

# DIGITAL ECONOMY AND ARTIFICIAL INTELLIGENCE IN BUSINESS IN VIETNAM: CURRENT SITUATION, OPPORTUNITIES, AND SOLUTIONS

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## ABSTRACT

This paper analyzes the role of the digital economy and artificial intelligence in business activities in Vietnam in the context of global digital transformation. Based on a systematization of theoretical foundations, the study evaluates the current state of digital economy development and the level of AI adoption across industries and enterprises. The findings indicate that Vietnam has achieved significant progress; however, it still faces limitations in human resources, data infrastructure, and institutional frameworks. At the same time, the paper highlights major opportunities arising from markets, technology, and policy. Accordingly, several solutions are proposed to promote sustainable development of the digital economy and enhance the effectiveness of AI application in business in Vietnam.

**Keywords:** Digital economy, artificial intelligence (AI), digital transformation (DT), Vietnamese enterprises, data infrastructure.

## 1. INTRODUCTION

In the context of a world undergoing profound transformation under the impact of the Fourth Industrial Revolution, the digital economy and (AI) have become core drivers of growth and innovation. In Vietnam, the process of DT is increasingly deep and widespread, creating fundamental changes in business models and corporate governance practices. The application of AI not only helps improve productivity and optimize costs but also opens up many new development opportunities in a globally competitive environment. However, alongside these achievements, Vietnam still faces numerous challenges related to infrastructure, human resources, and institutions. Therefore, studying the current situation, identifying opportunities, and proposing solutions for developing the digital economy associated with AI in business is essential, contributing to sustainable growth and enhancing national competitiveness. This paper aims to: (1) assess the current state of the digital economy and AI adoption in Vietnam across key sectors; (2) identify the principal barriers hindering further adoption; and (3) propose actionable policy and enterprise-level solutions.

## **2. THEORETICAL BACKGROUND**

### **2.1. Digital economy**

The digital economy encompasses economic activities that utilize digital information and knowledge as primary factors of production; use the internet and information networks as operational spaces; and employ ICT (electronics, telecommunications, and information technology) to increase labor productivity and optimize the economy. Simply put, it's an economy that is increasingly intertwined with digital technology [1].

The core of the digital economy is the 'digital sector': the IT/ICT sector producing foundational digital goods and services. The true 'digital economy' – defined as “that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services” – consists of the digital sector plus emerging digital and platform services. The widest scope – use of ICTs in all economic fields – is here referred to as the 'digitalised economy' [2].

In the context of the Fourth Industrial Revolution, data has become a crucial resource, similar to capital and labor in the traditional economy. The digital economy encompasses online platforms, e-commerce, digital services, and network-based business models. Its key characteristics include high connectivity, the ability to process large-scale data, and continuous innovation driven by technology.

### **2.2. Artificial Intelligence in Business**

AI is a technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy [3].

The findings of study of Celestin et al highlight the transformative role of AI in detecting accounting fraud in emerging markets. The statistical analysis demonstrated a strong correlation between AI adoption and fraud detection accuracy, with an  $R^2$  value of 1.0, indicating that AI-based fraud detection systems significantly improve fraud identification. Regression analysis revealed that for every 1% increase in AI adoption, fraud detection accuracy improved by approximately 1%, reinforcing the effectiveness of AI-driven fraud detection mechanisms [4].

Li et al. focused on Chinese A-share firms, possibly limiting broad understanding despite efforts to reduce bias. To improve, future research can replicate findings across diverse developing countries and industries. As the study suggests, the integration of AI proves effective in controlling managerial opportunistic behaviour, discouraging the suppression of adverse information, and subsequently contributing to the reduction of SPCR. This underscores the importance of future research delving into the ethical dimensions of AI, specifically examining potential issues such as manipulation and other forms of misconduct [5].

In business activities, AI plays a crucial role in analyzing big data, forecasting market demand, and optimizing operational processes. Through technologies such as machine learning and natural language processing, enterprises can personalize products, enhance customer experience, and improve management efficiency.

### **2.3. The Relationship Between the Digital Economy and AI**

Assessing the progress of DT and AI development in Vietnam, the Deputy Secretary-General of the United Nations, UN Special Envoy for Technology Amandeep Singh Gill said that Vietnam is emerging as a bright spot in the digital economy, with the right AI development orientation, focusing on people and based on a solid infrastructure and institutional foundation [6]. In the digital economy, data is considered a vital resource, and AI is the technology that processes, analyzes, and transforms data into useful information for business activities.

Conversely, the development of the digital economy - with its digital infrastructure, digital platforms, and abundant data resources - creates favorable conditions for the growth and widespread application of AI.

## **2.4. Research Methodology**

This paper adopts a descriptive-analytical approach based on secondary data. Data were collected from official Government statistical reports (Nhan Dan paper, Government paper, General Statistics Office of Vietnam, Ministry of Science and Technology of Vietnam, etc), International organizations, and industry reports published between 2023 and 2025. Sources were selected based on recency, institutional credibility, and relevance to the digital economy and AI adoption context in Vietnam. The analysis synthesizes these data to map sectoral trends, identify structural challenges, and derive policy-relevant solutions.”

## **3. CURRENT STATUS OF DIGITAL ECONOMY DEVELOPMENT IN VIETNAM**

### **3.1. Scale and Growth**

In 2025, the digital economy was continue to make an important contribution to Vietnam's economic growth with an estimated value-added ratio of 14.02% of GDP, equivalent to about 72.1 billion USD, 1.64 times higher than in 2020 (43.8 billion USD). In particular, the contribution ratio of the digital economy in the service sector to GDP has increased from 6.5% in 2020 to 7.2% in 2025, confirming the initial results in the effort to promote the application of technology and digitalization of economic sectors [7].

In 2025, the total industry revenue is estimated to reach 198 billion USD, a 26% increase compared to 2024 and exceeding the annual plan by 16%, contributing to GDP estimated at 1,075.120 billion VND, a 10% increase compared to 2024, with very high operational efficiency and estimated profit of more than 371,000 billion VND.

The export turnover of hardware and electronics is estimated at 178 billion USD, a strong 35% increase compared to 2024, completing 112% of the annual plan, continuing to maintain its position as a key export item of the country [8].

This is the first time Vietnam's goods exports have reached the milestone of over 44 billion USD/month. Some export groups in the month also reached new record milestones such as computers, electronic products and components exceeding 10 billion USD/month, reaching 10.74 billion USD [9]. These numbers reflected a strong shift toward a growth model based on technology and innovation.

### **3.2. Sectoral Analysis**

#### *3.2.1. Electronic commerce*

The size of Vietnam's e-commerce market exceeded US\$32 billion in 2025, placing Vietnam among the largest markets in Southeast Asia. With the total transaction value on major platforms reaching over VND 458 trillion, a 26% increase compared to 2024, e-commerce continues to affirm its role as an important driving force of the digital economy, while gradually moving towards a sustainable development phase [10].

This growth is driven by increasingly improved internet infrastructure, a high rate of smartphone usage, and the widespread adoption of digital shopping platforms.

#### *3.2.2. Digital Technology Industry*

Regarding innovation, the Ministry of Science and Technology has launched the Vietnam Technology Exchange (there are currently 24 technology exchanges operating nationwide); 940 science and technology enterprises, about 4,000 innovative startups; an expanding

ecosystem with 208 investment funds, 84 incubators, 40 business promotion organizations, and more than 75,000 stable operating digital technology enterprises [11].

In 2025, Vietnam's digital technology industry will continue to affirm its role as an important growth driver of the economy, with financial and export indicators growing exceptionally well, far exceeding the set plan. In 2025, the digital technology industry will contribute more than 1 trillion VND to GDP [12].

The development of this sector is driven by the increasing demand for DT in both the public and private sectors. In addition, Vietnamese digital technology enterprises are increasingly participating more deeply in the global value chain, particularly in software, digital services, and electronic equipment manufacturing. This contributes to enhancing competitiveness and promoting innovation in the economy.

### *3.2.3. Processing and Manufacturing Industry*

Several key industrial products recorded strong growth in January 2025 compared to the same period of the previous year. Notably, automobile production increased by 60.7%; televisions by 50.1%; NPK compound fertilizers by 13.7%; fabrics made from natural fibers by 9.6%; fresh milk by 7.3%; powdered milk by 5.7%; and casual clothing by 5.0%.

The processing and manufacturing industry continues to lead in attracting foreign investment, with total registered capital exceeding USD 3.09 billion, accounting for nearly 87% of total registered investment and increasing by 99.1% compared to the same period last year. This reflects positive signals for the development of the domestic industrial sector [13].

The industrial structure is shifting positively towards modernization, high-tech application, increased added value and sustainable development: the proportion of processing and manufacturing industry (which is a pillar criterion for assessing industrialized countries) continues to increase significantly, estimated at 24.7% of GDP (compared to 24.1% in 2024).

The processing and manufacturing industry has become a growth driver for the entire industry and the economy with a high growth rate: the processing and manufacturing industry production index in 2025 is estimated to increase by 10.5%, contributing 8.4 percentage points to the overall growth rate, which is also the highest growth rate since 2019 [14].

This indicates that the industry still has significant room for growth, particularly in terms of technological investment and improvements in management capabilities.

### *3.2.4. Services and Retail*

Total retail sales of goods and consumer service revenue at current prices in December 2025 are estimated to reach VND 627.8 trillion, up 3.9% compared to the previous month and 9.8% year-on-year.

Among these, revenue from garments increased by 13.8% compared to the same period last year; household appliances and equipment rose by 13.4%; food and foodstuffs increased by 9.7%; accommodation and food services grew by 14.2%; and tourism and travel services surged by 19.9%.

Total retail sales of goods and consumer service revenue in the fourth quarter of 2025 are estimated to increase by 8.4% year-on-year. For the entire year of 2025, total retail sales and consumer service revenue exceeded VND 7 quadrillion [15].

In the first two months of 2025 compared to the same period in 2024, the State Bank of Vietnam reported that non-cash payment transactions increased by 41.28% in volume and 21.91% in value; transactions via the Internet rose by 35.81% in volume and 29.69% in value; transactions via mobile phones increased by 35.13% in volume and 18.63% in value; and QR code transactions surged by 75.54% in volume and 196.62% in value [16].

This development is closely associated with the widespread adoption of digital platforms, particularly in cashless payments and online shopping. Enterprises are increasingly focusing on enhancing customer experience through technology and data. As a result, the services and retail sector continues to play a crucial role in stimulating consumption and supporting economic growth.

### 3.2.5. Enterprises and Ecosystem

It is estimated that in 2025, the total number of operating enterprises nationwide reached nearly 1.1 million, about 160,000 more than at the end of 2024 [17].

In 2025, there were 195,100 newly registered enterprises (up 24.1%) and 102,300 enterprises that resumed operations (up 34.3%), bringing the total number of newly established and reactivated enterprises to 297,400, an increase of 27.4% compared to the same period in 2024 [18].

This growth is closely associated with the wave of entrepreneurship and digital transformation across various sectors. However, it also comes with increasing competitive pressure, requiring enterprises to continuously innovate and enhance their technological capabilities. The expansion of the enterprise ecosystem contributes to promoting innovation and sustainable economic growth. From the above data, the authors obtained Table 1.

Table 1. Summary of quantitative indicators

| Factor                        | Value                  | Year | Resource |
|-------------------------------|------------------------|------|----------|
| The digital economy scale     | USD 72.1 billion       | 2025 | [7]      |
| GDP contribution              | >14% GDP               | 2025 | [7]      |
| E-commerce scale              | USD 32 billion         | 2025 | [10]     |
| Digital technology businesses | 75,000 businesses      | 2025 | [11]     |
| Total retail and services     | Over VND 7 quadrillion | 2025 | [15]     |

The table above shows that the digital economy in Vietnam is maintaining a positive growth rate and is increasingly contributing significantly to the national economy. Indicators of e-commerce, digital technology businesses, and cashless payments all show a strong upward trend in the 2024–2025 period. This reflects the increasingly profound DT taking place in many economic sectors and business activities in Vietnam. The authors also present Table 2, comparing the level of AI application among different business groups.

Table 2. Comparison of AI application levels among different business groups

| Target              | FDI businesses | Large domestic enterprises | SMEs    |
|---------------------|----------------|----------------------------|---------|
| AI investment level | High           | Medium                     | Low     |
| Data infrastructure | Completed      | Relatively                 | Limited |
| AI workforce        | Strong         | Medium                     | Lack    |
| Level of automation | High           | Medium                     | Low     |

The comparison table reveals a significant disparity in the level of AI application among different business groups in Vietnam. Foreign direct investment enterprises have the highest level of AI adoption due to advantages in capital, technological infrastructure, and access to high-quality human resources. Meanwhile, large domestic enterprises have begun to implement AI in management, marketing, and data analysis, but the level is still uneven. For SMEs, AI application remains limited due to difficulties in finance, technology, and specialized human resources. This disparity reflects the gap in DT capabilities between

business groups and highlights the need for appropriate support policies to promote comprehensive and sustainable AI application.

#### **4. CURRENT STATUS OF ARTIFICIAL INTELLIGENCE APPLICATION IN BUSINESS**

##### **4.1. By Sector**

The application of AI in business in Vietnam varies significantly across industries. Banks are applying AI for customer identification, including biometric authentication (Face ID, fingerprints, voice recognition) for login; identity verification for opening digital accounts (eKYC); and optical character recognition (OCR) to automatically extract information from ID cards, invoices, and contracts. These applications help reduce manual processing time in transactions such as loans and card issuance [19].

In Vietnam, the e-commerce platform Sendo has used virtual assistants to support its customer service. Customers only need to enter their tracking code, and the chatbot—integrated with a shared database system—can check and retrieve order status information, then quickly provide responses to users [20].

The Vietnamese Government has set a target to support at least 300,000 SMEs in adopting AI under Project 433, which has recently been approved. According to the SMEs DT program for the 2026–2030 period (Decision 433), issued on March 16, DT is identified as a key solution to enhance productivity, efficiency, and competitive advantages of SMEs.

By 2030, the Government aims to support 500,000 SMEs in DT, with at least 300,000 enterprises receiving support in applying digital technology products, digital platforms, and AI. At the same time, 200 exemplary enterprises in DT across various sectors are expected to be developed [21].

In response to the digitalization trend, Vietnamese logistics enterprises are gradually adapting by promoting research and applying technology to standardize operational processes, optimize costs and resources, enhance monitoring and management capabilities, improve service quality assessment, and increase customer loyalty. While the growth of the logistics market creates many opportunities for logistics service providers, it also poses significant challenges, requiring enterprises to strengthen their competitiveness through the application of digital technologies [22]. Overall, AI is being increasingly adopted across sectors; however, its application remains uneven and still holds substantial potential for further development.

##### **4.2. Enterprise Differentiation**

FDI enterprises implement AI at a high level thanks to strong financial resources, existing technological infrastructure from parent corporations, and the ability to attract global talent. Their financial advantages enable long-term investment in data systems, automation, and cloud computing infrastructure without facing short-term pressure.

Meanwhile, large domestic enterprises have begun to adopt AI at a moderate level, mainly in data analytics, marketing, and operational management. In contrast, SMEs still have a low level of adoption due to limitations in finance, human resources, and technological infrastructure. This disparity creates an increasingly large digital gap among different groups of enterprises. Therefore, narrowing this gap is an urgent requirement to ensure inclusive and sustainable digital economic development.

##### **4.3. Data Infrastructure**

Data flows in Vietnam are currently affected by several notable barriers. First, data fragmentation occurs at institutional, infrastructural, and technical levels, as ministries,

sectors, and localities still operate independent systems lacking openness and interoperability. Even in sectors with closely related data—such as education–population, healthcare–insurance, and finance–budget—data remains separated across multiple repositories, making sharing largely manual or dependent on temporary connections.

Second, Vietnam has not yet established a mandatory national data standard system. Differences in data structure, identification, and connection methods make it difficult to integrate or automatically reuse data, creating a major bottleneck in a context where fast and accurate data exchange is increasingly necessary.

Third, cybersecurity risks and privacy protection concerns reduce trust among organizations and individuals. Recent data breaches have led to a “data-hoarding” mindset to avoid risks, thereby weakening the motivation for data sharing and creating a cycle of stagnation.

Fourth, data-related human resources remain insufficient and underdeveloped, including both technical experts and data management professionals. Most small and medium-sized enterprises lack the capacity to establish data analytics units, resulting in data being available but not transformed into economic value.

Finally, a proper data market has yet to be established in Vietnam. Data is not yet regarded as an asset that can be valued, traded, or licensed under clear standards. The absence of data exchanges and mechanisms for defining ownership and usage rights leads to spontaneous and non-transparent data transactions [23]. Therefore, developing a synchronized, interoperable, and secure data infrastructure is a prerequisite for promoting the digital economy and enhancing business competitiveness.

## **5. THE EXISTING PROBLEMS IN VIETNAM**

### **5.1. Human Resources**

Behind the claims of mastering artificial intelligence, many enterprises and research institutions in Vietnam are still struggling to balance ambition with reality, as human resources have not yet kept pace with the rapid advancement of technology [24].

Vietnam’s AI labour market continues to face a severe shortage. Each year, Vietnam lacks between 150,000 and 200,000 highly skilled IT engineers, particularly AI engineers. It is estimated that Vietnam currently has only around 2,000 AI specialists, mainly concentrated in Hanoi, Ho Chi Minh City, and Da Nang—where major technology companies are headquartered. The Government aims to train at least 5,000 AI engineers and 7,000 AI experts by 2030 through the National Innovation Centre (NIC), but this figure still falls far short of the actual demand of approximately 100,000 AI professionals over the next five years [25].

In addition, the brain drain to more developed markets further exacerbate the shortage of human resources. Therefore, investing in education, training, and the development of AI human resources is a key factor in enhancing national competitiveness.

### **5.2. Costs and Technology**

The implementation of AI systems in enterprises requires relatively high initial investment costs, including expenses for software, hardware, and workforce training. For small businesses, this represents one of the biggest barriers to adopting AI in their operations, often forcing them to abandon such initiatives. Building in-house AI systems is typically feasible only for large corporations with strong financial capacity. However, most enterprises today access AI through outsourced solutions from service providers, which offer lower costs while still delivering high efficiency [26].

The application of AI in Vietnamese enterprises has shown strong growth, but it still depends significantly on imported infrastructure and technologies, particularly from major

global technology giants. In addition, Vietnam has been inviting leading global corporations such as Nvidia to consider Vietnam as their second home. Recently, the world-leading semiconductor company Qualcomm has also entered Vietnam, along with many other semiconductor technology firms [27]. Moreover, the country's technological self-reliance remains limited, reducing its competitiveness and capacity for innovation.

### **5.3. Institutions**

The recent passage of the AI Law by the 15th National Assembly marks an important step forward for Vietnam in governing emerging technologies. However, this moment also reveals an unavoidable reality: the pace of AI development is far outstripping the speed of legal framework formation. Technology can change weekly or even daily, while laws - despite efforts to keep up - still require lengthy processes of drafting, review, and impact assessment that can take years [28]. At present, Vietnam's institutional and legal framework has yet to keep pace with the rapid development of the digital economy and AI.

### **5.4. Enterprise Situation**

In the first 11 months of 2025, the number of businesses temporarily suspending operations was 110,100, an increase of 14.4% compared to the same period last year. There were 64,500 businesses that ceased operations pending dissolution procedures, an increase of 11.7%; 30,800 businesses completed dissolution procedures, an increase of 60.1%. On average, 18,700 businesses withdrew from the market each month [29]. This reflects significant pressures in terms of finance, technology, and management. Many enterprises, especially small and medium-sized ones, face difficulties in adapting to the requirements of digital transformation and the adoption of AI.

Based on the current situation in Vietnam, the authors would like to write the developments opportunities below.

## **6. THE DEVELOPMENT OPPORTUNITIES**

Vietnam is facing many favourable opportunities to develop the digital economy and apply AI in business. With the advantage of a young, dynamic population and a strong ability to quickly adopt new technologies, Vietnam possesses a suitable human resource base to promote innovation. Vietnamese Generation Z is a pioneering force driving the e-commerce revolution and the digital economy [30].

Vietnam is striving to achieve universal telecommunications coverage and broadband Internet access for all households, ensuring that 100% of the population owns smartphones, especially in remote, rural, and ethnic minority areas. This is one of the key tasks in the national DI strategy, contributing to narrowing the digital divide among regions, improving quality of life, and promoting socio-economic development [31].

The country is accelerating comprehensive digital transformation, placing people and businesses at the centre. In recent years, digital transformation, the development of the digital economy, and digital society have shown clear progress in awareness, thinking, and action, spreading to "every household and every individual," thereby creating momentum for rapid and sustainable socio-economic development. Institutions, mechanisms, and policies have been improved [32].

Vietnam's consumer market is maturing and becoming more demanding. To succeed, businesses need to take decisive steps to adapt, focusing on optimizing value, adjusting to digital purchasing behaviours, and promoting ethical standards in line with increasingly high consumer expectations [33]. A large consumer market with a rapidly growing middle class also opens up strong development potential for businesses.



## **7. SOLUTIONS**

### **7.1. Institutions**

Improving institutions is one of the key solutions to promote the development of the digital economy and the application of AI in Vietnam. First, it is necessary to develop and enact data-related laws to ensure that data collection, sharing, and utilization are conducted in a transparent, secure, and efficient manner. At the same time, establishing a legal framework for AI - including technical standards and ethical principles is essential to guide sustainable technological development. In addition, it is important to review and refine regulations related to information security and privacy protection.

### **7.2. Infrastructure**

Developing digital infrastructure is a key solution to promote the digital economy and the application of AI in Vietnam. First, it is necessary to build national data platforms, ensuring interoperability, data sharing, and efficient utilization among government agencies and enterprises. At the same time, investment in technological infrastructure such as cloud computing and 5G networks will provide the foundation for big data processing and the deployment of AI applications. In addition, attention should be paid to ensuring cybersecurity and information safety during the development of digital infrastructure. These factors will contribute to enhancing technological capacity and fostering innovation in the economy.

### **7.3. Enterprises**

Supporting enterprises, especially SMEs, is a crucial solution to promote the application of AI in business in Vietnam. It is necessary to implement financial support policies, provide consulting services, and facilitate technology transfer to help businesses effectively access and adopt AI. At the same time, enterprises should be encouraged to invest in research and development, foster innovation, and build digital business models.

The development of start-up ecosystems and innovation centers also plays an important role in promoting the adoption of technology. These solutions will contribute to enhancing competitiveness and fostering sustainable development in the enterprise sector.

### **7.4. Human Resources**

Developing human resources is a key solution to promote the application of AI in the digital economy in Vietnam. First, it is necessary to strengthen specialized training in AI, data science, and digital technologies in educational institutions and vocational training centers. At the same time, international cooperation should be enhanced to access advanced knowledge and technologies and to improve training quality. Enterprises also need to proactively improve employees' digital skills through internal training programs. In addition, policies should be introduced to attract and retain technology talent, thereby building a high-quality workforce to support sustainable development.

## **8. CONCLUSIONS**

This paper assesses the current state of digital economic development and the level of AI application in business operations in Vietnam, while identifying the main barriers and proposing solutions to promote digital economic development in the future. The research results show that the digital economy is playing an increasingly important role in national economic growth, while AI has been applied in many fields such as banking, e-commerce, logistics, and services. However, the level of AI application among different business groups still varies significantly, especially among SMEs which face many difficulties in finance, technology, and human resources.

The study also indicates that the lack of synchronized data infrastructure and the shortage of high-quality AI personnel are the most important bottlenecks for the development of the digital economy in Vietnam. Furthermore, the legal and institutional framework related to data, information security, and AI governance has not kept pace with the rapid development of technology. Nevertheless, Vietnam still possesses many promising opportunities thanks to its young population, high internet penetration rate, expanding digital consumer market, and strong government focus on national digital transformation.

Based on this, the paper proposes the need for a comprehensive implementation of solutions to improve institutions, develop data infrastructure, support businesses, and enhance the quality of human resources to promote AI application and sustainable digital economic development. This is considered a crucial condition for enhancing business competitiveness and promoting economic growth in the context of global DT. However, this study is primarily based on secondary data from published reports and documents, thus limiting its ability to fully reflect the practical implementation of AI in specific businesses. Furthermore, the digital economy and AI sectors are rapidly changing, meaning some data and trends may continue to fluctuate in the short term.

*Future research could incorporate empirical surveys of small and medium-sized enterprises (SMEs) to provide a more comprehensive assessment of the effectiveness of AI applications in real-world settings.* Simultaneously, comparative studies between Vietnam and several ASEAN countries could be conducted to clarify Vietnam's position, opportunities, and challenges in the region's digital economic development.

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