

DOI: <https://doi.org/10.32782/2524-0072/2025-74-63>

UDC 65.011.56

OMNICHANNEL STRATEGY, CONSUMER SAFETY, AND TECHNOLOGICAL INNOVATIONS ON MARKETPLACES

ОМНІКАНАЛЬНІСТЬ, СПОЖИВЧА БЕЗПЕКА ТА ТЕХНОЛОГІЧНІ ІННОВАЦІЇ НА МАРКЕТПЛЕЙСАХ

Farat Oleksandra

Doctor of Economic Sciences, Professor,
Lviv Polytechnic National University
ORCID: <https://orcid.org/0000-0002-2192-4136>

Danko Tetyana

PhD in Economics, Associate Professor,
Lviv Polytechnic National University
ORCID: <https://orcid.org/0000-0001-7342-4830>

Farat Nestor

Undergraduate student (Bachelor's degree),
University of Wrocław
ORCID: <https://orcid.org/0009-0000-0585-8549>

Фарат Олександра Володимирівна, Данько Тетяна Іванівна
Національний університет «Львівська політехніка»

Фарат Нестор Зіновійович
Вроцлавський університет

The article focuses on highlighting the key directions in the development of omnichannel strategies, ensuring consumer security, and implementing advanced technological solutions in the context of digital marketplace operations. It examines current trends in e-commerce, particularly the use of augmented reality (AR), machine learning (ML), and blockchain technologies to enhance service quality and personalize customer offerings. Special attention is paid to the integration of these technologies into the business models of modern marketplaces, which aim to provide a unified customer experience across multiple communication channels. The paper presents concrete examples of leading digital platforms that effectively implement innovative solutions to create a secure online trading environment. It also analyzes the impact of digital technologies on changing consumer behavior and the formation of new service standards.

Keywords: marketplace, omnichannel, e-commerce, augmented reality (AR), artificial intelligence (AI), machine learning (ML), blockchain, digital security, personal data, small and medium-sized businesses.

У статті здійснено комплексне дослідження трансформації маркетплейсів в умовах цифровізації економіки та стрімкого розвитку інноваційних технологій. Основна увага приділена ролі омніканальності як ключового чинника оптимізації взаємодії між споживачами та комерційними платформами. Розкрито сутність омніканального підходу, що передбачає інтеграцію фізичних і цифрових каналів комунікації з метою забезпечення безперервного і персоналізованого споживчого досвіду. Розглянуто вплив сучасних цифрових технологій – доповненої реальності (AR), штучного інтелекту (AI), машинного навчання (ML) та блокчейну – на ефективність функціонування маркетплейсів, підвищення рівня задоволеності клієнтів та забезпечення надійного захисту даних. Проаналізовано сучасний науковий дискурс, зокрема роботи провідних міжнародних і українських дослідників, що висвітлюють різні аспекти омніканальності, цифрової безпеки та впровадження інновацій на торговельних платформах. У рамках дослідження окреслено низку проблем, які залишаються недостатньо вивченими: загрози безпеці в омніканальному середовищі, ефективність правових регуляторів, специфіка впровадження інновацій для малих і середніх підприємств, що мають обмежені ресурси для цифрової трансформації. Наведено емпіричні приклади застосування AR, AI, ML і блокчейну в діяльності таких провідних компаній, як Amazon, IKEA, Alibaba та Zalando, із зазначенням конкретних результатів: зростання рівня конверсії, покращення логістичних процесів, зменшення кількості повернень, зниження випадків шахрайства. Зроблено прогноз щодо подальших трендів у розвитку електронної комерції на 2024–2025 роки,

включаючи очікувану інтеграцію віртуальної реальності та біометричних систем безпеки. Отримані результати мають прикладне значення як для наукової спільноти, так і для практиків – представників бізнесу, розробників цифрових платформ, що прагнуть адаптуватися до нових викликів цифрового середовища і зміцнити конкурентоспроможність на глобальному ринку.

Ключові слова: маркетплейс, омніканальність, електронна комерція, доповнена реальність (AR), штучний інтелект (AI), машинне навчання (ML), блокчейн, цифрова безпека, персональні дані, малий та середній бізнес.

Problem Statement. In the modern digital environment, e-commerce is becoming an integral part of the global economy. Marketplaces, as interactive commercial platforms, enable effective interaction between sellers and buyers. However, alongside this, there is an increasing need to ensure confidentiality, secure transactions, and ease of use across all available channels. In this context, omnichannel integration – connecting different points of customer interaction – serves as a powerful tool for optimizing the consumer experience.

With the growth of online trade, new threats emerge: fraud, data breaches, and privacy violations. The application of advanced technologies such as blockchain, augmented reality (AR), artificial intelligence (AI), and machine learning (ML) helps address these challenges and increase trust in digital platforms.

Analysis of Recent Research and Publications. Many scholars are actively researching omnichannel strategies, consumer security, and technological innovations in marketplaces, as these aspects directly impact the development and stability of such platforms in the modern digital environment. Among the well-known scholars whose work is frequently cited in these areas are: Javier Alonso-García (specializing in omnichannel and marketing strategies, working in the field of research on the impact of new technologies on marketplace business models) [1], Vili Lehdonvirta (digital security, particularly in the context of online commerce and user data protection on platforms) [2], Susan Lee (the impact of technological innovations on consumer experience) [3] and others.

As for Ukrainian scholars working in the fields of omnichannel strategies, consumer security, and technological innovations in marketplaces, notable figures include Borys Samorodov, Nataliia Dombrovska (focused on technological innovations, the impact of digital platforms on the economy, and the development of new business models) [4, 5], Lyudmyla Honcharova (studying innovations in business and the implementation of omnichannel strategies in commercial practices), Viktor Lyashenko (researching data

protection in the digital environment, including marketplaces, as well as methods for ensuring cybersecurity for online platforms) [6], Liudmyla Ivanenko (specializing in the development of innovative technologies for business and examining process optimization in e-commerce and marketplaces) [7] and others. These are just a few names, as research in the fields of digital technologies, marketing, and cybersecurity is actively developing in Ukraine, with many scholars continuing to explore these relevant topics for the advancement of online business and marketplaces.

Identification of Previously Unresolved Parts of the General Problem. Research on omnichannel strategies, consumer security, and technological innovations in marketplaces covers a broad range of important aspects of modern e-commerce. However, there are several unresolved or insufficiently explored parts of the general problem that can be highlighted for further investigation, namely: the insufficient study of specific security threats in an omnichannel environment; data protection mechanisms in the context of emerging technologies; the impact of regulations and legal aspects on omnichannel strategies and technological innovations; and the effectiveness of omnichannel strategies for small and medium-sized enterprises (SMEs). This issue requires separate research, as many SMEs may lack the resources to integrate cutting-edge technologies.

Formulation of the Article's Goals (Task Definition). The goal of the research is to systematically investigate the impact of omnichannel strategies, technological innovations, and consumer security mechanisms on the transformation of marketplaces in the age of digitalization. The main tasks are: determining the importance of omnichannel strategies in enhancing the efficiency and convenience of marketplaces; analyzing the impact of AR, AI, ML, and blockchain on the functioning of trading platforms; studying challenges in the field of digital security: data protection, combating fraud; providing case studies of successful innovation implementation by leading marketplaces (Amazon, IKEA, Alibaba, Zalando, etc.); and

formulating forecasts for the development of e-commerce in 2024–2025.

Presentation of the Main Material of the Research. The importance of the omnichannel approach in the modern business environment is hard to overestimate. In the digital age, consumers expect the ability to interact with a brand in a way that is most convenient for them – through the internet, mobile apps, social media, call centers, or physical points of sale. Omnichannel integration ensures continuity and consistency of experience across all of these channels.

In 2024, more than 60% of companies consider omnichannel strategies to be the foundation of their approach. Research by McKinsey & Company indicates that companies that have successfully implemented omnichannel strategies see a 30% higher customer retention rate compared to those using only one sales channel. An important factor is that omnichannel shoppers spend 15–20% more [8].

Mobile technologies are the foundation of omnichannel integration on marketplaces. According to a Statista study, by 2023, more than 70% of purchases on Amazon's platform were made through the mobile app. This highlights the importance of adapting to mobile platforms, where users can seamlessly make purchases anytime and from anywhere [9].

Mobile apps allow users not only to make purchases but also to receive personalized recommendations and interact with platforms via messages, interactive features, or chatbots. In 2023, mobile-based platforms saw a 20% increase in conversion rates compared to traditional websites (Zalando reports that 50% of all purchases on its site are made through mobile devices). This shows that consumers prefer the convenience and speed provided by mobile shopping.

The role of augmented reality (AR) in the modern world is hard to underestimate, especially in the context of technological advancements and changing consumer needs. AR has the potential to significantly improve not only the consumer experience but also business processes, making it an important tool for companies aiming to remain competitive. Augmented reality (AR) has become one of the most exciting and innovative technologies actively implemented in e-commerce and marketplaces. It combines the physical world with the digital one, allowing users to experience new ways of interacting with products, services, and content. In the context of modern competition

and high consumer demands, AR plays a major role for marketplaces, as it helps to enhance the user experience, increase customer loyalty, and boost sales.

Augmented reality (AR) changes the way users interact with products on marketplaces. This is especially important for products where visual perception plays a key role (e.g., clothing, furniture, cosmetics). AR technologies allow customers to see how a product will look in real life, which increases trust in the platform and helps in making purchasing decisions.

According to a Gartner study, by 2025, more than 70% of consumers plan to use AR to evaluate products before purchasing. This will allow marketplaces to reduce the number of product returns and increase customer satisfaction (IKEA, using AR in its mobile app, reports that 25% of users who used this feature made a purchase within two weeks. This confirms the effectiveness of AR in increasing conversion rates) [11; 18].

In 2024–2025, augmented reality (AR) continued and continues to be actively integrated into marketplaces. AR technologies not only allow products to be visualized in real time but also offer new ways of interactive shopping. For example, in 2024, platforms such as Amazon and IKEA expanded the features of their mobile apps with AR support, allowing users to "try on" furniture and other products in their living space through their smartphones or tablets [18].

Artificial intelligence (AI) and machine learning (ML) are becoming increasingly important in the field of e-commerce. They enable marketplaces to create personalized offers for each customer, improve search algorithms, and enhance the accuracy of recommendations.

According to a Forrester study, 62% of retailers believe that using AI significantly increases their sales efficiency. AI-based recommendation systems allow for creating individual offers for each user, leading to higher sales volumes (eBay uses machine learning for pricing optimization, which allows it to increase revenues by 12% per year. This confirms the importance of process automation and using AI to ensure business efficiency).

According to the European Commission, 61% of consumers express concerns about the security of their personal data during online purchases. Data breaches in 2023 led to significant financial losses for companies and consumers. According to the Ponemon Institute, global costs of data breaches in 2023 amounted

to \$5.4 billion, a 22% increase compared to 2022 [12; 13].

In today's world, technologies constantly change the rules of the game in the e-commerce market. One of the most important trends is omnichannel, which combines various sales channels and customer interaction points to ensure a seamless experience. However, with the development of new technologies, new challenges arise regarding consumer security. In this context, blockchain, as a technology that ensures transparency, security, and operational efficiency, becomes a crucial tool for marketplaces. This article will explore the impact of omnichannel on marketplaces, key consumer security issues, and the potential of blockchain to ensure effectiveness and trust.

Blockchain is an important tool for ensuring transparency and security in e-commerce. It allows tracking products at all stages of the supply chain, reducing the risk of counterfeiting and fraud (Alibaba uses blockchain to monitor product supply, which helps reduce counterfeiting and increase consumer trust, with over 10 million products passing through this system annually) [16].

Omnichannel is not just a concept but a requirement for modern business, especially for marketplaces. To successfully integrate omnichannel strategies, companies must go through several stages:

Consumer needs analysis: The first step is a deep analysis of consumer data to identify their preferences and the channel they most frequently use for purchases. This stage helps understand customer behavior at different stages of their journey.

Integration of sales channels: The second stage involves integrating various channels, such as physical stores, mobile apps, online stores, social media, and e-commerce platforms. This requires building a unified information space to ensure continuity in the customer experience.

Personalization and adaptation of offers: Personalization is a key element of the omnichannel strategy. Using data on customer behavior, marketplaces can tailor their offers and create individualized recommendations for each user, significantly boosting loyalty.

Inventory and logistics management: For omnichannel platforms, inventory and logistics management is crucial. At this stage, the marketplace must ensure real-time information about product availability and efficient product delivery across all channels (Amazon provides users with the ability to seamlessly transition

between online and offline shopping. For example, a user can make a purchase through the website and then pick up the product at the nearest pick-up point. This strategy helps reduce delivery costs and enhances customer loyalty).

Integrating omnichannel strategies significantly changes the business models of marketplaces. Traditional models based on either e-commerce or physical stores are being replaced by more integrated approaches, where the customer has the flexibility to choose when and how to make a purchase. For example, brands working with omnichannel models can synchronize their sales channels, including mobile platforms, online stores, and social media (the well-known platform Alibaba integrates omnichannel through Alipay—an app that allows purchases both online and offline by scanning QR codes in physical stores. This merges multiple channels, creating a unified and seamless experience for customers) [16].

One of the biggest challenges for marketplaces is ensuring the transparency of supply and product authenticity. Blockchain technologies can be fundamental in addressing these issues. Blockchain allows tracking a product at all stages of its lifecycle—from manufacturer to end consumer. This approach not only enhances trust among buyers but also prevents the appearance of counterfeits (IBM Food Trust, which uses blockchain to track the food supply chain, allows consumers to see where and how their products were grown. This enhances transparency and guarantees a high level of security) [13].

Transaction security on marketplaces also includes fraud protection during purchases. The use of biometrics (facial recognition, fingerprints) and multi-factor authentication significantly reduces the risk of account hacking and the use of unauthorized data. These methods are actively used to ensure high security during payment transactions (PayPal uses multi-factor authentication and facial recognition technologies to verify payment transactions, minimizing the risk of fraud. In 2024, the company recorded a 30% reduction in fraudulent transactions) [14].

Protecting personal data will remain a critically important aspect for marketplaces in 2024–2025. Considering numerous cases of data breaches in previous years, as well as new legislative initiatives such as GDPR in Europe and CCPA in California, platforms must adapt to strengthened security requirements. They are actively integrating advanced data encryption methods, biometric authentication, and two-factor authentication technologies.

According to PwC (2024), data breaches continued to increase in 2024, and companies are experiencing significant financial losses as a result. Specifically, in the first half of 2024 alone, the total costs of data breaches reached \$8.5 billion, which is a 15% increase compared to the previous year. (Platforms like Amazon are actively investing in the latest technologies to ensure data security. They use data encryption and other methods to reduce the risk of information leakage. Amazon reported that over the last three years, none of its 150 million users have fallen victim to a data breach thanks to their security system) [14].

Data protection will remain a critically important aspect for marketplaces in 2024–2025. Given the numerous data breaches in previous years and new legislative initiatives such as GDPR in Europe and CCPA in California, platforms must adapt to strengthened security requirements. They are actively integrating advanced data encryption methods, biometric authentication, and two-factor authentication technologies.

According to PwC (2024), data breaches continued to rise in 2024, and companies are suffering significant financial losses due to them. Specifically, in the first half of 2024, the total costs of data breaches reached \$8.5 billion, a 15% increase compared to the previous year.

Considering the development of augmented and virtual reality (VR) technologies, it is expected that in the near future, marketplaces will actively integrate VR to create hyper-realistic shopping experiences. This will allow consumers not only to see products but also interact with them, such as trying on clothes or furniture in real time (by 2027, it is expected that more than 60% of purchases on marketplaces will be made through mobile apps with AR and VR support, allowing consumers to shop in real-time).

Conclusions. Technological innovations such as augmented reality (AR), artificial intelligence (AI), blockchain, and biometrics are radically

transforming the way consumers interact with marketplaces. These technologies not only enhance the user experience but also significantly increase the level of security, personalization, and efficiency of interactions between buyers and sellers. By 2025, further integration of virtual reality (VR) is expected, which will create even more hyper-realistic shopping experiences. This will allow users to fully immerse themselves in digital shopping spaces, experience products in 3D format, and make purchases without leaving the virtual world. The future of omnichannel will promise even greater integration between different platforms, where buyers will be able to seamlessly transition from one channel to another, retaining all context and personalized settings at each stage of the purchase. This will create a seamless experience for customers, improving convenience and satisfaction throughout the purchasing process.

Regarding security, the development of new protection models is expected in the near future, such as the use of blockchain technology to verify the authenticity of products. This will help reduce fraud and increase consumer trust in platforms. Additionally, blockchain can be used to create transparent supply chains, allowing consumers to check the origin and authenticity of products. New forms of shopping combining digital and physical channels are also likely to emerge.

Overall, marketplaces in 2024–2025 will become more integrated and innovative, enhancing comfort and convenience for consumers. With the development of new technologies, greater security, efficiency, and personalization of purchases will be ensured, making the shopping process even more comfortable and adapted to the needs of each user. The technologies actively implemented today will form the foundation of the future of e-commerce and marketplaces, creating new opportunities for businesses and consumers alike.

REFERENCES:

1. Alonso-Garcia, J., Pablo-Martí, F., & Nunez-Barriopedro, E. (2021). Omnichannel Management in a B2B Context: Concept, Research Agenda and Bibliometric Review. *International Journal of Industrial Engineering and Management*, 12(1), 37–48.
2. Lehdonvirta, Vili. 2022. *Cloud Empires: How Digital Platforms Are Overtaking the State and How We Can Regain Control*. Cambridge, MA: MIT Press.
3. Susan Lee. EY. Retrieved May 19, 2025, from https://www.ey.com/en_dk/people/susan-lee/ (accessed: 01.05.2025).
4. Samorodov, B., Kotkovskiy, V., & Malafieiev, T. (2024). Business development management tools in the digital economy. *FINANCIAL AND CREDIT SYSTEMS: PROSPECTS FOR DEVELOPMENT*, 3(14), 35–46.

5. Dombrowska, N., & Farion, V. (2024). Tsyfrova transformatsiia v upravlinni pidpriemstvamy: Adaptatsiia biznes-modelei pid vplyvom innovatsiinykh tekhnolohii [Digital transformation in enterprise management: Adapting business models under the influence of innovative technologies]. *Ekonomichnyi analiz*, 34(3).
6. Lyashenko, V. I., & Vyshnevskiy, O. S. (2018). *Digital modernization of Ukraine's economy as a breakthrough development opportunity: Monograph* [Monograph]. National Academy of Sciences of Ukraine, Institute of Industrial Economics. Kyiv.
7. Ivanenko, L. M. (2021). Marketplaces as an objective consequence of the development of electronic commerce. *Ekonomika i orhanizatsiia upravlinnia*, 178–187.
8. McKinsey & Company (2025). Omnichannel retailing: The evolution of consumer behavior. Available at: <https://www.mckinsey.com> (accessed: 01.05.2025).
9. Statista (2025). Amazon Mobile App Usage Statistics. Available at: <https://www.statista.com> (accessed: 30.04.2025).
10. App Annie (2025). Mobile App Spending Trends. Available at: <https://www.appannie.com> (accessed: 30.04.2025).
11. Gartner (2025). The Role of Augmented Reality in Retail. Available at: <https://www.gartner.com> (accessed: 25.04.2025).
12. European Commission (2025). Consumer Protection in the Digital Age. Available at: <https://ec.europa.eu> (accessed: 30.04.2025).
13. Ponemon Institute (2025). Cost of Data Breaches Report. Available at: <https://www.ponemon.org> (accessed: 01.05.2025).
14. PayPal (2025). PayPal Security Overview. Available at: <https://www.paypal.com> (accessed: 30.04.2025).
15. Deloitte (2025). Blockchain and the Future of Supply Chain. Available at: <https://www2.deloitte.com> (accessed: 30.04.2025).
16. Alibaba (2025). Blockchain and Supply Chain Transparency. Available at: <https://www.alibaba.com> (accessed: 24.04.2025).
17. Zalando (2025). Zalando Annual Report. Available at: <https://corporate.zalando.com> (accessed: 01.05.2025).
18. IKEA (2025). IKEA Innovation Report. Available at: <https://www.ikea.com> (accessed: 20.04.2025).