

Analytical Method of Stimulation for Labour of Top-Managers

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Abstract – The problem of economic stimulation of top managers remains relevant and unresolved. Economic incentives of top managers should be based on the performance of the enterprise, and this relationship is recognized by economists, scientists, and practitioners. The main problem here is the development of a scale of economic incentives. In most cases, economic incentives are associated with only one indicator of performance - the company's profit, which is a criterion for incentives. But objectively, the criteria may be other indicators that reflect the efficiency of financial resources, fixed assets, labor resources, and the effectiveness of investment and innovation. A new analytical method has been developed that strengthens the objectivity of stimulating the work of top managers. The proposed logic of the stages of calculating the incentives of top managers allows not only to describe the performance of the enterprise using an appropriate system of indicators but also to establish the relationship between them and the economic incentives of top managers to ensure effective performance in general. The advantage of the proposed analytical method of stimulating top managers is to take into account the business needs of enterprises, the peculiarities of their activities.

Keywords – Analytical method, top manager, economic stimulation, performance of the enterprise, canonical analysis, multidimensional factor analysis, scale of awards.

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1. Introduction

The effectiveness of the work of employees depends on their motivation and stimulation. A scientifically based approach to the organization of incentives is based on its attachment to the effectiveness of the company's activities, and this relationship is recognized by both economists, scientists, and practices. A significant number of scientific publications are devoted to various issues of work and motivation of top managers and their components.

In the work of Ordinartsev [27] it is determined that the motivation and reward of top managers of the company require constant development and improvement, and especially complex issues of remuneration of its senior management.

Relevant instruments can be divided into two groups: bonus and stock option programs. Bonus programs involve large-scale remuneration for all managers based on the company's performance. Option programs are developed only for selected, leading top managers, who directly influence the financial results of the company. At the same time it is necessary to substantiate optimal mechanisms of remuneration of top managers and to research means of motivating managers.

It is suggested to use "phantom" shares as the country's legislative base often does not clearly define remuneration mechanisms. It is also recommended to use bonus programs with installment payments for two to three years.

The article of Lukyanenko et al [20] discusses the most commonly used means of incentives for top managers, based on improving the financial results of their work. The authors raise the topical question of how effective these methods are and how they affect management costs.

The article points out that it is extremely important to study the incentives of top managers and the introduction of a method of analysis of motivation and productivity based on the life cycle of top managers of industrial enterprises. It is emphasized that productivity and motivation of the manager must have a certain life cycle depending on the period of work in the company.

The authors provide a detailed description of each stage of the life cycle, variations of work behavior of the top manager and the direction of his motivation, disclosure of his professional potential and increase productivity depending on the position of the manager at a certain stage of his life cycle.

The work of Kuznetsov et al [19] is devoted to the issues of top-manager motivation from the point of view of consumer behavior theory. This can solve the problem of translating non-financial motivation into financial motivation by introducing a special metric of utility functions.

Financial resources allocated by the company for motivation can be used taking into account the definition of motivational optimum by analogy with the consumer optimum already known in economic science.

For the tasks implemented in the company, the optimal value of net present value is created, which leads to the structuring of an effective system of motivation for the top manager. It has been proven that the desired equilibrium value is directly dependent on the bonus fund used by the company.

The main purpose of the study [6] is to identify the motivation of top managers and prospects for its management. Research of Englund and Gerdin [9] is also devoted to systems for measuring the performance of top managers. In particular, new opportunities in the digital society that can be used for this are considered.

As justified in work of Masiukiewicz the problem of systemic motivation of top managers should be related to the responsibility for long-term profits [23], [24]. The article of Grušovnik et al investigates the relationship between the dimensions of quality of decision-making process of top managers and company performance [13]. It was found that for managers working in companies present in foreign markets, there is a weak correlation between the amount of effort on the quality of the decision-making process and the number of employees in the company.

A systematic review of the literature [18] investigates the relationship between corporate sustainability and the motivational components of the functioning of top managers of small and medium-sized businesses. It is proposed to consider four value parameters (values of goodwill, achievement, strength and compliance), which should be guided by top managers.

Research of Ndemezo and Kayitana confirms influence of motivation of top-managers on corporate efficiency [26]. In research of Kim and Nguyen [16] the role of top-manager is also studied as important motive force of corporate development and investments. Marked, that influence of top-managers on corporate investments is stronger for small and middle firms, than for large firms.

In the publication of Crabner and Speckbacher [33], among other things, highlights the importance of internal motivation of volume managers to perform tasks. It is necessary, in particular, the consistency of motivation with the assessment of effectiveness and with the achievement of predetermined goals. The authors of the publication [26] offer various means of motivation, which is especially important for companies facing intense technological competition.

Article of Roundy et al [28] presents possible differences in motivation of top-managers. Some of them are motivated to provide strategic changes, and other are motivated only to support strategic status quo. Work of Růčková and Heryán [29] examines the possible phenomena of separation of top-managers from positions of the owner of company that requires to increase attention to the questions and instruments of stimulation of the first.

In work [31] the interactive model of encouragement of top-managers is offered with the fixed effects, allowing to set raises to payment in time for the no-observed attributes of management. Such rewards can be conditioned by two administrative lines: by talent and conservatism, each of that becomes important on the certain stages of development and states of markets. After periods that are characterized a higher bonus for talent, conservatism becomes more desirable line, and vice versa.

The publication of Fiaz et al explores the issue of leadership style and its potential impact on the motivation of top managers [10], [11]. Descriptive statistics, reliability statistics, multiple regression models were used. There is a positive relationship between democratic leadership style and motivation of top managers. The aim of work [32] is to develop top management systems that improve organizational creativity. Factor and regression analysis is used.

Using cognitive assessment theory, the authors of [30] argue that external pressure from activist owners, the corporate control market, and securities analysts increases the likelihood of financial fraud by top managers. When top executives face tighter external controls, such as activist shareholders, the threat of takeovers or securities analysts, they are, in fact, more likely to engage in financially malicious behavior. Research [21] confirms that the higher quality of financial reporting is mainly due to the internal motivation of top managers to truthful reporting. Academic experience can also be valuable to company executives.

Klimchuk and Mikhailov proved the relationship between motivation and incentives for employees, taking into account their needs, motives and incentives in the effective management of industrial enterprises and increase its innovation.

However, most scientists consider incentives only in terms of personnel management [17]. But this issue requires in-depth research to improve methods of incentives for workers at different levels. In this sense, an important issue is to encourage top managers, as clear management of the enterprise, encouraging the development of competent and effective solutions becomes the basis for achieving the desired performance indicators of the enterprise and its future prospects in the market.

The study conducted by Grigorieva [12], determines that the top manager is responsible for the corporate strategy of the company and for the selection of partners, his decisions depend not only on the final financial result, but also the image of the company.

Thus, the importance of the top manager and the need to develop adequate incentive systems are

*Table 1. The main types of incentive systems in management
Source: Developed by the authors*

Reference point	The content of the type of incentive	Term of realization of a kind of stimulation
Qualifications, position and responsibilities of a top manager	Fixed salary, additional incentives are provided through various types of privileges	Perpetual (monthly)
Achieving goals and results on indicators that the manager can influence personally	Establishing a certain level of monetary reward	Short-term (quarterly)
The cost of business	Application of option programs that offer incentives by granting the right to purchase shares of the company under certain conditions	Long-term (once in 1-3 years)

Also in the work [20] on incentives for corporate executives noted that the standard manifestation of the motivational mechanism in modern conditions is the compensation package for senior executives, which consists of salary, surcharges, bonuses, social benefits and incentives, options or shares, fair remuneration according to results of managerial performance.

That is, among the various types of incentives, the mechanism of economic incentives is considered the most common, because in this case you can clearly subordinate the results of the enterprise to the amount of remuneration. The same opinion was shared by Hamilton [14] and Emerson [7], concentrating on material incentives.

2. Objectivities

The purpose of the study is to develop an analytical method of stimulating the work of top managers, which is based on the relationship between the top managers' pay indicators and the performance indicators of the enterprise in which they work.

The proposed analytical approach is based on the realization of the hypothesis that the choice of activity performance indicator should be associated

noted. Berger and Berger argue that "the stimulation of managers' labor should begin with the definition of its philosophy" [8], by which they mean certain methodological developments, that spell out the relationship between business development goals and the way method of coordination labor incentives.

It should be noted that by the basic types of economic stimulation of managers that use foreign enterprises there is an equity option and participating in property. But, as marked by Grigorieva [12], in Ukraine such kinds of economic stimulation are not provided with the terms of fund market development and does not stimulate arriving goals. Investigating the problem of stimulation of top-managers, authors of work [20], distinguished three basic approaches to forming of the system of stimulation of management companies maintenance of that is given in Table. 1. We believe that we can fully agree with this.

with the highest frequency of its presence in the latent factors of activity performance.

Next, it is expedient to establish the law of distribution and its numerical characteristics of the enterprise performance indicator, which creates a mechanism of interrelationship because it is most closely related to other indicators in the system.

This ensures the objective correspondence of the intervals of the values of the performance indicator and the intervals of 100% of the bonus scale to the position salary of the top manager.

3. Research Methods

Various methods of scientific knowledge were used to achieve the goal of the study:

- analysis and synthesis for substantiating the system of performance indicators of the enterprise and its relationship between indicators of payment and labor incentives of top managers and performance indicators;
- graphic method - for visualization of the obtained calculation results and their systematization;
- methods of multifactorial statistical analysis
- factor analysis and canonical analysis to determine latent factors of enterprise performance;

- descriptive statistics tools for determining the law of distribution of values and its numerical characteristics of the selected performance indicator of the enterprise.

4. Results and discussion

Agreeing with this opinion, it is proposed to consider economic incentives for top management as a factor in the success and efficiency of the enterprise. In a research of Belkin et al it is stated that according to the classification adopted by the World and work (American Association of Payroll Professionals), the system of material motivation includes: fixed wages, variable parts or bonuses, and social package [3].

That is, the classic scheme of economic incentives for top managers consists of a fixed part (salary), additional surcharges (stock options) and bonuses and additional benefits (quarterly and annual premiums, car insurance, life insurance, etc.). The authors of [15] found that "the most attractive forms of incentives for managers are salary increases (18.85%), payment of bonuses and bonuses (18.2%), career growth (16.9%)" [29]. Given this and summarizing the existing approaches to the formation of the system of material incentives for top managers according to [4], [5], [25], we can identify two main indicators of this system: the share of salaries (basic and additional) of top managers in the general payroll (GP) (y_1) and the share of bonuses and other rewards of top managers in GP (y_2).

Regarding the effectiveness of enterprises, it should first be noted that the current state of development of the domestic economy indicates a significant lag of Ukraine from many countries.

Thus, according to a study by the World Bank's Doing Business rating in 2020, among 190 countries in Europe and Central Asia, Ukraine ranks only 64th [1]. Despite the fact that during 2012-2020 there was a positive dynamics of Ukraine's position, the Government faces the task of developing measures to create conditions for Ukraine's entry in the TOP-30 Rating in the coming years. The implementation of such a task at the macro level largely depends on constructive and balanced management actions at the micro level - the level of the individual enterprise.

Therefore, increasing the efficiency of each enterprise becomes a driving force in development of the economy on the whole. There are several ways to evaluate performance. The main ones are Armstrong M. and Baron A. [2], namely: the Balanced Scorecard (BSC), the European Fund of Quality Management (EFQM), economic value added (EVA). There are many scientific approaches to assessing the effectiveness of economic activity and

management of industrial enterprises, the most common of them are the matrix "Cost - Profitability" and a system of balanced scores. In the works [4], [5], [25] the authors emphasize the common financial results of the enterprise.

The results of these areas of the enterprise in many scientific papers are covered from different points of view and differ in the specifics of the enterprise, the number of indicators and the period of their analysis. Of course, the system of financial performance indicators is the most developed and is used in most works of scientists. Production activities are considered in terms of analysis of the use of fixed assets and the implementation of investment and innovation programs [3].

Based on the resource approach, performance indicators of the enterprise as a system should characterize all economic resources of the enterprise, and therefore should reflect financial resources, results of use of fixed assets, labor resources, investment activities, innovation. Summarizing the above, we can offer as criteria for the effectiveness of the enterprise to consider the results of the main areas of its activities: financial results of the enterprise, the results of the use of fixed assets, labor resources, innovation and investment management.

Taking into account that a common method of substantiating the feasibility of including an indicator in the system is the analysis of the frequency of use of a particular indicator, it is proposed to determine the effectiveness of the enterprise on the following system of indicators:

1. financial results - return on total capital (x_1), gross return on sales (x_2), capital turnover ratio (x_3), working capital turnover ratio (x_4), fixed capital turnover ratio (x_5), financial stability ratio (x_6), financial risk ratio (x_7), autonomy ratio (x_8), financial leverage ratio (x_9);
2. results of use of fixed assets - coefficient of suitability of fixed assets (x_{10}), return on assets (x_{11}), capital adequacy (thousand UAH / person) (x_{12});
3. results of labor resources use - working time utilization rate (x_{13}), share of employees under 55 years of age (x_{14}), share of employees who graduated from higher education institutions (HEIs) (x_{15}), share of employees trained in new professions (x_{16}), share employees who improved their skills in the reporting year (x_{17}), the share of employees employed in conditions that meet sanitary and hygienic standards (based on the
4. results of certification of jobs under working conditions) (x_{18}), the share of labor costs in total production costs (x_{19}), average annual production per employee, thousand UAH / person. (x_{20}), the share of additional wages in GP (x_{21});

5. results of investment management – specific weight of real investments in fixed capital (x_{22}), specific weight of investments in marketing and advertising (x_{23}), the share of investments in informatization (x_{24}), the share of investment intellectual assets in total capital (x_{25});
6. results of innovation management – the share of research costs in the amount of innovations (x_{26}), the share of costs on the active part of fixed assets in total cost of innovation (x_{27}), the share of innovative production in realized (x_{28}), the share of production with technological innovations (x_{29}), the share of innovative production going to export (x_{30}).

The assessment of the relationship between the specified two systems of indicators allows to identify positive and negative factors of influence on the efficiency of the enterprise.

The process of assessing the relationship between indicators of economic stimulation of top managers and indicators of enterprise performance is a managerial and analytical process, the structure of which consists of subjects, objects, goals, tasks, principles and functions of the process (Table 2).

Table 2. The components and content of the assessment process between indicators of economic stimulation of top managers and indicators of enterprise performance
Source: Developed by the authors

Component of the process	Content
Subjects of definition	The parties are interested in improving the efficiency of the enterprise - business owners, business leaders, potential investors
Objects	Indicators of economic incentives for top managers and performance indicators of the enterprise
Goal	Establishing the relationship between economic incentives for top managers and performance indicators of the enterprise
Tasks	Formation of indicators of economic incentives for top managers; determination of criteria for the effectiveness of the enterprise; formation of a system of performance indicators of the enterprise; building a model of the relationship between indicators of economic incentives of top managers and performance indicators; analysis of the established connections and the direction of their action; developing approaches to managing the system of economic incentives for top managers
Principles	Systematic - the process of determining the relationship between economic incentives of top managers and performance indicators of the enterprise should be built into the overall management system of the enterprise. Target orientation on improving the results of the main areas of the enterprise. Reliability - determining the relationship between the economic incentives of top managers and performance indicators of the enterprise should provide information that adequately reflects the relationship. Flexibility and timeliness - the process of determination must be prompt and timely adapted to changes in the conditions of the enterprise. Optimality - using a system of indicators that reflect the most important factors in shaping performance in the definition process. Efficiency - the results of the definition should identify ways to increase effectiveness, the cost of which will not contradict the system of incentives for top managers. Analytical support - using a set of mathematical methods to analyse and explain results.
Functions	Information - timely provision of adequate information about the current state of performance of the enterprise. Analytical - analysis of changes in the performance indicators of the enterprise and the impact of types of economic incentives for top managers on them. Diagnostic - determining the level of current performance of the enterprise and measures for its improvement from the system of economic incentives for top management. Forecasting - planning the characteristics of the company's performance and approval of the programme of responsibility and incentives. Controlling - establishment of the correctness of measures designed to improve the performance of the enterprise and compliance of expenditures on remuneration of labour and economic incentives for top managers. Regulatory - adjustment of measures to achieve a certain level of performance of the enterprise and elimination of shortcomings of the incentive system.

The proposed structure of the process of determining the relationship between indicators of economic incentives of top managers and performance indicators allows for a comprehensive investigation of the level of achievement of enterprise goals by performance criteria and justification of the consistency of wages and economic incentives for top managers with performance indicators.

Analysis and evaluation of the effectiveness of the enterprise on the built system of indicators will not only identify and neutralize the negative factors but also strengthen the effect of positive factors.

Analytically confirm the relationship between the system of performance indicators and the system of

indicators of remuneration and incentives of top managers by implementing the method of multidimensional statistical analysis - canonical analysis, this method allows to determine the closeness of the relationship between two systems of indicators, in this case between the system indicators of economic incentives and a system of performance indicators of the enterprise [22].

Equation of the relationship between the two systems of performance indicators and indicators of remuneration and incentives of top managers for 19 industrial enterprises of the Kharkiv region for 2016 - 2020 is shown in Table. 3.

This model is statistically qualitative, as evidenced by the content of the Table. 3.

Table 3. Statistical characteristics of canonical correlations
Source: Collected by the authors

№ of the system of equations	Own numbers	Canonical correlation coefficient	Wilk's statistics	Pearson's criterion	Number of degrees of freedom	Significance level α
1	0,776581	0,881238	0,14106	151,789	60	0,0000
2	0,36863	0,607149	0,63137	35,6394	29	0,1843
Coefficients of the canonical variable equation U_1						
x_1	x_2	x_3	x_4	x_5	x_6	x_7
0,106	0,137	-0,21	0,112	-1,372	-0,081	-0,078
x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}	x_{14}
0,179	0,252	-0,21	1,389	0,582	-0,015	-0,026
x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}	x_{21}
0,02	0,123	-0,194	-0,018	0,113	-0,036	0,23
x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}
0,05	0,039	0,177	0,032	0,451	-0,147	-0,089
x_{29}	x_{30}					
0,2	0,073					
Coefficients of the canonical variable equation V_1						
y_1	y_2					
0,264	0,923					

The canonical correlation coefficient is 0.881, which indicates a close relationship between the two systems. The level of significance α indicates that it is advisable to use only the first system.

Next, to determine the relationship between economic incentives of top managers and performance indicators of the enterprise, it is advisable to calculate factor analysis, which will identify the latent mechanisms that occur in the enterprise and determine the appropriate state of performance.

The method factor analysis is designed to identify and quantify the generalizing characteristics, which fully describe the whole set of initial indicators and are called latent factors [22].

The calculated latent factors look like:

$$\begin{aligned}
 F_1 = & 0,356x_1 + 0,134x_2 + 0,94x_3 + 0,829x_4 + 0,944x_5 \\
 & - 0,122x_6 + 0,002x_7 + 0,029x_8 + \\
 & + 0,308x_9 - 0,23x_{10} + 0,931x_{11} - 0,071x_{12} + 0,195x_{13} \\
 & + 0,194x_{14} + 0,048x_{15} + 0,13x_{16} - \\
 & - 0,038x_{17} - 0,117x_{18} - 0,394x_{19} + 0,357x_{20} \\
 & + 0,075x_{21} + 0,343x_{22} - 0,22x_{23} + \\
 & + 0,027x_{24} - 0,046x_{25} - 0,205x_{26} - 0,056x_{27} \\
 & - 0,184x_{28} - 0,029x_{29} + 0,003x_{30} + \\
 & + 0,049y_1 - 0,055y_2; \\
 F_2 = & 0,302x_1 - 0,042x_2 + 0,088x_3 + 0,196x_4 \\
 & - 0,056x_5 - 0,036x_6 + 0,048x_7 \\
 & - 0,04x_8 - \\
 & - 0,02x_9 + 0,724x_{10} - 0,0051x_{11} + 0,915x_{12} \\
 & - 0,038x_{13} + 0,327x_{14} + 0,804x_{15} \\
 & - 0,075x_{16} -
 \end{aligned}$$

$$\begin{aligned}
 & -0,095x_{17} + 0,293x_{18} - 0,498x_{19} + 0,51x_{20} \\
 & \quad + 0,155x_{21} + 0,685x_{22} - 0,123x_{23} + \\
 & +0,139x_{24} - 0,094x_{25} + 0,019x_{26} + 0,153x_{27} \\
 & \quad - 0,229x_{28} - 0,115x_{29} - 0,165x_{30} + \\
 & +0,517y_1 + 0,259y_2; \\
 F_3 = & 0,498x_1 + 0,563x_2 - 0,096x_3 - 0,199x_4 \\
 & \quad + 0,031x_5 - 0,014x_6 - 0,048x_7 \\
 & \quad + 0,12x_8 - \\
 & -0,06x_9 - 0,239x_{10} + 0,122x_{11} - 0,014x_{12} + 0,089x_{13} \\
 & \quad - 0,095x_{14} + 0,213x_{15} - 0,032x_{16} + \\
 & +0,157x_{17} - 0,276x_{18} - 0,23x_{19} + 0,041x_{20} \\
 & \quad + 0,195x_{21} - 0,038x_{22} - 0,125x_{23} + \\
 & +0,187x_{24} + 0,071x_{25} + 0,705x_{26} + 0,004x_{27} \\
 & \quad + 0,002x_{28} + 0,622x_{29} + 0,333x_{30} + \\
 & +0,198y_1 + 0,787y_2; \\
 F_4 = & 0,437x_1 + 0,44x_2 - 0,031x_3 - 0,03x_4 + 0,02x_5 \\
 & \quad + 0,813x_6 - 0,135x_7 + 0,841x_8 - \\
 & -0,028x_9 + 0,167x_{10} - 0,021x_{11} - 0,069x_{12} \\
 & \quad - 0,038x_{13} + 0,061x_{14} - 0,071x_{15} \\
 & \quad + 0,116x_{16} - \\
 & -0,071x_{17} + 0,021x_{18} + 0,029x_{19} + 0,091x_{20} \\
 & \quad + 0,159x_{21} + 0,059x_{22} - 0,236x_{23} - \\
 & -0,208x_{24} + 0,24x_{25} - 0,16x_{26} + 0,126x_{27} + 0,195x_{28} \\
 & \quad + 0,148x_{29} - 0,068x_{30} - \\
 & -0,116y_1 + 0,026y_2; \\
 F_5 = & -0,125x_1 - 0,146x_2 + 0,116x_3 + 0,141x_4 \\
 & \quad + 0,05x_5 + 0,094x_6 - 0,058x_7 \\
 & \quad + 0,081x_8 + \\
 & +0,022x_9 + 0,142x_{10} + 0,063x_{11} - 0,081x_{12} \\
 & \quad + 0,728x_{13} + 0,503x_{14} + 0,251x_{15} \\
 & \quad + 0,086x_{16} + \\
 & +0,067x_{17} + 0,231x_{18} - 0,073x_{19} + 0,311x_{20} \\
 & \quad + 0,765x_{21} - 0,177x_{22} + 0,004x_{23} + \\
 & +0,063x_{24} - 0,093x_{25} + 0,202x_{26} + 0,103x_{27} \\
 & \quad - 0,025x_{28} + 0,142x_{29} - 0,008x_{30} + \\
 & +0,11y_1 + 0,121y_2; \\
 F_6 = & 0,192x_1 + 0,129x_2 + 0,029x_3 + 0,013x_4 + 0,014x_5 \\
 & \quad + 0,13x_6 + 0,109x_7 - 0,172x_8 - \\
 & -0,046x_9 - 0,035x_{10} + 0,009x_{11} - 0,096x_{12} \\
 & \quad + 0,168x_{13} + 0,32x_{14} - 0,095x_{15} \\
 & \quad + 0,745x_{16} + \\
 & +0,834x_{17} - 0,013x_{18} - 0,195x_{19} + 0,1x_{20} - 0,083x_{21} \\
 & \quad + 0,191x_{22} - 0,242x_{23} + \\
 & +0,181x_{24} + 0,007x_{25} + 0,307x_{26} + 0,106x_{27} \\
 & \quad - 0,003x_{28} - 0,075x_{29} - 0,037x_{30} - \\
 & -0,2y_1 - 0,042y_2; \\
 F_7 = & 0,083x_1 + 0,064x_2 - 0,036x_3 - 0,081x_4 - 0,014x_5 \\
 & \quad - 0,015x_6 + 0,045x_7 + 0,125x_8 - \\
 & -0,069x_9 - 0,267x_{10} - 0,032x_{11} - 0,145x_{12} \\
 & \quad - 0,051x_{13} + 0,175x_{14} - 0,063x_{15} \\
 & \quad + 0,165x_{16} -
 \end{aligned}$$

$$\begin{aligned}
 & -0,197x_{17} + 0,129x_{18} + 0,22x_{19} - 0,21x_{20} - 0,012x_{21} \\
 & \quad + 0,073x_{22} - 0,062x_{23} + \\
 & +0,065x_{24} - 0,056x_{25} - 0,056x_{26} - 0,118x_{27} \\
 & \quad + 0,825x_{28} + 0,265x_{29} + 0,803x_{30} - \\
 & -0,083y_1 + 0,106y_2; \\
 F_8 = & -0,194x_1 - 0,23x_2 + 0,108x_3 + 0,072x_4 \\
 & \quad + 0,093x_5 + 0,031x_6 + 0,787x_7 \\
 & \quad - 0,195x_8 + \\
 & +0,803x_9 + 0,012x_{10} + 0,036x_{11} - 0,05x_{12} - 0,103x_{13} \\
 & \quad - 0,049x_{14} + 0,0004x_{15} + 0,06x_{16} + \\
 & +0,042x_{17} - 0,372x_{18} - 0,191x_{19} + 0,186x_{20} \\
 & \quad + 0,054x_{21} - 0,135x_{22} + 0,15x_{23} + \\
 & +0,215x_{24} + 0,069x_{25} + 0,114x_{26} - 0,044x_{27} \\
 & \quad + 0,013x_{28} - 0,075x_{29} - 0,036x_{30} + \\
 & +0,112y_1 - 0,017y_2; \\
 F_9 = & 0,134x_1 + 0,302x_2 - 0,014x_3 - 0,018x_4 \\
 & \quad - 0,016x_5 - 0,133x_6 + 0,106x_7 \\
 & \quad + 0,039x_8 + \\
 & +0,012x_9 + 0,192x_{10} - 0,055x_{11} + 0,049x_{12} \\
 & \quad + 0,111x_{13} + 0,095x_{14} + 0,123x_{15} \\
 & \quad + 0,238x_{16} + \\
 & +0,022x_{17} - 0,06x_{18} - 0,097x_{19} + 0,251x_{20} \\
 & \quad + 0,014x_{21} + 0,067x_{22} + 0,509x_{23} + \\
 & +0,674x_{24} + 0,026x_{25} - 0,211x_{26} + 0,757x_{27} \\
 & \quad - 0,111x_{28} + 0,179x_{29} + 0,015x_{30} - \\
 & -0,138y_1 + 0,008y_2; \\
 F_{10} = & 0,138x_1 - 0,04x_2 - 0,025x_3 - 0,029x_4 \\
 & \quad - 0,053x_5 + 0,067x_6 + 0,024x_7 \\
 & \quad + 0,125x_8 - \\
 & -0,036x_9 - 0,131x_{10} - 0,041x_{11} - 0,011x_{12} \\
 & \quad + 0,015x_{13} + 0,367x_{14} + 0,092x_{15} \\
 & \quad - 0,23x_{16} + \\
 & +0,136x_{17} + 0,592x_{18} + 0,287x_{19} - 0,248x_{20} \\
 & \quad - 0,077x_{21} + 0,052x_{22} + 0,489x_{23} + \\
 & +0,025x_{24} + 0,821x_{25} - 0,055x_{26} - 0,015x_{27} \\
 & \quad + 0,009x_{28} - 0,092x_{29} - 0,007x_{30} + \\
 & +0,063y_1 + 0,015y_2.
 \end{aligned}$$

These latent factors explain 74.176% of the change in the values of top management incentives and performance of the industrial enterprises studied.

Comparing factor loads that are greater than 0.3, we determine the ratings of the impact of partial indicators on the latent factors of performance of enterprises, these are the following ratios:

1 factor:

$$x_5 > x_3 > x_{11} > x_4 > x_{20} > x_{19} > x_1 > x_{22} > x_9;$$

2 factor:

$$x_{12} > x_{15} > x_{10} > x_{22} > y_1 > x_{20} > x_{19} > x_{14} > x_1 > y_2;$$

3 factor:

$$y_2 > x_{26} > x_{29} > x_2 > x_1 > x_{30};$$

4 factor:

$$x_8 > x_6 > x_1 > x_2;$$

5 factor:

$$x_{21} > x_{13} > x_{14} > x_{20};$$

6 factor:

$$x_{17} > x_{16} > x_{14} > x_{26};$$

7 factor:

$$x_{28} > x_{30};$$

8 factor:

$$x_9 > x_7 > x_{18};$$

9 factor:

$$x_{27} > x_{24} > x_{23} > x_2;$$

10 factor:

$$x_{25} > x_{18} > x_{23} > x_{14}.$$

To determine the closest relationships in the system of indicators should analyse the frequency of relationships of each indicator with others, the following indicators were: return on total capital (x_1), the share of employees under 55 years of age (x_{14}), the average annual output per employee, thousand UAH / person (x_{20}), the share of labour costs in total production costs (x_{19}), the share of investment in real capital in fixed capital (x_{22}),

financial leverage ratio (x_9), the share of innovative production going to export (x_{30}), the share of workers with conditions of high quality of working life (x_{18}), the share of investment in marketing and advertising (x_{23}), the share of the sums for stimulating the work of top managers (y_2). Return on total capital (x_1) in terms of factor loadings is present in the first four factors, which describe the initial performance framework by almost 50%, so this is the indicator that should be taken as the basis for developing the economic incentive scale for top managers.

Continuing to analysis of the data of 19 industrial enterprises of Kharkiv, which is a representative set of industrial enterprises of Ukraine, the development of the bonus scale on the indicator of return on total capital should be developed taking into account the law of distribution of values of this indicator.

Table 4 shows a statistical tabulation, which allows using statistical characteristics of the distribution law of return on total capital to establish a relationship between intervals of its values and 100% scale of bonus to the salary of top manager.

Table 4. Frequency Tabulation for x_1

Source: Collected by the authors

	Lower	Upper			Relative	Cumulative	Cum. Rel.
Class	Limit	Limit	Midpoint	Frequency	Frequency	Frequency	Frequency
	at or below	-0,02		0	0,0000	0	0,0000
1	-0,02	-0,005	-0,0125	0	0,0000	0	0,0000
2	-0,005	0,01	0,0025	53	0,5579	53	0,5579
3	0,01	0,025	0,0175	3	0,0316	56	0,5895
4	0,025	0,04	0,0325	5	0,0526	61	0,6421
5	0,04	0,055	0,0475	1	0,0105	62	0,6526
6	0,055	0,07	0,0625	5	0,0526	67	0,7053
7	0,07	0,085	0,0775	3	0,0316	70	0,7368
8	0,085	0,1	0,0925	9	0,0947	79	0,8316
9	0,1	0,115	0,1075	6	0,0632	85	0,8947
10	0,115	0,13	0,1225	2	0,0211	87	0,9158
11	0,13	0,145	0,1375	2	0,0211	89	0,9368
12	0,145	0,16	0,1525	0	0,0000	89	0,9368
13	0,16	0,175	0,1675	1	0,0105	90	0,9474
14	0,175	0,19	0,1825	2	0,0211	92	0,9684
15	0,19	0,205	0,1975	0	0,0000	92	0,9684
16	0,205	0,22	0,2125	0	0,0000	92	0,9684
17	0,22	0,235	0,2275	2	0,0211	94	0,9895
18	0,235	0,25	0,2425	1	0,0105	95	1,0000
19	0,25	0,265	0,2575	0	0,0000	95	1,0000
20	0,265	0,28	0,2725	0	0,0000	95	1,0000
	above	0,28		0	0,0000	95	1,0000

The selected intervals of the values of the return on total capital in accordance with the same number of intervals of 100% of the scale of bonuses to the salary of the top manager are shown in Table 5. It should be noted that in this example we have 20

intervals, but the number of intervals depends on the number of observations, and the more values of the indicator, the more intervals and therefore more detailed the bonus scale.

Table 5. Correspondence between intervals for return on total capital and premium (% to basic salary)
Source: Collected by the authors

Class	Lower Limit	Upper Limit	Percentage of the basic salary	Class	Lower Limit	Upper Limit	Percentage of the basic salary
	at or below	-0,02			at or below	-0,02	
1	-0,02	-0,005	5	12	0,145	0,16	60
2	-0,005	0,01	10	13	0,16	0,175	65
3	0,01	0,025	15	14	0,175	0,19	70
4	0,025	0,04	20	15	0,19	0,205	75
5	0,04	0,055	25	16	0,205	0,22	80
6	0,055	0,07	30	17	0,22	0,235	85
7	0,07	0,085	35	18	0,235	0,25	90
8	0,085	0,1	40	19	0,25	0,265	95
9	0,1	0,115	45	20	0,265	0,28	100
10	0,115	0,13	50		above	0,28	
11	0,13	0,145	55				

That is, if in this period the rate of return on total capital is 0,15, the bonus will be 60% of the basic salary of top managers.

Thus, the analytical method of stimulating the work of top managers is implemented in the sequence of stages, which are presented in Table. 6.

Table 6. The stages of the implementation of the analytical method of economic stimulation of top managers
Source: Collected by the authors

The stage name	Tasks	Tools	Results
Formulation of goals and objectives for determining the relationship between remuneration and incentive indicators for top managers and the performance of the enterprise	Formulate goals and objectives for determining the relationship between remuneration and incentive indicators of top managers and the performance of the enterprise	Theoretical and logical analysis	Specified goals and objectives of the relationship
Justification of remuneration and incentive performance of top managers	Formulate the system of remuneration and incentive indicators of top managers	Theoretical and logical analysis	System of remuneration and incentives of top managers
Substantiation of performance indicators of the enterprise	Develop a system of performance indicators of the company	Theoretical and logical analysis	System of enterprise performance indicators
Selection of analytical tools for determining the relationship between compensation and stimulation performance of top managers and the performance of the enterprise	Generate a set of analytical tools to determine the relationship between compensation and incentives of top managers and the performance of the enterprise	Analysis of analytical tools	A set of analytical tools to determine the relationship

Determination of the relationship between the two systems of indicators	Evaluate the level of correlation between the two systems of indicators	Canonical analysis	The level of relationship between the two systems of indicators
Determine the relationship between compensation and incentives of top managers and business performance indicators	Determine the ranking of indicators in the relationship	Factor analysis	A set of indicators that form the mechanism of the relationship between the indicators of payment and incentives of top managers and performance indicators of the enterprise
Determine the enterprise performance indicator that is most frequently included in the latent factor equations	Choose one partial indicator from the system of indicators that reflect the effectiveness of the enterprise	Factor analysis	A partial indicator of the performance of the enterprise, which is most closely interconnected with others in the system
Calculate the value distribution law of the individual enterprise performance indicator that is closely interrelated with the others in the system	Determine the numerical characteristics of the law of distribution of values of the partial indicator of performance of the enterprise, which is most closely interrelated with others in the system	Tools of mathematical statistics	Value distribution law of a partial indicator of efficiency of activity of the enterprise which is most closely interconnected with others in system and its numerical characteristics
Calculate the intervals of the values of the indicator in Frequency Tabulation	Determine the intervals of values of the performance indicator	Tools of mathematical statistics	Intervals of values of the performance indicator
Match the intervals of the values of the performance indicator and the intervals of 100% of the scale of bonuses to the salary of the top manager	Direct development of the bonus scale	Functional mapping	Scale of bonuses to the salary of top managers

5. Conclusions and the Further Research

The proposed analytical approach makes it possible to objectively develop a bonus scale for top managers, taking into account their work aimed at improving the performance of the entire enterprise. With the help of this method, it is possible to reliably determine the effectiveness of the enterprise as a whole.

The essence of the stages of the developed analytical method is as follows.

At the first stage, the formulation of the main goal and objectives of determining the relationship between indicators of payment and labor incentives of top managers and indicators of the company's performance is carried out.

This is necessary to specify goals. The main method of this stage is theoretical and logical analysis.

At the second stage, it is proposed to substantiate the system of payment indicators and work incentives for top managers using theoretical and logical analysis.

Two main indicators are included in such a system: the specific weight of wages (basic and additional) of top managers in the general wage fund and the specific weight of bonuses and other rewards of top managers in the wage fund.

At the third stage, the system of performance indicators of the enterprise is formed using theoretical and logical analysis.

As the research proved, it is advisable to include the following groups of indicators in the system of performance indicators of the enterprise: the use of the main production assets, financial resources, human resources, i.e. personnel, indicators of the results of the management of investment and innovation activities of the enterprise.

At the fourth stage, it is proposed to conduct a selection of analytical tools for determining the relationship between the two indicator systems selected at the second and third stages, namely, the payment and stimulation of the work of top managers and the effectiveness of the enterprise.

As the main method of this stage, it is proposed to use the analysis of analytical tools.

The fifth stage of the method consists in evaluating the level of relationship between the two systems of indicators of payment and incentives for the work of top managers and the effectiveness of the enterprise's activity using the method of canonical analysis.

At the sixth stage, using the method of multidimensional factor analysis, it is proposed to determine the rating, i.e., the closeness of the relationship between the systems of indicators of payment and stimulation of the work of top managers and the effectiveness of the company's activities, which form the mechanism for distributing rewards to top managers.

At the seventh stage, using the analysis of the factor loadings of the indicators in the equations of the latent factors formed after the application of multidimensional factor analysis, it is proposed to single out the most important partial indicator of the performance of the enterprise, which has significant connections with other partial indicators.

As such an indicator, the profitability of the total capital was found, which is present in the first four latent factors, which almost 50% describe the initial system of indicators, so this indicator should be taken as a basis when developing a scale of economic stimulation of the work of top managers.

At the eighth stage, using the tools of mathematical statistics, it is proposed to reveal the law of distribution of values of the most significant partial indicator of the enterprise's performance, identified at the previous stage, and its numerical characteristics.

At the ninth stage, the quantitative values of the value intervals of the most significant partial indicator of the enterprise's performance in Frequency were determined by mathematical statistics tools.

At the tenth stage, using the method of functional mapping, it is proposed to match the value intervals of the substantiated partial indicator of the enterprise's performance, identified at the previous stage, with the intervals of the bonus scale to the salary of top managers.

In this way, a bonus scale was built to stimulate the activities of top managers of enterprises.

The proposed analytical approach allows you to objectively develop a scale for awarding top managers, taking into account the effectiveness of their work, aimed at increasing the effectiveness of the entire enterprise.

In the process of implementing this approach, a reliable description of the company's performance is carried out with the help of an appropriate system of indicators, the relationship between the factors of the company's performance and indicators of economic stimulation of top managers is evaluated to ensure their effective performance as a whole.

The well-founded and developed analytical method proves the existence of a relationship between the performance indicators of the enterprise and the results of the work of top managers, which allows to objectively determine the amount of the premium of enterprise managers.

However, each top manager has his own subjective ideas about the sufficiency of bonus amounts and a fair assessment of his work.

Therefore, it is advisable to adjust the objectively determined amount of premiums using the analytical method to the coefficients of subjective perception by top managers of the amount of premiums determined using expert survey methods.

Such a combination of objective and subjective will allow to take into account both the achieved results and capabilities of the enterprise, as well as the subjective expectations of top managers in evaluating their own efforts and work results aimed at increasing the efficiency of the enterprise.

It is in this proposal that the main direction of further research and the use of the developed analytical method lies.

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