

## Management accounting in state institutions of higher education as an element of the implementation mechanism of the sustainable development goals of Ukraine

Svitlana Svirko<sup>a\*</sup>, Larysa Hordiienko<sup>b</sup>, Tetiana Trosteniuk<sup>a</sup>, Uliana Andrusiv<sup>c</sup>, Svitlana Rudnychenko<sup>d</sup> and Anzhela Cherchata<sup>e</sup>

<sup>a</sup>Zhytomyr Polytechnic State University, Ukraine

<sup>b</sup>State Higher Educational Institution “Kyiv National Economic University named after Vadym Hetman”, Ukraine

<sup>c</sup>Ivano-Frankivsk National Technical University oil and gas, Ukraine

<sup>d</sup>Odessa State University of Internal Affairs Kherson Faculty, Ukraine

<sup>e</sup>Prydniprovsk State Academy of Civil Engineering and Architecture, Ukraine

### CHRONICLE

### ABSTRACT

#### Article history:

Received: November 28, 2020

Received in revised format:

January 30 2021

Accepted: March 29, 2021

Available online:

March 29, 2021

#### Keywords:

*Sustainable development  
State institutions of higher  
education*

*Management accounting*

*Budget planning*

*Cost accounting*

*Responsibility centers*

*Costing*

*Control cluster of management  
accounting*

*Analytical cluster of management  
accounting*

The aim of the article is to study the theoretical foundations and develop methodological, methodological and organizational approaches to management accounting in state institutions of higher education in Ukraine in the conditions of sustainable development goals implementation. Authors in the article suggest the distribution of activities, as well as the types of productive products of mentioned entities within them. A new concept of the planned cluster of management accounting in state institutions of higher education has been suggested for the development of budget planning. In the context of accounting cluster formation the model of coding of analytical accounts on the expenses accounts is offered, and also correlation of the last and codes of economic classification of expenses, a managerial reporting package is recommended for application. Within the control and analytical management accounting clusters of state institutions of higher education the adaptation of the general procedure of responsibility centers assessment is motivated, the composition of performance indicators is specified and the updated nomenclature of performance indicators is formed. In order to monitor the level of introduction of management accounting in the practice of state institutions of higher education, a model is formed, which is based on the calculation of an integrated indicator of the level of implementation of the latter; approbation of the developed model on the example of state institutions of higher education in Zhytomyr allowed to determine the leader who showed high results, leading the list of the latter.

© 2021 by the authors; licensee Growing Science, Canada

## 1. Introduction

Conditions for further development of modern society on the basis of sustainable development require significant emphasis on higher education, as the success of achieving the goals of the latter direction depends on the results of this area. As far back as 1992, the well-known United Nations International Plan of Action for Sustainable Development “Agenda 21”, adopted at the International Conference on Environment and Development in Rio de Janeiro, included education as part of its implementation, enshrining, among other things, the following vision of education (item 36.3, ch. 36): “Education is crucial in promoting sustainable development and empowering countries to address environmental and development issues. Both formal and non-formal education are indispensable factors in changing

\* Corresponding author.

E-mail address: [svirkosvitlana@ukr.net](mailto:svirkosvitlana@ukr.net) (S. Svirko)

people's attitudes in order to enable them to assess and address the challenges they face in the field of sustainable development" (Report of the United Nations Conference on Environment and Development: United Nations Resolutions Adopted by the Conference in Rio de Janeiro. New York: United Nations, 1992; Sustainable Development Goals and Ukraine). Almost 30 years have passed since then and most scientists, assessing the results achieved in gaining the sustainable development goals, emphasize their weakness and insignificance precisely because of the lack of attention to education in general and higher education in particular (Melnik, 2014). It should be noted that the impact of higher education on all components of the concept of sustainable development – economic, social and environmental – is the most significant. Thus, economically developed countries have already created all the conditions for transforming their economic model: according to the World Bank, as part of the US national wealth, for example, fixed assets are 19%, natural resources – 5%, human capital – 76% (Zelinska et al., 2020). Current trends and the state of economic development are characterized by a significant impact of the determinant of higher education, because, according to experts, from 70 to 90% of GDP is determined by scientific and technological progress and innovation economy, and in the most developed economies on average 60% of national income growth is determined by growth of knowledge and education of society, which are transformed into a real product of social production (Andrusiv et al., 2020). The decisive influence of higher education on the social and environmental components of the sustainable development concept is manifested in providing opportunities: each interested person to receive detailed scientifically sound information on both ecology and sociology, both within the training of relevant specialists in these fields of knowledge and for the purpose of simple popularization of this knowledge; creation in the latter of a reasoned set of philosophical approaches and values of society and sustainable development, skills and motivation of human behavior of sustainable development; acquisition of general knowledge in the field of physical and biological, socio-economic and spiritual and communication spheres in the context of the development of the latter in order to create a conscious responsibility of each person as a member of society. Obviously, the formation of an effective system of higher education becomes an integral condition for successful integration of Ukraine not only into the educational and economic world space, but also involvement in the implementation of major human projects on the evolution of the biosphere to the noosphere.

## 2. Literature review

The issue of management accounting in the SIHE is covered in some way both by the prevalence of the actual management accounting of the production sphere, and the tendency of the world's higher education to manage on the basis of private property. Certain general questions about the role of management accounting in the transformation of the public sector based on theories of Economics, Organization, Non-institutional Sociology, Critical Theory and the Theory of New Public Management (NPM) highlighted in his work (Brankovic, 2018). Scientists, Geuna et al. (2015) studied the impact of management accounting on public administration in the context of the implementation of the theory of new public management and emphasized the significant potential of management accounting in the formation of information and analytical support for final management decisions. Italian researchers, Golubchikova & Pidgorny (2017) suggested approaches to strategic management accounting in the context of expanding the autonomy of universities in the Organization for Economic Co-operation and Development (OECD), focusing on two aspects: resource allocation and new academic program. Some issues of accounting and reporting on cash flows from the educational services provision were once considered by Italian scientists, Mateos-González & Boliver (2019). Scientists, Wiener et al. (2019) presented a solution to the problem of building a value chain within the strategic management accounting of higher education institutions in the context of increasing competition, globalization and limited financial resources in this area. Researchers (de Jorge et al, 2019) claim that the effectiveness of the university depends on the intellectual potential of employees. Abramo et al. (2008) says that the financing of higher education institutions should be carried out according to the rating positions of citations of scientific publications of employees. Barra et al. (2018) substantiate in their study that the ratings of higher education institutions should be formed according to uniform principles and sustainable indicators, as they will have a great influence on management decisions. Guccio et al. (2017) conducted a study of the activities of the higher education institutions in northern and southern Italy, and concluded that it is from the sound management decisions of the management of the higher education institutions depending on the activities outcome. Krutova et al. (2020) suggested a procedure for adapting the practice of management accounting within the accounting system of British universities. As a result of regression analysis, the authors formed a final model that includes only seven of the initial twenty-nine variables, with a focus on search strategy, innovation culture, usability, mimesis and regulatory institutional factors, and the type of university is defined as determinants of strengthening the practice of introducing management accounting in UK universities. If we analyze higher education institutions of Ukraine, Popadynets et al. (2020) suggested an express method for assessing the effectiveness of cooperation between universities and stakeholders, as from the needs and interests satisfaction of both counterparties and the higher education institutions itself depends the effectiveness of achieving the goals by higher education institutions. Kinash et al. (2019); Cherchata et al. (2020) and Kupalova et al. (2020) state that in modern conditions, universities are becoming integrators, participants, intermediaries, catalysts for communication and cooperation of educational and scientific structures with industry, cultural institutions and regional authorities. Andrusiv et al. (2020) in their work grounded that a reliable segment for the diffusion of innovation is science and education and cited the best practices of Ukrainian universities in the commercialization of innovative developments and technology transfer in domestic and foreign markets. Ievdokymov et al. (2020) consider social capital as a potential resource for successful interaction between higher education institutions and business entities. Mamontova & Novak (2015) in the process of elaboration of management accounting in SIHE identified the sequence of actions for the implementation of management accounting in higher education and the organization of the educational process in accordance with new decision-making methods, defined the functions of the main departments of higher education and their powers in new conditions of registration, described the strengths and implementation of

management accounting principles, compliance with which will increase the efficiency of the educational process, analyzed the information and analytical support of accounting in higher education and identified the advantages and disadvantages of the latter. Apart from the significant achievements of these scientists in the study of management accounting, the number of theoretical, methodological, methodical and organizational principles is still remains unresolved. As a result, it slows down the implementation of management accounting in the accounting practice of domestic higher education institutions.

*The aim of the article* is to study the theoretical foundations and develop methodological, methodical and organizational approaches to management accounting in state institutions of higher education in Ukraine in the process of sustainable development goals implementation.

### 3. Results

The current state of development of higher education is characterized by the presence of one of the most developed networks of higher education institutions on the continent, within which more than 1.5 million students are currently trained (Tables 1, 2).

**Table 1**

Network and number of students of higher education institutions in Ukraine

(at the beginning of academic year)

Period	Number of HEL, items		Number of students in HEL, thousands of people	
	I-II levels of accreditation	III-IV levels of accreditation	I-II levels of accreditation	III-IV levels of accreditation
1990/91	742	149	757,0	881,3
1991/92	754	156	739,2	876,2
1992/93	753	158	718,8	855,9
1993/94	754	159	680,7	829,2
1994/95	778	232	645,0	888,5
1995/96	782	255	617,7	922,8
1996/97	790	274	595,0	976,9
1997/98	660	280	526,4	1110,0
1998/99	653	298	503,7	1210,3
1999/00	658	313	503,7	1285,4
2000/01	664	315	528,0	1402,9
2001/02	665	318	561,3	1548,0
2002/03	667	330	582,9	1686,9
2003/04	670	339	592,9	1843,8
2004/05	619	347	548,5	2026,7
2005/06	606	345	505,3	2203,8
2006/07	570	350	468,0	2318,6
2007/08	553	351	441,3	2372,5
2008/09	528	353	399,3	2364,5
2009/10	511	350	354,2	2245,2
2010/11	505	349	361,5	2129,8
2011/12	501	345	356,8	1954,8
2012/13	489	334	345,2	1824,9
2013/14	478	325	329,0	1723,7
2014/15 <sup>1</sup>	387	277	251,3	1438,0
2015/16 <sup>1</sup>	371	288	230,1	1375,2
2016/17 <sup>1</sup>	370 <sup>2</sup>	287 <sup>3</sup>	217,3 <sup>2</sup>	1369,4 <sup>3</sup>
2017/18 <sup>1</sup>	372 <sup>2</sup>	289 <sup>3</sup>	208,6 <sup>2</sup>	1330,0 <sup>3</sup>

Source: built by the author on the basis (Statistical data on universities of Ukraine)

The traditional structure of the network of higher education institutions in Ukraine, which is currently characterized by a ratio of 80/20 public / communal and private ownership, against the background of reducing the share of expenditures on higher education (3.5% of GDP in 2009, 2.7% GDP in 2014, 2.3% of GDP in 2016) looks quite economically and financially unstable (Golubchikova & Pidgorny, 2017). Under these conditions, the question of forming in state institutions of higher education (hereinafter – SIHE) the subsystem of management accounting as an element of an effective working system of management of mentioned entities is an urgent need, and its solution is extremely important and necessary. The well-known European specialist in management accounting (Drury, 2016) identified four classic components of management accounting: budgeting, cost accounting, control and analysis. In the context of such components,

research is traditionally carried out on the development of the management accounting subsystem, and therefore we suggest to follow the established tradition.

**Table 2**

General contingent of higher education institutions in Ukraine

(at the beginning of academic year)

Period	Number of people who entered HEI, thousands of people		Number of people who graduated from HEI, thousands of people		Number of graduate students, persons <sup>4</sup>	Number of doctoral students, persons <sup>4</sup>
	I-II levels of accreditation	III-IV levels of accreditation	I-II levels of accreditation	III-IV levels of accreditation		
1990	241,0	174,5	228,7	136,9	13374	...
1991	237,5	173,7	223,0	137,0	13596	503
1992	212,6	170,4	199,8	144,1	13992	592
1993	198,9	170,0	198,0	153,5	14816	765
1994	194,0	198,0	204,3	149,0	15643	927
1995	188,8	206,8	191,2	147,9	17464	1105
1996	183,4	221,5	185,8	155,7	19227	1197
1997	166,2	264,7	162,2	186,7	20645	1233
1998	164,9	290,1	156,9	214,3	21766	1247
1999	170,1	300,4	156,0	240,3	22300	1187
2000	190,1	346,4	148,6	273,6	23295	1131
2001	201,2	387,1	147,5	312,8	24256	1106
2002	203,7	408,6	155,5	356,7	25288	1166
2003	202,5	432,5	162,8	416,6	27106	1220
2004	182,2	475,2	148,2	316,2	28412	1271
2005	169,2	503,0	142,7	372,4	29866	1315
2006	151,2	507,7	137,9	413,6	31293	1373
2007	142,5	491,2	134,3	468,4	32497	1418
2008	114,4	425,2	118,1	505,2	33344	1476
2009	93,4	370,5	114,8	527,3	34115	1463
2010	129,1	392,0	111,0	543,7	34653	1561
2011	105,1	314,5	96,7	529,8	34192	1631
2012	99,8	341,3	92,2	520,7	33640	1814
2013	93,9	348,0	91,2	485,1	31482	1831
2014 <sup>1</sup>	69,5	291,6	79,1	405,4	27622	1759
2015 <sup>1</sup>	63,2	259,9	73,4	374,0	28487	1821
2016 <sup>1</sup>	60,6 <sup>2</sup>	253,2 <sup>3</sup>	68,0 <sup>2</sup>	318,7 <sup>3</sup>	25963	1792
2017 <sup>1</sup>	59,1 <sup>2</sup>	264,4 <sup>3</sup>	61,2 <sup>2</sup>	359,9 <sup>3</sup>	24786	1646

<sup>1</sup>Data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and the temporarily occupied territories in Donetsk and Luhansk regions.

<sup>2</sup>From the 2016/17 academic year – colleges, technical schools, colleges.

<sup>3</sup>From the 2016/17 academic year – universities, academies, institutes.

<sup>4</sup>At the end of 1990, 1991, ..., 2017.

Source: built by the author on the basis (Statistical data on universities of Ukraine)

The peculiarity of the process of SEHI management in Ukraine is its two-level distribution, the first level is determined by the requests of external management represented by the Ministry of Education and Science of Ukraine and the second level is represented by information needs of administrative staff directly at the SIHE level. Both the first and the second level of management require detailed information in terms of activities. Today in Ukraine there is no such systematic list; to overcome this problem, we have suggested the following division into the activities of SIHE and the corresponding types of products (Trosteniuk, 2020): the main functional, which is suggested to be understood as their activities in education and science in accordance with their functional purpose (types of products of activity – educational pedagogical services; scientific works); additional infrastructural is related to the organization of the main functional activity and infrastructural support of the latter (types of products of activity – services of organizational nature; services and works of infrastructural nature). The suggested distribution serves as a basis for information detailing all components of management accounting in state higher education institutions. Identification of the place and role of budgeting in the modern mechanism of management of state institutions of higher education obviously requires taking into account the peculiarities of the functioning of the budget sphere in general and these entities in particular (Svirko & Trosteniuk, 2019). This is a mechanism of budget planning, which, in fact, is vital for the

implementation of the mechanism of external management by the Ministry of Education and Science of Ukraine, because it is enshrined in the budget legislation of Ukraine. At the same time, the formation of the actual positions of the budgeting mechanism requires the identification of the main elemental component of management accounting, i.e. responsibility centers. Consideration of the content of such an important element of the subsystem of management accounting of business entities, which are the centers of responsibility in the context of SIHE, allows to formulate the concept of “centers of responsibility”, which are structural units of the institution (faculties and institutes, research departments, logistics departments, sales, marketing, accounting, planning department, etc.), which are under the guidance of middle managers, who are personally responsible for the results of their work. According to the theoretical and practical achievements of the global subsystem of management accounting, the following types of responsibility centers can be distinguished:

1) by functions performed by responsibility centers: basic (participate in the provision of services, performance of works and production of the product, their implementation, provision, management of these processes directly); auxiliary (provide services, perform work, manufacture products not for external consumers, but for the main centers of responsibility);

2) by the scope of authority and responsibility: cost centers, income centers, centers of financial results, centers of financial responsibility. Since the main financial and regulatory document governing the activities of the SIHE is an estimate, the logical conclusion is that the set of indicators of individual budgets of different functional direction for different responsibility centers in monetary terms by income and expenditure should correspond to the general indicators of income and expenses of SIHE estimate. Obviously, a detailed justification of each indicator of budgets by responsibility centers will increase the reliability of budget planning data, and thus help increase the efficiency of financial management of SIHE in general. Taking into account the above, on the basis of existing approaches to functional budgets budgeting, as well as the current classification of products of state institutions of higher education, it is suggested to apply a set of functional budgets of revenues and expenditures in terms of types of activities of SIHE by the products of the latter, the typical cost of the product of the activity and the budget of management costs. The formed budgets will provide formation of planned indicators on the functions performed by SIHE, and internal structure of processes of vital activity of mentioned entities, which: firstly, are the basis of control and analytical procedure within the management accounting, and secondly – the basis of financial planning of the activities of SIHE. Turning to the second component of management accounting – cost accounting and costing – we note that despite the fact that to questions of the development of procedure of cost accounting and costing of budgetary institutions services in general over the past 20 years 12 out of 25 domestic dissertations in the relevant specialization were devoted, so far within the line ministries, including the Ministry of Education and Science of Ukraine, there is no general methodology for cost accounting and costing of services by mentioned entities. This situation is explained by the fact that the issues of theoretical substantiation of accounting methods have not been widely covered in both scientific and practical, as well as educational and methodological literature. This, in turn, does not allow to form a comprehensive scientific motivation, and hence the theoretical foundation of industry accounting methods in this area of accounting. Thus, the task of theoretical substantiation of cost accounting and costing of the main functional products of the SIHE is a priority for the development of management accounting of their activities.

Without going into excessive detail of the classification of costs (which, according to our proposal, is formed in terms of classical management functions (planning, organization, motivation and control) and components of management accounting (budget planning, accounting for responsibility centers, costing, control and analysis to identify deviations and decision-making)), we focus on the model of development of analytical accounting of costs by type of activity and products of activity.

To identify all types and subtypes of the product of the SIHE activity, it is suggested to introduce auxiliary coding of sub-accounts, which will schematically have the following form according to Table 3.

**Table 3**

**Coding scheme of sub-accounts for identification of subtypes of products of SIHE activity within the limits of analytical accounting**

№	The name of the subspecies of the product of activity	Additional sub-account code		
		1st digit	2nd digit	3th, 4th digits
1	Main functional activity: educational and pedagogical services – services № from 1 to 13	1	1	from 1 to 13
2	Main functional activity: scientific works – services № from 1 to 10	1	2	from 1 to 10
3	Auxiliary infrastructural activities: organizational services – services № from 1 to 16	2	1	from 1 to 16
4	Auxiliary infrastructural activities: services and works of infrastructural nature – services № from 1 to 52	2	2	from 1 to 52

Thus, the additional encoding of sub-accounts will be as follows:

- “main functional activity: educational and pedagogical services – services № from 1 to 13 (Table 1. 2.) – 1.1.Z ∈ [1,2,3... 13];
- “main functional activity: scientific works – services № from 1 to 10 (Table 1.2) – 1.2.Z ∈ [1,2,3... 10];
- “auxiliary infrastructural activities: organizational services – services № from 1 to 16 (Table 1. 2) – 2.1.Z ∈ [1,2,3... 16];
- “auxiliary infrastructural activities: services and works of infrastructural nature – services № from 1 to 16 (Table 1. 2) – 2.2.Z ∈ [1,2,3... 52];

The general mechanism for constructing code is as follows:

X.Y.Z

(1)

where,  $X \in [1, 2]$ ;  $Y \in [1, 2]$ ;  $Z \in [1, 2, 3 \dots 52]$ ;  $a, X, Y, Z \in \mathbb{N}^*$

Regarding the processing of the comparison of the composition of costs in the context of accounts 8011/8011 and the codes of economic classification of budget expenditures, the authors suggest a correspondingly formed scheme of their correlation (Svirko & Trosteniuk, 2019). The control and analytical component of management accounting, based on the planning and accounting, as an information basis, is a direct preparatory stage of management decisions by any business entity. An important role in the control cluster of management accounting is played by the assessment of the responsibility centers of the SIHE, which is to determine the effectiveness and efficiency of the relevant structural units of the entity; efficiency is determined by the ratio of output to the amount of resources used and is to achieve maximum results at minimum cost). The assessment of the responsibility centers of SIHE is carried out using a certain system of indicators that reflect the specifics of each of them. However, there are a number of universal indicators (Table 4).

**Table 4**  
A sample of general calculation indicators for assessing the activities of the responsibility centers of the SIHE

Indicator	Calculation formula	Economic interpretation
PI	$PI = \frac{P_a}{P_p} \times 100,$	where PI – plan implementation for this indicator, %; $P_a, P_p$ – respectively the actual and planned values of the indicator in the established dimension
$\Delta P$	$\Delta P = P_a - P_p$ $\Delta P = \sum_{i=1}^n \Delta PP_i$	where $\Delta P$ – the total absolute deviation of the actual value of the indicator from the planned; $n$ – the number of factors (reasons) that caused this deviation; $\Delta P_i$ – deviation due to the influence of the $i$ -th factor.
Pr	$P_r = \frac{P_a}{P_b} \times 100$	where Pr – the ratio of actual values of the indicator in the reporting and previous periods, %; $P_b$ – the value of a certain indicator in the previous (base) period in the established dimension.
Pali	$Pa_{li} = \frac{Pa_i}{Pa_{al}} \times 100$	where $Pa_{li}$ – the ratio of the actual value of the $i$ -th unit to its average level of the group of units, %; $Pa_i$ – a certain indicator for the reporting period of the $i$ -th division; $Pa_{al}$ – the average value of the group of units.
LCC	$LCC = 1 + \sum_{i=1}^n CI_i - \sum_{i=1}^n CR_i$ $C_i(CR_i) = (PI_i - 100)R_i$	where LCC – the value of labor contribution coefficient; $n$ – the number of indicators by which work is evaluated; $CI_i$ – increasing coefficient for the $i$ -th indicator; $CR_i$ – reduction coefficient for the $i$ -th indicator. where $PI_i$ – plan implementation for the $i$ -th indicator, %; $R_i$ – rate of increase (decrease) of the labor contribution coefficient for each percentage of overfulfillment (underfulfillment) of the plan on the $i$ -th indicator in shares of the unit.

An important area of evaluation of the activities of the SIHE, as the responsibility center of internal management accounting, is the evaluation of the implementation of target budget programs in terms of performance indicators, which are developed on the basis of standard lists of programs and performance indicators for each industry. The general structure of the analytical cluster of management accounting of SIHE under such conditions will take the following form (Fig. 1). The study of the current state of the introduction of elements of management accounting in the system of SIHE indicates a disappointing situation. Thus, the processed data from the survey within the framework of 6 SIHE of III-IV level of accreditation of Zhytomyr indicate that this process is at the initial stage. This approach will ensure maximum consideration of the peculiarities of the SIHE in the new conditions of their functioning as subjects of the economic complex of Ukraine, and the budget process and system, the requests of the administration and will form an effective analytical support for the management of SIHE. Based on the presented approaches to the structuring of the management accounting subsystem, the following integrated indicator of the level of introduction of management accounting in the SIHE is suggested:

$$L_{mai} = L_{pci} \times L_{acci} \times L_{cci} \times L_{anci} \tag{2}$$

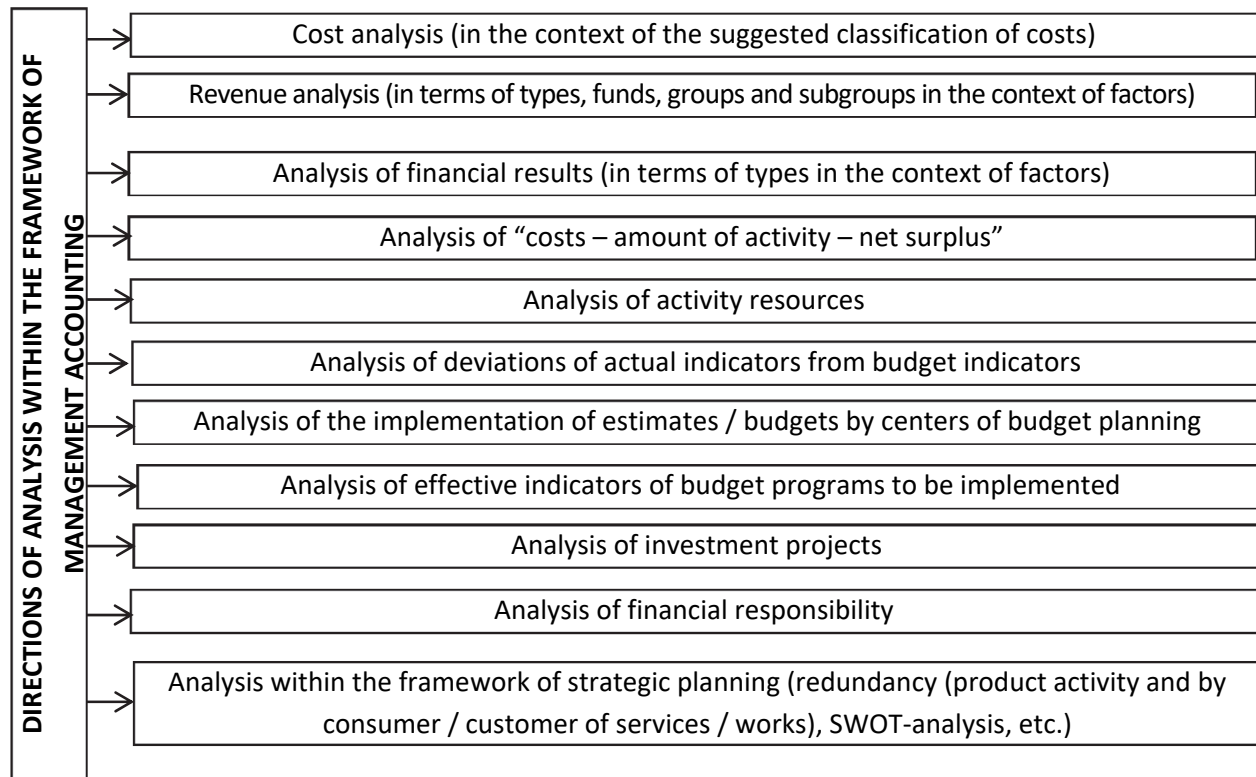
where, **Lmai** – an integrated indicator of the level of management accounting introduction in the activities of state institutions of higher education

**Lpci** – an indicator of the level of the planned cluster introduction of management accounting in the activities of state institutions of higher education

**Lacci** – an indicator of the level of the accounting cluster introduction of management accounting in the activities of state institutions of higher education

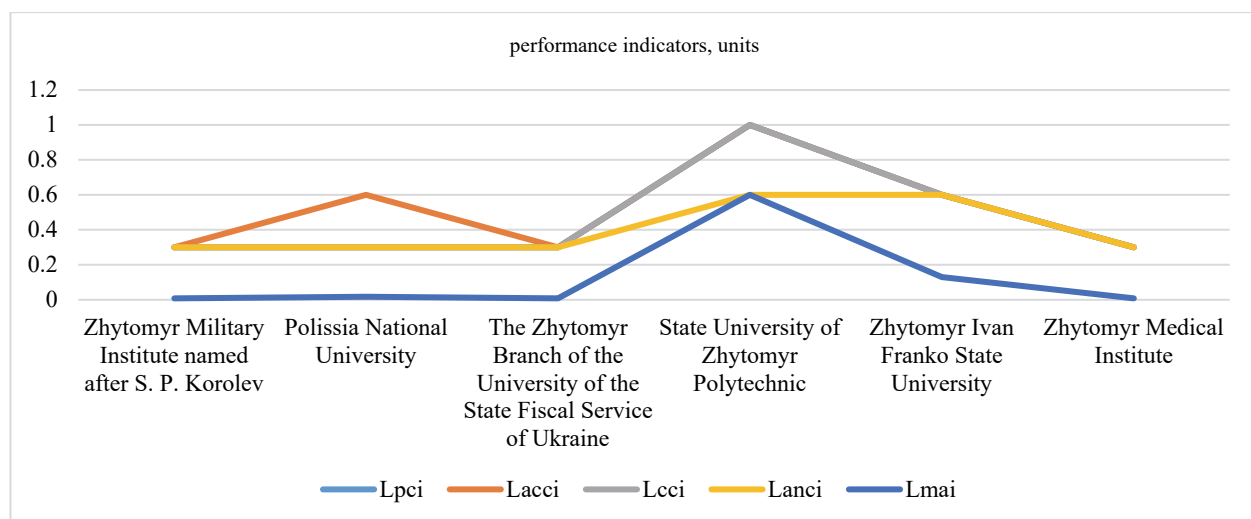
**Lcci** – an indicator of the level of the control cluster introduction of management accounting in the activities of state institutions of higher education

**Panci** –an indicator of the level of the analytical cluster introduction of management accounting in the activities of state institutions of higher education.



**Fig. 1.** Vector directions of analysis within the analytical cluster of management accounting of SIHE

Source: authors' own development



**Fig. 2.** The level of management accounting introduction in the activities of SIHE in Zhytomyr

In this case, the values of the above indicators can vary within the following digital limits (Table 5).

On the basis of the formed indicators on the basis of survey we will carry out an estimation of level of introduction of the management accounting in activity of SIHE (Fig. 2).

**Table 5**

The value of indicators of the level of management accounting introduction in the the activities of SIHE in the context of conditions

Indicator	Value	Conditions
<b>Lmai</b>	from 0,0081 to 0,0648	basic level of accounting for budget implementation
	from 0,1296 to 0,6	introduction of separate elements of budgeting
	1	formation of a complete mechanism of budget planning
<b>Lpci</b>	0,3	basic level of budget planning
	0,6	introduction of separate elements of budgeting
	1	formation of a complete mechanism of budget planning
<b>Lacci</b>	0,3	basic level of cost and expense accounting
	0,6	introduction of separate elements of accounting by responsibility centers (for example, costs centers) and costing
	1	formation of a complete mechanism for cost accounting by responsibility centers
<b>Lcci</b>	0,3	basic level of control over the budget implementation
	0,6	introduction of separate elements of the control cluster of management accounting
	1	formation of a complete mechanism of the control cluster of management accounting
<b>Lanci</b>	0,3	basic level of analysis for the implementation of the estimate
	0,6	introduction of separate elements of the analytical cluster of management accounting
	1	formation of a complete mechanism of the analytical cluster of management accounting

Source: formed by the authors on the basis of their own calculations

The accuracy of the suggested method of calculating the level of management accounting introduction in the activities of the SIHE is confirmed by the overall assessment and results of the above state institutions of higher education; thus, it is the Zhytomyr Polytechnic State University, which has the highest level of integrated indicator of management accounting in the institution, occupies the highest positions among other SIHE in Zhytomyr both in the consolidated rating of the Ministry of Education and Science of Ukraine (59) and in the TOP-200 (35) for 2020 (Rating of higher educational institutions of Zhytomyr, 2020); however, the significant achievements of the Zhytomyr Polytechnic State University in both educational and scientific, and the management process are confirmed by significant reporting indicators of a cost nature (Quality Management System of Zhytomyr Polytechnic State University, 2020).

#### 4. Conclusions

The analysis of the activity of domestic SIHE indicates a rather disappointing reality, delays in the solution of which can lead to the destruction of higher education in Ukraine, and thus to the creation of insurmountable obstacles to achieving the sustainable development goals. To overcome the crisis of higher education, several strategic vectors of modernization of the higher education system have been identified, i.e. the general mechanism of management of higher education institutions; system of financing of higher education institutions; quality assessment of higher education and educational measurements. Detailed elaboration of these vectors in the context of accounting has identified points of contact that unite the field of management accounting. The problem of formation of the basic provisions and introduction of the management accounting in SIHE is investigated. For the successful implementation of the specified task the characteristic of a product of activity of SIHE in a part is processed: its distribution on the basic functional and auxiliary infrastructural; development of the conceptual apparatus within which the application of such updated definitions of the educational and pedagogical service of the SIHE, the scientific work of the SIHE are suggested; classification of types of products of SIHE activity in the context of actual types of activity: basic functional (educational and pedagogical services, scientific works); auxiliary infrastructural (services of an organizational nature, services and works of an infrastructural nature), with further detailing by types of product of activity. In the context of formation of the planned cluster of management accounting in state institutions of higher education the following positions of budget planning are formed: the need for its identification is motivated and the definition of the last component of management accounting is given; it is suggested to apply a set of functional budgets of revenues and expenditures in terms of types of activities of the SIHE for the products of the latter, the standard cost of the product of the activity and the budget of managerial costs, the budget of operating costs by elements.

The recommended classification of SIHE costs for the management accounting subsystem in the context of the allocation of the following areas of information requests: 1) the level of management; 2) management functions; 3) components of management accounting. Organizational and methodological principles for reflecting the costs of manufacturing the main products of the SIHE were developed by: detailing the content of the standard nomenclature of cost elements within the management accounting subsystem; construction of the algorithm of analytical structure of sub accounts within accounts 801 "Expenditures of budget managers for budget programs" and 811 "Expenditures of fund managers for production (provision of services, performance of works)" on the basis of introduction of additional



coding providing four-digit algorithmic digital code and formation correspondence of accounts to reflect the costs of the main functional activities, as well as tables of comparison of sub-accounts 801/811 and updated CEEC. Theoretical and methodological principles of the control segment of management accounting in the SIHE were developed by: adaptation of the system of general coefficient indicators for monitoring the activities of the responsibility centers of the SIHE within the management control; motivation to clarify the composition of the performance indicators of the budget program at the micro-level of specific SIHE.

The monitoring of the introduction of management accounting in the SIHE was carried out on the basis of the formed model of determining the degree of the introduction of management accounting in the activity of the indicated business entities. The obtained results prove the direct dependence of the introduction of management accounting and high indicators of development of domestic SIHE. The final formation and full-fledged actual implementation of the management accounting mechanism in the SIHE will help increase the efficiency of their activities, and thus accelerate the process of achieving the sustainable development goals by Ukraine.

## References

- Abramo, G., D'Angelo, C. A., & Pugini, F. (2008). The measurement of italian universities' research productivity by a non parametric-bibliometric methodology. *Scientometrics*, 76(2), 225-244. doi:10.1007/s11192-007-1942-2
- Andrusiv, U., Kinash, I., Cherchata, A., Polyanska, A., Dzoba, O., Tarasova, T & Lysak, H. (2020). Experience and prospects of innovation development venture capital financing. *Management Science Letters*, 10(4), 781-788. doi: [10.5267/j.msl.2019.10.019](https://doi.org/10.5267/j.msl.2019.10.019)
- Andrusiv, U., Simkiv, L., Dovgal, O., Demchuk, N., Potryvaieva, N., Cherchata, A., Popadynets, I., Tkachenko, G., Serhieieva, O & Sydor, H. (2020). Analysis of economic development of Ukraine regions based on taxonomy method. *Management Science Letters*, 10(3), 515-522. doi: [10.5267/j.msl.2019.9.029](https://doi.org/10.5267/j.msl.2019.9.029)
- Barra, C., Lagravinese, R., & Zotti, R. (2018). Does econometric methodology matter to rank universities? an analysis of italian higher education system. *Socio-Economic Planning Sciences*, 62, 104-120. doi:10.1016/j.seps.2017.09.002
- Brankovic, J. (2018). The status games they play: Unpacking the dynamics of organisational status competition in higher education. *Higher Education*, 75(4), 695-709. doi:10.1007/s10734-017-0169-2
- Cherchata, A., Popovychenko, I., Andrusiv, U., Simkiv, L., Kliukha, O & Horai, O. (2020). A methodology for analysis and assessment of business processes of Ukrainian enterprises. *Management Science Letters*, 10(3), 631-640. doi: [10.5267/j.msl.2019.9.016](https://doi.org/10.5267/j.msl.2019.9.016)
- de Jorge Moreno, J., González Robles, A., Martínez, A., Minero Calvo, R., & Miron, A. G. (2019). Assessing efficiency in the spanish public universities through comparative non-radial and radial data envelopment analysis. *Tertiary Education and Management*, 25(3), 195-210. doi:10.1007/s11233-018-09017-6
- Drury, K. (2016). Cost and management accounting: an introduction (5th edition). Unity-Dana, Moscow, p. 735 M 2015 2 2 9.
- Geuna, A., Piolatto, M., & Labini, M. S. (2015). University funding and research assessment: An analysis of italian and british cases. *The university and the economy: Pathways to growth and economic development* (pp. 102-138). doi:10.4337/9781782549499.00013
- Golubchikova, Yu.V. & Pidgorny, A.Z. (2017) Statistical analysis of the dynamics and state of development of Ukrainian universities. *Statistics – an instrument of socio-economic research: a collection of scientific student works*, 3 (1), 7-14.
- Guccio, C., Martorana, M. F., & Mazza, I. (2017). The efficiency change of italian public universities in the new millennium: A non-parametric analysis. *Tertiary Education and Management*, 23(3), 222-236. doi:10.1080/13583883.2017.1329451
- Ievdokymov, V., Lehenchuk, S., Zakharov, D., Andrusiv, U., Usatenko, O & Kovalenko, L. (2020). Social capital measurement based on “The value explorer” method. *Management Science Letters*, 10(6), 1161-1168. doi: [10.5267/j.msl.2019.12.002](https://doi.org/10.5267/j.msl.2019.12.002)
- Kinash, I., Andrusiv, U., Golovnia, O & Popadynets, I. (2019). Aspects of the formation and development of innovation infrastructure in Ukraine. *Management Science Letters*, 9(13), 2403-2414. doi: [10.5267/j.msl.2019.7.015](https://doi.org/10.5267/j.msl.2019.7.015)
- Krutova, A., Tarasova, T., Nesterenko, O.; Blyzniuk, O. & Nosach, N. (2020) Strategic management accounting as an information basis of effective management of enterprise activities, *Academy of Accounting and Financial Studies Journal*, 2(24), 1-8.
- Kupalova, H., Bazylevych, V., Ignatyuk, A., Artyukh, T., Goncharenko, N., Andrusiv, U., & Tapenova, G. (2020). Collaboration of Higher Education Institutions and Business as a Tool Quality Training and Protection of Specialists, *International Journal of Management*, 11(6), 1590-1602.
- Mamontova, N.A., & Novak, A.F. (2015). Management accounting of higher education institutions: implementation stages and realization features. *Economics, Entrepreneurship, Management*, 2(2), 39-44.
- Mateos-González, J. L., & Boliver, V. (2019). Performance-based university funding and the drive towards ‘institutional meritocracy’ in italy. *British Journal of Sociology of Education*, 40(2), 145-158. doi:10.1080/01425692.2018.1497947
- Melnik, T. (2014). The role of education in the formation of the concept of sustainable development of society. *Scientific notes of the Oryol State University*, 4 (60), URL: <https://cyberleninka.ru/article/n/rol-obrazovaniya-v-stanovlenii-kontseptsii-ustoychivogo-razvitiya-obschestva> [in Russian]
- Popadynets, I., Andrusiv, U., Shtohryn, M. & Galtsova, O. (2020). The effect of cooperation between universities and stakeholders: Evidence from Ukraine. *International Journal of Data and Network Science*, 4(2). doi: [10.5267/j.ijdns.2020.1.001](https://doi.org/10.5267/j.ijdns.2020.1.001)

Quality Management System of Zhytomyr Polytechnic State University. URL: <https://ztu.edu.ua/ua/common/suyau.php>.

Rating of higher educational institutions of Zhytomyr. URL: <https://osvita.ua/vnz/rating/45551/>.

Report of the United Nations Conference on Environment and Development: United Nations Resolutions Adopted by the Conference in Rio de Janeiro. New York: United Nations, 1992, [Official site United Nations]. URL: [http://www.un.org/ru/documents/decl\\_conv/conventions/agenda21.shtml](http://www.un.org/ru/documents/decl_conv/conventions/agenda21.shtml)

Statistical data on universities of Ukraine. URL: [http://www.ukrstat.gov.ua/operativ/operativ2005/osv\\_rik/osv\\_u/vuz\\_u.html](http://www.ukrstat.gov.ua/operativ/operativ2005/osv_rik/osv_u/vuz_u.html)

Sustainable Development Goals and Ukraine. URL: <https://www.kmu.gov.ua/diyalnist/cili-stalogo-rozvitku-ta-ukrayina>

Svirko, S.V. & Trosteniuk, T.M. (2019) Budgeting of activities of state institutions of higher education: place and preconditions of introduction. *Economic Space*, 146, 161-175

Trosteniuk, T.M. (2020) Management Accounting in State Higher Educational Institutions in Ukraine”. Thesis for a Degree of Doctor of Philosophy in Management and Administration in specialty 071 accounting and taxation. Zhytomyr Polytechnic State University. Zhytomyr, 184 p.

Wiener, M., Maresch, D., & Breitenecker, R. J. (2019). The shift towards entrepreneurial universities and the relevance of third-party funding of business and economics units in Austria: A research note. *Review of Managerial Science*, doi:10.1007/s11846-019-00359-y

Zelinska, H., Andrusiv, U., Simkiv, L. (2020). Knowledge economy: trends in the world and analysis of Ukraine. *Journal of Eastern European and Central Asian Research*, 7(1), 104-113.



© 2021 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).