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FEDULOVA Iryna
https://orcid.org/0000-0002-8802-137X
Doctor of Sciences (Economics), Professor,
Professor of the Department
of Management
State University of Trade and Economics
19, Kyoto St., Kyiv, 02156, Ukraine
i.fedulova@knute.edu.ua

SBEHAT Fadi Nimer
https://orcid.org/0009-0005-5384-8544
Postgraduate Student
at the Department of Management
State University of Trade and Economics
19, Kyoto St., Kyiv, 02156, Ukraine
f.sbekhat@knute.edu.ua

ARTIFICIAL INTELLIGENCE IN BUILDING SUSTAINABLE COMPETITIVE ADVANTAGES IN RETAIL

The rapid commoditization of traditional sources of retail competitiveness – price, location, assortment, logistics – against the backdrop of the widespread diffusion of artificial intelligence (AI) technologies raises the question of whether AI can remain an independent source of sustainable competitive advantage when access to it is available to virtually any market player. The study aims to develop a conceptual framework that differentiates a retailer's AI resources by their potential to generate sustainable competitive advantage, and to operationalize the organizational conditions under which that potential is realized. The study proceeds from the proposition that sustainable competitive advantage from AI adoption arises not from the mere fact of using the technology, but from the combination of the uniqueness of the technological resource and the organizational capability of the enterprise to exploit it effectively. A qualitative conceptual-analytical approach was applied, combining a systematic review of academic literature, adaptation of the resource-based view of the firm and the VRIO framework to AI-specific resources, and comparison of the resulting framework with aggregated data from four international industry surveys. These surveys serve

ФЕДУЛОВА Ірина
https://orcid.org/0000-0002-8802-137X
д. е. н., професор,
професор кафедри менеджменту
Державного торговельно-економічного
університету
вул. Кіото, 19, м. Київ, 02156, Україна
i.fedulova@knute.edu.ua

СБЕХАТ Фаді Німер
https://orcid.org/0009-0005-5384-8544
аспірант кафедри менеджменту
Державного торговельно-економічного
університету
вул. Кіото, 19, м. Київ, 02156, Україна
f.sbekhat@knute.edu.ua

ШТУЧНИЙ ІНТЕЛЕКТ У ФОРМУВАННІ СТІЙКИХ КОНКУРЕНТНИХ ПЕРЕВАГ У РИТЕЙЛІ

Стрімка комодитизація традиційних джерел конкурентоспроможності в ритейлі – ціни, локації, асортименту, логістики – на тлі повсюдного поширення технологій штучного інтелекту (ШІ) актуалізує питання, чи здатен ШІ залишатися самостійним джерелом стійкої конкурентної переваги, коли доступ до нього отримує практично будь-який гравець ринку. Відтак доцільним виглядає розроблення концептуальної рамки, що диференціює ШІ-ресурси підприємства ритейлу за потенціалом формування стійкої конкурентної переваги, та операціоналізація організаційних умов реалізації цього потенціалу. Дослідження виходить із припущення, що стійка конкурентна перевага від впровадження ШІ формується не самим фактом використання технології, а поєднанням унікальності технологічного ресурсу та організаційної спроможності підприємства його ефективно експлуатувати. Застосовано якісний концептуально-аналітичний підхід, що поєднує систематизацію наукової літератури, адаптацію ресурсної теорії фірми та інструментарію VRIO до ШІ-специфічних ресурсів і зіставлення побудованої рамки з агрегованими даними чотирьох міжнародних галузевих опитувань, які виконують функцію вторинного джерела для

as a secondary source for assessing the plausibility of the theoretical propositions rather than as an instrument for their statistical testing. Application of the framework to eight typical AI resources revealed a consistent pattern: widely available, market-purchased solutions systematically fail the rarity filter and yield only operational parity, whereas resources built on a firm's proprietary data hold differentiation potential whose realization depends on digital maturity, depth of implementation, organizational culture, cross-functional integration, and workforce readiness. The study contributes an operationalization of the organization criterion as five cumulative conditions that must be established before, rather than alongside, the adoption of a specific AI solution. The findings offer retailers a rationale for prioritizing investment in proprietary data and organizational competencies over investment in AI technology as such.

Keywords: artificial intelligence, competitive advantage, retail, VRIO analysis, innovative development, resource-based view, organizational readiness.

оцінювання правдоподібності теоретичних побудов, а не інструменту їх статистичної перевірки. Апробація рамки на восьми типових ШІ-ресурсах виявила стійкий патерн: загальнодоступні, придбані на ринку рішення систематично не проходять фільтр рідкісності й забезпечують лише операційний паритет, тоді як ресурси на основі унікальних даних підприємства мають потенціал диференціації, реалізація якого залежить від рівня цифрової зрілості, глибини впровадження, організаційної культури, крос-функціональної інтеграції та кадрового забезпечення. Наукову новизну становить операціоналізація критерію організованості у вигляді п'яти кумулятивних умов, які мають бути сформовані до впровадження конкретного ШІ-рішення, а не одночасно з ним. Практичне значення результатів полягає в обґрунтуванні пріоритетності інвестицій у власні дані та організаційні компетенції порівняно з інвестиціями в технологічні рішення як такі.

Ключові слова: штучний інтелект, конкурентна перевага, ритейл, *VRIO*-аналіз, інноваційний розвиток, ресурсна теорія фірми, організаційна зрілість.

JEL Classification: L81, M15, O33, M10.

Introduction

Retail is currently undergoing a transformation whose scale is compared to the shift from offline trade to e-commerce in the early 2000s. Pressure on margins, changing consumer behaviour, and intensifying competition from technology giants are compelling traditional chains to seek new sources of competitiveness. In this context, artificial intelligence (AI) is increasingly identified as a key factor in the industry's transformation. According to McKinsey estimates, generative AI alone could bring retailers additional value of between USD 240 and 390 billion, equivalent to a margin increase of 1.2–1.9 percentage points through improved customer experience and greater efficiency of marketing operations (McKinsey & Company, 2024). A study likewise found that full-scale AI-based transformation could unlock approximately EUR 240–320 billion of economic value in European retail over the next five years (McKinsey & Company & EuroCommerce, 2026). Data from the KPMG Global Tech Report 2024 confirm this dynamic: in 2024 the share of consumer-goods and retail companies reporting profitability gains from AI technologies increased substantially (KPMG Ukraine, 2025). In Europe, retail accounted for almost 10 percent of total spending on AI and GenAI in 2024, ranking second by expenditure after the banking sector (Statista, 2026). At the same time, the rapid and near-universal diffusion of AI solutions gives rise to a paradox. If a technology is available

to virtually all market players, can it continue to be regarded as a source of competitive advantage in the classical sense of the term?

The theory of competitive advantage is traditionally based on the tenets of strategic management, according to which the source of an enterprise's long-term success is its ability to create value for the consumer more efficiently than its competitors. Porter treats competitive advantage as the result of pursuing a strategy of cost leadership or differentiation that secures superior performance relative to other market participants (Porter, 1985). With the development of the resource-based view, however, the emphasis shifted from the enterprise's market position to its internal resources and competencies.

According to the resource-based approach proposed by Wernerfelt (1984) and developed by Barney (1991), it is the unique resources of an enterprise that constitute the principal source of its competitive advantages. Barney (1991) formulated the VRIO concept, according to which a resource can secure sustainable competitive advantage only if it is Valuable, Rare, Inimitable, and supported by an appropriate Organization. The concept was subsequently complemented by the theory of dynamic capabilities, according to which an enterprise must not only possess valuable resources but also be able to transform them continuously in response to changes in the external environment (Teece et al., 1997).

The influence of artificial intelligence on business competitiveness has been actively investigated in recent years by both foreign and domestic scholars, although the depth and focus of these studies differ considerably.

Developing the resource-based approach in the context of artificial intelligence, Mikalef and Gupta (2021) introduce the concept of AI capability, which they define as a set of interrelated technological, human, and organizational resources that ensure the effective use of artificial intelligence. The authors demonstrate empirically that it is precisely AI capability, rather than the fact of implementing individual AI solutions, that has a positive effect on an enterprise's organizational creativity and performance.

Wade and Hulland (2004) provide a theoretical basis for evaluating artificial intelligence not as a separate technology but as a component of an enterprise's organizational capabilities. Accordingly, there arises a need to determine which AI solutions specifically are capable of acquiring the features of a strategic resource.

According to Davenport and Ronanki (2018), most contemporary AI-implementation projects are oriented toward the automation of business processes, whereas considerably less attention is devoted to the use of AI as an instrument for creating long-term strategic value.

Ukrainian studies are predominantly concerned with stating the general positive effect of AI on business processes and describing its areas of application. Stankovska et al. (2026) examine the provision of sustainable competitive advantages through the introduction of AI into an enterprise's core areas of activity. Titarenko (2025) notes that AI not only improves

traditional approaches to competition but also changes their very nature, making them more dynamic, personalized, and data-oriented. Tsybulak (2025) considers the formation of new rules of global economic competition under the influence of AI and the risks of technological lag for individual countries. A broader theoretical context is presented in the work of Fedulova et al. (2026), devoted to the systematization of innovative technologies as an instrument for building the competitive advantages of trade enterprises.

In these articles the authors establish the fact of AI's influence on competitiveness but for the most part do not focus on the mechanism of that influence, namely why in some companies investment in AI is transformed into a sustainable advantage while in others it is not.

Bunea and Corboș (2026) empirically test a capability-to-advantage model of AI application that sequentially links a company's digital maturity, the benefits obtained (qualitative and quantitative), customer experience, and the resulting competitive advantage. They point to the absence of an integrative explanation of the links among digital maturity, AI implementtation, and competitive outcomes.

Artificial intelligence has acquired particular significance in retail. A systematic review of studies on AI application in retail for 2005–2021, conducted by Heins (2023), indicates that the principal directions are demand forecasting, inventory management, personalization of marketing communications, automation of customer service, recommender systems, dynamic pricing, and logistics optimization.

Bhukya et al. (2025) treat AI as a component of the Smart Retail concept, in which it is integrated with Internet-of-Things technologies, digital platforms, and big-data analytics.

Velásquez (2025) examines current trends and emerging challenges in retail analytics across four key dimensions: artificial intelligence and machine learning, big data and data analytics, data-driven retail, and data-driven decision-making. The author identifies strategic opportunities and future research directions required to harness retail analytics for improving customer service, optimizing operations, and supporting competitive advantage in physical and digital retail landscapes.

Cui and Bulis (2025) identified five principal drivers of AI, including cost reduction, service-quality improvement, marketing activity, external factors, and decision-making support. They also identified seven principal barriers, including ease of use, uncertainty over profitability, a shortage of talent, the digital environment, investment and cost, data-privacy and ethics concerns, and organization and culture.

Wilson et al. (2024) reviewed the integration of AI into retail operations with considerable attention to barriers. They identify a substantial impact of AI on operating costs and profitability as a source of competitive advantage, while emphasizing that high implementation costs and a shortage of specialized skills are significant obstacles, especially for small and medium-sized businesses.

Studies that combine the theory of competitive strategy and the experience of using AI in retail with specific cases of leading companies deserve particular attention. Yrjölä et al. (2025) synthesize approaches to creating consumer value through AI in retail using ten cases of retailers with different value propositions, while cautioning that ill-conceived AI initiatives may instead destroy consumer value, for example through customers' sense of losing control or concerns about privacy. Jones and Wynn (2025) examined how four leading retailers, namely Amazon, Carrefour, J. Sainsbury, and Walmart, are developing their relationships with artificial intelligence. The authors link the strategic potential of AI with the development of customer-centricity and the formation of new sources of competitive advantage. At the same time, they stress that the effectiveness of AI use depends substantially on the enterprise's organizational readiness, data quality, the digital competencies of personnel, and the ability to integrate AI into strategic management. Viswanathan (2024) illustrates, using the example of Costco, how the slow adoption of digital technologies leaves a company behind its competitors (Walmart, Target), and stresses the importance of the ethical aspects of AI implementation, such as data privacy and algorithmic bias. In the study by Fedulova and Sbekhat (2026), the example of the Aurora multi-market chain shows how a "Blue Ocean" strategy makes it possible to create innovative value beyond the bounds of direct price competition. This substantiates the thesis that the traditional (primarily price-based) sources of competitive advantage in retail are being exhausted. Lykholat et al. (2025) observe that models of digital-technology adoption in retail differ substantially depending on the level of market development: international chains invest predominantly in large-scale hardware automation, whereas Ukrainian retailers emphasize software AI tools that provide greater adaptability. A separate body of evidence consists of documented practical cases of AI application by Ukrainian retailers (Foxtrot, NOVUS, ALLO, VARUS, Fozzy Group, COMFY), according to data of the Ukrainian Council of Shopping Centers (Ukrainian Council of Shopping Centers, n. d.).

A considerable share of the existing publications is confined to stating that the introduction of AI increases the efficiency, personalization, or profitability of retailers, without probing the question of why in some companies these investments are transformed into a sustainable competitive advantage while in others they yield only a temporary and quickly neutralized effect. There is a lack of studies that combine the evaluation of AI solutions with the criteria of VRIO analysis and thereby make it possible to differentiate those solutions by their strategic value for the enterprise.

The aim of the article is to develop and apply a conceptual framework that establishes the relationship among the directions of AI application, the transformation of an enterprise's business processes, and the criteria of VRIO analysis, thereby making it possible to differentiate AI solutions by their real potential to create sustainable competitive advantage.

To achieve this aim, the following tasks were defined:

- to analyze the traditional sources of competitive advantage in retail and to substantiate the reasons for their exhaustion under conditions of digital transformation;
- to systematize the key directions of AI application in retail and to assess the scale of its economic effect;
- to develop a conceptual framework for evaluating AI resources on the basis of the resource-based view of the firm (RBV) and the VRIO toolkit;
- to apply the proposed framework to examples of a retailer's typical AI resources and to identify patterns that distinguish sustainable competitive advantage from a temporary one;
- to identify the conditions under which organizational competencies pass into a state that ensures the realization of an AI resource's potential.

The hypothesis is formulated as a conceptual proposition that sustainable competitive advantage from the introduction of artificial intelligence in retail arises not from the mere fact of using the technology, but from the combination of the resource's uniqueness (data/model) and the company's organizational capability to exploit it; in the absence of at least one of these conditions, the effect is limited to operational efficiency or to a temporary advantage that is quickly neutralized by competitors.

To substantiate this thesis, the resource-based view of the firm (RBV) of Barney (1991) and its toolkit, VRIO analysis (Value, Rarity, Imitability, Organization), were applied. This toolkit is traditionally used to assess a company's strategic resources but has rarely been applied systematically to specific AI resources in the retail context.

The empirical basis of the study consisted of the results of four international industry surveys on the application of artificial intelligence in retail: a survey of retail companies in the United States (Amperity, 2025a, by Statista, 2026), with a sample of 1,000 specialists aged 18 and over working in retail; a survey of companies in Italy (Istat, 2024, by Statista, 2026), with a sample of 100 companies with ten or more years of operation; and a survey of companies in Germany (EHI Retail Institute, 2025, by Statista, 2026), with a sample of 119 companies; together with a survey of the expectations of C-level executives in the retail sector regarding AI implementation by area of work (IBM Institute for Business Value, 2026), with a sample of 100 executives of retail and consumer-goods companies in Australia, Germany, India, Singapore, the United Kingdom, and the United States, conducted in June and August 2025. The data were obtained from the aggregated statistical materials of the Statista platform.

Data from international surveys are not considered statistically comparable samples, as the studies differ by country, respondent composition, survey periods, survey design, and indicator wording. Therefore, their use is intended for comparative and illustrative analysis aimed at identifying recurring trends in the application of AI in retail, rather than for a statistical comparison of its adoption rates across countries. No statistical verification

of differences between survey results was conducted, as only aggregated data obtained using non-uniform methodologies is available.

In the proposed logic of analysis, the chain 'prevalence of an AI solution → nature of the resource → compliance with VRIO criteria → potential for competitive advantage' makes it possible to distinguish between the technological use of AI and its strategic value.

The main body of the article is structured into five core sections, which sequentially examine and analyze: the depletion of traditional sources of competitive advantage in retail; the channels through which artificial intelligence impacts retail competitiveness; a conceptual framework for assessing the strategic potential of artificial intelligence in building a sustainable competitive advantage for retail enterprises; the role of organizational competencies in developing sustainable competitive advantage; and the conditions required to leverage organizational competencies into a driver of sustainable competitive advantage

1. The exhaustion of traditional sources of competitive advantage in retail

The classical sources of competitive advantage in retail, in particular price, location, assortment, logistics, and brand, have historically provided sustainable differentiation among market players. An analysis of the current state of the industry, however, indicates the gradual exhaustion of these levers as independent sources of advantage.

Price has ceased to be a differentiating factor because of market transparency. Price aggregators and marketplaces allow the consumer to compare offers instantly, reducing price competition to a race to the bottom that erodes margins. Location, which for decades determined the success of offline retail, is being devalued by the growing share of online sales and last-mile delivery. Assortment is copied by suppliers within a matter of weeks, and logistics solutions (proprietary warehouses, partnerships with carriers) are available for acquisition by virtually any player through the outsourcing of 3PL providers. Even the brand, traditionally considered the most durable asset, is losing part of its value under the pressure of rationalized consumption. Under conditions of economic instability, consumers increasingly choose between the premium and discount poles, leaving the mid-price segment, which relied precisely on brand loyalty, in a zone of risk.

Under contemporary conditions of the digital economy, a growing number of researchers regard digital technologies as a new class of an enterprise's strategic resources. The development of big data, cloud technologies, analytics, and machine learning is changing the ways in which competitive advantages are formed, since the principal sources of value become information, the speed of decision-making, and the enterprise's ability to adapt to market changes. It is therefore important not only to substantiate the usefulness of AI in creating competitive advantages but also to determine the conditions under which an AI resource can become a source of

sustainable rather than temporary advantage. The data from international surveys are not considered as statistically comparable samples, since the studies differ by country, respondent composition, conduction periods, survey design, and indicator formulations. Therefore, their use has the character of a comparative and illustrative analysis aimed at identifying recurring areas of AI application in retail, rather than at a statistical comparison of the levels of its adoption between countries. Statistical testing of the differences between the survey results was not conducted, since only aggregated data obtained through heterogeneous methodologies are available.

2. Directions of AI's impact on a retailer's competitiveness

The systematization of the directions of AI application in retail, carried out on the basis of the sources analyzed, makes it possible to distinguish five key functional blocks (*Table 1*).

Table 1

Systematization of the functional directions of AI application in retail

Functional block	Examples of application	Expected effect
Personalization and customer experience	Recommended systems, dynamic pricing, personalized offers	Growth in average check, conversion, loyalty
Demand forecasting and inventory management	ML models forecasting sales at the SKU level	Reduction of out-of-stock/overstock, savings in working capital
Logistics and supply-chain optimization	Delivery routing, warehouse automation	Reduction of operating costs, shorter delivery times
Automation of in-store operations	Computer vision, automated checkouts, RPA	Reduced staffing costs, higher accuracy of record-keeping
Marketing and customer interaction	Generative AI for content, chatbots	Faster campaign time-to-market, scalability of support

Source: compiled from (Bunea & Corboş, 2026; Heins, 2023; Bhukya et al., 2025; Velásquez, 2025; Cui & Bulis, 2025; Wilson et al., 2024; Yrjölä et al., 2025; Jones & Wynn, 2025; Viswanathan, 2024; Lykholat et al., 2025; Ukrainian Council of Shopping Centers, n. d.).

A comparative analysis of industry surveys in three countries (the United States, Italy, and Germany) confirms the unevenness of AI diffusion across functional directions. According to the survey of U.S. retail companies (Amperity, 2025a, by Statista, 2026), the most widespread areas of AI application are predictive analytics (36.7% of companies), customer segmentation (33.7%), and chatbots or virtual assistants (32.9%), whereas identity resolution (20%) and audience suppression (11.6%) remain niche directions.

The survey of Italian retailers (Istat, 2024, by Statista, 2026) demonstrates the dominance of marketing and sales (46.2% of companies) and the generation of language content (42.7%), against markedly lower indicators for logistics (8.4%) and the autonomous movement of machinery (2.4%).

The German study (EHI Retail Institute, 2025, by Statista, 2026) is distinguished by a different emphasis. Forecasting and replenishment head

the list of applications (55% of the 119 companies surveyed), outstripping even employee support (48%) and text generation (42%).

This cross-country comparison reveals an important regularity that confirms the hypothesis of this study: the directions of AI application with the highest levels of diffusion, such as generative content, chatbots, and basic customer analytics, are at the same time the directions with the lowest differentiation potential, since they involve for the most part typical, market-purchased solutions available to virtually any competitor. By contrast, directions with a lower but growing level of diffusion, such as inventory forecasting based on proprietary data (55% in Germany, the highest indicator among all the categories studied) and logistics optimization, require deeper integration with a company's internal data and accordingly possess a higher theoretical potential for passing the filters of rarity and inimitability in the proposed VRIO framework.

The categories "data quality improvement" (32% of U.S. companies) and "data unification or preparation" (24.3%) (Amperity, 2025a, by Statista, 2026) deserve separate attention. They do not fit directly into any of the five functional blocks, yet they provide empirical confirmation of the thesis that the existence of a unified, high-quality data architecture is not an incidental but a foundational element of organizational readiness, without which the introduction of AI in any of the five functional directions is incapable of delivering its full effect.

Data on the level of AI-adoption maturity (United States) additionally confirm the conclusions regarding the difference between the "breadth" and the "depth" of implementation: only 15.7% of companies have achieved full AI adoption across several business units simultaneously, whereas 34.3% are at the stage of mixed, fragmented adoption in individual units, and 33.5% are at the stage of experimentation or have no adoption at all (Amperity, 2025b, by Statista, 2026). This quantitatively illustrates that organizational competencies must be regarded as a "bottleneck": the technological availability of AI does not translate automatically into the organizational capability to use it effectively.

Additional confirmation of the identified regularity is provided by the survey of C-level executives of retail companies regarding the expected implementation of AI by area of work in 2025 (IBM Institute for Business Value, 2026). According to the survey results, the highest expectations of management relate to content and campaign creation and management (64% of respondents) and to store-operation management, including loss prevention, inventory, and workforce management (60%). Somewhat lower but also substantial indicators are characteristic of personalized customer responses (56%), trade-promotion creation and management (56%), and loyalty and customer-relationship management (50%), whereas the directions associated with the physical space of the store, such as design/layout (46%) and visual merchandising (42%), have a relatively lower priority in executives' plans.

To verify the correspondence between the theoretically distinguished functional blocks and the actual practice of retailers, the results of the four empirical surveys analyzed are consolidated into a single comparative table (*Table 2*).

Table 2

International trends in the use of artificial intelligence in retail as a basis for assessing its strategic potential, % of respondents surveyed

Functional block	USA, actual adoption (Amperity, 2025a)	Italy, actual adoption (Istat, 2024)	Germany, actual adoption (EHI Retail Institute, 2025)	Worldwide, C-level executives' expectations (IBM Institute for Business Value, 2026)
Personalization and customer experience	Customer segmentation 33.7%; chatbots 32.9%; personalization 31.8%; real-time customer analytics 25.7%	–	Customer interaction 34%; personal assistance 28%	Personalized responses 56%; loyalty/CRM 50%
Demand forecasting and inventory management	Predictive analytics 36.7%	–	Forecasting and replenishment 55% (highest in the sample)	Store-operation management (inventory, workforce, loss prevention) 60%
Logistics and supply chains	–	Logistics 8.4%; autonomous movement of machinery 2.4%	–	–
Automation of in-store operations	Identity resolution 20%	Administrative processes 34%; workflow automation 25.1%; object identification 26.6%	Business analytics 21%; process automation 21%; coding 16%	Store design/layout 46%; visual merchandising 42%
Marketing and customer interaction	Content creation 29.3%	Marketing/sales 46.2% (highest in the sample); language generation 42.7%; analysis of written language 37.5%	Text writing 42%; image creation 30%	Content and campaign creation and management 64% (highest indicator across all sources)
Outside the framework (data infrastructure)	Data quality improvement 32%; data unification 24.3%	Machine learning 19.9%; R&D 7.2%; ICT security 4.9%	–	–

Note. The presented indicators are not statistically comparable across countries due to differences in samples, methodologies, and question formulations; the data are used to illustrate the prevalence of specific areas of AI application.

Sources: (Amperity, 2025a, by Statista, 2026; Istat, 2024, by Statista, 2026; EHI Retail Institute, 2025, by Statista, 2026; IBM Institute for Business Value, 2026).

Despite the methodological heterogeneity of the sources, a high focus on operational AI solutions related to forecasting, inventory management, and process automation can be observed in three out of the four studies. The most widespread areas of AI application remain marketing, content creation, personalization of customer interaction, and automation of communications. This is confirmed both by the expectations of company executives and by the empirical data from the United States, Italy, and Germany (*Table 2*).

At the same time, the results obtained reveal an important regularity. It is precisely those AI solutions that demonstrate the highest level of market diffusion that possess the lowest potential for strategic differentiation. The reason is that standardized content-generation tools, chatbots, personalization systems, and other typical AI services are accessible to the majority of retailers and therefore rapidly become an industry standard. Under such conditions they provide an increase in operational efficiency but do not create a sustainable competitive advantage, since they do not satisfy the rarity criterion (Rare) of the VRIO model.

A different situation is observed with respect to the use of AI for demand forecasting, inventory management, and operational activity. Despite the high relevance of these directions, their practical realization requires the integration of AI algorithms with an enterprise's unique internal resources: historical sales data, assortment structure, the specifics of logistics processes, information on buyer behaviour, and other corporate data. It is precisely this dependence on specific information resources that substantially complicates the copying of such solutions by competitors, which increases their correspondence to the criteria of value (Valuable), rarity (Rare), and difficulty of imitation (Inimitable).

3. A conceptual framework for assessing the strategic potential of artificial intelligence in building the sustainable competitive advantage of retail enterprises

To determine the strategic potential of various areas of AI application, it is advisable to move from assessing the level of their prevalence to analyzing the nature of the resources on which they are based. To operationalize the distinction between a temporary and a sustainable advantage, this study proposes that each type of AI resource be evaluated against four sequential criteria of the resource-based view of the firm (RBV): Value (V), Rarity (R), Imitability (I), and Organization (O). A resource that fails at least one of the filters provides, at most, a temporary advantage or parity with competitors. Only a resource that sequentially passes all four filters becomes a source of sustainable competitive advantage.

Application of this framework to eight typical AI resources of a retailer yielded the results summarized in *Table 3*.

Table 3

A conceptual framework for evaluating the application of AI resources in retail on the basis of the resource-based view of the firm (RBV) and the VRIO toolkit

AI resource	V (Value)	R (Rarity)	I (Imitability)	O (Organization)	Conclusion
Off-the-shelf generative model (ChatGPT/Gemini API) for a support chatbot	Yes – improves service, reduces the load on staff	No –available to any competitor by subscription	No (no point evaluating; the resource is already non-rare)	–	Temporary advantage / industry parity
Proprietary database of customer purchases over 10+ years (with a loyalty programme)	Yes – more accurate demand forecasting and personalization	Yes – unique to the company, accumulated over years	Yes – a competitor cannot "buy" the history quickly	Depends on the presence of an analytics team and data-driven decision-making processes	Sustainable advantage, if O = yes
ML model of dynamic pricing based on proprietary demand-elasticity data	Yes – optimizes margin in real time	Yes, if trained on the firm's own unique sales data	Moderate – the methodology can be reproduced, but not the model's exact parameters without your data	Requires integration with ERP/POS systems and management's trust in automated decisions	Partial sustainable advantage (depends on the depth of customization)
Computer vision for analyzing footfall and behaviour on the sales floor	Yes – insights on merchandising, zone-level conversion	Moderate – the technology is available on the market (Amazon Go-type solutions), but few have implemented it in their store format	Moderate – equipment and algorithms are copied, but calibration to a specific planogram is not	Requires changes to merchandising processes based on these data	Temporary to partial sustainable advantage
AI demand forecasting for inventory management based on the chain's proprietary SKU data	Yes – reduces out-of-stock/overstock, saves working capital	Yes, if the model is trained on the chain's specific assortment and logistics structure	Yes – deep integration with the company's unique business processes is difficult to reproduce	Requires mature logistics processes and trust in automated ordering	Sustainable advantage, if O = yes
Off-the-shelf SaaS product-recommendation tool (plug-and-play) for the website	Yes – increases the average check	No – the same tool is bought by dozens of retailers	No	–	Parity / minimal advantage
Proprietary recommender system trained on the behavioural data of the chain's mobile application	Yes – higher relevance compared with off-the-shelf solutions	Yes – trained on a unique dataset of the behaviour of these particular customers	Yes – the volume and specificity of the behavioural data are difficult to reproduce	Requires a product team and a culture of A/B testing	Sustainable advantage, if O = yes
RPA (robotic process automation) of routine back-office processes (invoice processing, stock reconciliation)	Yes – reduces operating costs	No – a standard solution available on the market	No	–	Operational efficiency, but not differentiation

Source: compiled by the authors.

An analysis of *Table 3* shows that the mere fact of using artificial intelligence does not yet secure a sustainable competitive advantage for an enterprise. The most widespread AI solutions, like generative services, SaaS platforms, and typical robotic-process-automation (RPA) tools, create added value and increase operational efficiency, yet do not satisfy the rarity criterion (Rare), since they are generally accessible to all market participants. As a result, they contribute to the levelling of competitive capabilities but do not secure long-term differentiation. A similar conclusion was reached by Yrjölä et al. (2025), who note that standardized AI solutions are capable of supporting only competitive parity, and that in the absence of consumer trust or adequate protection of personal data their use may even reduce perceived value.

At the same time, considerably higher strategic potential belongs to AI solutions grounded in an enterprise's unique internal resources. These are, above all, proprietary datasets on customers, purchase history, behavioural models, assortment specifics, and accumulated experience of interaction with consumers. Such resources are formed over an extended period, are specific to each retailer, and cannot be acquired or quickly reproduced by competitors. It is precisely for this reason that they satisfy the criteria of value (Valuable), rarity (Rare), and difficulty of imitation (Inimitable) of the VRIO model and create the preconditions for building a sustainable competitive advantage.

The obtained results are consistent with the assumption that competitive advantage is created not by the AI algorithm but by the enterprise's unique resources with which that algorithm works.

4. The role of organizational competencies (O) in building the sustainable competitive advantage of retail enterprises

An important result of the study is that, even in the presence of unique data, the final status of a resource remains undetermined and depends exclusively on the company's organizational capability to actually use that resource in decision-making (O). That is, the mere fact of using AI is not a source of sustainable competitive advantage; rather, the source is the unique combination of data, organizational processes, and competencies that emerge around the technology. This accords directly with the empirical results of Bunea and Corboș (2026), who show that the effect of AI implementation on competitive advantage is substantially mediated by customer experience and depends on the organization's prior digital maturity. It is also linked with the conclusions of Wilson et al. (2024), that a shortage of specialized skills and the high costs of organizational restructuring are the principal barriers to realizing AI's potential, especially for small and medium-sized businesses.

Thus, the O criterion is the "bottleneck" of the entire model, and possession of valuable and rare data is a necessary but not sufficient condition for a sustainable advantage. Without organizational processes, analytical competencies, and a culture of data-driven decision-making, even the most valuable body of information remains an unused asset rather than a source of competitive advantage.

Consequently, a sustainable competitive advantage in retail based on AI arises not from the fact of the technology's implementation but at the intersection of four conditions: value, uniqueness of the data, the difficulty of their reproduction by competitors, and the company's organizational capability to convert these data into effective decisions.

5. Conditions for the transition of organizational competency (O) into a state of building sustainable competitive advantage

Accordingly, the O criterion (organization, organizational readiness, organizational competencies) is the decisive filter; without it, even unique, difficult-to-reproduce AI resources remain unrealized potential. In view of this, it is important to determine which organizational conditions specifically determine whether a company is able to convert AI resources into real managerial decisions.

5.1. Digital maturity as a precondition (not a consequence) of implementation

The study by Bunea and Corboș (2026) empirically establishes that a company's digital maturity, manifested in the level of IT-system integration, the availability and quality of data, and the presence of digital processes, has a strong positive effect on the depth of AI implementation, and that it is precisely this depth of implementation, rather than the mere fact of using AI, that determines the scale of the benefits obtained. A company cannot acquire organizational competencies simultaneously with the acquisition of the technology. Digital maturity is therefore a precondition that ought to have been formed before the launch of the AI initiative. In practical terms, this means that if a company's data are dispersed across isolated systems (warehouse, checkout, CRM, and loyalty not integrated), no ML model, however sophisticated, will receive a quality input to work with. Accordingly, the indicator of organizational competencies is the presence of a single integrated data architecture that unites transactional, behavioural, and operational data within a single circuit accessible to analytical systems. The results obtained accord with the conclusions of Bharadwaj (2000), according to which generally available information technologies do not create a sustainable competitive advantage. What is of decisive importance is not the technology itself but the capabilities for its use that the enterprise has formed.

5.2. Depth and breadth of embedding ai algorithms in real business processes

The study by Bunea and Corboș (2026) distinguishes two concepts that are often mistakenly conflated: AI implementation (the depth and

breadth of the embedding of algorithms in real business processes) and the benefits from AI (the perceived effect). The empirical result of their study showed that broad implementation does not guarantee equivalent benefits. A company may have AI tools in many processes yet feel no substantial effect from them if the implementation remains superficial. This accords with the conclusion of Wilson et al. (2024) that the transition from pilot projects to enterprise-scale operationalization becomes the principal barrier, and that it is precisely the shortage of specialized skills and the high costs of such restructuring that impede the attainment of the necessary effect. It is noted in the study by Statista (2026) that AI implementation does not deliver the expected strategic effect without an integrated digital architecture of the enterprise. Only the coordinated functioning of information systems and a unified information space create the preconditions for the effective use of AI and its transformation from an instrument of automation into a source of competitive advantage. In view of this, the indicator of organizational competencies is AI solutions embedded in daily operational processes (automatic replenishment of inventory based on a forecast, rather than a dashboard for a manager to view), as opposed to AI solutions that exist as isolated pilot projects in a single department.

5.3. An organizational culture of data-driven decision-making

Titarenko (2025) notes that artificial intelligence requires not only technological but also cultural adaptation, according to which companies must reconsider the foundations of competition and the system of competitive relations, and that this is impossible without management's readiness to trust algorithmic recommendations and to act on their basis. If a company's culture is traditionally grounded in the intuitive decisions of an experienced buyer or merchandiser, and the model's forecast is perceived as optional advice that may be ignored, then the resource does not pass the O filter, irrespective of its technical quality. Accordingly, the indicator of organizational competencies is the existence of formalized processes in which the model's recommendation is the basis of a decision by default, and a deviation from it requires explicit justification by the manager, rather than the reverse.

5.4. Cross-functional integration

The effective use of an AI resource requires the interaction of at least three functions, namely the IT/data team (which builds and maintains the model), the relevant business unit (procurement, merchandising, marketing, which use the result), and management (which integrates the result into

strategic decisions). The integration of new systems with existing business processes is a complex task requiring considerable planning and adaptation (Wilson et al., 2024). When these functions act in isolation, that is, the data team creates a model that the relevant unit does not understand or use, the valuable resource remains a technical artefact without business effect. Accordingly, the indicator of organizational competencies is the existence of cross-functional working groups or product teams responsible for a specific AI case from development through implementation to support.

5.5. Human capital and continuous learning

Demand for specialists in machine learning, analytics, and programming exceeds their availability on the labour market, which complicates the realization of AI initiatives (Titarenko, 2025), and a shortage of specialized skills is a significant barrier, especially for small and medium-sized businesses (Wilson et al., 2024). It is important that this concerns not only data scientists; also critical is the level of IT literacy of line managers and of the employees who work daily with the models' outputs. In view of this, the indicator of organizational competencies becomes the presence not only of a narrowly specialized analytics team but also of programmes for raising the digital literacy of operational personnel.

These five conditions are not independent; they form a definite sequence. Digital maturity creates the technical basis for deep implementation; deep implementation is impossible without cross-functional integration and qualified personnel; and the resilience of this chain is ensured by a culture that trusts the model's outputs. Accordingly, organizational conditions make it possible to build sustainable competitive advantages not through a single managerial decision ("implement AI") but as the result of cumulative organizational development that precedes, rather than merely accompanies, the implementation of the technology itself.

5.6. Limitations of the study and prospects for further research

The study is theoretical and conceptual in nature. The proposed VRIO framework has been applied to illustrative examples and to four international industry surveys on the application of artificial intelligence in retail, rather than to empirical data of specific retailers. A promising direction for further research is the empirical verification of the framework on the basis of case studies or a survey of managers of Ukrainian and international trade chains, in particular to test under which of the five specific organizational conditions identified the organization criterion systematically passes into a state of building sustainable competitive advantages.

Conclusions

The traditional sources of competitive advantage in retail are consistently losing their differentiating power under the pressure of market transparency, the growing share of online channels, the availability of outsourced logistics solutions, and the erosion of brand loyalty under conditions of the economic rationalization of consumption. If AI is regarded as an independent technological factor rather than as a resource requiring evaluation against the criteria of strategic management, there is a risk that AI will repeat the trajectory of devaluation followed by other accessible resources.

The systematization provided a basis for identifying five functional directions of AI application in retail: personalization, demand forecasting, logistics optimization, automation of operations, and marketing. This potential, however, is not realized automatically. The effect of transforming AI into a competitive advantage is mediated by customer experience and depends on the company's initial level of digital maturity. This created the preconditions for the formal application of the VRIO framework.

The results of the illustrative analysis are consistent with the proposition of the conceptual framework, that sequentially passes each AI resource through the four VRIO filters (value, rarity, inimitability, organization), determining the resource's final status, from parity to sustainable competitive advantage. The proposed framework provides a tool applicable to an individual AI resource rather than solely to the fact of AI use in general.

The hypothesis, formulated as a conceptual proposition, was not refuted by the research results and is generally consistent with the obtained findings. The analysis provided grounds to believe that the mere fact of using AI is not a sufficient condition for generating a sustainable competitive advantage. Standardized AI solutions available to the majority of market participants primarily provide operational efficiency or competitive parity. In contrast, the combination of AI with unique data, specific business processes, and the organizational capabilities of the enterprise creates the prerequisites for meeting the VRIO criteria and forming a sustainable competitive advantage. At the same time, the presented results are of a conceptual and analytical nature and do not constitute a statistical confirmation of the proposition, which necessitates its further empirical verification.

For retailers, this has direct practical significance. The investment priority should shift from the acquisition of off-the-shelf AI tools, which are capable of delivering only operational efficiency and parity, toward the purposeful development of proprietary data and, no less importantly, of the organizational competencies around them, before or in parallel with technological implementation.

Further research will involve the empirical verification of the framework to determine the role of the five identified organizational conditions in the transformation of AI into a sustainable competitive advantage.

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