E-COMMERCE IN THE ERA OF DIGITAL GLOBALIZATION AND ARTIFICIAL INTELLIGENCE

Virgil-Constantin FĂTU[1], Ionuț HRUBARU[2]

[1]Teaching Assistant, PhD, "Alexandru Ioan Cuza" University of Iași, Romania
[2]Lecturer, PhD, "Alexandru Ioan Cuza" University of Iași, Romania
Corresponding author: Virgil-Constantin Fătu; e-mail: virgil@uaic.ro

Abstract

E-commerce has evolved beyond its traditional role as an alternative sales channel, emerging as a complex economic, technological, and social infrastructure that integrates producers, digital platforms, consumers, logistics networks, and payment systems on a global scale. Within the broader context of digital globalization, e-commerce is no longer characterized merely by the digitalization of commercial transactions but by the structural reconfiguration of markets around data-driven processes, algorithmic decision-making, digital interfaces, and transnational platform ecosystems. This transformation has been further accelerated by the widespread adoption of artificial intelligence (AI), which increasingly underpins critical business functions, including product discovery, personalized recommendations, dynamic pricing, customer relationship management, inventory optimization, risk assessment, and regulatory compliance. As a result, AI has become a strategic enabler of operational efficiency, customer value creation, and competitive advantage in the digital marketplace.The present article aims to demonstrate that competitiveness in contemporary e-commerce is no longer determined solely by price, product diversity, or global market access. Rather, it increasingly depends on organizations' ability to integrate and coordinate three strategic dimensions: the practical implementation of artificial intelligence, cross-border operational resilience, and responsible data governance.

Keywords*: E-commerce, digital globalization, artificial intelligence.*

1. INTRODUCTION

E-commerce has long since gone beyond the status of an alternative sales channel. It currently functions as an economic, technological and social infrastructure, through which producers, platforms, consumers, logistics systems and payment mechanisms are connected on a global scale. In the era of digital globalization, e-commerce is no longer just the transfer of a transaction from the physical store to the online environment, but a reorganization of the market around data, algorithms, digital interfaces and transnational platforms. This transformation is accelerated by artificial intelligence, which influences product search, recommendation personalization, pricing, customer interaction, inventory management, risk assessment, and legal compliance.

Recent UNCTAD data indicates the scale of the phenomenon: e-commerce sales by firms in 43 economies, accounting for about three-quarters of global GDP, increased by almost 60% between 2016 and 2022, reaching about $27 trillion. This growth is associated with the expansion of smartphones, digital platforms and IoT devices, but also with an increasingly visible environmental pressure on the digital economy. Therefore, e-commerce must be analysed simultaneously as an opportunity for economic development, as a mechanism of digital globalization and as an area of ethical, legal and social risk.

The idea of the present article is to highlight the fact that contemporary e-commerce is becoming competitive not only through price, variety or global access, but also through the organizations' ability to orchestrate three dimensions: pragmatically applied artificial intelligence, cross-border operational resilience and responsible data governance. Recent literature suggests a consensus on the role of AI in increasing efficiency and personalization, but also points to major controversies regarding privacy, algorithmic discrimination, behavioural manipulation, the concentration of power in platforms, and the sustainability of digital infrastructure.

2. DIGITAL GLOBALIZATION AND SCALING UP ECOMMERCE

Digital globalization can be understood as the process by which the flows of information, goods, services, capital and commercial interactions are mediated by digital infrastructures, reducing the geographical and temporal costs of economic exchange. For e-commerce, this process creates the possibility of rapid scaling: a small firm can sell in foreign markets without building extensive physical networks of stores, and the consumer can instantly compare products, prices and reviews from different jurisdictions.

In the literature, there is a relatively strong consensus that digital platforms have reduced search costs, expanded access to markets, and enabled the development of direct-to-consumer, marketplace, and omnichannel business models. Bibliometric studies on artificial intelligence in e-commerce show that research has focused mostly on personalized recommendations, customer relationship management, intelligent services, demand prediction, and business decision automation. Bawack, Wamba, Carillo, and Akter describe AI in e-commerce as a rapidly maturing field in which algorithmic technologies are becoming an integral part of the commercial and operational design. (Bawack, Wamba, Carillo, & Akter, 2022)

However, digital globalisation does not remove all barriers. It transforms them. Instead of physical distance, problems such as system interoperability, regulatory differences, cross-border taxation, return costs, consumer protection and supply chain vulnerabilities arise. Recent research on cross-border e-commerce indicates that public policies and logistics infrastructures can influence the resilience of supply chains, but the effects depend on the institutional context and the firms' ability to integrate foreign markets into internal processes (Zhang, P., 2025).

Therefore, globalized e-commerce cannot be reduced to the mere existence of an internationally available website. It involves the integration of complex systems: digital payments, logistics, machine translation, tax management, legal compliance, after-sales services, data protection and trust mechanisms. In this framework, AI becomes a tool for coordination, but not a one-size-fits-all solution.

3. ARTIFICIAL INTELLIGENCE AS A PERSONALIZATION INFRASTRUCTURE

One of the most visible applications of AI in e-commerce is personalization. Machine learning algorithms analyse browsing history, previous purchases, product interactions, reviews, approximate location, time spent on the page, and other behavioural signals in order to propose products, offers, and content tailored to the user's profile. Recent literature suggests that personalization can increase experience relevance, consumer satisfaction, and the likelihood of conversion, especially when recommendations are perceived as useful and non-intrusive.

A recent systematic review of AI and consumer behaviour shows that smart technologies influence the relationship between consumers and brands through personalization, conversational interaction, decision support, and the humanization of digital interfaces. The authors suggest that the impact of AI on purchasing behaviour is not mechanical, but mediated by trust, perception of utility, emotions, and acceptance of technology (Ribeiro, Rivero, & Abrantes, 2025). Another systematic review, based on articles indexed in Scopus by April 2025, indicates that AI is altering consumer decision-making through recommendations, conversational interfaces, and predictive analytics, but also highlights the need for more robust research on long-term effects (Rao, Baliga, Rodrigues, & Rajaram, 2026).

The academic consensus is that AI can reduce information overload. In a marketplace with millions of products, the consumer cannot rationally evaluate all the available options. Algorithmic recommendations work as filtering mechanisms, turning an impossible market into a seemingly personal experience. This function is essential in the attention economy, where competition is no longer just about money, but also about time, attention and data.

Controversy arises when personalization becomes opaque hyper-personalization. If the

user does not know why he sees a certain product, why he is offered a certain price or why certain options are hidden from him, personalization can become a form of informational asymmetry. In this sense, AI not only responds to consumer preferences, but can contribute to their formation. Platforms are not simply neutral storefronts; they design architectures of choice.

4. CHATBOTS, VIRTUAL ASSISTANTS, AND CONVERSATIONAL COMMERCE

Conversational commerce is one of the most important recent mutations in e-commerce. Chatbots, virtual assistants, and systems based on large language models allow consumers to search for products, compare options, ask for recommendations, and solve problems without traditionally navigating through categories and filters. In commercial terms, this can reduce friction and increase the conversion rate. In social terms, it can profoundly change the relationship between the customer and the platform.

Recent studies suggest that the perceived empathy, promptness, competence, and ease of use of chatbots can influence consumer trust and purchase intentions. A 2025 research on chatbot interaction in e-commerce indicates that effective problem-solving and the quality of responses can help build trust, although the effects depend on the context of use and consumer expectations (Gao, J. 2025).

At the same time, controversies arise regarding responsibility and accuracy. Chatbots can invent information, misinterpret the features of a product, or provide answers that create unrealistic business expectations. In the context of e-commerce, this problem is not only technical, but legal: who is responsible if an AI assistant promises a non-existent warranty, recommends an unsuitable product or omits relevant conditions? Conversational commerce may seem more human, but the responsibility remains institutional.

Generative AI is also changing the production of commercial content. Product descriptions, images, advertisements, review responses, and custom campaigns may be automatically generated. The 2025 literature on generative AI in e-commerce points to its potential for contextual content, multimodal experiences, and personalized advertising (Israfilzade, K. 2025). However, it is precisely this ability that raises risks regarding authenticity, uniformity of content, emotional manipulation and the appearance of incorrect commercial descriptions.

5. TRANSFORMING CONSUMER BEHAVIOUR: FROM TRANSACTION TO EXPERIENCE

The digital consumer doesn't just buy a product. He buys an experience of searching, comparing, delivering, returning, communicating and belonging to a symbolic community. After the COVID-19 pandemic, many digital behaviours have stabilized: consumers are more naturally using mobile apps, digital payments, fast delivery, social commerce, and omnichannel solutions. Research on omnichannel retailing shows that the integration of physical and digital channels has become a strategic condition for post-pandemic recovery and retailers use it to adapt to new consumer expectations (Salvietti, Ziliani, Teller, Ieva, & Ranfagni, 2022).

In this context, the modern buyer has some dominant expectations. The first is speed. Slow interfaces, unpredictable deliveries and difficult return processes can decisively affect the purchase decision. The second is transparency. Reviews, ratings, user-generated content, and origin information have become central sources of trust. The third is channel continuity: the consumer can discover the product on TikTok or Instagram, compare it on a marketplace, buy it from the app and pick it up from a physical point.

These mutations support the idea that e-commerce is increasingly becoming an experience system, not just a distribution system. Sellers no longer compete only for the quality of the product, but for the quality of the digital ecosystem. This includes navigation, referrals, content, payment, delivery, return, and support. For this reason, data becomes a strategic asset: without data on consumer behaviour, personalization, demand prediction and logistics optimization remain limited.

The central controversy is that the same data that allows for better experiences can produce trade surveillance. Consumers can benefit from useful recommendations, but they can also be followed, segmented and influenced in ways that are difficult to notice. This is where the fundamental tension of AI-based e-commerce arises: convenience is often paid for by ceding data and reducing control over the decision-making environment.

6. TRANSFORMING SELLER BEHAVIOUR: FROM PRODUCT TO DATA

From the perspective of companies, e-commerce in the age of AI involves a paradigm shift. The seller no longer only manages inventory, price, and promotion. He manages data flows, predictive models, risk scores, automated campaigns, and ongoing customer relationships. In this model, the product remains important, but the competitive advantage is often formed by the ability to interpret and use data faster than the competition.

AI can support demand forecasting, inventory optimization, customer segmentation, fraud detection, returns management, and marketing budget allocation. In global supply chains, demand prediction is important because firms need to simultaneously avoid both overstocking and understocking. In a volatile environment where logistics costs, regulations, and consumer preferences are changing rapidly, predictive tools can provide a significant advantage.

However, this advantage is not guaranteed. AI models are dependent on data quality, technical infrastructure, and organizational skills. Small firms can have access to AI tools through cloud platforms or integrated solutions, but they can remain dependent on technology ecosystems controlled by large players. Thus, digital globalization can democratize access to markets, but it can concentrate infrastructural power in the hands of dominant platforms.

A relevant example is the increasing importance of AI tools for traders. Shopify launched in 2025 an AI Store Builder tool, capable of generating online stores starting from keywords, which indicates a trend of automating market entry for small and medium-sized traders. This evolution can reduce barriers to entry, but it can also produce uniformity: if thousands of stores are generated by the same designs and templates, authentic differentiation becomes more difficult (Zahid, 2021).

7. DYNAMIC PRICING, ALGORITHMIC DISCRIMINATION, AND ETHICAL CONTROVERSIES

Dynamic pricing is one of the most discussed applications of AI in ecommerce. Basically, adjusting prices based on demand, stock, season, competition, and costs can increase market efficiency. In practice, when prices are adjusted based on personal data or behavioural profiles, there is a risk of algorithmic discrimination and trust erosion.

Recent literature on AI-powered dynamic pricing shows that this practice is becoming more prevalent in retail, transportation, entertainment, and digital services. Chenavaz discusses the role of AI in dynamic pricing and indicates that algorithms can increase efficiency but also produce problematic effects if used without transparency and control (Chenavaz, & Dimitrov, 2025). The controversy is not only about the fact that prices change, but the criteria according to which they change. Consumers can accept price variations related to stock or season, but may perceive the adjustment based on their browsing history, location, device, or estimated payment availability as incorrect.

This issue is closely related to trust. E-commerce needs data for personalization, but loses legitimacy if users feel that data is being used against them. From an ethical perspective, the difference between personalization and exploitation is sometimes subtle. A personalized offer can be helpful; A custom pressure can be manipulative.

In this framework, the concept of "dark patterns" becomes essential. The OECD defines dark patterns as digital interface practices that lead consumers to decisions that are not in their best interest, exploiting cognitive biases to get more money, more data, or more attention. These

practices are common in e-commerce sites, apps, and cookie consent interfaces (OECD 2022). If AI is used to test and optimize such interfaces, manipulation can become more efficient and harder to detect.

8. REGULATION: DSA, AI ACT, AND NEW PLATFORM GOVERNANCE

In the European Union, e-commerce can no longer be analysed separately from the new digital regulations. The Digital Services Act introduces obligations for platforms and marketplaces, including greater transparency, trader information obligations, and product traceability measures. The European Commission points out that the DSA requires marketplaces to display sellers' contact information and to make reasonable efforts to verify products or to use traceability technologies (European Commission 1, 2025). This directly affects e-commerce platforms, as it shifts some of the responsibility from individual sellers to the infrastructure that facilitates the transaction.

The AI Act complements this trend by introducing a risk-based approach for developers and users of AI systems. The European Commission presents the AI Act as part of a broader package for trustworthy AI, geared towards safety, fundamental rights and responsible adoption (European Commission 2, 2025). The act entered into force on 1 August 2024, with the aim of developing and using artificial intelligence responsibly in the EU (European Commission, 2024).

For e-commerce, the implications are multiple. Recommendation systems, chatbots, customer scoring, fraud detection, personalized advertising, and automated content management may fall under transparency, risk assessment, or data governance obligations, depending on usage. Large marketplaces need to demonstrate that they can manage systemic risks, and traders need to better understand how they use AI tools provided by third parties.

However, there is also controversy over regulation. Some of the legal literature suggests that a risk-based approach is appropriate but difficult to implement coherently. Ebers argues that the AI Act calls for a risk-based regulatory logic, but some provisions do not fully follow this principle, which can lead to legal uncertainty (Ebers M., (2025)). Therefore, regulating AI in e-commerce lies between two pressures: protecting consumers and avoiding an administrative burden that could stifle innovation, especially for small businesses.

9. SUSTAINABILITY AND THE MATERIAL COST OF DIGITAL

A superficial discourse regarding e-commerce may suggest that digitalisation is "immaterial." In reality, e-commerce relies on data centres, communication networks, devices, packaging, warehouses, couriers, returns, and international shipping. UNCTAD warns that the expansion of the digital economy has a significant environmental footprint, associated with the growth of devices, digital infrastructure, and resource consumption (UNCTAD, 2024).

This size is important because e-commerce promises efficiency, but it can also generate additional consumption. Fast delivery, free returns, multi-packing, and impulse shopping can increase your environmental impact. AI can help optimize routes, reduce unnecessary inventory, and anticipate demand, but it can also consume significant resources by training and running complex models.

The emerging consensus is that sustainability should be integrated into the commercial architecture, not added later as a marketing message. This involves transparency on the origin of products, optimization of packaging, reduction of returns, informing consumers and measuring the logistical impact. The controversy is that many companies use sustainability as a brand differentiator, without structurally changing consumption patterns. In this sense, e-commerce can become either a tool for efficiency or an accelerator of hyperconsumption.

10. CONSENSUS AND CONTROVERSIES IN RECENT LITERATURE

Analysing the 2020–2025 literature, several areas of consensus can be deduced. The first is

that AI is already integrated into e-commerce and is no longer just an experimental technology. Bibliometric studies and systematic reviews indicate a strengthening of the themes of personalization, recommendations, chatbots, predictive analytics, and operational management. The second area of consensus is that consumer experience becomes omnichannel, mobile, social, and heavily dependent on interface quality. The third is that trust represents a structural condition: without data protection, transparency and accountability mechanisms, the advantages of AI can be negated by suspicion and resistance. (Bawack, Wamba, Carillo, & Akter, 2022)

But controversies are just as important. The first concerns consumer autonomy. If platforms can anticipate and shape preferences, the question arises whether the user still decides freely or in an algorithmically configured decision-making environment. The second concerns equity. Dynamic pricing and segmentation can make the market more efficient, but they can also create unequal treatment that is difficult to justify. The third concerns the competition. E-commerce can allow small businesses to enter global markets, but it can strengthen dependence on dominant platforms. The fourth concerns regulation: too little regulation can allow abuses, and too much can favour large players, which have superior compliance resources.

Therefore, a mature academic treatment of e-commerce must avoid both naive technological optimism and deterministic pessimism. AI is neither the automatic saving of trade nor the inevitable cause of manipulation. Its effects depend on institutional design, the quality of governance, organisational competences and consumers' ability to understand the digital environment in which they operate.

11. CONCLUSIONS

E-commerce in the era of digital globalization and artificial intelligence is one of the most important transformations of contemporary economy. It connects markets, lowers barriers, personalizes experiences, and provides businesses with sophisticated analytics and automation tools. At the same time, it produces risks regarding privacy, manipulation, algorithmic discrimination, platform addiction and sustainability.

For students and researchers in the field of economics, the stake is not only the description of technology, but the understanding of the relationship between technology, market and governance. E-commerce does not evolve independently of rules, values, and institutions. The DSA and AI Act show that the digital space accesses a denser regulatory phase, in which transparency and accountability become components of competitiveness, not mere bureaucratic obligations.

The present article suggests that the companies that will be successful will not necessarily be the ones that adopt AI most aggressively, but those that integrate it coherently, ethically, and verifiably. The competitive advantage will depend on the balance between personalization and data protection, automation and human control, logistical efficiency and sustainability, global scaling and local adaptation. In this sense, the e-commerce of the future will not only be more technologically intelligent, but will also have to become more institutionally responsible.

References

Bawack, R. E., Wamba, S. F., Carillo, K. D. A., & Akter, S. (2022) Artificial intelligence in E-Commerce: A bibliometric study and literature review. Electronic Markets, 32, 297–338.

Chenavaz, R. Y., & Dimitrov, S. (2025) Artificial intelligence and dynamic pricing: a systematic literature review. Journal of Applied Economics, 28(1).

Ebers M. (2025) Truly Risk-based Regulation of Artificial Intelligence How to Implement the EU's AI Act. European Journal of Risk Regulation, 16(2):684-703.

European Commission (2024) AI Act enters into force. Available from: https://commission.europa.eu/news-and-media/news/ai-act-enters-force-2024-08-01_en [April 22, 2026].

European Commission a (2025). The Digital Services Act. Available from: https://digital-strategy.ec.europa.eu/en/policies/digital-services-act [April 22, 2026].

European Commission b (2025) AI Act: Regulatory framework for artificial intelligence. Available from: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai [April 22, 2026].

Gao, J. (2025) The influence of artificial intelligence chatbot problem-solving on consumer trust and

purchase behaviour in e-commerce. Journal of Business Research, 200, 115661.
Israfilzade, K. (2025) The role of generative artificial intelligence in e-commerce. EPESS, 42. doi:10.55549/epess.906.
Leiser, M. (2023) Dark patterns, enforcement, and the Digital Services Act. SSRN / Vrije Universiteit Amsterdam.
OECD (2022) "Dark commercial patterns", OECD Digital Economy Papers, No. 336, Paris:OECD Publishing.
Ribeiro, A., Rivero, A.J.L. & Abrantes, J.L. (2025) The impact of artificial intelligence on consumer behavior towards brands: a systematic review. Electronic Commerce Research. doi:10.1007/s10660-025-10063-7.
Salvietti, G., Ziliani, C., Teller, C., Ieva, M., & Ranfagni, S. (2022) Omnichannel retailing and post-pandemic recovery: Building a research agenda. International Journal of Retail & Distribution Management, 50(8/9), pp. 1156-1181.
UNCTAD (2024) Digital Economy Report 2024. United Nations Trade and Development. Available from: https://unctad.org/publication/digital-economy-report-2024 [April 22, 2026].
Zhang, P. (2025) Cross-border e-commerce, foreign shareholding, and corporate supply chain resilience. International Review of Financial Analysis 101, https://doi.org/10.1016/j.irfa.2025.103998
Rao M, K., Baliga, V., Rodrigues, C. G., & Rajaram, M. (2026) Consumer behaviour towards geographical indication products in emerging economies: a systematic literature review using TCCM-ADO framework. Cogent Business & Management, 13(1).
Zahid, T. (2021) Shopify launches AI tool that builds complete online stores from keywords. Available from: https://www.reuters.com/business/shopify-launches-ai-tool-that-builds-complete-online-stores-keywords-2025-05-21/ [April 22, 2026]