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SUSTAINABLE DEVELOPMENT OF ENTERPRISES IN THE CONTEXT OF CIRCULAR AND DIGITAL TRANSFORMATION: INTEGRATION OF ESG APPROACHES, OMNICHANNEL MARKETING, AND FINTECH SOLUTIONS IN THE SYSTEM OF FINANCIAL AND ECONOMIC SECURITY

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Abstract. *The article examines the theoretical and applied aspects of sustainable development of enterprises in the context of circular and digital transformation of the economy. It is substantiated that the modern business environment is shaped by the interaction of three key vectors – ESG approaches, omnichannel marketing, and fintech solutions – which are gradually transforming from separate management tools into interconnected elements of a unified system for ensuring the financial and economic security of enterprises. It is demonstrated that traditional approaches to security, primarily focused on financial indicators, are insufficient in the context of increasing digital, network, and regulatory risks. The study analyses contemporary scientific approaches to the integration of ESG into strategic management, the development of omnichannel models of customer interaction, and the implementation of fintech innovations in enterprise activities. It is established that the scientific literature is dominated by the study of individual or pairwise relationships (ESG – financial performance, omnichannel – customer loyalty, fintech – innovation), while the comprehensive integration of these elements within a unified system of financial and economic security remains insufficiently developed. Based on a systemic approach, an integrated model for ensuring the financial and economic security of enterprises is proposed, combining strategic (ESG), customer-oriented (omnichannel marketing), and transactional-control (fintech) components. It is shown that their synergy enhances the stability of cash flows, reduces risks, ensures transparency of operations, strengthens stakeholder trust, and increases the investment attractiveness of enterprises. Particular attention is paid to the role of digital data, payment infrastructure, open banking, and digital identification systems in shaping business resilience. The practical significance of the results lies in the possibility of applying the proposed model to form a comprehensive system for managing the sustainable development of enterprises, taking into account the interconnection of economic, technological, and security factors.*

Keywords: *sustainable development, ESG, omnichannel marketing, fintech, financial and economic security, digital transformation, circular economy.*

Statement of the problem. Marketing and fintech are no longer autonomous managerial domains. They operate as interdependent mechanisms that ensure revenue stability, liquidity, customer trust, regulatory compliance, and the ability of enterprises to withstand shocks. This logic is supported by OECD data [1]. According to the OECD, the ICT sector in OECD countries grew approximately three times faster than the overall economy during 2013–2023, with an average growth rate of 7.6% in 2023.

At the same time, according to UN Trade and Development, business-to-business (B2B) e-commerce sales across 43 countries, accounting for nearly three-quarters of global GDP, increased by almost 60% between 2016 and 2022, reaching USD 27 trillion. For enterprises, this indicates that digital channels are no longer auxiliary; they are becoming the core of demand generation, data flows, and financial transactions [1].

In parallel, the circular component of sustainable development is gaining increasing importance. According to the Ellen MacArthur Foundation, approximately 45% of global greenhouse gas emissions are associated with the production and use of products, materials, and food. In Europe, the transition to a circular economy could generate annual benefits of up to EUR 1.8 trillion by 2030. This shifts circularity from the domain of "environmental responsibility" to that of resource efficiency, reduced price and raw material volatility, and enhanced profitability and adaptability of business models [2].

According to McKinsey & Company, among a sample of 2,269 companies outperforming their peers simultaneously in growth, profitability, and ESG performance, median revenue growth reached 11% per year, exceeding other profit-growing companies by 2.5 percentage points in excess shareholder returns. PwC reports that 71% of investors believe companies should integrate ESG and sustainability directly into corporate strategy, while 86% consider a company's ability to withstand crises as a key investment factor [3]. Thus, sustainable development is increasingly evaluated by investors not merely as a reputational attribute but as a financially material characteristic.

The fintech component has also acquired systemic importance. According to KPMG, global fintech investment declined to USD 95.6 billion across 4,639 deals in 2024, marking a seven-year low; however, payments remained the most attractive segment, attracting USD 31 billion in investment [4]. According to McKinsey & Company, as of July 2023, publicly listed fintech companies had a market capitalization of USD 550 billion, while 272 fintech "unicorns" were collectively valued at USD 936 billion [5]. This indicates that even amid market slowdown, fintech remains a structural environment through which payments, identification, lending, analytics, compliance, and cybersecurity are executed.

The security context further intensifies the problem. According to the World Economic Forum, in the *Global Risks Report 2026*, 18% of respondents identified geoeconomic confrontation as the number one risk for 2026, while 14% pointed to interstate armed conflict. In the *Global Cybersecurity Outlook 2026*, 94% of respondents identified artificial intelligence as the most significant driver of change in the cyber domain over the coming year; 87% identified AI-related vulnerabilities as the fastest-growing cyber risk; and 65% of large companies cited third-party and supply chain vulnerabilities as the primary barrier to achieving cyber resilience [6].

In such an environment, financial and economic security can no longer be constructed without incorporating digital, behavioral, and network perspectives.

For Ukraine, this issue has even greater practical relevance. According to National Bank of Ukraine data, in 2024 the share of cashless payment card transactions reached 64.5% by value and 94.6% by volume; the total number of successful electronic identifications via the NBU BankID system amounted to 87.7 million; and the NBU's System of Electronic

Payments (SEP) processes more than 99% of interbank payments, having executed approximately 483 million transactions totaling over UAH 241 trillion in 2024.

As of July 25, 2025, the National Bank of Ukraine formalized regulatory requirements for open banking, including API access, authentication, and cybersecurity standards [7]. At the same time, as early as 2023, the Ministry of Economy of Ukraine explicitly linked the country's recovery to ESG principles, macro-financial stability, and security [8]. This indicates that Ukrainian businesses already operate in an environment where sustainable development, fintech, and security are embedded within a unified institutional framework.

Thus, the scientific problem lies not in examining the individual effects of ESG, omnichannel strategies, or fintech, but in developing an integrated approach that explains how these three components jointly shape the financial and economic security of an enterprise in the context of circular and digital transformation. This requires aligning sustainability objectives, customer omnichannelity, and financial and payment technologies in a way that does not create new vulnerabilities but instead enhances enterprise resilience.

Analysis of latest research and publications. Recent research has developed into three relatively distinct scientific domains. The first concerns ESG and financial performance. In their study, Gunnar Friede, Timo Busch, and Alexander Bassen demonstrate that approximately 90% of empirical studies report a non-negative relationship between ESG and corporate financial performance [9]. Studies by Xin Guo and Weiyan Pang [10], as well as Wei Zhang, Ke Yang, and Xue Li [11], show that digital transformation enhances ESG performance through innovation, the reduction of financial constraints, and improved information transparency.

The second domain concerns omnichannel marketing and cross-channel integration. Peter C. Verhoef, P.K. Kannan, and J.J. Inman established the understanding of omnichannelity as the synergistic management of channels and customer touchpoints [12]. Research by Lanlan Cao and Li Li demonstrates that cross-channel integration stimulates sales growth [13]. Cai and Lo identified seven domains of omnichannel management but explicitly pointed out the limited attention to the role of emerging technologies and the insufficient integration of the security dimension [14].

The third domain focuses on fintech as a driver of organizational transformation. Peter Gomber, Robert J. Kauffman, Chris Parker, and Bruce W. Weber proposed a comprehensive framework of fintech innovations across payments, lending, investing, and risk management [15]. Xinhao Huang, Di Li, and Meng Sun showed that fintech improves ESG performance by reducing financial constraints and enhancing environmental disclosure [16]. While this represents an important step toward integrating fintech into sustainable development frameworks, it still lacks sufficient consideration of omnichannel customer behavior and the broader contours of financial and economic security.

Ukrainian academic literature primarily focuses on digital financial security, financial inclusion, and enterprise adaptation to digital transformation. In particular, the study by O. Desiatniuk and O. Ptashchenko emphasizes that digital transformation is reshaping the very nature of financial security of enterprises in the context of globalization [17]. O. Polinkevych, V. Trynchuk, and V. Kucherenko demonstrate that the integration of ESG principles into strategic management enhances the long-term resilience of enterprises but requires the adaptation of managerial mechanisms and standards [18]. I. Britchenko, O. Polinkevych, V. Trynchuk, and I. Khovrak argue that the COVID-19 crisis accelerated the transformation of business models toward sustainability and increased enterprise resilience [19]. Furthermore, O. Polinkevych, V. Trynchuk, L. Horbatiuk, V. Kostiuk, and I. Zelenytsia show that omnichannel marketing enhances financial inclusion and improves the effectiveness of

customer interaction in the financial sector [20]. However, domestic research still provides limited coverage of the tripartite integration of ESG, omnichannel strategies, and fintech, while circular transformation is more often examined separately from marketing instruments and financial architecture.

The literature provides substantial coverage of pairwise relationships such as "ESG–financial performance," "omnichannel–customer loyalty/sales," and "fintech–innovation/inclusion." However, there is a lack of studies that integrate these elements into a unified system of financial and economic security of the enterprise, particularly in the context of circular business models, the rise of cyber risks, the API economy, and increasing regulatory requirements. It is precisely this gap that defines the research niche of the present study.

Statement of objective. The aim of the study is to develop theoretical and methodological foundations as well as practical recommendations for forming an integrated model of financial and economic security of enterprises based on the synergy of ESG approaches, omnichannel marketing, and fintech solutions in the context of circular and digital transformation. To achieve this aim, the following objectives are defined: to clarify the economic essence of financial and economic security of enterprises under conditions of circular and digital transformation; to generalize theoretical approaches to ESG, omnichannel marketing, and fintech as interrelated elements of sustainable development; to examine the mechanisms of their impact on revenue generation, liquidity, risk management, and investment attractiveness of enterprises; to substantiate the role of digital data and the integration of information systems in ensuring financial and economic security; to develop an integrated model for managing the financial and economic security of enterprises based on ESG, omnichannel marketing, and fintech solutions; and to identify practical directions for implementing the proposed model in enterprise activities.

Research Methods. A combination of general scientific and special research methods was employed in the study. The method of comparison and juxtaposition was used to analyse international and domestic experience in digital transformation, the development of fintech infrastructure, the implementation of ESG approaches, and omnichannel strategies. Content analysis was applied to examine academic publications, analytical reports of international organizations, consulting firms, and regulatory bodies in order to identify current trends in sustainable business development. System analysis made it possible to consider ESG, omnichannel marketing, fintech solutions, and financial and economic security as elements of a unified integrated enterprise management system. The methods of generalization and scientific abstraction were used to formulate theoretical provisions and to develop an integrated model for ensuring the financial and economic security of enterprises. Case study analysis was employed to examine Ukrainian practices in the functioning of payment infrastructure, digital identification, and the regulatory environment.

Presentation of principal material of the research. In the context of the transition to circularity and digitalization, the financial and economic security of an enterprise can be defined as its ability to maintain the continuity of cash flows, solvency, investment attractiveness, regulatory compliance, and stakeholder trust under conditions of increasing technological, network, and geoeconomic turbulence. Within this framework, ESG performs the function of a "strategic framework," omnichannel marketing acts as a "mechanism for stabilizing demand and customer value," and fintech serves as a "transactional and control layer." It is precisely the integration of these three functions that forms a resilient model of enterprise development.

Within this model, ESG should not be perceived merely as a reporting framework. The environmental component directly affects resource dependence, energy intensity, material costs, and sensitivity to climate and regulatory shocks. The social component influences

workforce stability, reputation, inclusiveness, and the quality of customer interactions. The governance component impacts control mechanisms, data transparency, internal auditing, and crisis management. McKinsey's evidence on "triple outperformers" [3; 5], together with KPMG's position on investor expectations [4], indicates that ESG functions both as a mechanism for access to capital and as a framework for reducing systemic risks. In the Ukrainian context, this aligns with the approach of the National Bank of Ukraine [7; 8], which explicitly identifies ESG integration as a prerequisite for the sustainable growth of the financial sector.

Within the system of financial and economic security, omnichannel marketing performs a significantly broader role than mere promotion. Its direct effect lies in reducing revenue volatility by increasing the frequency of customer interactions, repeat purchases, and improving demand predictability. However, its indirect effect is even more important. Specifically, integrated channels provide enterprises with higher-quality data on consumer behavior, returns, refusals, price sensitivity, and channel-switching patterns, thereby improving inventory management, production planning, and returns management within circular models. This is why, in the studies by Cao and Li [13] and Gao and Huang [21], the positive impact of cross-channel integration is observed not only in sales but also in customer trust, engagement, and loyalty. This is particularly critical for circular business models. Without an omnichannel layer, it is difficult to scale trade-in schemes, resale or secondary sales, repair or refurbishment, subscription models, take-back systems, and other mechanisms for value recovery from already sold products.

Fintech solutions within this system serve as the infrastructure of speed, authentication, and transparency. This extends beyond payment services to include tools such as instant payments, open banking, digital identification, antifraud solutions, API integration, regulatory technology (regtech) analytics, digital wallets, automated payment reconciliation, scoring systems, and risk monitoring. Ukraine is characterized by a high share of cashless transactions (94.6% by volume and 64.5% by value in 2024) [7], active use of the NBU BankID system (135 participants and more than 30% growth in identifications in 2023) [22], and the systemic role of the System of Electronic Payments (SEP), which processes over 99% of interbank payments and executes approximately 1.2 million transactions daily [23]. This forms a solid foundation for the development of open banking. All of this indicates that the domestic economy already possesses the core infrastructure necessary for integrating fintech into enterprise financial and economic security models. However, risk exposure is simultaneously increasing: dependence on third parties, API vulnerabilities, the shift of risks from the payment layer to the data layer, as well as cybersecurity threats which, according to the World Economic Forum, are increasingly shaped by artificial intelligence, geopolitics, and the fragility of supply chains.

The alignment of ESG, omnichannel, and fintech logics is possible only through shared data and integrated management. If ESG is reflected in non-financial reporting, marketing in CRM systems, and fintech within banking and payment infrastructures, the enterprise ends up with three isolated information domains. Within such a configuration, it becomes impossible to promptly address questions that are central to security, namely: how a supplier's ESG risk affects product availability across all channels; how an increase in returns in a specific channel impacts liquidity; how instant payments or API-based access to accounts alter the fraud risk profile; and how resale or repair programs influence gross margins and inventory turnover. Therefore, a financial and economic security system must begin with a unified data model and a comprehensive risk mapping framework. This constitutes the key methodological shift from a "set of digital projects" to an "architecture of resilience."

The model of integrating ESG approaches, omnichannel marketing, and fintech solutions within the system of financial and economic security is presented in Figure 1.

The strength of this model lies in its ability to integrate value-based and control dimensions. ESG defines the criteria for what constitutes acceptable development; omnichannel marketing determines where and how customer revenue is generated; and fintech specifies how quickly and securely this revenue is transformed into a manageable cash flow. The financial and economic security block is embedded within transactions, channels, procurement policies, product architecture, and data governance.

The practical significance of the model lies in enabling enterprises to move from fragmented initiatives to a coherent management program. First, it is necessary to develop a unified KPI framework that integrates ESG metrics with marketing and financial indicators, including energy intensity, return rates across channels, share of repeat purchases, average collection period, share of instant payments, fraud rate, frequency of cyber incidents, proportion of certified suppliers, and the share of revenue derived from circular products and services.

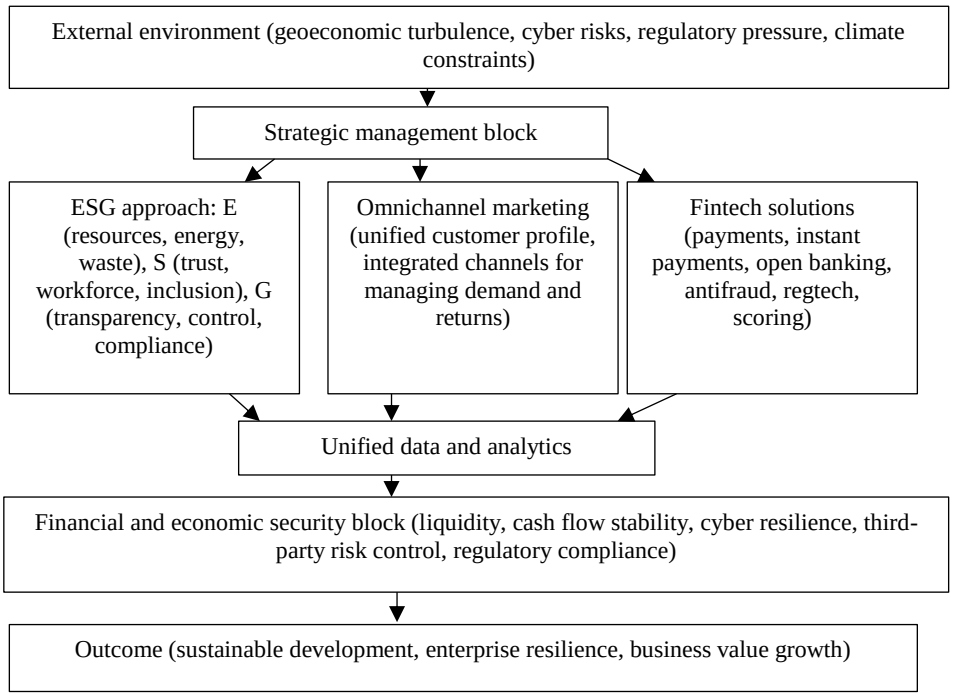

Figure 1. Integrated model of financial and economic security management of an enterprise based on ESG, omnichannel marketing, and fintech solutions

Source: developed by the author

Second, ESG principles should be embedded into investment and operational decision-making processes, including budgeting, procurement, counterparty assessment, incident management, and data policies. Third, omnichannel strategies should be designed not merely around “brand availability” but around full control of the customer lifecycle—from

acquisition to product reuse. Finally, fintech solutions should be evaluated not only in terms of return on investment but also with regard to cybersecurity risks, vendor and counterparty risks, and their impact on payment continuity.

For enterprises, it is advisable to establish a unified board or cross-functional committee on digital transformation, ESG, and risk management; to integrate channel and payment data with ESG metrics into a common BI/ERP environment; to implement dedicated continuity scenarios for payments, identification, and cyber incidents; to treat omnichannel strategies not only as a sales instrument but also as a mechanism for organizing reverse flows, including repair, returns, and resale; and to adopt open banking and instant payments only in conjunction with strong authentication, third-party risk assessment, and robust data governance policies. Within this framework, security ceases to be a cost function and becomes a productive infrastructure for sustainable development.

Conclusions and perspectives of further research work. The conducted review provides grounds for several generalizations. First, sustainable enterprise development under current conditions is not formed as an accumulation of "green," digital, and marketing initiatives, but rather as an integrated system of risk management, customer interaction, and financial infrastructure. Second, ESG approaches create conditions for reducing resource, regulatory, and reputational vulnerabilities; omnichannel marketing translates customer data into more stable revenues and improved demand management; and fintech ensures the speed, transparency, and scalability of transactions. Third, it is precisely their synergy that shapes the modern system of financial and economic security of the enterprise, which simultaneously supports liquidity, trust, compliance, cyber resilience, and long-term growth.

The scientific novelty of the proposed approach lies in shifting the focus from the analysis of individual instruments to the analysis of an integrated architecture. While the existing literature predominantly examines pairwise effects—namely, the impact of ESG on financial performance, omnichannel strategies on customer loyalty, and fintech on innovation—the proposed model demonstrates how these elements interact within a unified security framework.

For practice, this implies a transformation of managerial decision-making. Decisions related to channels, ESG, payments, API integration, or customer return programs can no longer be considered in isolation from liquidity risk, vendor and counterparty risks, cyber resilience, and regulatory compliance. The prospects for further research are associated with the empirical validation of the model using Ukrainian industry datasets, particularly in retail, manufacturing, financial services, and e-commerce; the development of an integrated index of financial and economic security incorporating ESG, omnichannel, and fintech indicators; and the examination of how open banking, digital identification, circular products and services, and strong authentication influence revenue, turnover, fraud, and the cost of capital. The limitation of this review lies in the fact that part of the empirical evidence is sector- or country-specific, and therefore the generalizability of the proposed conclusions requires further statistical testing and expert validation.

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СТАЛИЙ РОЗВИТОК ПІДПРИЄМСТВ В УМОВАХ ЦИРКУЛЯРНОЇ ТА ЦИФРОВОЇ ТРАНСФОРМАЦІЇ: ІНТЕГРАЦІЯ ESG-ПІДХОДІВ, ОМНІКАНАЛЬНОГО МАРКЕТИНГУ ТА ФІНТЕХ-РІШЕНЬ У СИСТЕМІ ФІНАНСОВО-ЕКОНОМІЧНОЇ БЕЗПЕКИ

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Анотація. У статті досліджено теоретичні та прикладні аспекти сталого розвитку підприємств в умовах циркулярної та цифрової трансформації економіки. Обґрунтовано, що сучасне бізнес-середовище формується під впливом поєднання трьох ключових векторів – ESG-підходів, омніканального маркетингу та фінтех-рішень, які поступово трансформуються з окремих управлінських інструментів у взаємопов'язані елементи єдиної системи забезпечення фінансово-економічної безпеки підприємств. Доведено, що традиційні підходи до забезпечення безпеки, орієнтовані переважно на фінансові показники, є недостатніми в умовах зростання цифрових, мережевих та регуляторних ризиків. Проаналізовано сучасні наукові підходи до інтеграції ESG у стратегічне управління, розвитку омніканальних моделей взаємодії з клієнтами та впровадження фінтех-інновацій у діяльність підприємств. Встановлено, що в науковій літературі домінує дослідження окремих або парних взаємозв'язків (ESG – фінансові результати, омніканальність – клієнтська лояльність, фінтех – інновації), тоді як комплексне поєднання цих елементів у межах єдиної системи фінансово-економічної безпеки залишається недостатньо розробленим. На основі системного підходу запропоновано інтегровану модель забезпечення фінансово-економічної безпеки підприємства, яка поєднує стратегічну (ESG), клієнтську (омніканальний маркетинг) та транзакційно-контрольну (фінтех) складові. Показано, що їх синергія дозволяє підвищити стабільність грошових потоків, зменшити ризики, забезпечити прозорість операцій, зміцнити довіру стейкхолдерів та підвищити інвестиційну привабливість підприємств. Особливу увагу приділено ролі цифрових даних, платіжної інфраструктури, відкритого банкінгу та систем ідентифікації у формуванні резильєнтності бізнесу. Практичне значення отриманих результатів полягає у можливості застосування запропонованої моделі для формування комплексної системи управління сталим розвитком підприємств, що враховує взаємозв'язок економічних, технологічних і безпекових факторів.

Ключові слова: сталий розвиток, ESG, омніканальний маркетинг, фінтех, фінансово-економічна безпека, цифрова трансформація, циркулярна економіка.

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