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INDICATORS AND METHODS OF MEASURING LABOR PRODUCTIVITY IN ENTERPRISES UNDER FIGHTING COMPETITION

***Abstract.** The article is devoted to a comprehensive study of theoretical problems and practices of labor productivity management at enterprises. Managing productivity is a complex challenge, equally important for organizations of all fields of activity and of any size, if they plan to succeed in market competition. The relevance of the problem of managing labor productivity, the importance of its study and unresolved a number of methodological and practical issues have determined the topic of this study.*

Methods of measuring labor productivity at enterprises are investigated. The basic methods of research of the level of labor productivity are revealed.

***Keywords:** personnel management, productivity, competition, enterprise, method.*

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ПОКАЗНИКИ І МЕТОДИ ВИМІРЮВАННЯ ПРОДУКТИВНОСТІ ПРАЦІ НА ПІДПРИЄМСТВАХ В УМОВАХ ЖОРСТКОЇ КОНКУРЕНЦІЇ

***Анотація.** Стаття присвячена комплексному дослідженню теоретичних проблем і практики управління продуктивністю праці на підприємствах. Управління продуктивністю праці — це складне комплексне завдання, однаково важливе для організацій будь-якої сфери діяльності й будь-якого розміру, якщо вони планують досягти успіху в ринковій конкуренції. Актуальність проблеми управління продуктивністю праці, значення його вивчення і невирішеність ряду методичних і практичних питань визначили тему даного дослідження.*

Сучасна економічна ситуація в Україні та кризовий стан справ на підприємствах зумовили необхідність підвищення ефективності праці як на рівні підприємства – первинної ланки суспільного виробництва, так і на рівні усього народного господарства загалом. Підвищення продуктивності праці є безперечною умовою прогресу і розвитку виробництва. Систематичне зростання продуктивності праці має пріоритетне значення для підвищення ефективності функціонування будь-якого підприємства, галузі промисловості, всього господарського комплексу, для підвищення матеріального добробуту кожного працюючого.

Можливості мінімізації негативних наслідків економічної кризи залежать, насамперед, від мобілізації внутрішніх чинників економічного зростання країни, що базується на підвищенні продуктивності праці та забезпечує конкурентоспроможність національної продукції. Тому останнім часом актуалізуються проблеми дослідження продуктивності праці, визначення резервів та шляхів її підвищення в кризових умовах.

Теоретичною та методологічною основою дослідження є фундаментальні положення сучасної економічної теорії, наукові концепції та теоретичні розробки вітчизняних і зарубіжних учених з питань підвищення продуктивності праці на підприємстві. Досліджено методи вимірювання продуктивності праці на підприємствах. Виявлено основні методи дослідження рівня продуктивності праці.

***Ключові слова:** управління персоналом, продуктивність праці, конкуренція, підприємство, метод.*

Problem statement. The emergence of a market economy led to a change in the paradigm of industrial production management, led to the transition from the principles of bureaucratic, administrative and command leadership to rational principles of organization of the administrative process.[5]

Each enterprise is characterized by a certain level of productivity, which can increase or decrease under the influence of various factors. The level of productivity

is determined by the quantity of production (volume of work or services), producing one worker per unit of working time (hour, shift, day, month, quarter, year), or the amount of time spent producing a unit of product (performing a work or service) [4].

Analysis of recent research and publications. Theoretical and methodological principles of increasing labor productivity are the subject of active scientific research. Various aspects of this problem have been explored in the writings of foreign and academic economists A.Ye. Avrutina, Yu.D. Borisov, B.S. Busheyev, V.M. O.I. Datsii, Zarubin, V.I. Zolotarov, Ya.M. Kuperman, V.S. Sierov, Ye.K. Siedykh, V.I. Stomakhin, A.A. Frenkel, I.V. Holodets, Ye.Y. Zablotskyi, B.M. Lytvyn, Ye.V. Mnykh, R.I. Oleksenko, R.T. Peliachek, V.G. Fedorenko, I.D. Farion, N.G. Chumachenko, S.I. Shkaraban, I.G. Yaremchuk, O.P. Ivanytska and other.

The purpose of the article is a comprehensive study of enterprise productivity management in a highly competitive environment.

To achieve this purpose, the following tasks have been set and solved:

- to analyze methods of measurement and indicators of the level of labor productivity;
- to develop a system of employee motivation to achieve the intended level of productivity;
- to analyze the factors of productivity growth. [6]

The realization of these tasks depends on the competent and coordinated work of economists and managers at all stages of the program.

Given the utmost importance of improving productivity for enterprise competitiveness, executives and professionals of all levels in prospective organizations must develop and implement work productivity management programs. However, competitive advantages can extend not only to the production system of the enterprise, but also to the management system.[7]

Presenting main material. Enterprise productivity management programs include the following steps: measuring and evaluating the achieved level of productivity at the enterprise as a whole and by particular types of work in particular; finding and analyzing performance enhancements based on measurement and evaluation information; development of a plan for the use of labor productivity reserves, which should include specific terms and measures for their implementation, provide for financing the costs of these measures and the expected economic impact of their implementation, determine responsible executors; developing employee motivation systems to achieve the intended level of productivity; control over the implementation of measures, envisaged by the plan and the entire program and regulation of their implementation; measuring and assessing the real impact of anticipated measures on productivity growth [2].

So, managing productivity at the enterprise — it's actually part of the overall enterprise management process that involves planning, organizing, motivating, guiding, controlling and regulating. This work is based on a constant analysis of the benefit-to-work ratio on the one hand, and the cost of that activity on the other. Labor productivity as an economic category should be understood as the efficiency of labor costs, the ability of a particular work to create a certain amount of material goods per unit time.

– The level of labor productivity is determined by the amount of output produced by one worker per unit of working time or by the amount of working time spent on producing a unit of output.

An important prerequisite for determining labor productivity is to properly calculate the level and dynamics of labor productivity in all sectors of the economy.

Measuring labor productivity should be based on an understanding of its economic content, the definition of indicators that can characterize the level of productivity in time and space. The methods of accounting for labor productivity must meet the following requirements:

— the unit of measure cannot distort labor productivity indicators, fully take into account the actual amount of work and labor costs, ensure the unity of methods of measuring labor productivity;

— labor productivity indicators should be cross-cutting, consolidated, comparative, have a

high degree of generalization, be versatile in application.

Distinguish productivity across the society, region, industry, enterprise, organization, workshop, production site, team and individual employee.

Labor productivity is measured by the ratio of output to labor costs (average number of staff). Depending on the direct or inverse relationship, there are two indicators: production and complexity.

Output is the amount of output produced per unit of time or the amount of output per accounting employee per year, quarter, or month. It is measured by the ratio of the amount of output to the amount of working time spent on its production:

$$B = \frac{Q}{T} \quad (1)$$

where B – yield;
T – working time costs;
Q – volume of production

The complexity — it is an indicator that characterizes the time spent per unit of production (that is, the inverse of the output):

$$T_p = \frac{T}{Q} \quad (2)$$

where T_p – labor intensity per unit of production.

The higher the output per unit of time or the lower the time per unit, the higher the level of productivity. However, the percentage increase in output is not equivalent to the percentage reduction in complexity. The relation between them is expressed as follows:

$$K_{\text{п.в.}} = \text{К}_{\text{з.т.}} : (100 - \text{К}_{\text{з.т.}}) - 100 \quad (3)$$

and

$$K_{\text{з.т.}} = \text{К}_{\text{п.в.}} : (100 + \text{К}_{\text{п.в.}}) - 100 \quad (4)$$

where $K_{\text{п.в.}}$ – production increase factor;

$\text{К}_{\text{з.т.}}$ – coefficient of reduction of complexity.

The most common and versatile indicator is production. In the economy scale, the level of labor productivity (production) in the sphere of material production is determined by the ratio of the value of newly created value — national income — for a certain period up to the average number of personnel, employed in the field of material production during this period. In the service sector, labor productivity (yield) is determined by the ratio of the cost of services excluding the cost of material costs for their provision over a period to the average number of service personnel over that period.

They differentiate the output depending on the unit of working time:

— output per one man-hour worked — hourlong; [10].

— workings out for one spent man-day - day;

— output per average employee - annual (quarterly, monthly). [9].

Hourly output characterizes labor productivity over actual hours worked. Full time depends also on the length of the working day and the use of working time within the shift. Its level is affected by intrinsic downtime and time loss.

The annual output takes into account not only intra-shifts, but also round-the-clock downtime.

The relationship between these indicators can be expressed by calculating the formula:

$$\text{I}_{\text{д.в.}} = \text{I}_{\text{г.в.}} * \text{I}_{\text{в}} \quad (5)$$

or

$$\text{I}_{\text{р.в.}} = \text{I}_{\text{д.в.}} * \text{I}_{\text{я.д.}} \quad (6)$$

where $\text{I}_{\text{д.в.}}$ – daily production index;

$\text{I}_{\text{г.в.}}$ – hourly production index;

$I_в$ – usage index;

$I_{р.в.}$ – the index of annual production of working time during the shift;

$I_{я.д.}$– index of the number of attendance days during the year.

Methods of measuring labor productivity (production) depend on the method of determining the output. There are natural, labor and value (money) methods.

The essence of the natural method is that the volume of products produced and labor productivity are calculated in natural units (pieces, tons, meters, etc.).

This method is widespread in the enterprise: in the workplace, in the brigades, at separate sites of those industries that produce homogeneous products (electricity, mining industries).

If the enterprise (shop, station, brigade) produces products that have the same purpose, but differ in some ways, production can be calculated using conventional units. The natural method is of limited use, since enterprises and industries produce mostly heterogeneous products. In addition, this method does not eliminate changes in the volume of work in progress, which in some industries has a large share in total output (construction, shipbuilding, etc.).

The labor method is most often used in workplaces, in teams, in manufacturing sites and in workshops, where the volume of production or work performed is determined in normal hours. With scientifically grounded and for a certain period of unchanged norms, this method fairly accurately characterizes changes in labor productivity.

Labor method is of limited use because it is based on the use of unchanged standards, which is contrary to the need for revision of standards as organizational and technical measures are implemented. In addition, technological complexity is still largely calculated at enterprises, which reflects the time spent by only the main workers. And the labor costs themselves are often incomparable because of the different degree of validity. There are no scientifically substantiated labor standards for certain types of work or job functions.

In today's environment, the most common method of measuring labor productivity is value (pecuniary), which is based on the use of product volume values (gross, commodity production, gross turnover, standard processing cost, net, regulatory-net and conditionally-net production, gross income).

The advantage of the cost method is the ability to compare heterogeneous products with the cost of manufacturing them at the individual enterprise or in the industry and the economy as a whole. In this regard, the value method is applied at all stages of planning and accounting at both the sectoral and territorial levels.

Gross and product outputs have similar advantages and disadvantages. The disadvantages are, first of all, that the level of production is more due to the costs of the past (accomplished) labor than the cost of living labor. Changes in the range of products, its material and labor intensity, changes in the volume of cooperated deliveries, the volume of work in progress, differences and dynamics of prices for products have a side effect on the value of production and its dynamics. When calculating gross or commodity products, it is often the case that the calculation of the value of the enterprise supplying these products affects the productivity of the enterprise using it.

The distortion of the value of production, which occurs in the case of changes in the range of products, occurs when the proportion of products with higher raw material costs, that is, with high material intensity and low complexity, increases or decreases. In such cases, in practice, to eliminate this deficiency, it is possible to calculate labor productivity indices of variable, permanent composition, structural index.

The variable composition index reflects changes in both output and output.

The permanent composition index characterizes the labor productivity index, independent of changes in product structure, and is calculated by weighting partial production growth indices by the number of employees in the comparative (planned) period for each product.

Structural index is calculated as the ratio of the index of variable composition to the index of permanent composition. The Structural Index shows how changes in product structure affect the overall productivity index. If the structural index is greater than one, it means that the labor productivity index is increased by increasing the

material consumption and reducing the complexity of the product in case of changing its assortment, and vice versa.

Gross and commodity output indicators have some differences. They are that the first indicator characterizes the total volume of production activity of the enterprise, and the second - the amount that goes into the national economic records. In some industries, such as sewing, printing, etc., labor productivity is calculated using the rate of normative processing cost. To calculate the normative cost of processing for each type of products determine for a certain period uniform and constant rates of expenditure for such articles: wages of basic production workers with social security contributions (cost of living labor), shop and factory expenses. Direct material costs are not reflected in this standard, that is, the indicator is largely unaffected by past labor costs. The disadvantages of this indicator is that it does not characterize the amount of work completed, does not take into account the actual cost of processing, but only its normative value [8].

From a theoretical point of view, the most complete idea of the enterprise's contribution to product creation is an indicator of the value of net production. — newly created value. The value of net production is calculated as the difference between the volume of gross output and the cost of raw materials, materials, semi-finished products, fuel, energy, depreciation (elements of accomplished labor):

$$ЧП = ОВ – МВ \text{ or } ЧП = ЗП + ПР, \quad (7)$$

where ЧП – volume of net production;

ОВ – volume of gross production;

МВ – material costs;

ЗП – wages with social security contributions;

ПР – profit of the enterprise.

Pure products accurately characterize newly created ones, if they are realized at market prices, but now monopoly prices play a major role, which change the real contribution of the enterprise to the creation of new value.

In industries with a high level of technical equipment, the contingent net product is used to calculate labor productivity, which includes, in addition to wages and salaries, profit, as well as the amount of depreciation and amortization. (part of past work).

However, the use of this indicator is limited due to the fact that due to the significant difference in the profitability of individual products and large differences in the profit share in the wholesale price of the enterprise, it is impossible to have accurate and reliable results comparing the real contribution of the enterprise to the output and the corresponding value of profit.

More commonly used in enterprises is the labor productivity indicator calculated on the basis of the normative net product.

The essence of the normative method of determining net production is that for each type of production produced by the enterprise, along with the wholesale price is also set the standard of pure production. The volume of normatively-pure production at the enterprise is determined by multiplying the volume of output of each type of production in a natural meter (pcs, kg) by the standard and compiling the obtained results. Clean production standards have to be stable, so volumes of regulatory clean products are compared over a period of time.

The net product standard for a product can be calculated as follows:

$$Н_{ч.п.} = З_{в.р.} * (1 + К_з) + П_н \quad (8)$$

where $Н_{ч.п.}$ – net product standard on i-1 product, UAH;

$З_{в.р.}$ – wages of basic production workers with social security contributions, UAH;

$К_з$ – coefficient calculated as the ratio of the wages of workers engaged in maintenance and production management to the wages of the main production workers; [8].

$П_н$ – regulatory profit, UAH.

The drawbacks of the normative-net output are identical to the disadvantages of the net-output indicator.

The level of labor productivity at the enterprise can be characterized by the indices of the complexity of production. Labor intensity reflects the amount of labor costs of industrial production personnel (live labor) for the production of a unit of production and is

measured in man-hours (normal hours). There are such types of complexity: Technological complexity (T), which includes all the labor costs of the principal workers, both part-time and part-time:

$$T_т = T_в + T_п \quad (9)$$

where $T_в$ – the cost of labor of the principal workers-agents;

$T_п$ – labor costs of basic hourly workers.

The complexity of production maintenance (Тоб) includes all labor costs of auxiliary workers.

Production complexity (Твир) — these are all labor costs of the major (T) and ancillary (ТД)workers:

$$T_{вир} = T_{о.р.} + T_{д.р.} \quad (10)$$

The complexity of production management (Твир) includes the labor costs of managers, specialists, employees.

Full complexity (Тп) — this is the labor cost of all categories of industrial production personnel:

$$T = T_{о.р.} + T_{д.р.} + T_у$$

or

$$T = T_в + T_п + T_{д.р.} + T_у \quad (11)$$

or

$$T = T_{вир.} + T_у$$

By nature and purpose distinguish normative, actual and planned complexity.

Regulatory complexity determines the cost of labor to produce a unit of production or perform a certain amount of work, calculated in accordance with current standards.

Actual complexity expresses the actual cost of producing a unit of product or a certain amount of work.

Planned labor intensity is the cost of labor per unit of production or performance of work taking into account the possible change in regulatory complexity by implementing the measures provided for in the comprehensive plan for improving production efficiency [8].

Consequently, managing productivity is a complex challenge, equally important for organizations of all fields of activity and of any size, if they are to succeed in market competition. The realization of this task depends on the competent and coordinated work of economists and managers at all stages of the program.

In the broad sense, increasing labor efficiency means continuous improvement of people's economic activity, constant finding the opportunity to work better, produce more quality benefits at the same or less labor costs, which provides an increase in the real product and income in general and per capita, increasing consumption. and therefore the standard of living.

Labor productivity is an indicator of its efficiency, productivity, which is characterized by the ratio of the volume of products, works or services, on the one hand, and the amount of labor spent to produce this volume, on the other. Depending on the direct or inverse ratio of these values, we have two indicators of the level of productivity: production and complexity. Production is a direct indicator of the level of labor productivity, which is determined by the quantity of production (works, services), produced by one worker per unit of working time. Production can be determined in different ways depending on what units are measured by output and labor costs - natural, conventional, natural, value, labor. Labor intensity is an inverse indicator of the level of labor productivity, which is characterized by the amount of working time spent on the production of a unit of production (works, services). For planning and analysis of work at

the enterprise different kinds of labor are calculated: technological, production, service, management, complete [3].

Labor productivity growth factors are the whole set of driving forces and reasons that lead to increased productivity. They are classified by level of controllability, content, scope and action. Labor productivity growth reserves are those opportunities to increase productivity that have already been identified but for various reasons have not yet been used. It is essential for the economist and the manager to classify in-house reserves and factors by content, since it directly helps to identify opportunities to improve productivity at a particular enterprise [1].

Conclusions. For the fullest use of the reserves of productivity growth at enterprises the programs of management of productivity are defined which define the types of reserves, specific terms and measures for their identification and realization, the expenses for these measures and the expected economic effect from their implementation are planned, responsible executors are appointed, systems of motivation are developed employees to achieve the intended level of productivity.

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