# "Accounting support for sustainability reporting: theoretical foundations and bibliometric analysis"

AUTHORS	Hanna Filatova (D) Tetiana Vasylieva (D) R Nataliia Vynnychenko (D) Martina Ballova (D) R Milan Gedeon (D) R	
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Hanna Filatova, Ph.D., Assistant Professor, Department of Accounting and Taxation, Sumy State University, Ukraine. (Corresponding author)

Tetiana Vasylieva, Doctor of Economics, Professor, Director of Education and Research Institute of Business, Economics and Management, Sumy State University, Ukraine.

Nataliia Vynnychenko, Doctor of Economics, Associate Professor, Department of Accounting and Taxation, Sumy State University, Ukraine.

Martina Ballova, Assistant Professor, University of Economics in Bratislava, the Slovak Republic.

Milan Gedeon, Assistant Professor, University of Economics in Bratislava, the Slovak Republic.



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Hanna Filatova (Ukraine), Tetiana Vasylieva (Ukraine), Nataliia Vynnychenko (Ukraine), Martina Ballova (Slovak Republic), Milan Gedeon (Slovak Republic)

# ACCOUNTING SUPPORT FOR SUSTAINABILITY REPORTING: THEORETICAL FOUNDATIONS AND BIBLIOMETRIC ANALYSIS

#### **Abstract**

The purpose of this study is to substantiate the theoretical provisions on the accounting support for sustainability reporting and develop practical recommendations for improving the mechanisms for generating fragments of non-financial reporting based on accounting data. The study is conducted on the example of Ukraine. The paper provides a bibliometric analysis of scientific publications on the reporting in the field of sustainable development. Generalizing the results of the content-context block of the bibliometric analysis allowed identifying seven clusters. In the context of the study, the most relevant is the fourth cluster, which reflects the relationship between sustainability reporting and accounting. To create an effective mechanism for building sustainability reporting, a five-step sequence of actions based on accounting data was proposed, and tables were created to simplify the search for the necessary information to fill out fragments of a sustainability report and assess social and environmental security based on accounting data.

**Keywords** sustainability reporting, sustainable development,

accounting, accounting support, GRI, reporting

**JEL Classification** M41, M48, Q01

#### INTRODUCTION

According to the Global Reporting Initiative (GRI), sustainability reporting, also referred to as non-financial or social reporting, corporate social responsibility (CSR) reporting, means the practice of measuring, disclosing information, reporting to external and internal stakeholders about the performance of an organization in accordance with the sustainable development goals (SDGs). That is, sustainability reporting is a document that contains information about a company's social, environmental and economic activities. Environmental aspects refer to the impact of business on biotic and abiotic natural systems, including ecosystems, land, air and water. Social responsibility is expressed in the provision of social benefits to employees and the improvement of environmental living conditions, as well as economic responsibility – the economic conditions of a company's stakeholders and the economic system at the local, national and global levels.

The sustainability reporting process is based on generally accepted and specific principles, which partially differ from the financial reporting principles defined by national accounting regulations (standards). However, sustainability reporting is derived from financial reporting and accounting data. Therefore, the more effective accounting is, the more informative the sustainability reporting will be, and the

more opportunities a company can have (for example, to gain access to investments, since it is known that most investors, funds and banks are increasingly paying attention to social responsibility and business continuity when making investment decisions).

In addition, enterprises can conduct an internal sustainability analysis of their activities, which will allow them to identify opportunities to reduce costs and improve efficiency by reducing negative impacts on natural resources and the social sphere. Therefore, it is also important to form an algorithm for enterprises to act on fragments of a sustainability report based on accounting data.

#### 1. LITERATURE REVIEW

Sustainability reporting is a search for meaning and a tool for socially responsible companies:

- demonstrate a company's mission;
- show employees what company they work for, investors – what company they invest in, and partners – who they work with;
- establish a dialog with public organizations and local communities.

There are several reporting systems for generating sustainability reports, depending on whether an organization wants to focus on environmental or economic performance, social impact, etc. Three reporting schemes consistently rated highly by investors are the Carbon Disclosure Project, the Dow Jones Persistence Index and the Global Reporting Initiative. Moreover, the most common use was the use of GRI standards.

Ukrainian companies are also starting to look for meaning in reporting, moving from simply publishing indicators to conceptual issues. Nonfinancial reporting in Ukraine is at the stage of active development, especially in times of war, when most companies are trying to demonstrate their contribution to the preservation and/ or restoration of Ukraine. International research by the Association of Chartered Certified Public Accountants shows that more than 3,000 companies worldwide currently publish annual reports on sustainability and corporate responsibility, including more than two-thirds of the companies included in the Fortune Global 500 list of the world's 500 largest companies. They include enterprises from around the world, from all sectors and branches of the economy.

According to the KPMG Sustainability Reporting Study published in 2022, which analyzed the disclosure practices of the world's 250 largest companies by revenue (G250), as well as a larger pool of the top 100 companies in each of 8 countries (N100) (GRI, 2022):

- 78% of G250 countries now apply GRI reporting standards (compared to 73% in 2020);
- 68% of the 5,800 N100 companies use the GRI (compared to 67% in 2020, when the N100 sample size was smaller);
- 96% of the G250 (unchanged from 2020) and 79% of the N100 (77% in 2020) reported sustainability or ESG;
- carbon reduction is widely reported (80% G250 and 71% N100), but less than half (46% G250, 40% N100) report biodiversity;
- GRI provides harmonized reporting standards used by the majority of surveyed companies in all regions (75% in the Americas, 68% in Asia Pacific and Europe, and 62% in the Middle East and Africa).

The quality of reporting of different companies is not the same, but at the same time, each organization should strive to prepare an understandable and reliable report. On the other hand, in Ukraine, only 10% of the 100 largest companies publish non-financial reports. According to the Global Reporting Initiative (GRI) study 2021, 22 sustainable development reports that meet GRI standards were published in Ukraine.

Despite the importance and crucial role of accounting in sustainability reporting, and although this issue is largely ignored in the scientific liter-

ature, there are interesting studies. In particular, Vasilchuk (2015), Nesterenko (2018), Sokil (2018), Pasko et al. (2021), Makarenko et al. (2021), Maama & Gani (2022), and Pasko et al. (2022) singled out the internal and external advantages of implementing, compiling and publishing sustainability reporting based on accounting data. Moskaluk (2014), Deineko et al. (2021) notes that after choosing the European direction of development, Ukraine and Ukrainian companies should consider the following areas as priority areas of activity: respect for human rights, guarantee of safe working conditions and opportunities for continuous development and self-improvement. Lodhia and Hess (2014) investigate sustainability accounting and reporting by analyzing the literature in the Journal of Cleaner Production from 2004 to 2013. Note that this article is of an applied nature.

Among the researchers who analyze the accounting support for reporting on sustainable development in Ukraine, the works of Baryshnikova (2016; 2016a) are a thorough study. The author has published a number of works related to the development and improvement of theoretical and organizational and methodological provisions for the formation, accounting support and verification of sustainability reporting.

Makarenko (2016) investigated the issues of drafting the Management Report and comparing Ukrainian requirements with the draft international standard, providing her own recommendations on report structuring and characterizing the trends in the spread of non-financial reporting. Cavagnetto et al. (2022) reviewed the importance of transparency in non-financial reporting, as well as key perspectives and challenges in reporting for an IFD. Some scientists, such as Maas et al. (2016), link disclosures in non-financial reports to audit, internal control, and accounting management. The work of Tommasetti et al. (2020) is a significant contribution to the development of theoretical and methodological provisions for the formation and accounting support for sustainability reporting of enterprises.

It is worth noting that the works of Hahn and Kühnen (2013) and Gray (2010) are significant scientific developments. The works of these scientists are the basis for developing the scientific component of the accounting system in the con-

text of preparing sustainability reports. Certain problematic issues that have remained partially or completely out of their attention need to be resolved in order to form a comprehensive approach to the formation and accounting of sustainability reporting.

Considering the economic activity of enterprises through the prism of sustainable development affects the organization and methods of accounting. The reliability of the compiled and submitted reporting is a guarantee of the successful activity of economic entities, which requires improved accounting support, which is the basis for the formation of reporting indicators in the field of sustainable development.

In accordance with Article 2 of Directive 2014/95/EU, to help interested companies to disclose non-financial information in an appropriate, useful, consistent and more comparable manner, the Guidelines for Non-Financial Reporting (Methodology for Reporting Non-Financial Information) 2017/C215/01 have been developed. These guidelines are designed to help companies disclose transparent, relevant, useful, consistent and more comparable non-financial (environmental, social and governance) information in a way that promotes sustainable growth and employment.

Ukraine, in turn, as a country supporting cooperation with the EU, and as of June 23, 2022 an EU candidate, is closely following the development of normative regulation and reporting practices in the field of sustainable development, which has already led to the introduction in Ukraine of the first forms of mandatory non-financial reporting, Management Report. Among the reporting standards in Ukraine, the Global Reporting Initiative standards are popular. Presentation of activity results in accordance with the requirements of the international reporting standard in the field of sustainable development GRI characterizes the responsibility, development level and capabilities of an enterprise in the overall economic system both at the national and international levels.

The GRI system of protocols consists of three performance groups, such as economic (protocols that define direct impact (consumers, suppliers, personnel, sources of capital, state and public sector) and indirect impact), environmental (protocols in terms of raw materials, energy, water, biodiversity, emissions, discharges, waste, suppliers, products and services, regulatory compliance, transport), and social (protocols that define approaches to labor organization, human rights, society, responsibility for products).

In accordance with international reporting standards, the key accounting principles for sustainability reporting are:

- Integrated approach. Accounting support for sustainability reporting should be integrated with financial reporting to reflect the impact of an enterprise's activities on the environment and society.
- 2. Stakeholder approach. Accounting support should reflect the needs and expectations of various stakeholders (consumers, shareholders, employees, and others).
- Periodicity. Reports should be published regularly to ensure continuous monitoring and identification of trends in an enterprise's activities.
- 4. Integrity and reliability. The information contained in the report must be complete and reliable.
- 5. Consideration of sustainability issues at the management level. Sustainability issues should be considered at the management level, and not just in the accounting departments.
- 6. Publicity. Reports should be public so that stakeholders can evaluate an enterprise's activities.
- Compliance with standards. Accounting support must comply with international standards.
- 8. Reporting transparency. Reporting transparency means that organizations and companies must publish reliable and accessible information about their sustainability activities. Reporting transparency is an important ele-

ment of corporate social responsibility, as it allows you to increase the level of trust in the company, reduce the risks of corruption and undue influence on decision-making from individuals, and improve management efficiency.

It should be noted that only a few scientific works contain scientific developments on improving the accounting system in order to develop a mechanism for generating reports on sustainable development for the effective implementation of companies' activities.

The purpose of the paper is to substantiate the theoretical provisions and develop practical recommendations for improving the mechanism for generating fragments of sustainability reporting based on accounting data.

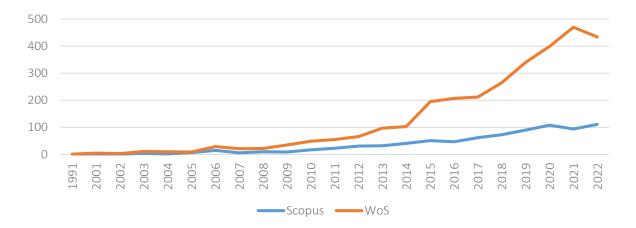
#### 2. METHODOLOGY

To substantiate the theoretical provisions regarding sustainability reporting, methods of theoretical generalization, analysis and synthesis are used; in the implementation of contextual, evolutionary and spatial clustering, a comparative analysis was used. The developed organizational and methodological provisions for the formation of accounting support for reporting on sustainable development are based on the use of methods of induction and deduction, grouping, and theoretical generalization. In addition, several special methods and tools were used, including built-in Scopus and WoS database tools. Meta-analysis was conducted using VOSviewer tools, built-in Scopus and Web of Science tools for the period 1991–2022.

The multifactor nature of research in bibliometric analysis is achieved by analyzing data from the two largest scientometric databases: Scopus and Web of Science. They represent academic achievement.

## 3. RESULTS AND DISCUSSION

Among more than half a million articles published worldwide on the subject of sustainability reporting (non-financial reporting), its accounting is discussed in less than 0.1% of cases. This trend is also characteristic of the number of citations.



**Figure 1.** Dynamics of published articles for 1991–2022 for the search query "sustainability reporting AND accounting", the number of articles

Dynamic analysis of reporting on sustainable development (see Figure 1) and its accounting support in the scientific literature for the period 1991–2022 indicates that, in general, the results of research in the context of this topic are increasing (a positive trend in the number of published articles and citations).

In particular, the largest number of works was recorded in 2021 (Scopus – 111 scientific articles, WoS – 470), which is 12 times more than in 2009 (Scopus – 9, WoS – 22). That is, there is an increase in academic interest.

Despite evidence that the accounting support for sustainability reporting is partially ignored in the scientific literature, the high potential of this subject area is confirmed by cluster analysis by subject area, according to which the Business, Management and Accounting cluster accounts for 4.1% of the total number (see Figure 2).

Comparison of subject areas in the study of accounting support for sustainability reporting shows the predominance of the fields of medicine and social sciences, and also confirms the interdisciplinary nature of research on sustainability reporting. Further analysis of the scientific landscape in the WoS system will be carried out to confirm the preliminary results obtained on the basis of data from the Scopus and WoS databases.

Based on the results of a bibliometric analysis of the relevant scientific publications indexed by the Scopus and WoS scientometric databases using the VOSviewer tools, a map of the relationship between the concept of "sustainability reporting" and other categories was formed, which made it possible to identify seven clusters marked (see Figure 3) in green, red, yellow, blue, purple, cyan and orange. At the same time, a larger diameter of the circle means a higher frequency of mention-

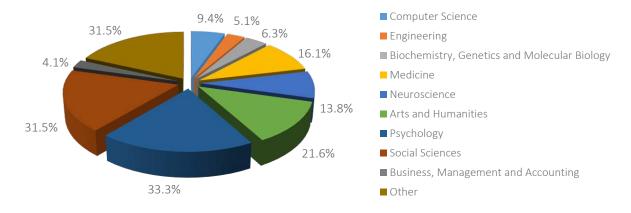


Figure 2. Structural analysis of the concept of "sustainability reporting" by subject area

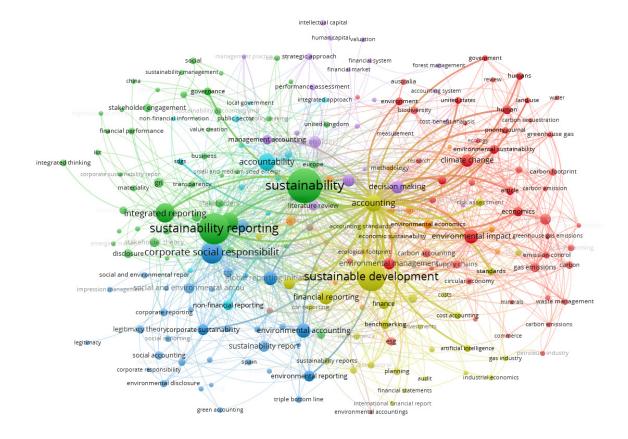


Figure 3. Defining the relationship between "sustainability reporting" and other concepts

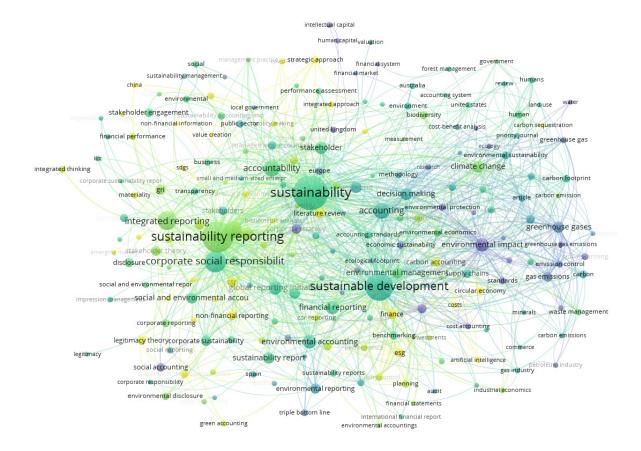
ing the corresponding concept of "sustainability reporting" as a keyword along with the concept in scientific articles indexed by the Scopus and WoS databases.

Summarizing the results of the content-contextual block of the bibliometric analysis showed

that the main clusters are focused on identifying the relationship between sustainable development and the SDGs. In the context of the study, the most relevant is the fourth cluster, which accurately reflects the relationship between sustainability reporting and accounting.

**Table 1.** Characterization of bibliographic clusters based on the analysis of interconnection identification using VOSviewer

Cluster characteristic	Significant characteristics and examples of top keywords	
Cluster 1 (red): 49 units of objects	Includes research on the environmental dimension of sustainability reporting. Examples of keywords: ecology, greenhouse effect, green investment, environment, etc.	
Cluster 2 (green): 45 units of objects	Includes research on SDG reporting. Examples of keywords: integrated reporting, management reporting, sustainability, SDGs, sustainability reporting, etc.	
Cluster 3 (blue): 34 units of objects	Includes research on corporate social reporting. Examples of keywords: CSR, corporate social responsibility, CSR reporting, social accounting, etc.	
Cluster 4 (yellow): 31 units of objects	Non-financial reporting as a tool for achieving sustainable development Accounting support for a sustainability report. Examples of keywords: sustainable development, accounting, accounting support, accounting standards, etc.	
Cluster 5 (purple): 23 units of objects	Monitoring sustainability reporting processes	
Cluster 6 (cyan): 13 units of objects Cluster 7 (orange): 3 units of objects	Sustainability reporting as part of a company's business strategy. Examples of keywords: business strategy, corporate strategy, reporting methodology, industrial development, etc.	



**Figure 4.** Visualization map of the context-time dimension of research on "sustainability reporting" published in the editions of the Scopus database

Based on the results of the analysis of the context-time block of studies (see Figure 4) on sustainability reporting, it was possible to identify five main stages during which the main emphasis in this area changed, in particular, in the period 2016–2018, scientists actively considered the relationship between the concepts of "sustainability reporting" and "accounting".

In general, the scientific literature related to accounting support for sustainability reporting is fragmented (in essence) and covers only certain aspects. Meta-analysis using VOSviewer, Google Scholar, built-in Scopus and Web of Science tools for the period 1991–2022 shows that this area of research is understudied.

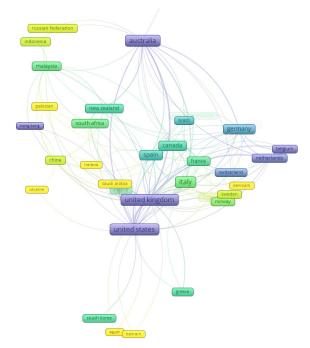
The leaders of scientific research on the topic of "Accounting support for sustainability reporting" by geographical dimension are the USA and the UK.

In continuation of the temporal context of the bibliometric analysis of research on the accounting support for sustainability reporting, it is also advisable to analyze its spatial component (Figure 5).

Thus, the spatial-temporal aspect of bibliometric analysis showed that the intensification of research on accounting support for sustainability reporting takes place in the countries of the world within successive time ranges, each of which has its own geographical centers. In general, a pattern can be noted: earlier studies up to 2016 – Great Britain, USA, the Netherlands, Belgium; 2016–2018 – Canada, New Zealand, Germany, Greece; 2018–2019 – France, Italy, Norway; 2019 – until now – Ukraine, Egypt, Pakistan.

Based on the analyzed scientific literature, as well as international standards, the following sequence of actions for sustainability reporting based on accounting data can be formulated:

1. Determining key indicators of sustainable development that should be reflected in the report, for example, the impact of a company's



**Figure 5.** Spatial component of the bibliometric analysis of the concepts "sustainability reporting" and "accounting"

activities on the environment, waste and resource management, social responsibility, investment in R&D, development of new technologies, etc.

- Assessing the impact of a company's activities on the specified key indicators of sustainable development. This can be done using accounting data and other sources of information, such as social responsibility reports, environmental impact reports, consumer surveys, etc.
- Determination of indicators reflecting the degree of achievement of a company's goals and objectives in the field of sustainable development.
- 4. Drawing up a sustainability report based on the data received. The report may contain information on a company's achievement of key sustainability indicators, a description of the impact of the company's activities on the environment and the social sphere, the risks and challenges associated with the company's activities in the field of sustainable development, as well as the company's development strategy in this direction.
- 5. Publishing the sustainability report and providing access to it for stakeholders such as

shareholders, consumers, investors, government bodies, public organizations, etc.

The algorithm is general and can be supplemented or modified depending on the specific needs and requirements of a company and its stakeholders. However, when drawing up a sustainability report, it is important to create a mechanism for building reports on sustainable development based on accounting data. Therefore, as part of this, tables were created that allow you to simplify the work of finding the necessary information to fill in the fragments of a sustainability report, assess the state of social and environmental security and all risks that may arise on the basis of accounting data.

In general, the accounting support for sustainability reporting includes a system of accounting, control and reporting on economic, social and environmental indicators of an enterprise's activity in order to ensure its sustainable development.

The accounting system should include the following components:

• cost accounting for the implementation of sustainable development measures;

**Table 2.** Accounting support to generate a fragment of sustainability reporting: the social component

Sustainability reporting component	Reporting mechanism	Information support (Accounting support)
Social component	Information is provided on social assets (labeled finished products; raw materials and materials by sources of origin that affect society)	Data of analytical accounts to account 26 «Finished products»
	Provides information on social obligations to the state (payment of taxes, fines for violation of the law); to clients (suppliers, buyers); to employees (payment of wages, creation of new jobs, training and advanced training, etc.)	Data of analytical accounts to accounts 63 "Settlements with suppliers and contractors", 64 "Settlements on taxes and payments", 36 "Settlements with domestic buyers", 66 "Settlements with payments to employees", 94 "Other expenses of operating activities", 97 «Other expenses»
	Information on social costs is provided (costs related to the implementation of social measures for sustainable development)	Data is generated according to accounts 94 «Other costs of operational activities», 97 «Other costs»
	Information is provided on social income (income in the form of interest from the provision of loans and other forms of financing to employees; income from the disposal of labeled finished products)	Social income in accounting is not separated, but is determined by the total income of activities for their respective types, taking into account the types of activities of an enterprise

- monitoring and analysis of social and environmental performance indicators of an enterprise;
- accounting of resource use and energy conservation;
- accounting for costs and income from activities related to sustainable development.
- The control system should include:
- monitoring and analysis of the state of the social and ecological environment;
- monitoring and control over the implementation of plans regarding measures to ensure sustainable development;
- monitoring and analysis of resource utilization efficiency.
- The reporting system should include:
- reports on the implementation of sustainable development activities;
- reports on social and environmental performance indicators of an enterprise;
- financial reports on expenses and income from activities related to sustainable development.

Accounting for sustainability reporting allows enterprises to fulfill their social and environmental obligations to society and the state, as well as to improve their efficiency and competitiveness in the market.

The objects of accounting of the social activity of an enterprise, information about which can be depicted in sustainability reporting may include the following:

- CSR spending, including charity, philanthropy, sponsorship and other community support programs;
- measures to protect the environment, such as programs to reduce greenhouse gas emissions, energy efficiency measures, programs to restore natural resources, etc.;
- expenses for improving the quality of life of employees, such as programs for health care, social insurance, etc.;
- community development programs, such as projects for the development of education, culture and art, support for small and medium-sized businesses, etc.;
- the costs of improving ethics and respect for human rights in the activities of an enterprise; sustainability reporting usually reflects not only the costs of these facilities, but also their

**Table 3.** Accounting support to generate a fragment of sustainability reporting: the environmental component

Source: Developed based on Baryshnikova (2016).

Sustainability reporting component	Reporting mechanism	Information support (Accounting support)
Environmental component	Provides information on the generation of waste as a result of normal activities and emergencies for individual business processes, their types in accordance with the classification, with the simultaneous indication of overtime volumes	Data of analytical accounts to account 26 "Finished products" in terms of related products, 209 "Other materials" – waste subject to regeneration, 206 "Materials transferred for processing" – waste that was transferred for processing, 201 "Raw materials" – waste that is credited as raw materials and will be used in production; 07 "Decommissioned assets" – irretrievable waste
	Information is provided in the relevant areas: processing and its results – secondary resources are formed; recycling by types of non-returnable waste; storage of related waste; waste disposal by types of landfills	Data are formed on the basis of accounting data for waste management operations (recycling on its own and using the services of third parties); non-returnable waste disposal operations.  Data are generated on accounts 94 «Other expenses of operating activities», 97 «Other expenses», 23 «Production»
	Information is provided on the violation of the norms related to waste and waste management operations, as well as the economic and environmental consequences of emergency situations	Data are formed on the basis of accounting data for waste management operations reflecting the economic and environmental consequences of emergencies. Data are generated on accounts 97 «Other expenses»
	Separately, the costs associated with waste management operations and emergency response measures are indicated	Data are formed on the basis of the proposed accounting procedures and costing of inventories resulting from processing and accounting models for capital and operating expenses associated with emergencies
	Information is provided on preventive measures related to avoiding, preventing or reducing the consequences of future emergencies	Data are generated on the basis of the proposed accounting models for capital and current expenditures associated with preventive measures and measures to eliminate the economic and environmental consequences of emergency situations. Data are generated on accounts 94 "Other expenses of operating activities", 97 "Other expenses"

impact on the sustainability of an enterprise and the society in which it operates.

Table 3 presents the mechanism for generating a fragment of sustainability reporting relating to the environmental part of an enterprise's activities, based on accounting data.

Taking these aspects into account when preparing sustainability reports will facilitate the work of an enterprise and contribute to the development of sustainable and responsible business practices in Ukraine. In general, enterprises must have an appropriate organizational structure and procedures for collecting and processing information. Typically, this includes the establishment of a sustainability committee, which is responsible for developing and implementing sustainability policies, as well as establishing metrics and indicators to assess the achievement of goals.

Since sustainable development has a complex nature, the collection and analysis of informa-

tion should cover various aspects of a company's activities. To collect this information, enterprises can use various tools, such as surveys, audits, monitoring of environmental indicators, etc. In addition, businesses must maintain open communication with their stakeholders such as investors, consumers, employees, and others. This will allow stakeholders to be involved in the dialog and take into account their interests when formulating sustainable development policies. Therefore, the implementation of an effective accounting system for sustainability reporting is an important step for enterprises, which allows them to ensure the sustainability of their activities and take into account social and environmental factors.

Ensuring sustainability development is an important component of corporate social responsibility of enterprises. Such reports provide information about a company's social, environmental and economic activities, allowing for more transparent and open communication with stakeholders, including customers, part-

ners, investors and the public. Ukraine has adopted a number of legislative and regulatory documents aimed at implementing the strategy of ensuring sustainable development. This shows that the state supports initiatives to ensure sustainability and increase the transparency of enterprise activities. Although there is no

exact number of non-financial reports in recent years, companies are slowly starting to publish sustainability reports. This is a positive step towards more sustainable and responsible enterprises that ensure the sustainability of economic development, which is extremely important in a state of martial law.

## CONCLUSIONS

To be effective, sustainability reports must be understandable and accessible to a wide range of stakeholders. In addition, reports must be prepared in accordance with international sustainability reporting standards such as the Global Reporting Initiative, which will ensure standardization and comparability of reports. It is also important that the reports are objective and reflect all aspects of a company's activities, including negative consequences. This will enable enterprises to identify problematic issues and look for ways to solve them, as well as help build trust with stakeholders. Conducting a bibliometric analysis of the scientific literature on the topic "Sustainability reporting and its synergistic relationship with accounting support" made it possible to draw the following conclusions. In general, the scientific literature related to accounting support for reporting in the field of sustainable development covers only certain aspects. Meta-analysis shows that this area of research is understudied, although positive dynamics can be seen in the number of published articles and citations Summarizing the results of the content-context block of bibliometric analysis made it possible to note that the main clusters are focused on identifying the relationship between sustainable development, sustainability and the SDGs. In the context of the study, the most relevant is the fourth cluster, which accurately reflects the relationship between sustainability reporting and accounting. To form an effective mechanism for sustainability reporting, a five-step sequence of actions was provided for the formation of sustainability reporting based on accounting data, and tables were created to simplify the search for the necessary information to fill out fragments of a sustainability report and assess the state of social environmental safety and all risks that may arise on the basis of accounting data.

## **AUTHOR CONTRIBUTIONS**

Conceptualization: Hanna Filatova.

Data curation: Tetiana Vasylieva, Hanna Filatova.

Formal analysis: Tetiana Vasylieva, Nataliia Vynnychenko.

Funding acquisition: Tetiana Vasylieva.

Investigation: Hanna Filatova, Tetiana Vasylieva, Nataliia Vynnychenko.

Methodology: Nataliia Vynnychenko, Milan Gedeon.

Project administration: Hanna Filatova. Resources: Martina Ballova, Milan Gedeon.

Software: Martina Ballova. Supervision: Tetiana Vasylieva. Validation: Milan Gedeon.

Visualization: Nataliia Vynnychenko, Martina Ballova. Writing – original draft: Tetiana Vasylieva, Hanna Filatova.

Writing – review & editing: Hanna Filatova.

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13