100; \\
x_{16} + x_{26} + x_{36} + x_{46} + x_{56} = 105; \\
x_{17} + x_{27} + x_{37} + x_{47} + x_{57} = 85; \\
x_{18} + x_{29} + x_{39} + x_{49} + x_{59} = 109; \\
x_{19} + x_{29} + x_{39} + x_{49} + x_{59} = 95; \\
x_{1,10} + x_{2,10} + x_{3,10} + x_{4,10} + x_{5,10} = 104; \\
\sum_{t_{ij} > r} x_{ij} = 0, \quad r = \overline{1,50}; \\
x_{ij} \geq 0, \quad i = \overline{1,5}; \quad j = \overline{1,10}.
\end{cases}
$$

By solving the task, we will obtain tab. 2.

The total requirement in financing encouragement of the subdivisions is completely satisfied and equals to 1,000 ths rubles with the following equation:

$$\sum_{i=1}^{m} x_{ij} = \sum_{j=1}^{n} x_{ij}.$$

The minimal time spent on the fulfillment of the j-th managerial task by i-th subdivision is 19 days in this case.

The obtained amounts of bonuses in subdivisions for the fulfillment of specific tasks are subdivided among employees, involved in the tasks, for instance, allowing forthe priority of the employees' economic potential.

According to the Russian specialist in the sphere of manpower management Saichenko O.A.: human capital management is one of the basic factors which enhances a competitive ability of enterprises and which is based on motivation to achieve the strategic development goals [6]. The developed economic and mathematical model allows the bonus fund to be allocated, by both subdivisions engaged in the fulfillment of specific tasks and by employees engaged in the implementation of the respective tasks, depending on their priority of the economic potential calculated by the company using comparison models of employees' potentials. As the priority of the employees' economic potential to allocate the bonus fund in specific subdivisions, one can take a value of an individual's cultural capital developed by the Russian specialist in intellectual capital assessment Arfae A.V., calculated as the aggregate of assessments of intellectual capital, educational capital, ethical capital and social capital [7].

T a b l e 1

Time for fulfilling a task implies the fulfillment of as set of tasks by 5 subdivisions

Subdivisions	Time (days) p_{ij} for fulfillment by i-th subdivision (j = 1, 2, ..., 10) of j-th task (j = 1, 2, ..., 10)										Budgets of subdivisions, ths rubles
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	
1	15	19	19	23	15	25	16	29	21	13	190
2	17	23	24	25	27	29	15	16	15	14	180
3	23	27	19	16	27	22	18	23	20	20	205
4	22	33	27	20	17	29	19	27	26	21	210
5	21	19	18	14	18	16	28	32	27	15	215
Bonus budget for task fulfillment, ths rubles	113	88	110	91	100	105	85	109	95	104	

Transport table obtained in the result of solving a task, ths rubles

Subdivisions	Volume of a bonus fund as calculated for i-th subdivision ($j = 1, 2, ..., 10$) to encourage fulfillment of j-th task ($j = 1, 2, ..., 10$) as soon as possible											Budget of the subdivision
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	$\sum\limits_{j=1}^{n} x_{ij}, \; j = \overline{1, 10}$	d_i
1	86	0	0	0	0	0	0	0	0	104	190	190
2	27	0	0	0	0	0	85	0	68	0	180	180
3	0	0	0	69	0	0	0	109	27	0	205	205
4	0	0	110	22	78	0	0	0	0	0	210	210
5	0	88	0	0	22	105	0	0	0	0	215	215
Bonus budget for task fulfillment $\sum\limits_{i=1}^{m} x_{ij}, \; i = \overline{1, 5}$	113	88	110	91	100	105	85	109	95	104	**1,000**	**1,000**
b_j	113	88	110	91	100	105	85	109	95	104	**1,000**	−

The model in question is based on the mechanism of competition between the company's subdivisions for the result of the tasks. It is possible to solve the problem of allocating the bonus fund for the task fulfillment in no time and ensure the formation of organization's cultural environment allowing for the integration of various resource flows (the problem of package treatment of material flows, financial, and informational resources is considered in [8]). Thus various options to enhance efficiency of personnel performance should be considered through implementing organizational managerial innovations [9, p. 255] and taking into account that organizational managerial innovations imply the flow process; and obtained results depend on the amount of the intellectual potential which is embedded in the innovations upon their creation [10, p. 267].

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