PROBLEMY EKOROZWOJU/ PROBLEMS OF SUSTAINABLE DEVELOPMENT

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Managing Sustainable Digital Marketing in the Context of SDGs: Financial, Environmental, Ethical and Security Dimensions

Zarządzanie równoważonym marketingiem cyfrowym w kontekście Celów Zrównoważonego Rozwoju: implikacje finansowe, środowiskowe, etyczne i bezpieczeństwa

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Abstract

The article presents a comprehensive theoretical and methodological analysis and conceptualization of the notion of sustainable digital marketing (SDM) as an integrated management system that combines economic performance with adherence to the principles of sustainable development – ecological responsibility, ethical conduct, social justice, and cybersecurity. The relevance of the study is driven by the growing role of digital technologies in business operations, alongside increasing societal and regulatory demands for responsible brand behavior in the context of global digital transformation.

The purpose of the study is to formulate the theoretical and methodological foundations of sustainable digital marketing, identify its structural components, and define performance assessment criteria in the context of ESG-oriented business strategies. Within an interdisciplinary framework, the research employs content analysis, expert evaluation, and economic-mathematical modeling methods (including ROI, ROAS, CLV, CAC, and Payback Period), and introduces an ethical matrix to assess digital communications according to transparency, accountability, safety, and environmental sustainability.

The empirical part of the research is based on the analysis of strategies of five leading global companies – Google, Amazon, Meta, Apple, and Microsoft – regarding their implementation of sustainable marketing approaches, investments in ecological initiatives, and compliance with digital ethics standards. The feasibility of integrating the SDM concept into strategic planning across various sectors and scales is substantiated, and a system of indicators is developed to evaluate marketing performance from the perspective of long-term social responsibility.

The findings of this study have both theoretical and practical value, offering a new paradigm of marketing management aligned with the challenges of the digital era and the principles of sustainable development.

Key words: digital marketing, economic security, sustainable development, green economy, business models, digitalization

Streszczenie

Artykuł przedstawia kompleksową teoretyczną i metodologiczną analizę oraz konceptualizację pojęcia zrównoważonego marketingu cyfrowego (SDM) jako zintegrowanego systemu zarządzania, który łączy efektywność ekonomiczną z przestrzeganiem zasad zrównoważonego rozwoju – odpowiedzialności ekologicznej, etycznego postępowania, sprawiedliwości społecznej i cyberbezpieczeństwa. Znaczenie badania wynika z rosnącej roli technologii cyfrowych w działalności biznesowej, a także rosnących wymagań społecznych i regulacyjnych dotyczących odpowiedzialnego zachowania marek w kontekście globalnej transformacji cyfrowej.

Celem badania jest sformułowanie teoretycznych i metodologicznych podstaw zrównoważonego marketingu cyfrowego, identyfikacja jego elementów strukturalnych oraz zdefiniowanie kryteriów oceny efektywności w kontekście strategii biznesowych zorientowanych na ESG. W ramach interdyscyplinarnych badań wykorzystano analizę treści, ocenę ekspercką oraz metody modelowania ekonomiczno-matematycznego (w tym ROI, ROAS, CLV, CAC i okres zwrotu z inwestycji), a także wprowadzono matrycę etyczną do oceny komunikacji cyfrowej pod kątem przejrzystości, odpowiedzialności, bezpieczeństwa i zrównoważonego rozwoju środowiskowego.
Część empiryczna badania opiera się na analizie strategii pięciu wiodących globalnych firm – Google, Amazon, Meta, Apple i Microsoft – w zakresie wdrażania przez nie zrównoważonych strategii marketingowych, inwestycji w inicjatywy ekologiczne oraz przestrzegania standardów etyki cyfrowej. Uzasadniono wykonalność integracji koncepcji SDM z planowaniem strategicznym w różnych sektorach i skalach, a także opracowano system wskaźników do oceny efektywności marketingu z perspektywy długoterminowej odpowiedzialności społecznej. Wyniki niniejszego badania mają wartość zarówno teoretyczną, jak i praktyczną, oferując nowy paradygmat zarządzania marketingiem, dostosowany do wyzwań ery cyfrowej i zasad zrównoważonego rozwoju.

Słowa kluczowe: marketing cyfrowy, bezpieczeństwo ekonomiczne, zrównoważony rozwój, zielona gospodarka, modele biznesowe, cyfryzacja

1. Introduction

In the 21st century, digital transformation is fundamentally changing the paradigm of business management, including the field of marketing. Digital marketing, previously considered an auxiliary tool for promotion, has gradually evolved into a strategic component of companies' activities, providing personalized interaction with consumers, customer behavior analytics, and effective use of communication channels (Kannan, 2020; Dwivedi et al., 2021). At the same time, the rapid spread of digital technologies is accompanied by new challenges, in particular, the ethical risks of targeted advertising, cyber threats, as well as the growing environmental burden from digital infrastructure. At the same time, the concept of sustainable development, which encompasses the balancing of economic, social, and environmental interests, has gained priority in the formation of a modern business model (Sachs, 2015; Mensah, 2019). Integrating sustainability principles into marketing activities allows companies to increase social legitimacy, create a positive ESG (Environment, Social, Governance approach) image, and minimize regulatory risks. However, the scientific discourse still lacks a holistic approach to the synthesis of digital and sustainable practices within a single concept of sustainable digital marketing, which would take into account both strategic and ethical, environmental, and financial aspects.
Thus, the relevance of the topic is due to the need for a methodological justification of sustainable digital marketing as a new management approach that combines technological innovations with the principles of responsibility and sustainability. In this context, the article aims to explore the mechanisms of managing sustainable digital marketing, focusing on financial implications, cybersecurity issues, ethical challenges, and environmental responsibility.

2. Literature review

The analysis of scientific works devoted to sustainable development indicates the growth of interdisciplinary interest in this concept as a paradigm of balanced development of society. In particular, the classical vision of sustainable development as a process of balance between economic, environmental and social components is presented in the works of Sachs (2015), Mensah (2019), as well as in studies that focus on the conceptual origin of the three pillars of sustainability (Purvis, Mao, & Robinson, 2019). In the modern context, considerable attention is paid to the combination of sustainability with digital processes, which is reflected in the works of Awan, Sroufe, & Shahbaz (2021), Skarzauskiene & Maciuliene (2021) and Pawłowski (2021), who consider sustainability as a key factor in the digital transformation of societies and economies. The ethical and social aspects of sustainable digital communications are revealed in the studies of Granstedt (2024) and Skokanova (2024), which focus on consumers' perception of brand responsibility.
Regarding digital marketing, key areas of research are focused on its strategic role, technological tools, and ethical challenges. Kannan (2020) offers a systemic conceptualization of digital marketing as an analytical and adaptive system, and Dwivedi et al. (2021) as a strategic tool for personalization and KPI management. The studies of Polyakh (2020), Oaklander and Romanenko (2015), and Wenger (2017) complement the understanding of digital marketing from the perspective of the Ukrainian academic school, focusing on its duality (online and offline interaction) and business philosophy. The empirical aspect of the marketing activities of digital giants is highlighted in reports and articles such as Marino (2024), Johnson & Hiebert (2024), Norris (2023), which analyze in detail the advertising costs, KPIs and the evolution of advertising platforms of Google, Amazon, Microsoft and others. Overall, the existing literature creates a solid foundation for the integration of the concepts of sustainable development and digital marketing, however, a comprehensive theoretical understanding of their interaction remains limited, which determines the relevance of this study.

3. Aim of the research

The aim of the article is a comprehensive study of the sustainable digital marketing management system with a focus on financial implications, ethical responsibility and cyber security, as well as the justification of the need to integrate these elements into the business models of companies to ensure their sustainability in the digital economy. Particular attention is paid to the analysis of the practices of leading global companies, the quantification of marketing and security costs, as well as the formation of a conceptual model of the relationship between the key parameters of sustainable digital marketing.

4. Methodology

The methodological basis of the study was a combination of systemic, interdisciplinary and structural-functional approaches, which made it possible to holistically consider sustainable digital marketing as a complex management model integrated into the modern digital economy. The use of a systemic approach made it possible to cover the relationships between economic, environmental, social, ethical and security aspects of marketing activities in the digital environment. To study the theoretical foundations of sustainable development and digital marketing, the content analysis method was used, which provided a qualitative classification of existing scientific approaches and identified morphological features of key concepts. This made it possible to form a substantiated conceptual framework for further research. In the process of determining the main components of the sustainable digital marketing system, the expert assessment method was used to generalize the views of leading specialists in the field of digital marketing, environmental management and cybersecurity. This contributed to the formulation of relevant criteria for the ethics, safety and environmental feasibility of digital strategies.

For the empirical analysis of the activities of leading digital corporations, such as Google, Amazon, Meta, Apple and Microsoft, a comparative analysis of costs, KPIs, strategies and environmental initiatives was used, which made it possible to assess the practical implementation of the concept of sustainable digital marketing in a global context.

Economic and mathematical modeling methods were used to quantify the financial consequences of introducing sustainable marketing principles. This made it possible to substantiate the feasibility of sustainable initiatives from both an economic and socio-ecological point of view.

In the process of developing an ethical matrix for evaluating digital marketing campaigns, a multi-criteria assessment method was applied. This method allowed to systematically structure the key ethical parameters of sustainable digital marketing – transparency, data protection, fairness, social impact, lack of manipulation and environmental friendliness – and transform them into a formalized evaluation scale.

By using an expert approach to selecting criteria and questions for analysis, the matrix takes into account interdisciplinary requirements formed at the intersection of ethics, marketing, law and digital technologies. The assessment was carried out on a five-point scale based on the analysis of the content of companies' digital communications, which made it possible to ensure comparative relevance and representativeness of the results. This approach allows not only to identify weaknesses in companies' strategies, but also to form the basis for improving sustainable digital marketing practices.

To strengthen the empirical validity of the study, the selection of the five analyzed companies – Google, Microsoft, Apple, Meta, and Amazon – was based on their global market influence, consistent publication of ESG reports, leadership in digital innovation, and public commitments to sustainable practices. These companies represent different segments of the digital economy (search engines, social media, e-commerce, cloud infrastructure, and hardware), ensuring diversity in the analysis.

Additionally, the expert evaluation involved six professionals selected based on at least seven years of experience in digital marketing, ESG consulting, or technology management, and at least two scholarly publications or conference presentations in the relevant field. Experts included three university faculty members, two corporate strategists, and one independent consultant. Their assessments were structured using a standardized matrix and ranked on a five-point Likert scale to evaluate sustainability components in digital marketing strategies.

Thus, the comprehensive application of qualitative and quantitative research methods ensured the formation of a new scientific and practical model of sustainable digital marketing management, adapted to the modern challenges of digital transformation.

5. Results

Sustainable development in the 21st century is defined not only as an environmental necessity, but as a strategic paradigm for global resource, economic and technological management. In 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development, which includes 17 global sustainable development goals (SDGs). These goals cover a wide range of issues: from poverty eradication and quality education to climate action

and innovative infrastructure that should ensure a balance between economic growth, social justice and environmental protection.

In the context of the digital economy, in particular the development of digital marketing, the closest relationship is observed between the goals:

- Goal 9 – Industrialization, innovation and infrastructure, which involves supporting innovative business models, digital platforms and developing the technological capacity of enterprises.
- Goal 12 – Responsible consumption and production, which focuses on ethical marketing, transparency in digital communications, the use of consumer data and the fight against manipulative technologies.
- Goal 16 – Peace, justice and strong institutions, which includes the development of digital ethics, the protection of personal data, cybersecurity and strengthening trust in digital channels of interaction.

Thus, digital marketing in the modern globalized environment is not only a tool for promoting goods and services, but also a mechanism for implementing sustainable transformations in society. That is why the study of its management from the perspective of financial efficiency, security and ethics is extremely relevant and is the purpose of this scientific work. The focus of this article is to study how the integration of sustainable development principles into digital marketing can not only contribute to the achievement of individual SDGs, but also create new competitive advantages for business in the context of digital transformation.

In the modern era of digital transformation, digital marketing has ceased to be an auxiliary tool for promoting goods and services – it has become one of the key components of a company's strategic management, which directly affects its financial stability, competitiveness and reputation. However, the rapid development of technologies and the globalization of digital communications have created new challenges that go far beyond the purely commercial aspect: the environmental burden on digital infrastructure, the growth of ethical risks in the field of personalized advertising, as well as the critical need to ensure cybersecurity in all links of the marketing chain. These global challenges require a rethinking of the role of digital marketing taking into account the principles of sustainable development, which, in turn, opens up new opportunities for integrating environmental and social values into marketing practice. Despite the rapid development of both areas - sustainable development and digital marketing – their interaction and potential for synergy remain insufficiently studied from a scientific point of view. Particularly noticeable is the lack of a comprehensive theoretical justification and conceptualization of the concept of *sustainable digital marketing,* which would combine environmental, social and economic principles with the tools of digital marketing into a single system. The combination of environmental, social and economic components with modern digital marketing practices requires systematic research aimed at forming methodological principles and practical recommendations for implementing the concept of sustainable digital marketing in the activities of enterprises of various industries and scales.

A wide range of theoretical background and its careful analysis allowed the authors to be convinced of the need to distinguish the concepts of *sustainable development* and *digital marketing* for further leveling existing contradictions in the categorical and conceptual apparatus. An attempt was made to demonstrate the relationship of their most significant substantive characteristics (signs) using the method of theoretical and graph structures (Fig. 1).

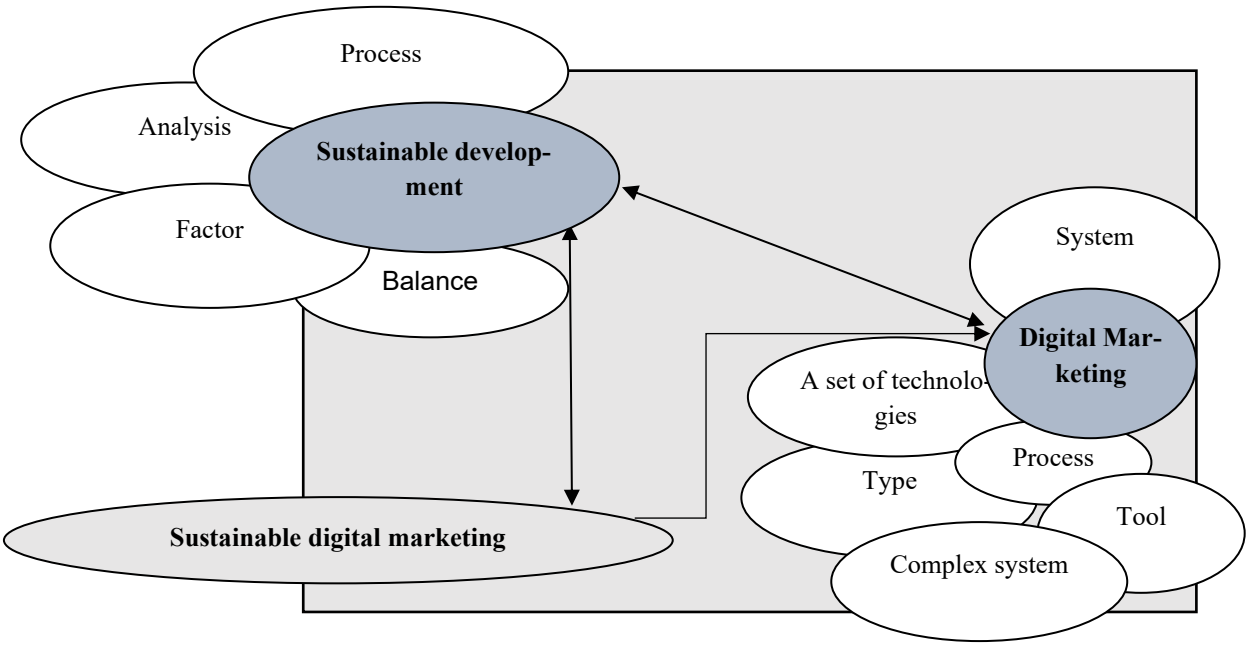

Figure 1. Thesaurus relationship diagram for the concept of sustainable digital marketing, source: developed by the authors based on (Dwivedi, et al., 2021; Pawłowski, 2021; Kannan, 2020; Mensah, 2019; Poliakh, 2020; Sachs, 2015; Skokanova, 2024; Venger, 2017)

Thus, according to the analysis conducted, the concept of *sustainable development* is interpreted as a multidimensional concept that encompasses procedural, analytical, normative and systemic aspects – as a process, analysis, balance and factor. Regardless of the morphological form, all definitions emphasize the need to reconcile economic, environmental and social interests, focus on intergenerational justice and the importance of an integrated approach in the context of digital transformation. This creates a methodological basis for formulating a comprehensive vision of sustainable digital marketing. At the same time, definitions of digital marketing vary from technologically oriented to strategic-philosophical approaches and encompass various morphological features – as a system, tool, set of technologies, type of activity or complex system. This indicates the multidimensionality of the concept and the absence of a single generally accepted interpretation, which necessitates the need for further conceptualization of digital marketing in the context of sustainable development.

The analysis of the concepts of *sustainable development* and *digital marketing* allows us to identify common strategic guidelines and complementary characteristics, in particular, an orientation towards long-term value, innovation, adaptability to environmental changes, an emphasis on effective communication with stakeholders, as well as the desire for social responsibility and environmental balance. Therefore, according to the authors, sustainable digital marketing is an integrated concept and methodological basis for the development, implementation, monitoring and evaluation of marketing strategies in the digital environment, which combines the achievement of economic efficiency with the simultaneous provision of environmental balance and social responsibility. The scientific novelty lies in the formalization of the concept of *sustainable digital marketing* as an integrated methodological system that combines the principles of sustainable development with digital marketing tools based on economic efficiency, social responsibility and environmental balance.

The concept of *sustainable digital marketing* is gaining increasing importance as a comprehensive management paradigm that combines the principles of responsible use of digital resources, protection of personal data, compliance with ethical norms in advertising messages and assessment of long-term financial consequences of marketing decisions. This approach corresponds to the concept of sustainable development defined by the United Nations (Likhonosova, et al, 2025), and supports the idea of integrating economic, social and environmental priorities into business activities.

This topic is especially relevant in the context of the growing role of digital giants, such as Google (Alphabet), Amazon, Apple, Meta and Microsoft, which to a large extent shape the global ecosystem of digital consumption, defining new standards of marketing practice. Their activities demonstrate at the same time the potential for high efficiency of digital communication channels and the risks of excessive data concentration, violation of ethical boundaries of targeting, as well as environmental impact through excessive energy consumption.

In this context, sustainable digital marketing management requires a systemic justification (Likhonosova, et al, 2024), which takes into account the relationship between four key aspects:

- ✓ Financial consequences (impact of digital investments on ROI, security costs, sanction risks due to ethical violations, etc.);
- ✓ Environmental responsibility (reduction of digital footprint, use of *green* technologies in marketing platforms);
- ✓ Cybersecurity (protection of user data, resistance of advertising channels to attacks, security of the software-content environment);
- ✓ Ethical challenges (transparency of data collection and processing, non-discrimination of algorithms, responsibility for content).

5.1. Financial implications of implementing sustainable digital marketing

A special aspect of Sustainable Digital Marketing (SDM) management in leading global companies is the study of the economic feasibility of implementing Sustainable Digital Marketing practices, as well as the analysis of costs, benefits, financial efficiency and examples of successful companies. Such a study should justify why a sustainable approach to digital marketing is worth investing in not only from the point of view of image, but also financial results.

It is clear that the implementation of sustainable and safe digital marketing requires significant financial resources. The areas of such investment can be classified in several key perspectives (Ushenko et al., 2023):

1) Investments in infrastructure and digital technologies. This includes the costs of modernizing websites and online platforms in accordance with the principles of environmental friendliness. In particular, this concerns the use of energy-efficient hosting providers, code optimization to reduce the carbon footprint and ensure digital sustainability. In addition, companies should invest in the purchase of licensed and certified tools for collecting, processing and storing data that meet international standards (e.g. GDPR, ISO/IEC 27001).
2) Investment in staff training. This involves organizing advanced training programs in ethical marketing, data protection, cybersecurity and ESG communications, as well as hiring specialists in digital ethics, compliance and information security.

3) Investment in ensuring digital security and consumer privacy. This area requires financing the implementation of personal data protection tools, in particular SSL certification, two-factor authentication, end-to-end encryption. In addition, an important element is the audit of marketing systems (CRM, advertising platforms, etc.) from the point of view of cyber threats.
4) Investment in ESG communications. The direction involves the development of transparent reports, conducting information and educational campaigns for consumers, creating and promoting verified *green* certificates, and partnering with environmental and social initiatives.

The effectiveness of SDM implementation should be assessed through a key financial indicator – ROI (Return on Investment). It shows how profitable the costs invested in a particular project, campaign or initiative are. It is calculated by the formula (1):

$$ROI = \frac{CR-CE}{CE} \times 100\%. \quad (1)$$

where ROI – Return on Investment;
CR – Revenue from the campaign aimed at implementing SDM;
CE – Expenses for the campaign aimed at implementing SDM.
As a result of the implementation of sustainable digital strategies, positive changes are observed:
Therefore, the ROI value in percentage illustrates how much profit was received for each unit of expenditure. For example, ROI = 30% means that for every 1 dollar of expenditure, the business received 0.30 dollars of net profit. If ROI = 0%, the investment only paid off (without profit or loss), respectively, ROI < 0% indicates that the initiative is unprofitable.
ROI allows you to compare different marketing channels or strategies: for example, a sustainable digital campaign versus a traditional one, organic content versus paid advertising, or campaigns using personalized data versus general. In financial modeling, ROI is used to forecast the return on future marketing investments. This is especially important for sustainable digital marketing campaigns, which may have a longer payback horizon, but provide higher customer loyalty and lower cost of acquisition (CAC) in the future. When discussing the feasibility of switching to sustainable digital marketing, ROI becomes a key argument. Even if the initial investment is higher, positive ROI dynamics in the medium term indicate the strategic profitability of decisions.
Despite the simplicity of calculation, the ROI indicator has a number of limitations: it does not take into account the time factor (unlike NPV or IRR), does not take into account risks or uncertainty (especially relevant for innovative and sustainable initiatives); does not always allow for taking into account intangible benefits – for example, increased brand loyalty, company image, social capital. In this regard, in practice, when assessing the financial performance of implementing sustainable digital marketing, it is recommended to use ROI in conjunction with other indicators: ROAS (Return on Ad Spend), CLV (Customer Lifetime Value), CAC (Customer Acquisition Cost), IRR (Internal Rate of Return) and Payback Period.
Sustainable digital marketing management involves integrating the principles of environmental, safety, social and economic responsibility into all stages of a company's marketing activities. In this context, financial dimensions play a key role, as they provide a quantitative basis for making informed decisions, measuring the effectiveness of marketing strategies and assessing the level of compliance with the principles of sustainable development (table 1).
According to Table 1, we can conclude that at the strategic planning stage, financial indicators are used to form the budget of sustainable initiatives, such as the implementation of environmentally neutral communication channels or investments in secure digital infrastructures. It is important to foresee not only direct marketing costs, but also indirect ones – related to compliance, certification, cyber protection, etc. During the implementation of digital campaigns, financial measurements allow you to control the costs for each marketing channel and project. Indicators such as CPC (cost per click), CPA (cost per acquisition) or CPM (cost per mille) serve to quickly assess the cost of user acquisition, which is extremely important when implementing ethical personalization and working with restrictions on the processing of personal data (GDPR, CCPA). At the stage of analytics and performance assessment, financial ratios play a key role: ROI (Return on Investment) - shows the overall effectiveness of investments in digital marketing; ROAS (Return on Advertising Spend) - demonstrates the payback of specific advertising campaigns; CAC (Customer Acquisition Cost) – reflects the cost of acquiring one new customer; CLV (Customer Lifetime Value) – assesses the long-term value of a customer for the company. These metrics not only help optimize the marketing strategy, but also identify threats of overspending, ineffective targeting, or excessive dependence on paid channels.
A separate level in the sustainable digital marketing management system is data security and ethical responsibility. Financial dimensions in this aspect relate to data protection costs (DLP systems, encryption, auditing), fines for violating regulations, as well as investments in the transparency of digital practices (certification, open data policy). Economic assessment of cyber threat risks allows companies to make informed decisions about liability insurance, expanding IT teams, or modernizing platforms.
At the optimization and performance management stage, financial indicators allow you to analyze the profitability of channels, conduct A/B testing with a clear justification of costs, and also calculate the Payback Period – the

period of payback of marketing investments. This ensures sustainable development and effective management of digital risks.

Table 1. The place of financial dimensions in the sustainable digital marketing management system, source: author's development based on (Likhonosova, et al., 2024; Skarzauskiene, et al., 2021)

Stage management	Key actions	Digital metrics	Financial measurements and indicators
1. Strategic planning	Definition permanent marketing goals, channels, audiences	-	- Budgeting expenses - Cost implementation digital solutions
2. Implementation marketing activities	Carrying out campaigns in social networks, email, SEO, PPC, blogs	CTR, CPC, CPM, Engagement rate	- Expenses on campaigns - Expenses on personalization and automation - Funds on cyber defense
3. Analytics and monitoring efficiency	Rating results campaigns, reporting	Conversion Rate (CR), Bounce Rate, Reach	- ROI: (Revenue − Expenses) / Expenses × 100% - ROAS: Revenue / Expenses on advertising - CAC, CLV
4. Management risks and safety	Protection data users, compliance to standards ethics and regulatory politicians	-	- Expenses on compliance and audit - Potential sanctions / fines - Investments in certification (ISO, GDPR, etc.)
5. Optimization and adoption solutions	Redistribution budget, scaling effective tools	A/B tests, Retention Rate, Lifetime Value	- Payback Period - Profitability channels - Comparison expenses / profits by channels
6. Reverse cycle sustainable development	Adaptation to new standards, ESG reporting, sustainable image	Number permanent initiatives, Eco-indices	- ESG costs - ROI from ecological / ethical campaigns - Integration into financial reporting

Ultimately, in the reverse cycle of sustainable improvement, financial dimensions are used to assess the payback of ethical and environmental initiatives, which is reported through ESG reporting. The cost of such initiatives can be integrated into the company's overall financial statements, forming the basis for decision-making not only at the marketing level, but also at the corporate governance level.

Thus, financial dimensions are a cross-cutting foundation that supports the effectiveness, transparency and adaptability of the sustainable digital marketing system in the current conditions of global security challenges and digital ethics.

Currently, in times of digital market transformation, large transnational digital corporations play a key role in implementing the principles of sustainable development, which form ethical standards for marketing communication and guaranteeing the security of digital data. An analysis of the activities of such digital giants as Google, Amazon, Meta, Apple and Microsoft allows us to identify systemic approaches to integrating environmental, ethical and financial criteria into their digital marketing strategies (Table 2).

Google has developed an innovative approach to assessing the environmental impact of advertising by launching the Carbon Footprint for Google Advertising reports (Segal, 2025), which allows advertisers to measure the carbon footprint of their campaigns. In addition, the creation of the Sustainability Marketing Playbook provides a systematization of green marketing practices for businesses. Google is also actively developing a first-party data strategy that minimizes the use of third-party cookies, contributing to safer and more ethical processing of consumer data.

Amazon demonstrates a high dynamics of integrating ESG principles into marketing activities through the Higher Impact initiative (2025 Higher Impact, 2025), which explores the relationship between brand trust and consumer environmental behavior. The company’s financially significant achievement was a 3% reduction in total emissions and a 13% reduction in emissions intensity by 2023 (Norris, 2023), which indicates a cost-effective transformation of internal processes. In the area of security, Amazon Web Services (AWS) provides access to ESG analytics, which allows companies to assess their risks and adhere to sustainable standards when working with data. In 2025, Meta (Facebook, Instagram, WhatsApp) reported revenue of $42.31 billion in the first quarter (Meta's Q1, 2025), which exceeded analysts' expectations and confirms the profitability of the company's digital advertising tools. At the same time, the company is implementing an ambitious decarbonization policy: reducing emissions by 94% compared to 2017 and providing all facilities with renewable energy. In the area of digital security, Meta is implementing data collection transparency tools and strengthening privacy policies in mobile applications.

Apple is demonstrating a deep integration of the environmental paradigm into brand communications, advancing its transition to carbon neutrality by 2030. The expansion of the Restore Fund by $200 million to finance nature-based carbon removal projects demonstrates the strategic connection between marketing, corporate image and

investment activities. On the security front, Apple is a leader in innovative privacy solutions - in particular, through the implementation of App Tracking Transparency (Apple App Tracking, 2021).
Microsoft is actively developing the direction of sustainable cloud marketing, investing more than 23.6 million MWh in renewable energy by 2023 (What is Microsoft Cloud, 2023) – enough to provide electricity to a metropolis like Paris. The Microsoft Cloud for Sustainability program allows businesses to monitor the carbon footprint of their activities in real time, which is a powerful tool for making financially sound management decisions. The company is also developing new protocols for secure data work, including within cloud services and artificial intelligence.

Table 2. Digital marketing spending of leading technology companies (2022–2024), billion USD, source: author's development based on (Marino, 2024; Johnson, et al, 2024; Norris, 2023)

Company	Year	General costs on marketing	Average CPC/CPA	Key channels	Functional appointment	Dynamics
Google (Alphabet)	2023	$44.34	CPC: $4.22; CPL: $53.52	Search, display advertising, YouTube	Engagement traffic through relevant queries, visualization suggestions, personalization messages	CPC and CPL growth compared to previous years for years
	2022	$42.29	CPC: $3.22; CPL: $43.52	Display Network		
	2021	$36.42	CPC: $2.92; CPL: $39.52	Retargeting		
Amazon	2023	$20.3	CPC: $0.81	Own advertising platform (Amazon DSP, Sponsored Ads)	Promotion goods through recommendatory algorithms, retention customers, incentives repeated purchases	Decrease expenses on general marketing, however magnification on digital marketing
	2022	$20.6	CPC: $0.91	Email marketing		
	2021	$16.9	CPC: $0.63	SEO inside platforms		
Apple	2023	24.93 billion, of which $775 million (display advertising)	CPA: $2.58; CPT: $1.59	YouTube, TikTok, Apple Search Ads	Engagement to Apple products through native ecosystem, increase loyalty, promotion applications	Decrease in CPA and CPT compared to 2022
	2022	$25.09	CPA: $2.28; CPT: $1.29	Branded content		
	2021	$21.97	CPA: $1.98; CPT: $1.69	App Store promotions		
Microsoft	2023	$25.18	CPA: $3.98; CPT: $2.59	Bing Ads, LinkedIn Ads	Target advertising in the B2B segment, promotion Azure, Teams, Dynamics 365 solutions	Growth general expenses on marketing
	2022	$21.83	CPA: $3.99; CPT: $2.34	Content marketing (blogs, webinars)		
	2021	$20.12	CPA: $4.21; CPT: $1.59	Email campaigns		

Thus, judging from Table 2, in Google (Alphabet) the average CPC in 2023 was $4.22, and CPL – $53.52, which indicates an increase in the cost of customer acquisition. In 2023, Amazon reduced advertising spending in the US by 20% ($700 million) compared to the previous year, reducing it to $2.7 billion. In 2023, Apple spent $775 million on display advertising, of which about $512 million was directed to YouTube. The average CPA decreased to $2.58, and the CPT – to $1.59. In Microsoft, total sales and marketing expenses in fiscal year 2023 amounted to $25.18 billion, which reflects the active expansion of the company's marketing initiatives. Thus, digital corporations systematically integrate omnichannel approaches, combining traditional platforms with innovative communication formats. Each channel plays a role in the formation of marketing value, ensuring measurable effectiveness, campaign adaptability, as well as the transformation of costs into strategic brand assets.

5.2. Environmental responsibility in the management policy of sustainable digital marketing

Sustainable digital marketing involves reducing the negative impact of digital technologies on the environment. The field of digital marketing – although not industrial – generates significant energy consumption through the operation of data centers, email mailings, website operation and targeted advertising in real time.
The digital presence of companies today requires awareness of the impact on the ecosystem, including, in particular: CO_2 emissions from digital advertising, energy consumption for server maintenance, e-waste, water load for cooling data centers (Table 3).
The data presented in Table 3 show that various digital marketing tools, despite their intangible nature, have a clearly measurable and sometimes significant impact on the environment. The carbon dioxide (CO_2) emissions associated with typical marketing activities vary depending on the complexity of the operation, the type of digital content and the technical infrastructure that supports it. In particular, sending a single email without attachments generates an average of 4 g of CO_2, and with attachments – up to 19 g, which demonstrates a significant increase

in environmental impact due to the volume of data. At the scale of a large organization that sends tens or hundreds of thousands of emails per month, these values are transformed into tons of carbon emissions annually. For example, for a campaign covering 200,000 emails per month, total emissions can exceed 18 tons of CO_2 per year.

Table 3. Carbon footprint of typical digital marketing tools, source: author's development based on (Sachs, 2015; Skokanova, 2024)

Tool / activity	Average CO_2 emission (grams)	Unit measurement	Note
1 electronic letter without investments	4 g CO_2	for 1 letter	By data Radicati Group (2023)
1 electronic letter from attachment (1 MB)	19 g CO_2	for 1 letter	
Search engine Google query	0.2 – 7 g CO_2	for 1 request	Depends from difficulties and depths request
1000 views banner display ads	60–130 g CO_2	per 1000 impressions	By according to Scope3 data, 2023
1 second 1080p video ads	0.25–0.5 g CO_2	in 1 second	Streaming through mobile networks spends more than Wi- Fi
1 site companies (10,000 visitors / month)	211 kg CO_2 / year	by year	By according to Website Carbon Calculator
Digital advertising campaign average scale	5–8 tons of CO_2	by full cycle campaigns	Scope3, Statista, 2022

Of particular note are the results for video content, which is considered the most energy-intensive type of digital media. It is estimated that one second of 1080p video advertising is accompanied by the emission of 0.25–0.5 g of CO_2, which, at a duration of 30 seconds and a high frequency of displays, creates a significant load. Similar figures are recorded for banner advertising: 1,000 views of display advertising can generate up to 130 g of CO_2.

The highest emissions are observed when implementing medium-scale digital advertising campaigns - from 5 to 8 tons of CO_2 per cycle. This can be equated to the annual electricity consumption of an average household in developed countries. In addition, even a standard corporate website with 10,000 visits per month can cause over 200 kg of CO_2 annually.

Taking into account the above, it is also worth noting that it is a clear fact of the development of the modern world that not all energy is generated only from fossil fuels (coal, oil or gas). Renewable energy sources are becoming increasingly popular all over the world. However, their efficiency still cannot satisfy large consumers (industry).

Digital marketing as a modern tool for business communications and promotion of products and services is increasingly integrated into sustainable development strategies, which is reflected in the global Sustainable Development Goals (SDGs). In particular, digital technologies open up new opportunities for supporting environmental sustainability, among which the use of renewable energy sources (RES) occupies an important place.

Sustainable Development Goal 7 (affordable and clean energy) is aimed at ensuring access to affordable, reliable, sustainable and modern energy sources. The introduction of digital marketing provides a unique space for promoting and encouraging consumers and businesses to switch to RES through the use of digital platforms that allow effectively informing the target audience about the benefits and accessibility of renewable energy, disseminating examples of successful cases and technological innovations. Through digital campaigns, demand is created for *green* products and services that use energy from RES, which supports SDG 12 (responsible consumption). Digital marketing also contributes to the rapid spread of innovative solutions in the energy sector (SDG 9), such as smart meters, energy management systems that optimize consumption.

Despite the growing influence of digital technologies, they also consume significant amounts of electricity, in particular data centers, cloud services, advertising platforms. A responsible digital strategy involves optimizing resources and using *green* energy to reduce the carbon footprint of marketing campaigns.

Therefore, digital marketing acts as a catalyst in achieving sustainable development goals, creating an information and motivational space for the transition to renewable energy sources. In turn, the integration of RES into digital infrastructure helps reduce environmental burden and supports the ethical principles of sustainable marketing.

If the development of society is based on renewable energy sources, then the scope of digital marketing will have no limits. But this may already have ethical consequences of such unlimited use of digital marketing tools and its complete penetration into the life support of every person.

Thus, the analysis demonstrates that implementing digital marketing without taking into account the principles of sustainability leads to a significant technogenic footprint. This requires companies not only to be environmentally responsible, but also to review digital communications strategies in favor of energy-efficient solutions (Table 4), such as the use of *green* data centers, minimizing or compressing video content, reducing the volume of email newsletters, and implementing digital eco-management policies.

Table 4. Comparative assessment of sustainable and unsustainable digital marketing practices, source: author's development based on (Kannan, 2020; Mensah, 2019)

Indicator	Traditional approach	Constant digital approach	Decrease influence, %
Choice hosting	Standard (non-ecological)	Green data centers (100% renewable energy)	up to -80% CO_2 emissions
Email newsletter	Mass mailings without segmentation	Spot marketing, AI- segmentation	up to -40% energy consumption
Type content	Full HD video, without compression	Compressed video, adapted to mobile consumption	-30% energy consumption
SEO/SEM	Without assessments carbon trace	Optimization speed pages, reduction scripts	-25% energy consumption
Using CO_2 analytics in campaigns	Missing	Monitoring Scope3 emissions	-15–30% on campaign

Judging from Table 4, there are significant differences between traditional (unsustainable) and sustainable digital marketing practices in the context of their environmental impact, in particular in terms of energy consumption and associated CO_2 emissions. Each of the key elements of digital marketing activities – from the choice of hosting provider to content management and the use of analytics – has the potential to be optimized for sustainable development. One of the most critical factors is the choice of hosting. The use of standard, non-ecological data centers significantly increases the carbon footprint of companies. The transition to *green* hosting, which operates exclusively on renewable energy sources (solar, wind, etc.), allows you to reduce CO_2 emissions by up to 80%. This approach is already being implemented by leading companies – for example, Google and Microsoft, which are actively investing in *carbon-neutral* infrastructure. In the field of email marketing, a sustainable approach is based on targeted audience coverage using AI segmentation instead of mass irrelevant mailings. This approach reduces not only the load on servers, but also up to 40% of energy consumption, while simultaneously increasing the relevance and ROI of campaigns.

Another area that needs optimization is the content strategy, in particular the use of video formats. Traditional Full HD video without compression creates a significant energy load due to high data transfer volumes. Video compression, optimization for mobile devices and resolution reduction allow you to reduce energy consumption by up to 30%, while maintaining the effectiveness of delivering the marketing message.

SEO and SEM practices are no less important. The implementation of eco-optimized approaches (page loading speed, script minimization, use of lighter image formats) contributes not only to improving user experience indicators, but also to reducing the energy consumption of web resources by up to 25%. The latest approaches involve the implementation of CO_2 analytics in marketing campaigns, in particular, monitoring Scope 3 emissions, which cover indirect emissions related to IT infrastructure and user behavior. According to estimates, systematic monitoring and analysis of this indicator allows reducing the total energy consumption of digital campaigns by 15–30%.

Thus, the implementation of sustainable practices in digital marketing is not only a tool of environmental responsibility, but also a strategy for increasing economic efficiency by optimizing resources, reducing energy costs and creating a positive ESG image of the company. Such actions are relevant in the context of international climate commitments and growing expectations of digital consumers regarding ethics and business transparency.

Thus, environmental responsibility in digital marketing is moving from a trend to a necessity. Saving resources, reducing carbon footprint and reputational benefits are shaping a new paradigm of digital policies of companies. Implementing sustainable digital strategies can reduce emissions by 30–80%, while increasing the effectiveness of marketing campaigns.

The study conducted a detailed comparative assessment of sustainable and unsustainable digital marketing practices, which is based precisely on the issues of sustainable development, and especially on Goals 9 (Innovation and Infrastructure), 12 (Responsible Consumption), and 16 (Peace and Strong Institutions) of the UN 2030 Agenda, which are selected as a priority in this article (Table 5).

Goal 9 is supported by sustainable practices that integrate innovation, technological modernization and digital infrastructure. Unsustainable practices, on the other hand, contribute to technological stagnation, technological inequality and the digital divide.

Goal 12 is achieved through the development of conscious consumer behavior, transparent product communication and the promotion of sustainable consumption patterns. Unsustainable approaches lead to mass overproduction, digital noise and increased advertising waste (e.g. CO_2 emissions from servers in programmatic advertising).

Goal 16 calls for building trust, digital justice and ethical responsibility. Sustainable practices contribute to an open, safe digital environment, while unsustainable practices undermine the foundations of social dialogue, lead to digital mistrust and legal violations.

Therefore, sustainable Digital Marketing provides long-term value, increases consumer trust, reduces reputational and legal risks, and contributes to the implementation of SDG 9 (innovation and infrastructure), SDG 12 (responsible consumption and production), and SDG 16 (strong institutions and justice).

Table 5. Comparative assessment of sustainable and unsustainable digital marketing practices in the context of Sustainable development goals, source: developed by the authors

Criterion assessments	Sustainable digital marketing (corresponds to SDGs 9, 12, 16)	Unsustainable digital marketing (contradicts SDGs 9, 12, 16)
Innovation (SDG 9)	Using ethical innovations: artificial intelligence for personalization without discrimination, blockchain for transparency, Big Data for forecasting demand	Excessive using manipulative algorithms, opaque targeting, non-compliance standards digital infrastructure
Infrastructure	Construction digital ecosystems taking into account user needs, mobility, and inclusivity	Absence inclusivity (e.g., inaccessibility for people with disabilities), ignoring users' needs for protection data
Resource efficiency (SDG 12)	Using *green hosting*, optimization data, digital footprint reduction, awareness content strategy	Mass creating content with high carbon followed by energy consuming advertising campaigns, absence digital responsibility
Ethical advertising (CSR 12)	Compliance principles transparency, honesty, voluntary consent to processing data, avoidance manipulative practices	Clickbait, hidden advertising, fake reviews, dark UX templates, automatic collection personal data without consent
Protection personal data (SDG 16)	Compliance GDPR standards, use encryption, protection digital identities user	Data sales to third parties, improper policy preservation data, ignoring risks cybersecurity
Transparency activities (SDG 16)	Openness in methods collection and use data available politicians' confidentiality	Complicated or hidden information about processing rules data, complex and unclear conditions using
Interaction with users	Construction long-term relationships through values, reverse connection, involvement communities	Focus on fast profit, ignoring reactions users, distribution unreliable information
Social responsibility	Integration of ESG principles in communication, support social initiatives, promotion digital inclusions	Absence support socially important topics, emphasis only on commercial benefits, distribution gender or cultural stereotypes
Management risks	Availability anti-crisis strategies, analysis digital threats, regular renewal politician security	Disregard reputational and ethical risks, lack of a spill response plan data

Table 6. National Cyber Security Index (NCSI) 2019–2024, source: author's development based on (e-Governance Academy Foundation, Statista, VPNRanks)

Country	2019	2020	2021	2022	2023	2024
Poland	85.00	86.67	88.33	90.83	87.01	92.50
Ukraine	72.50	75.83	78.33	80.83	80.83	80.83
Lithuania	85.00	88.33	90.00	93.51	93.51	85.00
Estonia	90.00	91.67	92.50	90.91	93.51	85.83
Czech Republic	88.33	89.17	90.00	90.91	90.91	98.33
Belgium	85.00	86.67	88.33	90.00	94.81	92.50
Italy	80.00	82.50	85.00	87.50	88.31	88.33
Canada	82.50	83.33	85.00	87.50	87.50	87.50
USA	80.00	81.67	83.33	84.17	84.17	84.17
Vietnam	65.00	67.50	70.00	72.50	75.00	78.00
Finland	88.00	89.50	90.50	92.00	93.00	92.81
Norway	87.00	88.00	89.00	90.50	91.50	92.63
Denmark	86.50	87.50	88.50	90.00	91.00	92.45
Sweden	85.00	86.00	87.00	88.50	89.50	91.00
Japan	84.00	85.00	86.00	87.50	88.50	90.00
Singapore	83.00	84.00	85.00	86.50	87.50	89.00
France	82.00	83.00	84.00	85.50	86.50	88.00
Germany	81.00	82.00	83.00	84.50	85.50	87.00
India	70.00	72.00	74.00	76.00	78.00	80.00
Brazil	68.00	70.00	72.00	74.00	76.00	78.00

On the other hand, unsustainable practices, despite possible short-term effectiveness, carry the risks of loss of reputation, sanctions for violations of digital ethics and privacy, as well as reduced consumer loyalty in the context of global digital transformation.

5.3. Cybersecurity as a component of sustainable digital marketing

As digital marketing increasingly relies on the processing of personal data, the collection of information about user behavior and the use of online platforms, cybersecurity issues are becoming critical. The ethical aspects of digital campaigns are closely linked to data security, the transparency of their processing and the ability of companies and government agencies to respond to cyber threats. In this context, it is appropriate to complement the ethical

analysis of digital marketing with the overall level of cyber protection in the countries where the analyzed companies operate. The National Cyber Security Index (NCSI), which assesses the readiness of states to counter cyber incidents and ensure the protection of information systems, serves as a useful tool for such analysis. In this article, we analyze the dynamics of the NCSI over the last available years for a sample of 20 countries (Table 6). This allows us to understand the conditions in which companies that use digital marketing operate, the extent to which their environment supports safe digital interaction, and how this may affect the implementation of ethical principles, in particular in the area of data protection and cyber ethics in general.

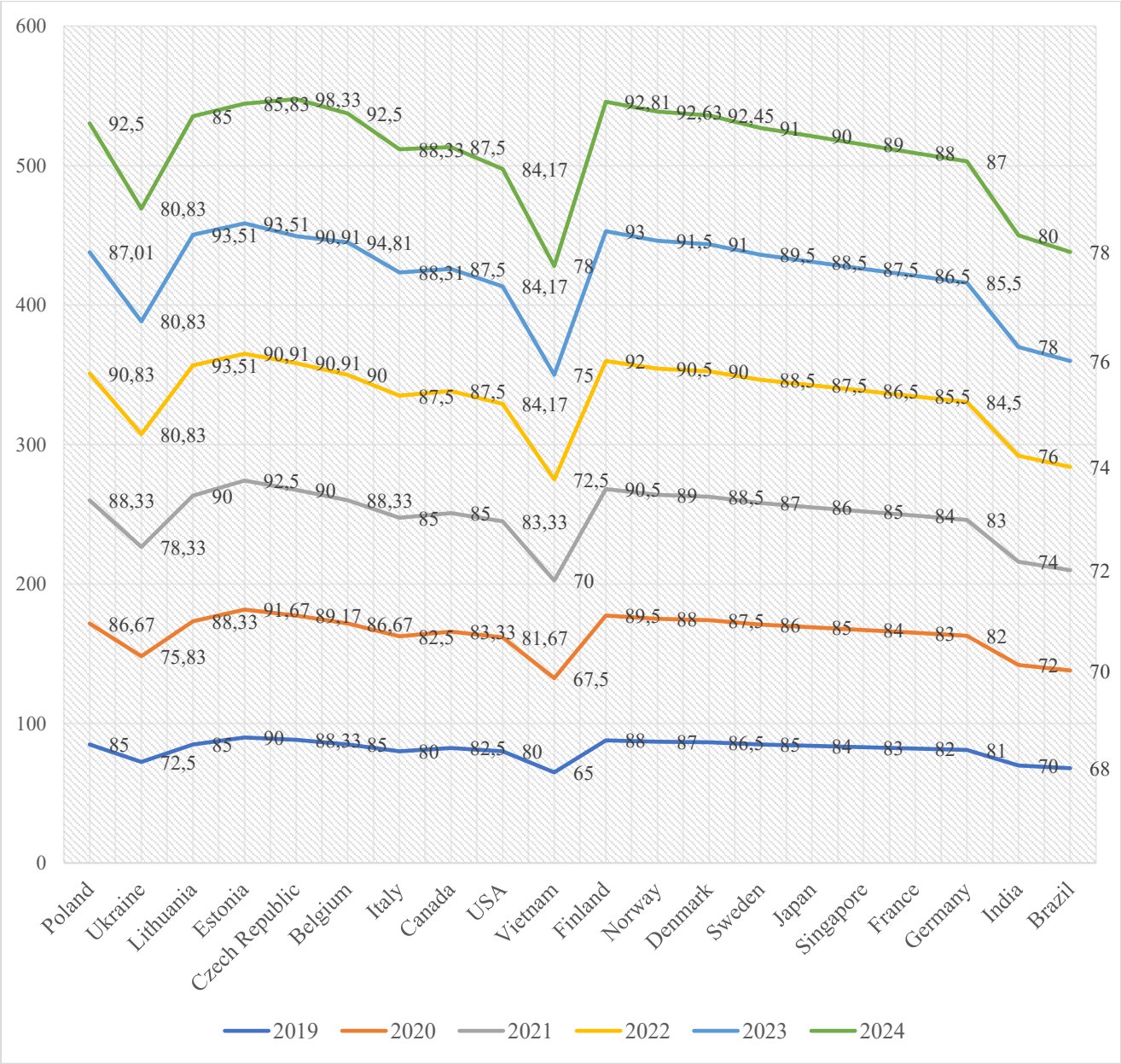

Figure 2. Dynamics of the National Cybersecurity Index 2019–2024, source: developed by the authors based on Table 6

The summary table (Table 6) shows that in most developed countries the level of cybersecurity is gradually increasing, which indicates a consistent improvement in the regulatory framework, cyber incident response infrastructure and public awareness. At the same time, for some countries, such as Lithuania and Estonia, there is a fluctuation in indicators, which may indicate a reassessment of methods or a change in priorities in cyber defense strategies.

For a clearer perception of trends, we also presented the dynamics of the National Cyber Security Index in the form of a diagram, which allows you to track the change in indicators in each country during 2019–2024 and identify leaders and outsiders in the field of cyber defense (Figure 2).

The analysis of the National Cybersecurity Index allowed us to integrate an important component – digital security – into the broader context of sustainable digital marketing management. The use of this index in the study not only expands the understanding of factors that affect the ethics and security of digital campaigns, but also allows us to assess the extent to which the environment in individual countries is conducive to the implementation of responsible digital business.

5.4. Ethical challenges of implementing digital marketing practices

In today's digital environment, marketing campaigns have not only commercial but also significant social and ethical impact. To assess the compliance of marketing strategies with the principles of sustainable development, it is important to consider the transparency of communications, the protection of personal data, fairness, social and environmental impact, as well as the risks of manipulation. For this purpose, an ethical matrix was developed (Table 7) – a tool that allows you to systematically evaluate a marketing campaign according to a number of ethical criteria.

Table 7. Ethical matrix for digital marketing, source: developed by the authors

Criterion	Description	Question for analysis	Rating (1-5)	Comment
Transparency	Or campaign clearly informs user?	Or indicated who initiator advertising?		
Protection data	As company works with personal data?	Is there consent? on processing data? Or safe storage?		
Justice	Or campaign not discriminates separate groups?	Or taken into account gender, age, social aspects?		
Social influence	Or campaign has positive or negative effect?	Or contributes advertising sustainable development / health?		
Manipulation	Is there pressure? or cheating in the content?	Is there a hidden advertising or insurance manipulation?		
Environmental friendliness	Or takes into account campaign ecological aspects?	Or advertising stimulates stable behavior consumer?		

Implementing an ethical matrix not only allows you to identify weaknesses in marketing strategies, but also helps build consumer trust, increases transparency and strengthens the brand's reputation. This approach also allows companies to systematically assess the compliance of their digital campaigns with key ethical criteria, which is especially important in the context of the global demand for sustainable development.

To illustrate the practical application of the ethical matrix, we have selected 10 leading international companies that actively use digital marketing and at the same time declare their commitment to environmental values. Among them are manufacturers of clothing, cosmetics, appliances, furniture, food products and coffee drinks. All of them implement various formats of environmental initiatives, inform consumers through digital platforms and create communication campaigns with elements of social responsibility, namely:

Patagonia – promotes the ideas of conscious consumption and the fight against overproduction.

Unilever – promotes sustainable brands through digital channels, emphasizing ethical supply practices.

Lush Cosmetics – actively includes environmental themes in social media and supports a zero-waste approach.

The Body Shop – integrates packaging reuse initiatives into digital communications.

IKEA – stimulates environmental behavior through online recycling and furniture reuse programs.

Ben & Jerry's – combines social messaging with digital communication channels.

Nike – talks about the transition to zero emissions in production through a digital platform.

Apple – leads an information campaign about reducing its carbon footprint and responsible packaging.

Table 8. Ethical matrix for digital marketing (1 – low score, 5 – high), source: developed by the authors

Company	Transparency	Protection data	Justice	Social influence	Manipulation	Environmental friendliness
Patagonia	5	4	5	5	5	5
Unilever	4	4	4	5	4	5
Lush Cosmetics	5	4	5	4	5	5
The Body Shop	4	4	5	4	4	5
IKEA	4	3	4	4	4	5
Ben & Jerry's	5	4	5	5	5	4
Nike	4	4	4	5	3	4
Apple	4	5	4	4	3	4
Starbucks	4	3	4	5	4	4
Timberland	5	4	4	5	5	5

Starbucks – implements reusable tableware programs and promotes them online.
Timberland – creates powerful digital campaigns dedicated to planting trees and restoring the environment.
Based on an analysis of each of these companies' digital presences, we applied an ethics matrix (Table 8) that allows us to evaluate their marketing efforts according to six key criteria: transparency, data protection, fairness, social impact, manipulation and sustainability. The table presents the results of this analysis, demonstrating the degree to which ethical principles are integrated into the digital marketing of these brands.

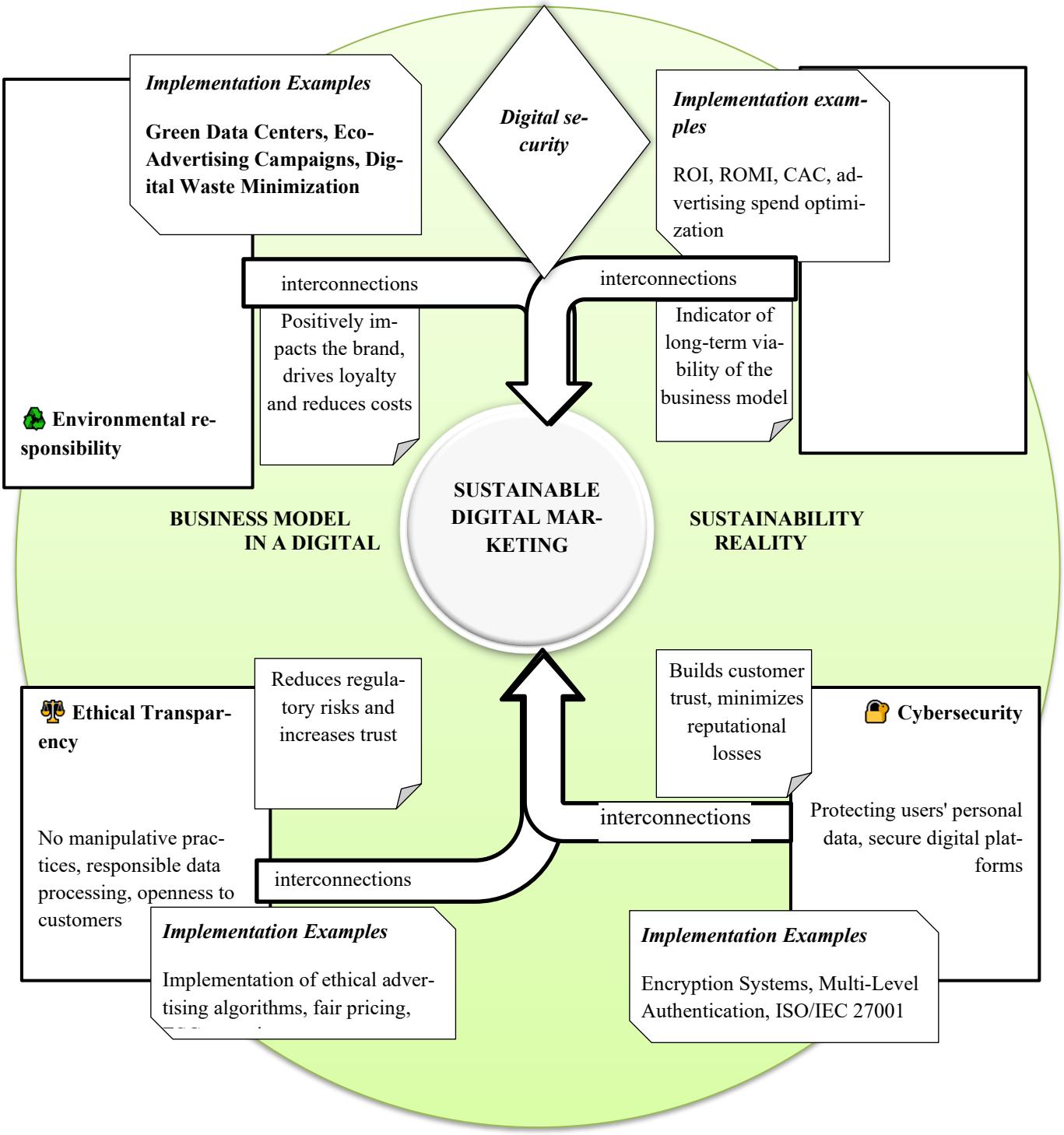

Figure 3. Components of the sustainable digital marketing management mechanism that ensure the sustainability of the business model in the digital reality, source: developed by the authors

The analysis of the ethical matrix showed that companies that consistently integrate environmental and social principles into their digital communication demonstrate high results on most criteria. For example, Patagonia, Ben & Jerry's and Timberland received the highest scores due to their transparent approach to communication, strong social messaging and active promotion of sustainable practices. Unilever, Lush and The Body Shop also have a high level of ethics, especially in the areas of sustainability, fairness and social impact, although certain aspects (such as data protection or avoidance of manipulation) still need to be improved.

In the case of Apple and Nike, although the companies demonstrate ambitious environmental goals, the ethical matrix revealed gaps in transparency and in some cases the use of manipulative elements in communication. This indicates the need for a deeper integration of ethical standards into the marketing strategy.

Thus, using the ethical matrix allows not only to assess the current level of responsibility of digital campaigns, but also to outline vectors for further development. This is especially true for brands that strive to meet the expectations of modern consumers, who increasingly prefer transparency, honesty and an ethical approach.

Thus, analyzing the practices of digital corporations, we can see that sustainable marketing has already ceased to be an exclusive function of image positioning and is becoming a financially significant element of management strategy. Environmental responsibility, financial performance, ethical transparency and cybersecurity are becoming interconnected components of the sustainable digital marketing management mechanism, which not only build consumer trust, but also ensure the sustainability of the business model in the new digital reality (Figure 3).

In order to practically understand the synergistic impact of the relationships between the key components of the sustainable digital marketing policy shown in Figure 3 on the sustainability of the business model in the digital transformation, it is advisable to reveal the explanation of a separate type of relationship.

The relationship between environmental responsibility and financial performance consists in reducing the operating costs of companies, in particular in terms of data center maintenance, server equipment and logistics, reducing the carbon footprint by optimizing energy consumption and implementing environmentally friendly technologies. This contributes not only to the positive positioning of the brand in the market, but also increases profitability indicators, such as ROI (Return on Investment) and ROMI (Return on Marketing Investment). For example, switching to renewable energy sources to power server infrastructure can reduce electricity costs by 20–40% in the medium term, which directly increases the financial efficiency of digital marketing campaigns.

Companies that adhere to the principles of ethical collection, storage and use of personal data simultaneously reduce the risk of legal sanctions and data leaks (ethical transparency ↔ cybersecurity). For example, the use of opt-in only users, data encryption, and auditing of digital advertising algorithms allow for a high level of transparency and security. As a result, trust is formed with customers and partners, which becomes the basis for sustainable long-term relationships, and the cost of restoring reputation after incidents is reduced.

Investing in reliable cyber security solutions — multi-level authentication, regular Pen-tests, compliance with ISO/IEC 27001 standards — helps prevent significant financial losses in the event of attacks or leaks (cyber security ↔ financial performance). According to IBM (2023), the average cost of a security breach for a large company is about $4.45 million. Thus, proactive cybersecurity directly affects financial performance, reducing potential losses and costs of eliminating the consequences of incidents.

Ethical transparency and environmental responsibility are mutually reinforcing elements of sustainable brand positioning. Companies that demonstrate both social and environmental responsibility create a holistic image of responsible business. For example, transparent reporting in the ESG (Environmental, Social, Governance) format, which includes both environmental initiatives and ethical business practices, is positively perceived by consumers and investors. This approach forms the basis for sustainable trust-centric marketing and sustainable growth of the company in the market.

Thus, the integration of the above interdependent components into a sustainable digital marketing strategy contributes not only to the implementation of corporate responsibility, but also to increasing the financial viability of the business, resilience to crises and competitiveness in the digital age.

6. Discussion

The findings of this study contribute to the growing body of literature on sustainable digital marketing (SDM) by proposing a multidimensional framework that integrates financial performance, ethical principles, environmental concerns, and cybersecurity. Compared to previous studies (e.g., Belz & Peattie, 2009; Lim et al., 2021), which often treat sustainability in marketing from a narrow perspective – focusing either on environmental or ethical dimensions – this research attempts to holistically conceptualize SDM as an integrated management system aligned with the principles of sustainable development.

One notable feature of this study is the development of an ethical matrix for digital marketing, which supplements earlier models by incorporating practical guidelines for value-based decision-making in marketing strategy. This approach resonates with the principles of stakeholder theory (Freeman, 1984) and addresses the growing demand for corporate accountability in digital ecosystems. However, ethical frameworks are context-sensitive and lack

universal applicability. Therefore, the proposed matrix should be treated as a flexible tool, adaptable to the specific cultural, legal, and industrial settings of each company.

The study suggests that implementing a sustainable digital marketing policy not only provides environmental benefits but also creates long-term competitive advantages and positive financial results. According to the Digital Marketing Institute, most global companies are already integrating ESG indicators into their marketing strategies (Digital Marketing Institute, 2022). As empirical data and industry analytical reviews have shown, implementing environmentally responsible digital marketing – in particular, switching to *green* hosting platforms, optimizing video content, using energy-efficient advertising formats – allows companies to reduce CO_2 emissions by 20–80%, depending on the chosen tool. This directly correlates with the ESG indicators of companies, which are now crucial for attracting investors, especially in the field of venture financing, fund operations, and government support for innovation. Leading digital market players – such as Google, Microsoft, and Apple – have already publicly declared their goals to achieve carbon neutrality and are investing billions of US dollars annually in optimizing their digital infrastructure in accordance with the principles of sustainable development. For example, Microsoft has been working since 2020 to achieve *carbon negative* by 2030 and as of 2023 has spent over $1 billion on relevant initiatives. This confirms the economic viability of green innovations even in the short term.

However, along with environmental efficiency, significant ethical challenges arise, in particular: manipulative behavior of targeting algorithms, lack of transparency in the collection and processing of users' personal data, the use of psychological pressure through AI-optimized content. These aspects are causing growing concern among consumers, regulators, and the public, as evidenced by the increase in the number of lawsuits against digital corporations (in particular, Meta and Google) for violating GDPR and similar acts. Digital marketing compliance with the European GDPR regulation requires the integration of ethical standards and increased requirements for the processing of personal data (European Commission, 2021). Ethical transparency – including open access to data processing policies, informed user consent, and responsible use of personalized algorithms – is becoming a critical factor in brand trust. As noted in an analytical review by Harvard Business Review, ethical transparency is increasingly determining the long-term competitiveness of a brand (Harvard Business Review, 2022). Companies that do not integrate ethical practices into digital marketing face the risk of reputational damage, fines, and loss of consumer loyalty, which in a highly competitive environment can have a significant financial impact.

Another key element that enhances the importance of sustainable digital marketing is cybersecurity. The rise in cyberattacks, including phishing, ad-supported attacks, and exploitation of marketing analytics vulnerabilities, requires the integration of protection across all stages of digital interaction. According to an IBM Security report, the average cost of a data breach for a digital services company is $4.45 million (IBM Security, 2023), significantly higher than in traditional sectors. Thus, implementing secure data processing protocols, investing in encryption and cybersecurity, and auditing third-party vendors (DSPs, analytics) is not only a technical but also a strategic management task. Integrating cybersecurity into a sustainable marketing policy ensures the integrity of the business model and minimizes the financial risks associated with attacks on consumer data and brand communications.

Financial metrics that reflect the effectiveness of sustainable marketing solutions are multidimensional. They include not only direct costs of digital campaigns but also indicators such as ROI of investments in *green* technologies, cost of customer acquisition (CAC) within ethical strategies, reputational risk index, losses from data leakage, as well as the percentage of reduction in indirect costs due to reduced energy consumption. Building a comprehensive system of financial KPIs to assess sustainable digital marketing allows organizations to make informed strategic decisions regarding investments, automation, and ESG compliance. Thus, sustainable digital marketing management acts as an interdisciplinary platform where financial efficiency, ethical responsibility, cybersecurity, and environmental sustainability intersect. The conducted study confirms that the integration of sustainable development principles into digital communications not only reduces risks for the brand but also increases consumer trust, optimizes costs, and strengthens the competitiveness of the company. This is confirmed by the strategic initiatives of global corporations (Google, Microsoft, Apple), which direct billion-dollar budgets to environmental, ethical, and security improvements of their marketing practices.

Nonetheless, this study is not without limitations. Firstly, the empirical component is based on secondary data and illustrative indicators rather than original data collection. The selection of technology companies, although justified by market share and availability of reports, lacks a transparent and reproducible methodology. Secondly, the expert evaluation process – while conceptually relevant – is insufficiently formalized, and its validation mechanism is underdeveloped. These limitations restrict the generalizability of the findings and suggest the need for more robust empirical methodologies in future research.

Further investigations could focus on cross-national comparisons to reveal how SDM strategies vary across regulatory environments and cultural contexts. Moreover, longitudinal studies might capture the evolution of sustainable marketing practices over time, especially under the influence of ESG (Environmental, Social, and Governance) frameworks and EU digital regulation policies (such as the Digital Services Act).

In conclusion, while the study provides a theoretical contribution to the discourse on sustainable digital marketing, it requires empirical deepening and methodological refinement. Future research should aim to build on this conceptual foundation by integrating original data, stakeholder interviews, and comparative assessments across sectors and countries.

7. Conclusions

Summarizing the above, it should be noted that the article examines modern approaches to managing sustainable digital marketing with an emphasis on financial, security and ethical aspects. Based on the analysis, general conclusions were drawn that have both theoretical and practical significance for digital strategies of enterprises. It was established that sustainable digital marketing is a significant factor in long-term business growth, as it combines economic efficiency with environmental and social responsibility. Such practices form a new system of values in the interaction between the brand and the consumer, where transparency, trust and digital ethics are priorities. It is proven that the financial consequences of implementing sustainable digital practices have an amortized effect: despite the increase in costs at the initial stage (development of data protection policies, implementation of digital technologies, investments in security), in the future this ensures a reduction in operational risks, cost optimization, an increase in the level of customer loyalty and competitiveness. It is outlined that cybersecurity is a critically important element of sustainable digital marketing. Effective security risk management requires the implementation of comprehensive measures: compliance with international standards (in particular, GDPR), protection of users' digital identity, ensuring the integrity of marketing platforms.

Particular attention is paid to ethical issues in the field of digital marketing. It has been established that compliance with ethical principles – in particular, voluntary consent to data processing, non-discrimination, transparency of personalization algorithms – is the key to forming sustainable relationships between a company and its target audience. The integration of ESG approaches (Environmental, Social, Governance) into digital marketing activities allows not only to ensure compliance with modern requirements of sustainable development, but also creates reputational and investment advantages in the global market.

In summary, we note that effective management of sustainable digital marketing requires a systemic approach, which includes the implementation of digital data management platforms, the use of artificial intelligence to monitor ethical standards, as well as the continuous development of digital competence of personnel. Further research should focus on empirically assessing the impact of such strategies on the financial sustainability of companies in different industries.

The scientific novelty lies in combining the ethical assessment of digital marketing with the level of national cyber readiness. This approach allows for a comprehensive analysis of the relationship between macro-level cyber security conditions and micro-level practices of individual companies. The results can be useful both for researchers in the field of digital ethics and marketing, and for strategic planning of international businesses that work with personal data and communicate through digital platforms. Thus, the inclusion of NCSI indicators in the research structure strengthens the interdisciplinary approach, combining issues of sustainable development, ethics, marketing and cybersecurity.

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