### ЕКОНОМІЧНІ НАУКИ

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# SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL ASPECTS IN PUBLISHING INDUSTRY MANAGEMENT

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The article focuses on studying the importance of the concept of sustainable development in management activities in the publishing and information industry, especially in view of current global environmental threats and radical changes in market priorities. The key object of the study is the implementation of environmental protection strategies in the publishing process, which aims to minimize greenhouse gas emissions (reducing the «carbon footprint»), ensure more efficient use of resources and meet modern criteria for environmental sustainability. Given the projected global trends of 2025, in particular, the growth of demand for electronic formats (e-books and audio content, the share of which in the US and European markets already reaches about 30%), the article analyzes the mechanisms for publishers to adapt to the decline in interest in printed products. This involves the transition to «digital-first» strategies and the use of environmentally friendly raw materials, such as paper certified by the Forest Stewardship Council (FSC). In the international aspect, positive examples of the work of leading companies are studied, in particular Penguin Random House, which actively invest in zero-waste technologies and recycling, as well as European initiatives that stimulate climate-neutral production practices (for example, the European Green Deal).

In the Ukrainian context, the study focuses on the specific challenges arising from the lack of capital, the expansion of domestic book publishing (a 73% increase in published books by 2023), and the requirements for integration with global guidelines on sustainable development. It examines the methods by which Ukrainian publishing entities, such as the Old Lion Publishing House or Nash Format, are innovating through digitalization and local projects aimed at minimizing waste, despite supply and financing obstacles. The methodological basis of this publication is based on the study of real numerical indicators, in particular, data on the carbon footprint in the publishing sector (estimated at up to 1.5 kilograms of CO2 per unit of printed publication), as well as on the use of conceptual schemes for managing transformations, such as the idea of the "three dimensions of sustainability" (economic indicators, environmental impact, social responsibility).

The most significant challenges facing managers include the need to find a balance between economic benefit, the needs of the target audience and environmental standards. An additional challenge is the implementation of innovative solutions, in particular, the use of artificial intelligence (AI) to accelerate content delivery or blockchain technology to ensure transparency of the path of goods from producer to consumer. This material

contains effective advice for publishers: from the full use of «green» technologies to fruitful interaction with foreign colleagues to exchange best practices. In the field of scientific analysis, the ability of a sustainable management strategy to strengthen the industry's position in the market is considered. Particular attention is paid to both precisely measurable indicators (for example, a 10-15% reduction in operating costs due to the introduction of digital tools) and intangible benefits, including an increase in readership for brands that demonstrate a responsible attitude to the environment. The publication is aimed at management personnel, academics, and all stakeholders in the publishing industry who seek to modernize business models in accordance with the requirements of sustainable development in both the global and national Ukrainian perspectives.

**Keywords:** management, publishing industry, environmental aspects, digital formats, book market, green technologies.

Question. In the context of global environmental threats and fundamental changes in the publishing and information industry, the issue of sustainable development is becoming an absolute priority for the management of the publishing sector. The increase in requests for electronic publications, the general decline in the volume of printed products (for example, in Europe there has been a decrease of 10–15% in recent years), as well as the increasing pressure on environmental awareness (in accordance with the goals of the "European Green Deal" and global sustainable development criteria) require publishers to revise their operating models. In Ukraine, where the publishing market is demonstrating rapid positive dynamics (+73% growth in book production in 2023), managers are dealing with complex tasks: a shortage of raw materials, the need for rapid implementation of international environmental standards, and fierce competition both within the country and abroad. However, the introduction of environmental solutions, in particular electronic platforms, the use of certified raw materials, and modernized logistics schemes, open up significant prospects for strengthening market positions.

The key issue of this scientific research: how can the management of the publishing sector within Ukraine and in the international arena effectively implement the principles of sustainable development into their management plans in order to reduce the negative impact on the environment, rationalize the use of available resources, and meet the needs of the modern reading community? What methodological techniques, tools, and new technologies (in particular, digital-first strategies, artificial intelligence systems for optimizing content distribution, and the use of blockchain to ensure transparency of logistics chains) contribute to achieving harmony between economic feasibility, environmental awareness, and social significance? The objective of the publication is to conduct a comparative analysis of global and domestic publishing practices, assess their effectiveness using specific quantitative indicators (for example, confirmation of a reduction in carbon dioxide emissions by 1.5 kg in the process of creating a unit of publication) and formulate proposals for publishing entities that seek to successfully undergo transformation in accordance with the current requirements of sustainable development.

Analysis of current publications and articles. Current research (published in 2024–2025) covering the issues of sustainable development in the publishing sector is mainly focused on embedding environmental approaches directly into the operational activities of companies, minimizing greenhouse gas emissions and adapting to largescale problems such as climate change. On a global scale, the leading directions are the transition to electronic versions of publications, the use of secondary raw materials, afforestation campaigns and strict adherence to the requirements of the United Nations Sustainable Development Goals (UN SDGs). In Ukraine, the main focus has shifted to ensuring the financial viability of the market in conditions of military conflict, as well as the preservation of cultural heritage. The environmental component is presented less intensively here, which is explained by the priority of recovery and economic growth strategies. Academic work actively promotes management paradigms, in particular the concept of the «triple bottom line» (finance, environment, society), and emphasizes the importance of active leadership in the field of climate equity. We will then examine the defining trends, methodologies and obstacles, drawing on recent publications, structuring the analysis along global, national and scientific-theoretical axes.

During 2024–2025, the publishing industry is actively implementing sustainable development principles, mainly aimed at reducing its environmental footprint. Analytical materials highlight five main trends: an increase in the number of supporters of the SDG Publishers Compact initiative (the increase in signatories in different regions reached from 68% to 127%), the development of interactive dashboards for decisionmaking (for example, the IPA SDG Dashboard with a focus on SDG 13 - combating climate change), the rather limited creation of specialized sustainability committees in publishing associations, the integration of sustainability topics into industry events and a moderate growth in publications on this topic (by 60% in Learned Publishing) [1]. Approaches include reducing waste through the development of secondary book markets, carbon footprint calculations (e.g., calculators from the British Publishers Association) and supply chain optimization (e.g., HarperCollins' use of more compact fonts to save ink) [2]. Environmental measures include the active use of recycled paper (saving 40% energy and 50% water), emission compensation mechanisms (investing in renewable energy), print-on-demand to avoid overproduction, and the transition to electronic formats (reducing CO2 emissions, although with caveats regarding e-waste) [3]. Players such as Penguin are investing in achieving zero waste and creating ethical supply chains [4]. Tree planting programs are gaining popularity: Wiley has planted over a million trees, and The Company of Biologists has planted 2,652 trees for every published article, serving the goals of carbon reduction and brand promotion [5].

In the educational and scientific publishing segment, the concept of "conscious leadership" is proposed, based on the principle of a triple bottom line (ecology, society, finance), prioritization of Sustainable Development Goals (e.g., SDG 10 — reducing inequality) and the involvement of AI/blockchain technologies for distribution [6]. Strategies for ensuring climate justice vary from stated commitments (e.g., UN SDG Compact, achieving net zero by 2050) to concrete actions (boycotts, divestment from fossil fuels, as in Fossil Free Books), but there is criticism of the phenomena of "green

laundering" (e.g., in the case of Elsevier) [7]. Obstacles include the voluntary nature of commitments, the lack of proper control, the problem of overproduction, and a strong dependence on commercial profit. The recommendations also concern the implementation of "degrowth" models, the "slow science" concept, and the "Diamond" open access model to minimize resource consumption (Table 1).

Trends	Description	Examples of strategies
Growing liabilities	Increase in subscribers SDG Compact	Integrating SDGs into events (EASE, CSE)
Waste reduction	Processing, print-on-demand	Offset due to reforestation
Climate justice	Boycotts, divestment	Refusal of fossil fuel sponsors
Planting trees	Carbon offset	Wiley: 1 million trees

Publications on Ukraine in 2024–2025 focus on the recovery of the book market, showing a 31% increase in revenue and a 21% increase in circulation during 2024, with an expected stabilization of indicators in 2025 (about 6,680 new titles in the first half of the year). Considerable attention is paid to the adaptation of the industry to war conditions, which is reflected in an increase in the number of bookstores to 461 units and a noticeable shift in sales to the digital space (growth of e-books and audiobooks by 44–100%), which is evidence of cultural resilience [8].

Environmental aspects are less prominent: FSC certification is mentioned (printing is carried out by Unisoft), but Asian competition creates obstacles; digitization reduces the need for paper [9]. The Reading Development Program for 2021–2025 emphasizes the sustainability of the entire system: preferences are given to publishers (tax exemption, access to credit), an electronic library is developed, mobile bookstores are introduced, measures against piracy are undertaken, and inclusivity is worked on (through targeted grants for less protected groups). Difficulties include: oversaturation of emotional perception, reduction in sales volumes (-20%), reduction in the number of child readers, and high dependence on external funding (grants). Proposals: consolidation of efforts to form stable regulatory frameworks, focus on product quality (as a decisive criterion for readers) [9]. Environmental Perspective: Digital transformation can help save resources, but this requires alignment with global criteria.

Scientific papers and profiles (based on Google Scholar) emphasize the integration of sustainability principles into management processes: this includes identifying key drivers for project managers (Silvius) [10], using tools to assess competencies in line with the Sustainable Development Goals (Muff) [11], the role of big business in ensuring environmental sustainability (Shrivastava) [12] and developing a "sustainability mindset" in education (Mitchell) [13]. In the publishing sector, this translates into a shift towards

flexible (resilient) models that focus on long-term benefits (Ortiz-de-Mandojana) [14] and the implementation of environmental management in small and medium-sized businesses (Rajeshwari) [15]. These concepts complement practical steps, providing the necessary theoretical basis for management activities.

In general, global publications highlight aggressive environmental approaches, while Ukrainian sources emphasize economic viability with the possibility of integrating environmental aspects. Management should take the following steps: tracking carbon dioxide (CO2) emissions, establishing partnerships for divestment of high-emission assets, and transitioning to digital technologies.

**Purpose of the article.** The main purpose of this publication is to provide a detailed analysis and develop practical approaches (strategies) that will enable management personnel in the publishing sector to implement sustainability principles into daily management activities, thereby reducing the environmental burden and enhancing the industry's ability to compete in the market.

**Presentation of the main research material.** Examining current sustainable management practices in the publishing sector requires examining the methods publishers use to minimize their environmental impact, improve financial performance, and comply with social and regulatory norms, taking into account both global and domestic circumstances. Drawing on relevant 2024–2025 materials, market reports, and academic writings, we present an overview of leading approaches to sustainable management in the printing industry, their effectiveness, implementation cases, and advantages and disadvantages, focusing on the international and Ukrainian environments.

One of the priority areas is digital-first approaches and the introduction of electronic formats. The transition to digital media (e-books, audio versions, e-journals) leads to a reduction in the use of paper and a reduction in energy costs for production. According to analytical data, by 2025 the share of e-books and audiobooks in the US and European markets will reach 30%, which will provide a 50-70% reduction in CO2 emissions compared to traditional printing. The publishing sector is also using artificial intelligence to improve digital distribution and provide users with personalized content. For example, companies such as Penguin Random House and Wiley are investing in their own digital platforms, in particular, the development of applications for e-books, which minimizes logistical emissions. Elsevier uses AI capabilities to automate editorial stages, achieving time savings of 15%. As for Ukraine, there is a rapid growth in the popularity of digital media (+44-100% for e-books and audiobooks during 2024). Publishing houses such as Nash Format offer readers electronic versions of their publications, and initiatives such as a digital library as part of the state strategy for the development of reading for 2021–2025 contribute to their maximum accessibility. This results in a reduction in the carbon footprint, savings of material resources (paper, water) and expanded access to information. However, this model also has disadvantages: high energy consumption of data centers (accounting for 2% of global emissions), the problem of electronic waste from devices (up to 40 kg of CO2 per e-reader), as well as insufficient development of infrastructure in Ukraine. The following challenges face managers responsible for the implementation of this direction: ensuring investments in highly energy-efficient server capacities and conducting educational work among the reading audience to stimulate the transition to digital formats.

The next step in this area is quite logical to see the implementation of the Print-on-Demand (POD) system. Thanks to POD, publications are printed only after receiving an order, which makes it impossible to accumulate surpluses (since up to a third of the circulation usually remains unsold) and, accordingly, reduces waste. This leads to a reduction in paper use by 10–20% and minimizes logistical emissions. Vivid examples are IngramSpark and Amazon Kindle Direct Publishing, which actively use POD, freeing publishers from the burden of warehouse maintenance and the risks of over-release. For its part, the large publishing house HarperCollins has integrated POD to work with highly specialized literature, achieving a 15% reduction in material waste. Regarding the Ukrainian market, the prevalence of POD is somewhat limited due to the high price of the necessary equipment and the general focus on small print runs. However, some local printing houses, such as Unisoft, already provide such services to small publishing houses. The advantages of this approach are waste minimization, resource conservation, and flexibility in working with micro-runs. The disadvantages include significant initial investments in equipment, insufficient prevalence in Ukraine, and potential reduction in print quality for certain book formats. Managers who decide to implement this model will have to overcome difficulties, in particular, in finding reliable POD partners and securing financing to upgrade printing facilities.

As for the further tactics of our research, it is worth focusing on the introduction of environmentally responsible components into production processes. In particular, the use of FSC-labeled paper, the use of recycled materials and environmentally friendly inks significantly minimizes the environmental footprint (saving energy resources by 40%, water resources by 50%). On a global scale, book publishers are gradually switching to recycled paper, covering 20-30 percent of the total circulation. A vivid example of the implementation of this approach is Penguin Random House, which uses FSCcertified paper in 80% of its publications, and HarperCollins is making efforts to optimize typefaces in order to reduce ink consumption. Organizations such as the UK Publishers Association provide tools for calculating the impact caused by the choice of materials. In the Ukrainian context, the use of FSC paper is not very widespread due to its high price and import dependence. Although Unisoft Printing House offers eco-friendly printing services, active implementation is hampered by fierce competition from Asian manufacturers. The advantages of this concept are reduced deforestation, improved brand reputation, and compliance with European environmental initiatives (EU Green Deal). The disadvantages include the increased price of FSC-grade materials, their limited supply on the domestic Ukrainian market, and the need to undergo certification procedures. Managers implementing this program have to overcome such difficulties as finding local suppliers and maintaining a balance between economic feasibility and environmental responsibility.

In line with the next approach to long-term development and environmental responsibility, one can consider the option of canceling carbon offset programs and tree planting. Publishers currently offset their emissions by participating in tree planting

programs and directing funds to renewable energy sources. Such measures, in addition to the environmental effect, contribute to strengthening ties with readers. As an example of the successful implementation of this model, we can mention Wiley, which has ensured the planting of over a million trees, as well as The Company of Biologists, which plants trees (2652) for every published article, integrating compensation with the brand image. At the same time, Bloomsbury directs investments into renewable energy projects to achieve neutral status. In Ukraine, such programs are practically absent, which is due to the lack of financial resources. Some domestic publishers, such as Stary Lev Publishing House, support local environmental initiatives, but their scale remains small. The strengths of this tactic include reducing the company's carbon footprint, improving its image (PR), and attracting an environmentally conscious audience. The disadvantages include significant financial investment, the risk of being accused of greenwashing, and less attention to biodiversity. Among the challenges that managers face when implementing this strategy are the need to build compensation costs into the financial plan and the need to avoid accusations of "laundering" reputation through environmental initiatives.

The fifth, and by no means last, approach to sustainability is climate equity combined with regulatory accountability. This is evidenced by publishers joining the SDG Publishers Compact, aiming to achieve net-zero carbon neutrality by 2050, divesting from oil and gas companies, and introducing open reporting on their sustainability. Prominent examples of this tactic include the Fossil Free Books initiative, which advocates for a boycott of fossil fuel sponsors, and EASE and CSE, which integrate the Sustainable Development Goals (SDGs) into their activities. At the same time, Elsevier has been criticized for "greenwashing" due to a lack of data transparency. It is worth noting that Ukraine demonstrates support for sustainability through its reading development strategy, but environmental standards have not yet become a top priority. Grant funds aimed at inclusion, in turn, can be used to finance digital initiatives. The advantage of this approach is its consistency with international norms (such as the SDGs and the European Green Deal), as well as the ability to interest the readership. Accordingly, the disadvantages are the voluntary nature of the commitments made, the lack of proper control and limited implementation in Ukrainian realities. Managers will face the need to build into their daily work the practice of transparent reporting and finding partners to comply with the established standards.

Given the current situation, the following approaches are being implemented in the publishing sector for sustainable management: the transition to digital formats, print on demand (POD), the use of environmentally friendly materials, carbon offset and climate equity. On a global scale, these methods allow large publishing houses to achieve noticeable results (reducing emissions by 10–15%), but they are hindered by the phenomena of «greenwashing» and significant financial costs. In Ukraine, despite the promising nature of digital solutions and local projects, their development is hampered by a lack of funds and underdeveloped infrastructure. Fundamental scientific concepts, such as the «triple bottom line» or the ideas of «degrowth», emphasize the critical importance of a comprehensive, systematic implementation of changes. Industry leaders, in turn,

should focus their efforts on those activities that are financially justified, actively seek partnerships, and conduct educational work among readers to achieve maximum impact from their environmental initiatives.

Conclusion: This publication is useful for managers, editors, and all stakeholders, as it provides methods for adapting to international sustainable development requirements (such as the SDG Publishers Compact and the commitment to achieve net zero emissions by 2050) as well as to domestic contexts (in particular, the Ukrainian Reading Development Strategy for 2021–2025). At the same time, it has significant scientific significance for scholars investigating the intersections of environmental issues, management practices, and the publishing sector.

The analysis confirms that the publishing industry is at the intersection of environmental, financial and social challenges, which is forcing managers to transform their approaches to business management towards a long-term and sustainable model (resolvent). International trends — namely, the spread of electronic media (which occupy a third of the market in the US and Europe), the implementation of the European Green Deal and the SDG Publishers Compact initiative, as well as consumer expectations for environmentally responsible brands — emphasize the critical importance of implementing environmental principles in the production cycles of publishing houses.

At the same time, the Ukrainian book market, which is showing steady growth (+73% in book production in 2023, +44–100% for e-books in 2024), faces limited resources, dependence on imported materials, and socio-economic barriers caused by the war. These conditions form a unique context in which sustainability becomes not only an ethical imperative, but also a strategic necessity for competitiveness.

An analysis of current approaches to sustainability in management demonstrates that elements such as digitalization of processes, the «Print-on-Demand» model, integration of secondary raw materials, carbon offset programs (for example, Wiley's million tree planting initiative) and ensuring climate equity are effective levers in minimizing the ecological footprint. However, the practical implementation of these measures in Ukraine is hampered by both financial constraints and insufficient state regulatory support. The theoretical framework, formed on the basis of the concepts of the «triple criterion» (social, environmental, economic accountability), the ideas of «enlightened leadership» and the philosophy of «economic decline» (degrowth), demonstrates: flexible (resilient) management architectures allow publishing structures to successfully adapt to changing circumstances, rationalize the use of resources and respond to the needs of the readership. These management paradigms acquire particular importance in the context of unpredictable crises in the market (such as the one-fifth drop in book sales recorded in Ukraine) and ambitious global aspirations to achieve carbon neutrality (net-zero) by mid-century.

Looking ahead, the publishing sector must adopt a holistic approach to sustainability. This approach requires a combination of technological breakthroughs (such as artificial intelligence or blockchain), a supportive regulatory environment, and an evolving management mindset. In the Ukrainian context, this directly points to the need to incorporate environmentally-friendly projects into the reading development plan for 2021–

2025 and to establish partnerships with foreign organizations for mutual knowledge exchange. Future research should be directed at quantifying the economic feasibility of implementing green solutions, as well as determining the role of educational programs in fostering an environmentally conscious reading community, which in turn will help the publishing industry take a leading position in the field of sustainable development.

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## СТАЛИЙ РОЗВИТОК І ЕКОЛОГІЧНІ АСПЕКТИ В МЕНЕДЖМЕНТІ ВИДАВНИЧОЇ ГАЛУЗІ

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Анотація. Стаття зосереджується на вивченні важливості концепції сталого розвитку в управлінській діяльності у видавничо-інформаційній галузі, особливо з огляду на актуальні світові екологічні загрози та кардинальні зміни у ринкових npiopumemax. Ключовим об'єктом дослідження  $\epsilon$  впровадження природоохоронних стратегій у видавничий процес, що має на меті мінімізувати викиди парникових газів (зниження «вуглецевого сліду»), забезпечити ефективніше використання ресурсів та відповідати сучасним критеріям екологічної стійкості. Зважаючи на прогнозовані глобальні тенденції 2025 року, зокрема, на зростання попиту на електронні формати (е-книги та аудіоконтент, частка яких на ринках США та Европи вже сягає близько 30%), стаття аналізує механізми пристосування видавництв до зменшення зацікавленості у друкованій продукції. Це передбачає перехід до стратегій «digital-first» (спершу цифра) та застосування екологічно безпечної сировини, як-от папір, сертифікований Радою лісового опікунства (FSC). У міжнародному аспекті вивчаються позитивні приклади роботи провідних компаній, зокрема Penguin Random House, які активно інвестують у технології «нульових відходів» (zero-waste) та вторинну переробку, а також європейські ініціативи, які стимулюють кліматично нейтральні виробничі практики (наприклад, Європейська зелена угода, EU Green Deal).

У площині українських реалій, дослідження зосереджує свою увагу на специфічних труднощах, які виникають через брак капіталу, експансію вітчизняного книговидання (приріст виданих книжок на 73% протягом 2023 року) та вимоги до інтеграції з глобальними настановами щодо стійкого розвитку. Розглядаються методи, якими українські суб'єкти видавничої діяльності, наприклад, «Видавництво Старого Лева» або «Наш Формат», впроваджують інновації через цифровізацію та місцеві проекти, спрямовані на мінімізацію відходів, незважаючи на перешкоди у сфері постачання та фінансування. Методологічна база цієї публікації базується на вивченні реальних числових показників, зокрема, даних про вуглецевий слід у видавничій сфері (за оцінками, до 1,5 кілограма СО2 на одиницю друкованого видання), а також на використанні концептуальних схем управління трансформаціями, таких як ідея «трьох вимірів стійкості» (економічні показники, вплив на довкілля, соціальна відповідальність).

Найсуттєвіші труднощі, що постають перед керівниками, охоплюють необхідність знайти рівновагу поміж економічною вигодою, потребами цільової аудиторії та екологічними нормативами. Додатковою задачею є впровадження

новаторських рішень, зокрема застосування штучного інтелекту (ШІ) для прискорення доставки контенту або технології блокчейн для забезпечення прозорості шляху товарів від виробника до споживача. Цей матеріал містить дієві поради для видавництв: від повноцінного використання «зелених» технологій до плідної взаємодії із закордонними колегами для обміну найкращими практиками. У площині наукового аналізу розглядається спроможність стратегії сталого управління зміцнити позиції галузі на ринку. Особлива увага приділяється як точним вимірюваним показникам (наприклад, зменшення операційних витрат на 10–15% завдяки впровадженню цифрових інструментів), так і нематеріальним перевагам, серед яких зростання прихильності читачів до торгових марок, що демонструють відповідальне ставлення до навколишнього середовища. Публікація орієнтована на управлінський персонал, науковців та всіх зацікавлених осіб у видавничій індустрії, які прагнуть модернізувати бізнес-моделі відповідно до вимог сталого розвитку як у світовій, так і в національній українській перспективі.

**Ключові слова**: менеджмент, видавнича галузь, екологічні аспекти, цифрові формати, книжковий ринок, зелені технології

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