

SEARCH AND IDENTIFICATION OF RESERVES FOR REDUCING COSTS IN INDUSTRIAL ENTERPRISES

Dubynina S. M.

Zaporizhzhia National University
Ukraine, 69600, Zaporizhzhia, Zhukovsky str., 66

dubynina.s.m@gmail.com

ORCID 0000-0003-4498-4753

Key words:

prime cost, production costs, ways, reserves, factors, cost reduction sources, indicators.

The purpose of the article is to review theoretical and to search for practical reserves for reducing costs at the industrial enterprises. Industrial enterprises lead the main sector of the Ukrainian economy, but competition from Chinese manufacturers caused by the lowest market prices does not allow further development of this sector. Therefore, the Ukrainian industrial complex experiences difficult economic times. The article deals with the problems of cost formation as the main factor in the enterprise functioning and production efficiency and the main works of scientists who have studied this problem are disclosed in the article. The issues of classification and different grouping of production costs of the enterprise to identify reserves and ways of the cost reduction are investigated in the article. The main reserves for the production costs reduction are considered. The main indicators of the reserves for the production cost reduction and their impact on financial and economic activity of PJSC "Zaporizhzhia Abrasive Plant" in 2014-2018 have been analyzed. The focus is made on the certainty and the application in practice of the more significant reserves to reduce the cost of industrial products, which will influence the competitiveness of this type of the goods and result in its being break-even on the market, or even better – its being cost-effective at all stages of the production cycle. Cost reduction is the main and first task of a manager of any enterprise. In the article the suggestions are made to reduce the prime cost of industrial products, namely due to the following: automation and modernization of the existing equipment; improvement of production technology for efficient use of resources; production of innovative products in order to increase production and sales volumes due to the reduced fixed costs; the use of economical production; labor productivity increase etc.

ПОШУК ТА ВИЯВЛЕННЯ РЕЗЕРВІВ ДЛЯ ЗНИЖЕННЯ СОБІВАРТОСТІ НА ПРОМИСЛОВИХ ПІДПРИЄМСТВАХ

Дубиніна С. М.

Запорізький національний університет
Україна, 69600, м. Запоріжжя, вул. Жуковського, 66

Ключові слова:

собівартість, витрати на виробництво, шляхи, резерви, фактори, джерела зниження собівартості, показники.

Метою статті є розгляд теоретичних і пошук практичних резервів для зниження собівартості на промислових підприємствах. Промислові підприємства очолюють основний сектор економіки України, але конкуренція з боку китайських виробників через найнижчу ціну на ринку не дозволяє розвиватися цьому сектору, тому промисловий комплекс України функціонує в складні економічні часи. Розглянуто проблеми формування собівартості як головного чинника функціонування підприємства та ефективності виробництва, основні праці вчених, які досліджували цю проблематику. Досліджено класифікацію й різне угруповання витрат на виробництво підприємства для виявлення резервів і шляхів зниження собівартості. Розглянуто резерви зниження собівартості на виробництві. Проаналізовано основні показники резервів зниження собівартості виробництва та їх вплив на фінансово-господарську діяльність ПрАТ «Запорізький абразивний комбінат» за 2014-2018 рр. Акцентовано на визначеності та застосуванні на практиці більш вагомих резервів зниження собівартості промислової продукції, що стане чинником конкурентоспроможності на ринку цього виду товару бути беззбитковим, а краще – рентабельним на всіх стадіях виробничого циклу. Зниження собівартості – це основне і найперше завдання менеджера будь-якого підприємства. Внесено пропозиції щодо скорочення витрат на виробництві промислової продукції, а саме за рахунок: впровадження автоматизації, модернізації існуючого обладнання; удосконалення технології виробництва з метою ефективного використання ресурсів; випуску інноваційної продукції з метою збільшення обсягів виробництва і реалізації, через що скоротяться умовно постійні витрати; використання ощадливого виробництва; збільшення продуктивності праці та ін.

Statement of the problem

Nowadays domestic industrial enterprises are facing the problem of non-competitiveness on the world and domestic markets. Outdated equipment, old buildings together with obsolete technologies, unused production capacities, endless energy tariffs increase, VAT refunding delays, lack of investments, high credit rates, loss of the domestic market, passive innovation activities, slow structural reconstruction - all this characterizes the stagnation of this complex, a high loss level, downtime or bankruptcy. It is generally accepted that the competitiveness of a domestic producer is a problem of economic security of the state. Therefore, achievement of these goals is possible only through the further development of the state industrial enterprises.

It is well known that the end consumer pays the market price for the quality, so the better the price is the faster the products will be bought. Quality and price indicators are inextricably connected with the prime cost of production. A detailed study of the structure of cost formation reveals reserves and ways to reduce costs.

Analysis of recent studies and publications

Cost reduction and cost management issues in Ukraine have been studied by such scholars as: O. I. Gomenyuk [1, p. 21-26], V. K. Gorkaviiy [2, p. 79-93], M. I. Ishchenko [3, p. 114-23], U. V. Lavryk [4, p. 360-369], K. V. Melnykova [5, p. 214-219], L. V. Mikhalchuk [6, p. 47-50], A. Yu. Orlova [7, p. 119-123], I. Ya. Romankiv [8, p. 141-147], E. M. Rudnichenko [9, p. 40-46], L. A. Svistun [10, p. 57-62], O. M. Sinchuk [11], S. M. Spivak [12, p. 78-82], A. V. Cherep [13], I. A. Shapiro [14, p. 342-348], M. Yudina [15].

They have studied problems such as determining the composition of the cost structure and its classification; production costs management, the search for reserves to reduce production costs in modern conditions. Despite the theoretical and practical researches of scientists, the author of the article will discover the reserves of production costs reduction and their impact on the production cost on the example of an industrial enterprise.

I. A. Shapiro, K. F. Kovalchuk point out that cost management is a necessary part of the economic work at the enterprise, because for the purpose of the planned and actually perfect activity of the enterprise, the reasons for the occurrence of the target result as well as the preconditions for making management decisions must be revealed [14].

Romankiv I. investigates the following concept: "Prime cost describes all aspects of production activity of the economic unit. Prime cost and cost management is an important element of economic management. Production costs, on the one hand, are one of the main objects of economic management at the micro level, and on the other hand are the important part of management accounting" [8].

According to O. I. Gomenyuk, the cost of production is a synthetic, generic indicator that reflects all aspects of the enterprise activity in their unity and interconnection. This is a quantitative and qualitative indicator of production and economic activity [1].

In her research, Orlova A. accepts that the competitiveness of machine-building products in terms of

range is a dynamic complex characteristic, which is influenced by many factors. They are divided into those that depend on the enterprise and those that are independent of it. Factors that depend on the enterprise include the level of equipment, technology and production organization used to produce it; cost and price of products; quality of products, service and after sales service, marketing support of products; availability of the required certificate of conformity, quality system certificate, image of the enterprise [7].

But today, when Ukraine is experiencing crisis and hard economic conditions, when the struggle not only for foreign markets but also primarily for the domestic market is intensifying, in such conditions the issues of relevance of reducing the cost of production of industrial products become especially relevant.

Thus, in their study, Melnikova K. V. and Vasilkova Y. K. have come to the conclusion that the effect of equipment modernization is significant for the enterprise. The introduction of innovations will not only make a profit but will also reduce the level of production costs in growing products, which is much more important for the level of competitiveness of the enterprise in general and products in particular [5].

In her work A. V. Cherep emphasizes that production costs of the enterprise differ. They have thousands of names, varying in place, time, purpose and economic content. Therefore, it is necessary for each object of study to carry out a detailed classification and different grouping to identify reserves and ways to reduce cost in order to improve production efficiency and competitiveness of the enterprise [13, p. 337].

Objectives of the article

The goal of the article is to review theoretical and to search for practical reserves to reduce the prime cost at industrial enterprises.

The main material of the research

Prime cost is one of the significant indicators of financial and economic activity of an enterprise and is an integral part of the production process. Cost management is the most important tool for achieving high profitability and financial independence of an enterprise.

The cost management system in an industrial enterprise must be comprehensive, meet the requirements of management decisions that would help reduce costs and efficiently use the material resources.

In the process of production, an industrial enterprise incurs many costs that have different classifications and different groupings. In economic publications the terms such as ways, reserves, factors and sources (Table 1) are used as internal cost management at the enterprises for planning, accounting, managerial decision-making in order to reduce prime cost. In order to find reserves of the industrial production cost reduction, let us focus on identifying the actual cost reduction factor

Table 1 – Grouping to identify cost reduction reserves

Ways and directions	Technical ways	Creation of new innovative products; rational use of resources; automation, mechanization, production modernization.	
	Organizational ways	Organization of labor and production management improvement; certification, standardization of production and products; reengineering of the business processes.	
	Economic ways	Cost management approach; economic incentives for staff; increase in production volumes; attraction of investments.	
Reserves or sources	Depend on the enterprise	Domestic production	Improved use of labor tools (improvement of production technology, full utilization of production capabilities, mechanization and automation of production processes)
			Improvement of production, labor and management organization (improvement of staff qualification, scientific organization of labor and management, reduction of working time losses, improvement of normalization and motivation of work)
			Improvement of the use of work items (Computerization of accounting of working capital movements and description of production losses, prevention of losses from defects, improvement of normalization of material losses, saving of material losses)
	Do not depend on the enterprise	External	Inflationary processes in macroeconomics
			Prices for consumed resources
Tax burden			
Specialization and cooperation in a competitive environment			
Factors	External, internal		
	Objective and subjective		
Cost reduction planning methods	Enlarged	It is based on the structure of the cost of production of the reporting period and the expected change in costs for individual cost items in the planning period compared with the reporting	
	Refined	It is carried out by comparing the detailed planned and actual calculations for individual products.	
	According to the technical and economic factors	Costs for 1 UAH of commodity products are determined according to the reporting year	
		The planned prime cost of the planned year is calculated under the conditions of the current one	
		Cost reduction is planned for TEF, considering the time of innovation within the planned year	
		Improvement of the technical level of the enterprise	
		Improvement of the organization of production and labor	
		Changing the volume and structure of products	
		The cost of the planned volume of production under the conditions of the planned year is determined	
Costs for 1 UAH of commodity production are calculated in the conditions of the planned year			
Determined planned cost reduction in %			
Factors of actual cost reduction	Increasing the technical level of production		
	Improvement of the organization of production and labor		
	Changing the volume and structure of products		
	Improving the use of natural resources		
	Sectoral and other factors		

Note: Written by the author based on source [13]

The research in order to identify the actual factors that have influenced cost reduction will be started with improving the technical level of production, namely the introduction of new technology, new products, automation, mechanization, modernization of existing

production facilities, the introduction of energy-saving technologies, environmental measures. The research is done on the basis of actual data of PJSC “Zaporizhzhia Abrasive Plant” activity in 2017-2018 (Table 2).

Table 2 – Main Indicators of Actual Expenditures on the Technical Reequipment Fund (TRF) of PJSC "Zaporizhzhya Abrasive Plant" in 2014-2018. (thousand UAH)

Indicators	2017	2018	Absolute deviation	Relative deviation
The development of new types of products	0	495,4	495	
Automation, mechanization, modernization of existing production	0	3197	3197	
Introduction of energy saving technologies	7119	4225,8	-2893	-41
Environmental measures	602,3	3494	2892	480
Total:	7721,3	11412,2	3691	48

Note: calculated by the author based on the actual data of PJSC "Zaporizhzhya Abrasive Plant"

As can be seen from the Table 2, there is a tendency to the increase of the company expenditures on the re-equipment fund. In 2018 the expenditures amount has increased by 3691 thousand UAH (48%), including the development of new products by 495 thousand UAH, automation, modernization of existing production by 3197 thousand UAH, but the expenditures on the introduction of energy-saving technologies have decreased by 2893 thousand UAH (41 %), while the cost for the environmental protection measures have increased by 2892 thousand UAH (4.8 times).

The increase in TRF costs is caused by the increased production and sales volumes as well as increased revenue and profits. For each TRF measure, an economic effect is calculated, which is reflected in the prime cost reduction. At the same time, transitional savings are also considered in the following years. The savings of measures planned to be implemented over next several years are calculated based on the volume of work only in the reporting year, without the initial implementation period.

Table 3 – Main Performance Indicators (TFR) of PJSC "Zaporizhzhya Abrasive Plant" in 2017-2018 (thousand UAH)

Indicators	2017	2018	Absolute deviation	Relative deviation
Income	1271231	1558885	287654	23
Prime Cost	993805	1186304	192499	19
Profitability, %	28%	31%	3%	13
TRF costs	7721,3	11412,2	3691	48
The effect of such TRF implementation, savings	14410	16210	1800	12
Expenses for TRF for 1 UAH of income, cop	0.61	0.73	0,125	21
Effect of introduction of TRF on 1 UAH of costs, cop	1.45	1.37	-0,084	-6

Note: calculated by the author based on the actual data of PJSC "Zaporizhzhya Abrasive Plant"

Having determined the expenditures on TRF it should be defined what effect these measures have produced, to which extend the production costs have been decreased and the share of TRF and savings in revenue and cost respectively should be calculated as well. Analysis of the main indicators of the effectiveness of the TRF implementation at PJSC "Zaporizhzhya Abrasive Plant" during 2017-2018 are presented in Table 3. The effect of the implementation of TRF at the enterprise in 2018 has increased by 1800 thousand UAH (12%) compared to 2017.

Now we should consider other factors which influence the cost reduction. These are introduction and development of the new products, the development of new production, the elimination of outdated technologies and their replacement for more modern and innovative ones at PJSC "Zaporizhzhya Abrasive Plant" in 2014-2018 (Table 4).

The study showed that in the period of 2014-2018 years the highest costs for innovation at the enterprise occurred in 2014 and reached 3010 thousand UAH. In 2015 they decreased to 363.7 thousand UAH, resulting in their total absence in 2016-2017. This happened due to the general economic crisis in 2014-2015, a sharp deterioration of the situation in the country, a complete loss of the state influence over the economic processes.

Table 4 – Main Indicators of Innovative Implementation at PJSC "Zaporizhzhya Abrasive Plant" in 2014-2018 (thousand UAH)

Indicators	2014	2015	2016	2017	2018
Costs for innovation , thousand UAH	3010,1	363,7	0	0	495,4
Incl. the acquisition of machinery	517,6		0	0	495,4
marketing	2492,5	363,7		0	0
own funds	3010,1	363,7	0	0	495,4
Volume of innovative products sold		387	4165,4	5900,3	26827,9
Incl. export		64,5	391	5156,9	26827,9
Total sales of products at the enterprise	581815,7	898133,2	955223,3	1265918	1559178
The share of sales of innovative products ,%	0.00%	0.04%	0.44%	0.47%	1.72%
Number of embedded new types of products	2	1	0	0	2
Incl. only new to the enterprise	2	1	0	0	2
The share of workers of the enterprise that have higher education ,%	20	18	18.6	18.9	19,1
	Absolute Deviation 2018				
Indicators	2015	2016	2017	2018	
Costs for innovation , thousand UAH	-2515	132	495	495	
incl the acquisition of machinery	-22	495	495	495	
marketing	-2493	-364	0	0	
own funds	-2515	132	495	495	
Volume of innovative products sold	26828	26441	22663	20928	
Incl.exports	26828	26763	26437	21671	
Total sales of products at the enterprise	977363	661045	603955	293260	
The share of sales of innovative products ,%	0	0	0	0	
Number of embedded new types of products	0	1	2	2	
Incl. only new to the enterprise	0	1	2	2	
The share of workers of the enterprise that has higher education , %	-1	1	1	0	
	Relative deviation 2018 r .				
Indicators	2015	2016	2017	2018	
Costs for innovation , thousand UAH	-84	36			
Incl.the acquisition of machinery	-4				
marketing	-100	-100			
own funds	-84	36			
Volume of innovative products sold		6832	544	355	
Incl.exports		41494	6761	420	
Total sales of products at the enterprise	168	74	63	23	
The share of sales of innovative products ,%		3893	295	269	
Number of embedded new types of products	0	100			
Incl. new only to the enterprise	0	100			
The share of workers of the enterprise that have higher education ,%	-4	6	3	1	

Note: Prepared by the author on the basis of the actual data of PJSC "Zaporizhzhia Abrasive Plant", forms of statistic reporting №1-innovation "Survey of innovative activity of industrial enterprise" approved by the State Statistics Committee of 10.11.2015 №319, statistic "Survey of innovative activity of enterprise" № INN (once for two years) approved by the State Statistics Service of 25.11.2016 №225 (thousand UAH).

In 2016 the situation in the country was improved, the tension of the crisis has fallen, and since 2016 the company has begun to gradually increase production and sales volumes. That is why we see the company's next investments into innovative products in 2018 only and they reached 495.4 thousand UAH only. The cost of innovative products consists of the cost of purchasing equipment and marketing, all investments at the enterprise's own expense.

But not only the crisis has affected the reduction of costs for innovative products, but also low skills of the company personnel which is acknowledged by the low share of employees of the enterprise with higher education which in 2014-2018 did not reach more than 20%.

Table 5 – The main technical and economic indicators of economic activity at PJSC "Zaporizhabraziv" in 2014-2018 (thousand UAH)

Indicator	Unit	2017	2018	Absolute deviation	Relative deviation
Product: in current prices	thousand	1226178	1554379	328201	27
in comparative prices	- "-	1070391	1330415	260024	24
Realization	- "-	1271231	1563479	292248	23
including export	- "-	1012191	1273342	261151	26
Ukraine only	- "-	259040	290137	31097	12
Utilizing capacity	%	45.05	51.28	6	14
The costs for production	thousand	1071964	1339950	267986	25
profitability	%	14,4	16	2	11
Profit from the product	thousand	154214	214429	60215	39
The fund payment labor PPP	- "-	114318,8	163900,1	49581	43
Number in full- time equivalent	people	1335	1348	13	1
The average monthly salary	UAH	7136	10132	2996	42
Average monthly output	UAH	56943,8	66815,9	9872	17

The most important factor in prime cost management is the consideration of factors responsible for the technical and economic conditions of the enterprise, that is analysis of economic activity, the use of production capacity, the organization of production process, the use of raw materials, labor etc. Certain reserves to reduce costs are laid in the normal organization of production, elimination of overtime, use of maximum capacity. This is ensured primarily by increasing labor productivity, that is, by increasing it in the unit of output, its share decreases in cost. The dependence of labor productivity, the use of capacity on the cost of production will be examined on the example of PJSC "Zaporizhzhia Abrasive Plant" in 2017-2018. (Table 4).

The main task of the analysis is to find a cost reduction reserve by increasing production volumes. Therefore, in 2018 the commodity products at current prices were increased by 328201 thousand UAH (27%), and at compared prices - by 260024 thousand UAH (24%), capacity utilization in 2018 was increased by an absolute value of 6% (by relative value to 14%) compared to 2017, and that is the source of cost reduction. Another source of cost reduction is the reduction of production costs by improving labor productivity. Thus, in 2018 the labor productivity was increased by 9872,100 UAH (17%) compared to 2017. Company profit in 2018 increased by 60215 thousand UAH (39%), profitability of production increased by 2% (11%) by 2017.

With the increase of production volumes, the number of employees involved was increased in 2018 by 13 persons

(1%), while the average wage was increased by 2996 UAH (42%), with the wage bill increasing by 49581 thousand UAH (43%) compared to 2017. Production costs in 2018 increased by 267986 UAH thousand (25%) compared to the expenses in 2017. That is, the reserves to reduce the cost of the enterprise really exist and one of these is unused capacity which in 2018 made only 51,28% at the enterprise. With the increase of industrial output, only variable costs increase while the constants remain unchanged, resulting in a lower prime cost of production.

Conclusions

The search for the cost reduction reserves can be divided by terminology into the ways, reserves, factors and sources of cost reduction, which in their turn are divided into internal, external, subjective or objective, technical, organizational and economic ones. Cost reduction methods are planned or actual. As an example, the article presents financial and economic activity data for the last years at PJSC "Zaporizhzhia Abrasive Plant". It should be noted that actual factors that reduce prime cost are identified which correspondingly results in the profit increase of this industrial enterprise. But there is a great many of other reserves of the prime cost reduction that need to be applied. Among them are such as the introduction of innovative products to increase production volumes and reduce the relatively constant costs per production unit, the automation of equipment, the restructuring of staff to increase productivity, the introduction of lean production for the rational use of resources, improving technological level etc.

References

- Gomenyuk, O. I. (2012). Neobkhidnist znyzhennya sobivartosti produktsiyi z metoyu zabezpechennya konkurentospromozhnosti produktsiyi pidpryemstv [The need to reduce the cost of production in order to ensure the competitiveness of enterprise products]. *Kultura narodov Prichernomor'ya - Culture of the Black Sea peoples*, 244, 21-26 [in Ukrainian].
- Gorkavii, V. K. & Litvinova, K. O. (2016). Oblikovo-analitychni aspekty upravlinnya sobivartisty produktsiyi [Accounting and analytical aspects of production cost management]. *Visnyk KHNAU - Bulletin of KhNAU*, 1, 79-93. Retrieved from http://nbuv.gov.ua/UJRN/vkhnau_ekon_2016_1_11 [in Ukrainian].
- Ishchenko, M. I. (2013). Modelyuvannya ta prohnozuvannya rivnya potochnykh vytrat na hirnycho-zbahachuvalnykh kombinatakh Ukrayiny [And puppies MI Modeling and prediction of current expenditure on mining complexes Ukraine]. *Yevropeyskyy vektor ekonomichnoho rozvytku - European vector of economic development*, 2, 114-123. Retrieved from http://nbuv.gov.ua/UJRN/ever_2013_2_14 [in Ukrainian].

4. Lavryk, U. V. & Bondyk, K. YU. (2013). Suchasni pidkhody do upravlinnya vytratamy promyslovykh pidpryyemstv [Modern approaches to the management costs of industrial enterprises]. Naukovi pratsi Kirovohradskoho natsionalnoho tekhnichnoho universytetu. Ekonomichni nauky - Scientific works Kirovograd National Technical University. Economic sciences, 24, 360-369. Retrieved from http://nbuv.gov.ua/UJRN/Npkntu_e_2013_24_55 [in Ukrainian].
5. Melnykova, K. V. & Vasykova, YU.K. (2016). Shlyakhy znyzhennya sobivartosti produktsiyi za umov vprovadzhennya tekhniko-ekonomichnykh novatsiy [Ways to reduce the cost of production under the conditions of introduction of technical and economic innovations]. Visnyk Khmelnytskoho natsionalnoho universytetu. Ekonomichni nauky. - Bulletin of the Khmelnytsky National University. Economic sciences, vol 3, 1, 214-219. Retrieved from [http://nbuv.gov.ua/UJRN/Vchnu_ekon_2016_3\(1\)__43](http://nbuv.gov.ua/UJRN/Vchnu_ekon_2016_3(1)__43) [in Ukrainian].
6. Mykhalechuk, L. V. & Krysko, YU.I. (2012). Operativne upravlinnya vytratamy na vyrobnychomu pidpryyemstvi [Operational Cost Management at a Manufacturing Enterprise]. Kultura narodov Prychernomor'ya - Culture of the Black Sea peoples, 227, 47-50 [in Ukrainian].
7. Orlova, A. YU. (2015). Neobkhidnist obgruntovanoho vyznachennya sobivartosti produktsiyi mashynobudivnoho pidpryyemstva dlya pidvyshchennya yiyi konkurentospromozhnosti [Necessity of a justified determination of the cost of production of a machine-building enterprise to increase its competitiveness]. Naukovyy visnyk Mukachivskoho derzhavnogo universytetu - Scientific Bulletin of the Mukachevo State University, Vol 2, 1, 119-123. Retrieved from [http://nbuv.gov.ua/UJRN/nvmdue_2015_2\(1\)__22](http://nbuv.gov.ua/UJRN/nvmdue_2015_2(1)__22) [in Ukrainian].
8. Romankiv, I. YA. (2013). Osoblyvosti bukhhalterskoho obliku i ekonomichnoho kontrolyu vytrat vyrobnytstva [Features of accounting and economic control of production costs]. Innovatsiyana ekonomika - Innovative Economics, 10, 141-147. Retrieved from http://nbuv.gov.ua/UJRN/inek_2013_10_25 [in Ukrainian].
9. Rudnichenko, YE.M. (2015). Perspektyvy vykorystannya netradytsiynykh metodiv upravlinnya vytratamy na vitchyznyanykh promyslovykh pidpryyemstvakh [Prospects of using non-traditional methods of cost management at domestic industrial enterprises]. Ekonomika i rehion - Economy and region, 5, 40-46. Retrieved from http://nbuv.gov.ua/UJRN/econrig_2015_5_9 [in Ukrainian].
10. Svystun, L. A. & Levkova, R. M. (2017). Udoskonalennya systemy upravlinnya vytratamy pidpryyemstva v umovakh nestabilnoi ekonomiky [Improvement of enterprise cost management system in conditions of unstable economy]. Ekonomika i rehion - Economy and region, 4, 57-62. Retrieved from http://nbuv.gov.ua/UJRN/econrig_2017_4_11 [in Ukrainian].
11. Sinchuk, O. M., Sinchuk, I. O., Yalova, O. M. & Baulina, M. A. (2014). Spozhyvannya elektrychnoyi enerhiyi ta vplyv na tsey protses systemy chynnykiv formuvannya faktornoho prostoru v umovakh zalizorudnykh pidpryyemstv [Electricity Consumption and Influence on this Process of Factor Space Formation Factors in Iron-Ore Enterprises]. Zbirnyk naukovykh prats Kirovohradskoho natsionalnoho tekhnichnoho universytetu. Tekhnika v silskohospodarskomu vyrobnytstvi, haluzeve mashynobuduvannya, avtomatyzatsiya - Proceedings of the Kirovograd National Technical University - Engineering in Agricultural Production, Industry Engineering, Automation, 27, 339-349. Retrieved from - http://nbuv.gov.ua/UJRN/znpkntu_2014_27_52 [in Ukrainian].
12. Spivak, S. M. & Kravchuk, N.V. (2015). Udoskonalennya modeli upravlinnya vytratamy meblevykh pidpryyemstv [Improving the Cost Model of Furniture Enterprises]. Innovatsiyana ekonomika - Innovative Economics, vol 2, 57, 78-82 [in Ukrainian].
13. Cherep, A. V. (2005). Upravlinnya sobivartisty [Management of the Cost]. Kharkiv: VD «Inzhek» [in Ukrainian].
14. Shapiro, I. A. & Kovalchuk, K.F. (2009). Upravlinnya vytratamy yak faktor pidvyshchennya konkurentnozdatnosti metalurhiynoho pidpryyemstva [Management costs as a factor in increasing the competitiveness of metallurgical enterprises]. Naukovi pratsi Kirovohradskoho natsionalnoho tekhnichnoho universytetu. Ekonomichni nauky - Scientific papers of Kirovograd National Technical University. Economic sciences, 15, 342-348. Retrieved from http://nbuv.gov.ua/UJRN/Npkntu_e_2009_15_55 [in Ukrainian].
15. Yudina, M. (2009). Strukturni elementy systemy upravlinnya sobivartisty produktsiyi [Structural elements of the system management cost of production]. Zbirnyk naukovykh prats Cherkaskoho derzhavnogo tekhnolohichnoho universytetu - Collection of scientific papers Cherkasy State Technological University, Vol 39, 1, 36-45. Retrieved from [http://nbuv.gov.ua/UJRN/Znpchdtu_2015_39\(1\)__7](http://nbuv.gov.ua/UJRN/Znpchdtu_2015_39(1)__7) [in Ukrainian].