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Ecosystem of Innovative Information Technologies in Digital Business Transformation

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Abstract. *The ongoing evolution of the digital economy stimulates the emergence of new information technologies and reshapes approaches to their application in business. Such developments highlight the necessity of integrating these technologies into a comprehensive ecosystem capable of driving the digital transformation of enterprise economic activities. The study aims to identify emerging technological trends in the digital economy, substantiate their role in the formation of an integrated information technology ecosystem, and examine the impact of such an ecosystem on business operations and the digitalization of economic processes. The methodological framework relies on systems and functional approaches, providing a basis for analyzing the interrelationships among ecosystem components and clarifying their contribution to business digitalization. The findings reveal key technological trends shaping the future of the digital economy, including AI agents, AI-assisted software engineering, autonomous procurement, digital energy management, cloud environments supported by blockchain-based data structuring, quantum computing, intelligent robotics, the Internet of Things, digital twins, the metaverse, and virtual and augmented reality technologies. Their integrated deployment creates a comprehensive information technology ecosystem, whereas the isolated adoption of individual technologies fails to generate the synergistic advantages required for effective digital transformation. The study systematizes the technological components of this ecosystem and defines their functional roles in corporate information system integration, business process automation, software engineering management, supply chain coordination, resource optimization, secure data exchange, high-performance data processing, autonomous execution of operational activities, digital modeling, and remote collaboration. The findings further demonstrate that the implementation of a comprehensive information technology ecosystem strengthens business efficiency, organizational adaptability, and managerial control while optimizing workforce allocation and reducing organizational and information processing costs.*

Keywords: *information technology, ecosystem, business information environment, digitalization of economic processes, digital economy.*

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Екосистема інноваційних інформаційних технологій у цифровій трансформації бізнесу

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Анотація. *Сучасний етап розвитку цифрової економіки характеризується появою нових інформаційних технологій та трансформацією підходів до їх використання в бізнесі. Це актуалізує необхідність дослідження їхньої комплексної інтеграції в єдину екосистему, здатну забезпечити цифрову трансформацію економічної діяльності підприємств. Мета дослідження полягає в ідентифікації перспективних технологічних трендів розвитку економіки, обґрунтуванні їхнього місця у формуванні комплексної екосистеми інформаційних технологій та з'ясуванні впливу такої екосистеми на функціонування бізнес-структур і цифровізацію економічних процесів. Методологічною основою дослідження стали системний і функціональний підходи, що дали змогу розкрити взаємозв'язки між компонентами екосистеми інформаційних технологій та визначити їхню роль у цифровізації бізнесу. У результаті дослідження визначено перспективні технологічні напрями розвитку цифрової економіки, до яких віднесено ШІ-агентів, ШІ-програмування, автономні закупівлі, цифровий енергоменеджмент, хмарні середовища з блоково-ланцюговим структуруванням даних, квантові обчислення, інтелектуальну роботизацію, Інтернет речей, цифрові двійники, метавсесвіт і технології віртуальної та доповненої реальності. Обґрунтовано, що їх інтегроване використання формує комплексну екосистему інформаційних технологій, а ізольоване впровадження окремих рішень не забезпечує реалізації синергетичних переваг цифровізації. Систематизовано технологічні компоненти екосистеми та визначено їхнє функціональне призначення щодо інтеграції корпоративних інформаційних систем, автоматизації бізнес-процесів, управління розробленням програмного забезпечення, координації ланцюгів постачання, оптимізації використання ресурсів, захищеного обміну даними, високопродуктивної обробки інформації, автономного виконання виробничих операцій, цифрового моделювання й підтримки дистанційної взаємодії. Доведено, що імплементація комплексної екосистеми інформаційних технологій сприяє підвищенню ефективності, адаптивності та керованості бізнесу, оптимізації кадрового забезпечення і скороченню витрат на організаційні та інформаційні процеси.*

Ключові слова: *інформаційні технології, екосистема, інформаційне середовище бізнесу, цифровізація економічних процесів, цифрова економіка.*

Introduction. Information technologies are becoming increasingly embedded in economic processes. The highest level of technological integration into business processes emerges through the development of the digital economy. Progress in the digital economy continuously drives the adoption of new information technologies, while the transformation of technologies for processing economic information evolves in parallel with changes in the technological paradigm of society. Scientific and technological progress accelerates the development of advanced hardware and software concepts for data processing, prompting economic and social systems to adapt to emerging technological trends.

A defining characteristic of contemporary business transformation involves the growing integration of digital technologies across the economy. The increasing demand for integrated information processing stimulates the development of integrated information technologies, making technological integration the dominant trend of digital transformation. This process extends beyond the convergence of methods for processing economic information to encompass the advancement of innovative information technologies, the modernization of digital infrastructure, and the digitalization of managerial practices. Collectively, these developments give rise to a comprehensive digital business ecosystem. Advanced information technologies serve as the primary driver of the ecosystem's continuous evolution, while artificial intelligence constitutes its technological core. Artificial intelligence fundamentally transforms economic processes, enabling their integration into a unified digital ecosystem that underpins the ongoing development of the digital economy.

Analysis of research and publications. Technological trends shaping economic development remain a central focus of contemporary academic research. A substantial body of literature

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addresses business digital transformation, the evolution of digital systems, the application of information technologies, and their contribution to improving business performance. For example, S. Nadkarni and R. Prügl systematized research on enterprise digital transformation, identified its major stages, and outlined promising directions for future studies on the digital economy [1]. A. Hanelt, R. Bohnsack, D. Marz, and C. Antunes Marante synthesized previous research findings, proposed a conceptual framework for digital transformation, and substantiated the role of digital systems in facilitating organizational change [2]. I. Mazur, R. Aliiev, S. Saveliev, and M. Petrovskyi examined the integration of contemporary information technologies into the digital transformation of entrepreneurship, highlighting their contribution to enhancing digital maturity and supporting the development of modern digitalization strategies [3]. O. A. Shevchuk and V. V. Muravskyi systematized innovative technological trends in accounting and control within the broader context of the digital economy [4]. J. Furman and R. Seamans analyzed the impact of artificial intelligence on economic productivity, labor market transformation, enterprise innovation, and the emergence of new business models [5].

Another important research direction focuses on identifying individual information technologies expected to reshape business processes in accordance with the evolving paradigm of the digital economy. Existing studies emphasize the significance of various technological solutions for business digitalization. S. Adiyono and M. Arifin identified generative artificial intelligence, agent-based systems, digital twins, robotics, Big Data, and predictive analytics as key technological drivers of economic development [6]. A. Semenoh examined artificial intelligence, blockchain, the Internet of Things, Big Data, and cloud computing, demonstrating their interdependence in the digital transformation of Ukraine's economy [7]. A. Thelen, X. Zhang, O. Fink, Y. Lu, and co-authors investigated artificial intelligence, the Internet of Things, cloud computing, modeling, optimization, and data analytics as enabling technologies for the digital transformation of economic systems [8]. V. V. Muravskyi explored the application of computer and communication technologies in accounting as the information component of business activities [9]. A. Fuller, Z. Fan, C. Day, and C. Barlow substantiated the prospects of artificial intelligence, the Internet of Things, sensor technologies, and digital interaction tools for manufacturing, logistics, and management [10]. J. Singh, S. Bharany, S. Rani, and co-authors examined blockchain, artificial intelligence, and cloud technologies [11]. S. Handoyo and M. Sueb analyzed the application of artificial intelligence, the Internet of Things, blockchain, and Big Data in the circular economy, highlighting their role in forecasting, process optimization, monitoring, and traceability of economic activities [12]. A. Zimina and O. Kavun considered artificial intelligence, blockchain, 5G networks, and other digital technologies as the technological foundation of the digital economy [13]. Z.-M. Zadorozhnyi and co-authors investigated the role of the Internet of Things and 6G communication networks in developing a comprehensive digitally enabled marketing-oriented economy [14]. M. Al-Jabri and A. Lahrech demonstrated the contribution of Big Data, the Internet of Things, artificial intelligence, blockchain, digital twins, and edge computing to digital accounting, business process automation, and managerial decision support [15].

Only a limited number of studies adopt a holistic perspective by examining the integrated application of information technologies that collectively constitute a unified business ecosystem. C. H. Tsai, J. Zdravkovic, and J. Stirna generalized approaches to modeling digital business ecosystems and emphasized the necessity of integrating information technologies, business processes, stakeholders, and information flows to ensure their effective functioning [16]. H. Liu and W. Pan comprehensively investigated the evolution of digital business ecosystems and digital business models, revealing the interrelationships among digital platforms, information technologies, and value creation processes [17]. S. Nikolaiev, V. Voronenko, B. Kovalov, P. Hrytsenko, and O. Odewole identified blockchain as

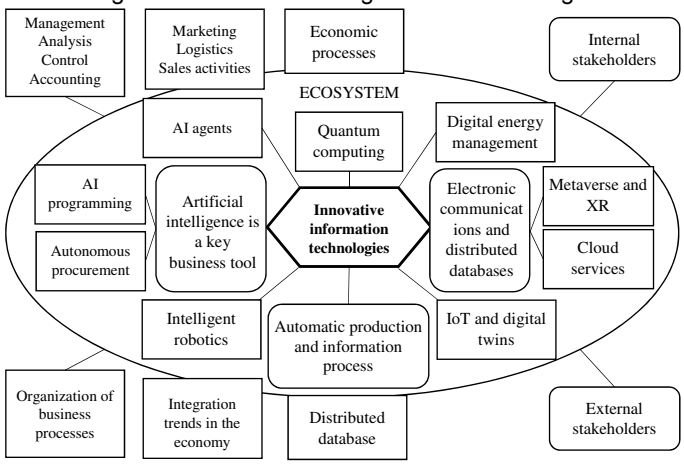
one of the key drivers of Ukraine's digital economic transformation and substantiated its integration with other digital technologies to enhance the transparency and efficiency of economic processes [18].

Despite the extensive body of research devoted to digital transformation, comprehensive investigations into the integrated application of information technologies as a unified business ecosystem remain limited. Insufficient attention has been devoted to the interaction among emerging technological trends, their mutual influence within an integrated digital environment, and their collective role in transforming economic processes. These research gaps highlight the need for further investigation into the formation and functioning of comprehensive information technology ecosystems in the digital economy.

The purpose of this article is to identify emerging technological trends in economic development, substantiate their role in shaping a comprehensive information technology ecosystem, and examine the impact of such an ecosystem on business operations and the digitalization of economic processes.

Results. An information technology ecosystem in business represents an integrated network of interconnected digital components that enables continuous information exchange, business process integration, and managerial decision support. Unlike standalone information systems, such an ecosystem relies on the synergy of software, digital platforms, databases, network infrastructure, intelligent algorithms, and users operating within a unified digital environment. The integration of advanced information technologies enables the automated generation, transmission, storage, analysis, and utilization of economic data in real time, thereby enhancing the speed, transparency, and adaptability of business management.

Contemporary business practice increasingly incorporates artificial intelligence, cloud computing, the Internet of Things, digital twins, intelligent robotics, Big Data technologies, and blockchain into business processes. Emerging technological trends, however, extend beyond the adoption of these individual technologies toward the expanded use of AI agents, autonomous robotic systems, cloud-based environments, and Internet of Things technologies, whose combined application gives rise to a comprehensive information technology ecosystem. Within this paradigm, information technologies no longer perform merely a supporting function but evolve into an autonomous component of economic process management (Fig. 1). Continuous interaction among digital components enables the autonomous execution of a substantial share of business operations, real-time monitoring of economic activities, predictive analysis of future developments, and automated support for managerial decision-making. Consequently, a unified digital ecosystem emerges in which information, technologies, and business processes operate as an integrated environment designed to enhance organizational efficiency.



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Conventional generative artificial intelligence is gradually giving way to more advanced forms of autonomous intelligent technologies. Until recently, most business organizations relied on artificial intelligence primarily for content generation, document preparation, and web-based communication. AI has also become widely embedded in chatbot systems that provide advisory and customer support services. In this role, artificial intelligence assists employees by providing professional guidance, automating business information processing, and preparing draft responses to operational and managerial tasks.

A major technological trend shaping the future of business involves the evolution of artificial intelligence from a supporting tool into an autonomous economic agent capable of independently executing sequential managerial activities. AI agents are becoming the core entities around which comprehensive information technology ecosystems are being developed. These intelligent agents continuously monitor interconnected business events and autonomously initiate appropriate actions once predefined conditions are satisfied. Automated data acquisition, analytical interpretation, and autonomous initiation of managerial processes enable seamless interaction across multiple business subsystems, significantly expanding organizational automation.

AI agents also represent effective participants in interactions with customers, suppliers, and other business partners. When predefined business conditions are met, artificial intelligence can automatically initiate corresponding operational activities. For example, confirmation of customer payment may immediately trigger product dispatch, while scheduled deadlines can activate payroll processing, tax payments, and other routine financial transactions. Such event-driven workflows rely on continuous monitoring of business events and algorithmic execution of predefined actions. Consequently, AI agents can replace human personnel in routine information collection, data processing, and operational decision-making.

The adoption of AI-agent technology enables the integration of heterogeneous information systems into a unified digital environment, thereby establishing a comprehensive business information technology ecosystem. Artificial intelligence coordinates business processes across organizational functions, creating a unified information space for enterprise management. Such an ecosystem fundamentally transforms traditional enterprise information systems by integrating diverse digital technologies into a cohesive technological environment.

Another significant technological trend involves AI-assisted software engineering. Contemporary artificial intelligence technologies increasingly automate the entire software development lifecycle. Beyond generating source code, modern AI agents analyze information flows, design software architectures, perform software testing, conduct automated code refactoring, and generate customized software solutions for specific business requirements. For example, an online retail platform may automatically obtain customer feedback modules, product comparison functions, and image-based search capabilities. Integrating AI agents into the enterprise software environment reduces development costs, minimizes programming errors, and accelerates the implementation of digital business solutions.

AI agents also possess broader capabilities for shaping business digitalization ecosystems. They can generate software modules that integrate previously disconnected information systems into a unified business information environment while autonomously synchronizing information flows in real time. This enables seamless data exchange among client–bank systems, electronic tax platforms, business partner registries, and other digital business services. Consequently, information flows are consolidated through Big Data principles, forming a comprehensive information infrastructure for business process management.

The application of AI agents also improves the organization of business information ecosystems by continuously generating software applications tailored to current operational requirements. They

can dynamically modify program code and application functionality as business needs evolve. AI-assisted software engineering therefore reduces expenditures associated with software developers, quality assurance engineers, and system administrators by automating a substantial share of their responsibilities. As information technology ecosystems continue to mature, many routine software engineering and system maintenance functions may become fully autonomous.

Another promising application of AI agents concerns procurement and commercial operations. Procurement represents the initial stage of the business value chain, where artificial intelligence can perform functions traditionally assigned to logistics specialists, procurement managers, and warehouse coordinators. AI technologies already identify the most advantageous product offers in online marketplaces, while AI-powered shopping assistants have become standard features of e-commerce platforms. The next stage of development involves AI agents autonomously identifying business partners, negotiating contractual conditions, preparing agreements, and concluding commercial transactions without direct human intervention.

Within the information technology ecosystem, AI agents constitute the primary interface connecting enterprises with their external business environment. They determine incoming material flows, initiate purchases of goods and services, and coordinate procurement activities according to operational requirements. Continuous demand monitoring enables AI agents to determine the optimal timing and quantity of orders required to maintain uninterrupted business operations. Automated logistics further reduces procurement costs through intelligent price comparison, optimized delivery routes, and improved inventory management.

The widespread adoption of artificial intelligence substantially increases enterprise demand for energy resources. Under conditions of geopolitical instability and rising energy prices, energy efficiency and sustainable resource management have become strategic priorities. Conventional energy-saving technologies address only part of these challenges. Sustainable information technology ecosystems additionally require reliable electricity generation, energy storage, and resilient power supply infrastructure, since disruptions in energy availability directly threaten the continuity of digital business processes.

Artificial intelligence also enables intelligent management of enterprise energy systems. Digital energy management optimizes the balance among on-site electricity generation, energy storage, centralized power grids, and electricity distribution across organizational units. Intelligent energy management systems dynamically redistribute available energy resources during supply interruptions or capacity constraints, thereby maintaining uninterrupted business operations.

Optimization of enterprise energy flows through advanced information technologies also supports environmental sustainability. Digital energy management contributes to decarbonization, reduces energy consumption associated with building operation, detects unauthorized electricity usage, eliminates inefficient energy losses, and improves resource efficiency. Consequently, stable operation of a comprehensive information technology ecosystem depends on intelligent energy management capable of minimizing energy costs while ensuring operational resilience.

Organizations lacking sufficient resources to maintain proprietary data centers increasingly rely on cloud outsourcing to ensure the stability of their information technology ecosystems. Delegating information processing and digital management functions to cloud platforms has become common practice among innovative enterprises, while cloud computing already supports a substantial proportion of modern digital business models. Cloud infrastructures reduce the need for specialized technical and administrative personnel by transferring computational and information management functions to external service providers.

The strategic potential of cloud computing extends beyond conventional outsourcing. Integration of blockchain technology into cloud environments transforms centralized data storage into a distributed

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information architecture. Business information is partitioned into interconnected datasets maintained across distributed cloud infrastructure, where records are continuously replicated and synchronized whenever information is created or updated, thereby improving data integrity, availability, and resilience.

Cloud services supported by blockchain-based data structuring can assume responsibility for primary data acquisition, financial accounting involving non-confidential information, external assurance, financial analysis, and public monitoring. Business datasets that do not contain commercially sensitive information can be transferred to cloud environments to support website hosting, e-commerce operations, cybersecurity services, collaborative digital workspaces, and other business functions.

Cloud service providers are increasingly adopting hyperscale architectures in which organizational infrastructures are designed specifically for cloud-native information processing. Under this approach, business models are developed from the outset to exploit cloud capabilities. Certain forms of economic activity may ultimately operate without permanent personnel, proprietary fixed assets, or traditional logistics infrastructure. In such cases, entrepreneurs contribute primarily the business concept, whereas hyperscale cloud environments provide the technological infrastructure required for its implementation.

The transition toward cloud computing combined with blockchain-based data structuring fundamentally reshapes enterprise cybersecurity. Conventional cybersecurity strategies primarily emphasize responding to cyberattacks and mitigating their consequences after incidents occur. However, the resilience of business information technology ecosystems depends on embedding cybersecurity directly into the digitalization of economic information processing. Future cybersecurity therefore requires reconsideration of both organizational principles and methodological approaches governing business operations.

Business process reengineering should integrate cybersecurity requirements throughout every stage of economic activity. Within such an ecosystem, business processes are designed according to the principles of security by design, whereby cyber resilience becomes an inherent characteristic of organizational architecture rather than an additional layer introduced in response to emerging threats. AI agents can continuously identify system vulnerabilities, assess cybersecurity risks, and autonomously implement corrective actions before security incidents occur.

Developing information technology ecosystems based on continuous cyber resilience further reduces organizational dependence on dedicated cybersecurity personnel. Small and medium-sized enterprises may increasingly outsource cybersecurity functions or rely on autonomous AI agents capable of providing continuous monitoring, threat detection, and incident response. Nevertheless, future cybercriminals are also expected to exploit AI agents, making it essential to design enterprise information architectures that explicitly account for AI-enabled cyber threats.

Embedding cybersecurity mechanisms directly into the information technology ecosystem minimizes organizational losses associated with unauthorized access, theft, or corruption of confidential information. At the same time, AI agents and cloud-based outsourcing services optimize the costs of enterprise cybersecurity while improving the effectiveness of digital risk management.

Migration of business operations to cloud environments also expands opportunities for establishing comprehensive information technology ecosystems within small and medium-sized enterprises. Smaller organizations gain access to advanced digital capabilities without substantial investments in proprietary hardware, software infrastructure, or specialized technical personnel. Cloud service providers assume responsibility for information processing and selected operational functions in exchange for service-based remuneration.

A cloud-based information technology ecosystem built upon blockchain-enabled distributed data architectures provides both technological resilience and economic sustainability. Cloud outsourcing establishes an optimal balance between organizational expenditures and access to advanced digital technologies integrated within a unified business ecosystem.

Establishing the technological foundation of comprehensive digital ecosystems requires computing resources that exceed the capabilities of conventional information systems. Contemporary artificial intelligence platforms rely on high-performance graphics processing units (GPUs) and specialized AI accelerators to execute increasingly sophisticated computational tasks. As AI assumes responsibility for a growing share of business operations, computational requirements continue to increase. Consequently, large-scale deployment of integrated information technology ecosystems will depend on advances in quantum computing, whose computational capabilities are expected to support the next generation of enterprise digital transformation.

Although quantum computing remains too costly for widespread business adoption, declining hardware costs are expected to make it a core technological foundation of future enterprise information technology ecosystems. Unlike conventional computing architectures, quantum systems can evaluate multiple scenarios simultaneously, creating new opportunities for economic forecasting, logistics optimization, financial risk management, and managerial decision support. Integration of quantum computing with artificial intelligence, Big Data, digital twins, and cloud computing will accelerate analytical processing of business data, improve process modeling, automate managerial decision-making, and strengthen information support for accounting, control, and auditing. Quantum computing will also enhance financial analysis, supply chain management, investment planning, and risk management by enabling rapid evaluation of alternative economic scenarios, optimization of resource allocation, adaptive pricing, and more accurate market forecasting.

Another emerging technological trend involves the physical embodiment of artificial intelligence through intelligent robotics. Modern robotic systems are capable of performing production and service operations with minimal or no human intervention, and some business models already operate on fully autonomous manufacturing principles. Such automation has become possible through integrated information technology ecosystems, and the number of enterprises relying on intelligent robotic systems is expected to continue increasing.

Comprehensive information technology ecosystems also enable autonomous management of business operations. Intelligent robotic equipment can independently adjust production processes in response to unexpected situations or managerial instructions while automatically detecting defective products, operational downtime, production errors, fraudulent activities, and other events that reduce enterprise performance. Integrated ecosystems further support fully digitalized standard costing through continuous monitoring of operations, automatic detection of deviations, identification of their causes, and dynamic revision of production standards. Product costs can therefore be calculated before completion of the production cycle, reducing production costs and operational losses through continuous process optimization.

The Internet of Things (IoT) constitutes the primary technology for collecting source data within business digitalization ecosystems. Networks of sensors, smart devices, and connected equipment continuously transmit operational data to integrated information repositories. IoT technologies are increasingly embedded across manufacturing systems and service operations, enabling automatic collection of production data for subsequent economic analysis. Consequently, most intelligent production equipment already functions as an integral component of enterprise information technology ecosystems, substantially reducing the need for manual data collection and processing.

The strategic potential of IoT extends beyond operational data acquisition. Combined with digital twin technology, IoT enables virtual representations of physical assets and business processes,

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allowing organizations to analyze operational scenarios before implementation and evaluate managerial decisions by simulating their potential economic effects. This facilitates selection of the most effective strategy for specific business conditions.

Integration of IoT with augmented reality (AR) and virtual reality (VR) technologies enables business activities to be transferred into immersive metaverse environments. Certain economic processes may operate entirely within virtual environments without direct dependence on physical assets. The gaming industry, cryptocurrency ecosystems, non-fungible tokens (NFTs), and other digital assets currently represent the sectors most prepared for this transition, where many business processes can already operate autonomously.

Leading technology companies are introducing augmented reality glasses, virtual reality headsets, and mixed-reality devices that overlay digital information onto physical environments. Enterprise information technology ecosystems therefore evolve into intuitive digital workspaces that improve collaboration, support remote work, enable joint interaction with business documents and digital models, and reduce expenditures associated with physical workplaces, office facilities, and business communications while increasing organizational flexibility. A synthesis of the emerging technological trends shaping the contemporary information technology ecosystem in business is presented in Table 1.

Table 1

Prospective technological trends as information components of the IT ecosystem in business

Promising technology trend	Related IT	Previous applications in the economy	IT ecosystem component	Employee Replacement	Impact on the economic situation
AI agents	Generative AI, LLM, RPA, API	Chatbots, decision support; transition to autonomous agents	Integrates ERP, CRM, SCM, financial and production systems into a single information environment, automates data exchange, business process coordination and support for management decisions.	Operators, Dispatchers, Junior Managers	Reduction in administrative costs
AI programming	AI coding, DevOps	Active code generation	Automates software development, testing and maintenance, integrating with DevOps, version control systems and cloud platforms.	Entry-level Programmers, Testers	Less costs for software development
Autonomous procurement	AI, Big Data	Search for suppliers and prices	Combines supplier systems, logistics platforms and analytical services for automatic supplier selection and supply management.	Purchasers, Logisticians	Less costs for procurement
Digital energy management	IoT, AI	Implemented in large enterprises	Combines IoT sensors, digital twins and AI algorithms to optimize energy consumption in real time.	Energy Engineers	Less energy costs

Continuation of Table1

Cloud ecosystem + Blockchain	Cloud, Blockchain	Massive distribution of SaaS	Creates a single secure digital space for storing, exchanging and verifying economic data between all participants.	System Administrator	Less IT costs
Quantum computing	Quantum, AI	Pilot projects	Complements the ecosystem with high-performance computing for modeling, forecasting and optimizing complex economic processes.	Routine Task Analysts	Less costs for optimization
Intelligent robotics	Robotics, AI	Means of local automation	Integrates robotics, computer vision and AI for autonomous execution of production operations and digital quality control.	Production Operators	Less production losses
IoT and digital twins	IoT, Digital Twins	Sensors for information collection in production equipment	They provide continuous data collection, digital modeling of assets and forecasting the results of management decisions.	Primary Data Controllers	Less costs for control
Metavasvesvit and XR	AR/VR, IoT	Augmented reality and visual effects	They form a virtual environment for remote interaction, training, design and management of business processes.	Clerical Staff	Less costs for offices and business trips

Source: generated by the author.

The emerging technological trends shaping contemporary business development are closely interconnected. Each technological direction relies on the complementary application of multiple information technologies, while the effectiveness of any individual solution depends on its integration into broader digital business processes. Consequently, advanced information technologies collectively form a comprehensive ecosystem that underpins business digitalization. Isolated implementation of individual technologies cannot fully realize the benefits of an integrated digital ecosystem. The absence of any essential component weakens ecosystem integrity, resilience, and overall effectiveness while increasing vulnerability to technological and organizational risks.

The integrated implementation of these technological trends generates synergistic benefits that exceed the capabilities of individual digital solutions. A key organizational outcome is reduced workforce requirements as routine activities are automated by AI agents or delegated to other digital components of the ecosystem. From an economic perspective, a comprehensive information technology ecosystem minimizes operational, administrative, and transaction costs while improving organizational efficiency. Its implementation supports the transition toward a new stage of business digitalization consistent with the principles of Industry 5.0.

Conclusions. The continued evolution of the digital economy stimulates both the emergence of new information technologies and the advancement of existing digital solutions applied in business. Prominent technological trends include the expanding adoption of AI agents, AI-assisted software engineering, autonomous procurement, digital energy management, cloud environments supported by blockchain-based data architectures, quantum computing, intelligent robotics, the integration of the Internet of Things (IoT) and digital twins, together with the ongoing evolution of the metaverse

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and augmented and virtual reality technologies. The simultaneous integration of these technologies establishes a comprehensive business digitalization ecosystem. In contrast, isolated implementation of individual technologies cannot fully realize the benefits of an integrated digital ecosystem. The absence or insufficient development of any technological component undermines ecosystem integrity, reduces resilience and operational efficiency, and weakens its capacity to withstand technological, organizational, and cybersecurity risks.

The technological components of the information technology ecosystem collectively support enterprise information system integration, business process automation, AI-assisted software development, supply chain coordination, resource optimization, secure exchange of business data, high-performance information processing, autonomous execution of operational activities, digital modeling of assets and business processes, and advanced capabilities for remote collaboration and management. The implementation of a comprehensive information technology ecosystem enhances business efficiency, organizational adaptability, and managerial effectiveness while optimizing workforce requirements and reducing organizational, informational, and administrative costs.

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