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OPTIMIZATION OF INCOME OF THE PERSONNEL OF THE ENTERPRISES OF THE FOOD INDUSTRY

Abstract. The relevance of the research topic is explained by the fact that the most important means of ensuring the coordination of the labor process and achieving overall sustainable development of the enterprise in the future is to establish a mechanism for generating staff income and determine its optimal level. The purpose of the article is to make recommendations and proposals for optimizing the formation of the components of the total income of the personnel of the enterprise with the help of the target function, focused on maximizing the income of the business entity. The article proves that the successful operation of the enterprise is impossible without the coordination of the interests of the employer and its staff in the field of income generation, so this process needs to be optimized using mathematical modeling methods. Since the income of personnel, first of all, belongs to the sphere of personnel management of the enterprise, the indicators of the goal are indicators of the effectiveness of the use of labor resources. Depending on the goals of optimization, there are several types of unknown variables in the tasks of income management of the enterprise: the level of the employee; the level of a separate structural unit; the level of the enterprise as a whole. The scientific novelty of the article is a created model of optimal formation of staff income, which, unlike existing ones, is based on optimization of income components that provide the maximum performance level indicator of staff income effectiveness and meet the conditions of not exceeding the financial resources of the enterprise and reaching at the same time the optimal level of profitability. The practical significance of the obtained results is that the developed optimization criteria were tested in the economic activity of food industry enterprises, which made it possible to determine the optimal composition of the total staff income, which increases the efficiency of these entities.

Keywords: total income of enterprise personnel, optimization, target function, income return.

Formulas: 2; fig.: 1; tabl.: 1; bibl.: 21.

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ОПТИМІЗАЦІЯ ДОХОДІВ ПЕРСОНАЛУ ПІДПРИЄМСТВ ХАРЧОВОЇ ПРОМИСЛОВОСТІ

Анотація. Актуальність теми дослідження пояснюється тим, що найважливішим засобом забезпечення узгодження сторін трудового процесу і досягнення в цілому стійкого розвитку підприємства в майбутньому є налагодження механізму формування доходу персоналу та визначення його оптимального рівня. Метою статті є формування рекомендацій і пропозицій стосовно оптимізації формування складових сукупного доходу персоналу підприємства за допомогою цільової функції, орієнтованої на максимізацію доходовіддачі суб'єкта господарювання. Доведено, що успішне функціонування підприємства неможливе без узгодження інтересів роботодавця і його персоналу у сфері формування доходів, тож цей процес потребує оптимізації із застосуванням методів математичного моделювання. Оскільки доходи персоналу передусім належать до сфери менеджменту персоналу підприємства, то показниками цілі є показники результативності використання трудових ресурсів. Залежно від цілей оптимізації виділено кілька типів невідомих змінних у задачах управління доходом персоналу підприємства: рівень працівника; рівень окремого структурного підрозділу; рівень підприємства в цілому. Науковою новизною статті є побудована модель оптимального формування доходів персоналу, яка, на відміну від наявних, базується на оптимізації складових доходу, що забезпечують максимальний рівень результативного показника оцінки ефективності доходів персоналу і задовольняють умови неперевищення фінансових ресурсів підприємства при досягненні максимально потрібного рівня прибутковості. Практичне значення отриманих результатів полягає в тому, що розроблені критерії оптимізації були апробовані в господарській діяльності підприємств харчової промисловості, що надало можливість визначити оптимальний склад сукупного доходу персоналу, за якого відбувається зростання результативності діяльності цих суб'єктів господарювання.

Ключові слова: сукупний доход персоналу підприємства, оптимізація, цільова функція, доходовіддача, підприємства харчової промисловості.

Формул: 2; рис.: 1; табл.: 1; бібл.: 21.

Introduction. The efficiency of any business entity is closely related to the resource provision of its functioning. Determining the appropriate strategy for enterprise development depends on the ability of managers to ensure the rational formation and use of all types of resources, including labor. At the same time, the processes of labor migration and level decrease in skills of potential labor resources, the shortage of workers determine the need to develop a system of personnel income management, which would ensure the involvement of skilled workers, as well as

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their further retention. Establishing a mechanism for generating staff income and determining its optimal level for any business entity, becomes the most important means of ensuring the consensus building of the labor process parties and achieving overall sustainable development in the future. This problem is relevant not only for the food industry, but also for all enterprises of Ukraine.

Analysis of research and problem statement. The issues of the enterprise staff income formation have been partially considered inscientific works by D.P. Bohynia, N.A. Volhin, T.I. Hrinko, V.A. Hrosul, L.M. Shymanovska-Dianych, O.V. Dodonov, N.V. Dudina, A.V. Kalyna, A.M. Kolot, Yu.P. Kokin, A.S. Krutova, V.I. Lievashov, Yu.V. Malakhovskyi, I.M. Novak, O.O. Nesterenko, N.P. Pavlovska, T.O. Sazonova, T.O. Strybulevych, S.O. Tsymbaliuk, A.O. Cherchata, R.A. Yakovlev, V.L. Yasinskyi and others. The researches of optimization of economic processes for enterprise management and its development have been carried out by P.M. Hryhoruk, A.V. Zelikman, N.V. Roshchyna and O.H. Timinskyi. As for the optimization of enterprise costs for staff motivation, some aspects can be traced in the works of N.L. Havkalova, S.V. Voloshyna, L.D. Kostakova, A.S. Kryvoruchko, V.I. Litvinova, L.O. Ptashchenko, L.V. Romashchuk, Yu.V. Sherstennykov.

Noting the value of the research results of these scientists, it should be mentioned that the process of optimization of the income of staff of food industry enterprises is insufficiently studied by scientists, so the relevance of this problem, the presence of unresolved discussion issues led to the choice of research topic.

Unsolved aspects of the problem. Noting the value of the research results of these scientists, it should be noted that the process of optimizing the income of personnel of food industry is insufficiently studied by scientists, so the presence of unresolved issues led to the choice of this area of research.

The purpose of the article. Given the importance of management decisions by enterprises on the formation of income of its staff, the purpose of the article is to form recommendations and suggestions for optimizing the formation of components of the total income of personnel of the enterprise through the target function aimed at maximizing income of the entity.

Research results. Formalization of the optimization problem begins with writing the target function of the optimization model in formal form. As noted above, the unknown variables are the size of the income components of the food industry personnel. The number of variables depends on the required degree of detail of such components. The simplest option is to find two variables: the size or share of salary, first of all, and, secondly, the labor force costs of the enterprise (except those included in the payroll fund [1, 2, 3]). It is an indisputable fact that the purpose of optimizing the income of the company's staff is not to reduce the responding costs, but to determine exactly how much you need to pay to ensure the maximum return on each hryvnia invested in staff salaries. In particular, given Maslow's hierarchy of needs and the theory of diminishing utility, we can assume that from the standpoint of management it is important to identify those items of income that motivate both individual employees and staff as a whole to the most productive work [4, 5]. *Table. 1* shows a set of variables for optimization tasks of different levels of the hierarchy of the organizational structure for the food industry.

All effective indicators of formation and use of staff income are calculated on the basis of, first, the effective indicator of staff activity (gross or net income, gross output, profit, etc.) and directly the amount of income [6]. In formal form, the target function should take the form of the dependence of the target indicator on the unknown variables x. In this case, the performance of staff must be displayed as a function of unknown variables [7—9].

The implementation of the proposed methodological approach is considered on the example of income optimization of the chief technologist of PJSC «Ovruch Bakery». The relevant task will be as follows: to determine the share and total amount of income that will ensure the maximum level of income.

Table

Variables of the optimization model of income of personnel of the food industry

Hierarchy level	Variables	
	the size of the income components	the share of the income component
Enterprise level	x_1 — the rate of the basic salary of the employee; x_2 — the amount of systematic additional salary of the employee; $x_3, x_4, ..., x_n$ x_1 — the rate of the basic salary of the employee; x_2 — the amount of systematic additional salary of the employee; $x_{n+1}, x_{n+2}, ..., x_n + m$ — the amount of the enterprise costs, which are not included in the payroll fund, n + 1st, n + 2d, …, n + m-th type	x_1 — the share of the basic salary of the employee; x_2 — the share of systematic additional salary of the employee; $x_3, x_4, ..., x_n$ — the share of the 3rd, 4th,…, n-th component of the additional salary, which depends on the efficiency of the employee; $x_{n+1}, x_{n+2}, ..., x_n + m$ — the share of the enterprise costs that are not included in the payroll fund, n + 1st, n + 2nd, …, n + t-th type.
Subdivision level	x_1 — the amount of the payroll fund of the subdivision personnel ; x_2 — the amount of systematic additional salary of the subdivision staff; x_3 _ the amount of the additional salary for a high level of work performance; x_4 — the amount of additional salary for the preservation of fixed assets; x_5 — the amount of additional salary for saving resources; $x_6, x_7, ..., x_n$ — the amount of enterprise costs, which are not included in the payroll fund, 6th, 7th,…, n-th type..	x_1 — the share of the payroll fund of the subdivision staff; x_2 — the share of systematic additional salaries of subdivision personnel; x_3 — the rate of the additional salary for a high level of work performance; x_4 — the share of additional salary for the preservation of fixed assets; x_5 — the share of additional salary for saving resources; $x_6, x_7, ..., x_n$ — the share of enterprise costs , which are not included in the payroll, 6th, 7th,…, n-th type.
Employee level	x_1 — the rate of the payroll fund of the subdivision personnel; x_2 — the amount of systematic additional salary of the subdivision staff; x_3 _ the amount of systematic additional salary; $x_4, x_5, ..., x_n$ — the amount of enterprise costs, which are not included in the payroll, 4th, 5th,…, n-th type.	x_1 — the share of the payroll fund of the subdivision staff; x_2 — the share of systematic additional salary of subdivision personnel; x_3 — the share of systematic additional salary; $x_4, x_5, ..., x_n$ — the share of enterprise costs, which are not included in the payroll, 4th, 5th, …, n-th type.

Source: authors' own development.

The procedure for calculating the effective staff performance indicator, which provides 1 UAH of a specific i-th component of income, includes the following stages [10—12]: 1) determining the current return as the ratio of an effective indicator (gross output, gross or net income, profit, dividends etc.) received as a result of the employee's activity to the amount of his income; 2) calculation of the share of the result (gross output, gross or net income, profit, dividends, etc.), the reception of which is provided by each individual component of income; 3) calculation of the amount of income, which provides 1 UAH for each individual component of income. Given the above logic, the target function, focused on maximum return, will look like:

$$v_i = \frac{\sum_{i=1}^{n} r_{ij}}{\sum_{j=1}^{k} \sum_{i=1}^{n} r_{ij}}, \quad (1)$$

where r_{ij} — a score that reflects the opinion of the j-th specialist on the extent to which the i-th component of income motivates him to increase productivity; k — the number of surveyed staff who perform identical work and receive identically structured income.

As the concordance coefficient meets Pearson's criterion and the dimension of agreement of the sampling experts is high [13—15].

If we consider the example of the chief technologist, the sources of his additional salary may be extra payments for overfulfilling the norm and for expanding the product-line of bakery products and optimization of raw materials for 1 product, reducing production waste [16; 17; 21].

The next component of the task of optimizing staff income is a system of its limitations. In addition, the model must include restrictions on the minimum level of the ratio between

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productivity growth (as the amount of net income or gross output per employee) and employee income (if this ratio is not selected as a target indicator). The corresponding restriction will look like [18-20]:

$$\frac{\Delta T_{nn}}{\Delta T_{\partial n}} \geq 1 \quad \Rightarrow \quad \frac{\frac{\sum_{i=1}^{n} v_i x_i X}{TI^0} \cdot 100 - 100}{\frac{\sum_{i=1}^{n} x_i}{X^0} \cdot 100 - 100} \geq 1, \qquad (2)$$

where TI^0 — the actual amount of gross output;; $\sum_{i=1}^{n} v_i TI$ — the amount of gross output after optimization; X^0 — actual staff income before optimization.

The formalized optimization model will look like *Fig*., where v_i is the share of gross output, which is made at the expense of the *i*-th component of staff income; x_i — the required share of the *i*-th component of staff income; X — the required total income of the employee; TI — the amount of gross output manufactured by a particular employee; *n* — the number of components of staff income; x_z — the share of additional payments for overtime work in the total income of the employee; X — total income of the employee; V — the desired excess production; r_0 — piece rate; k_z — percentage with which the amount of additional salary for plan overfulfillment should at least exceed the amount of the basic salary; x_1 — the share of basic salary in the total income of the worker; $x_1^{\min}$ — the minimum basic wage, according to the tariff class of the worker; x_2 — the share of regular salary in the total income of the worker; $x_2^{\min}$ — the minimum amount of regular additional salary of the worker, where $X^{\max}$ — the maximum amount of the worker's income, TI^0 — basic level of gross output, that is, the size of gross output produced by the worker before optimization; X^0 — the basic amount of employee income.

As mentioned earlier, the salary of a technologist includes basic and additional (regular and non-regular) components. Additional salary, which depends on the results of work, is formed by a bonus payment for excess production of bread at the working site of the technologist. The following initial data are needed to solve the optimization problem: TI^0 — the size of the gross output made by the worker before optimization (7,5 thousand units / year); X^0 — the amount of staff income to be optimized (UAH 49.2 thousand per employee / year) V — desired excess production (20%); r_0 — piece rate per unit of overproduction (UAH 8 / unit); k_z — the percentage with which the amount of additional salary for plan overfulfillment should at least exceed the amount of basic salary (10-20%);$x_1^{\min}$ — the minimum basic wage, based on the tariff class of the worker (3840 UAH / month); $x_2^{\min}$ — the minimum amount of the regular additional salary of the worker (300 UAH / month); $X^{\max}$ — the maximum amount of the worker's income is 51.36 (or 60.00, or 75.00 thousand UAH / year).

The calculation of the amount of gross output per UAH 1 of each of the three components of income was carried out according to the following logic. According to current calculations, each hryvnia of income of the technologist provides 162 loaves. According to the results of an expert survey of technologists of 4 production facilities, it was found that 43% (or 70 loaves) provide the basic salary, 1.2% (or 2 loaves) provide an additional regular component of the salary and 56% (90 loaves) provide an additional non-regular component. Therefore, the values of the coefficients of the optimization model, which reflect the size of gross output, which provides 1 UAH of basic wages, is 70 ($v_1 = 70$), additional regular — 2 ($v_2 = 2$), additional non-regular — 90 ($v_3 = 90$). The application of these optimization parameters will provide an opportunity to increase staff income and revenue.

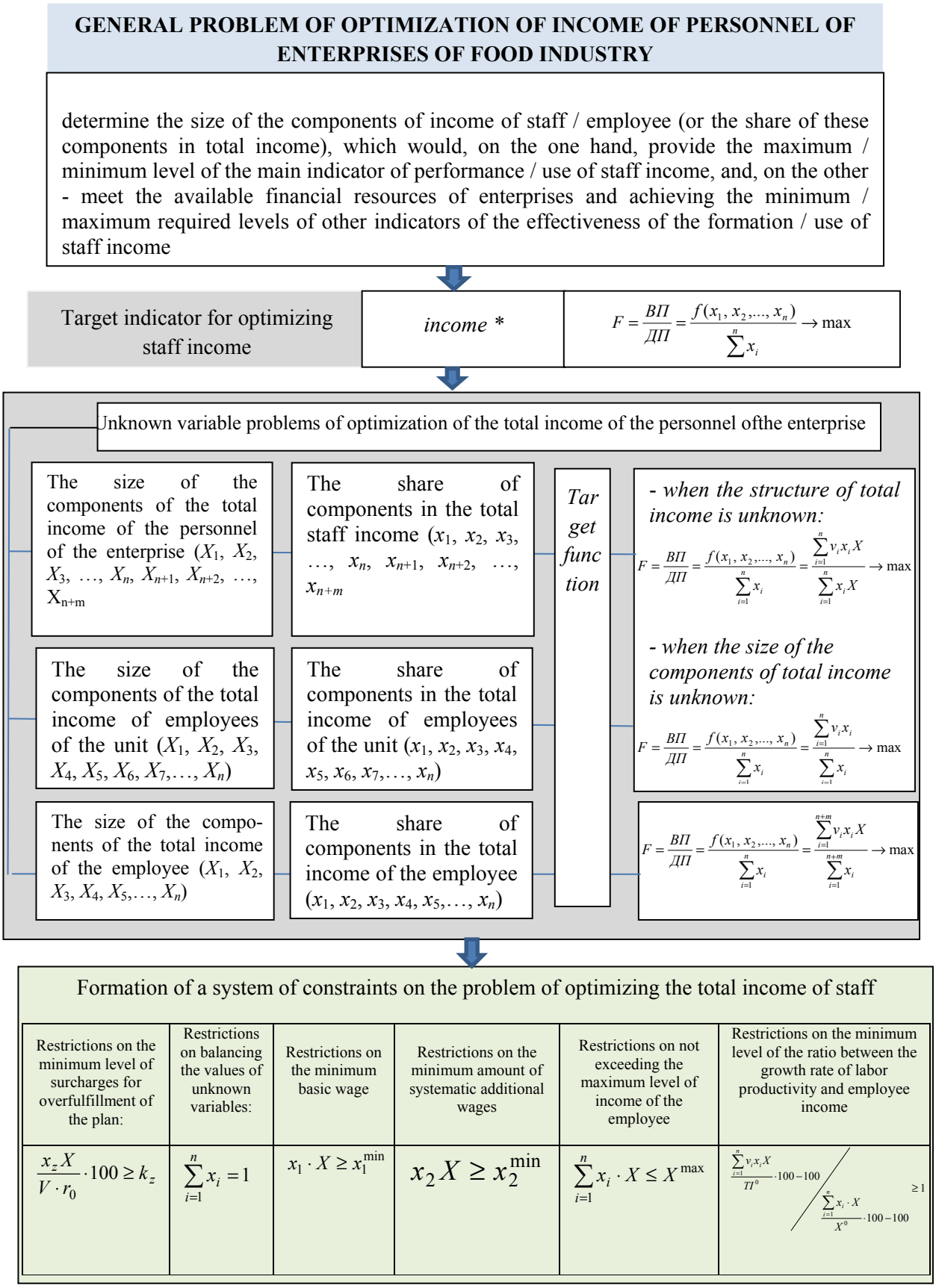

Fig. Model of optimization of income of the personnel of the enterprise of the food industry on income return

Source: developed by the authors.

Conclusion. The inappropriate state of regulation of internal economic relations between the business entity and its staff in terms of income generation creates the problem of labor migration

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and requires optimization of the process of income generation of employees. With the help of the target function, which is focused on maximizing income for the business entity, a model of optimal staff income generation was created, which, unlike the existing ones, is based on optimization of income components that provide the maximum level of performance efficiency and meet the conditions not exceeding the financial resources of the enterprise while reaching the maximum required level of profitability. The developed optimization criteria were tested in the economic activity of food industry enterprises, which made it possible to determine the optimal composition of the total income of staff, which increases the efficiency of these entities.

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