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THE IMPACT OF DIGITAL TRANSFORMATION ON THE RECOGNITION OF DIGITAL ASSETS IN ACCOUNTING

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Abstract. *Digital transformation has catalyzed the emergence of digital assets by creating the technological, economic, and social foundations that enable their existence. It has not only enabled the development of novel financial and non-financial instruments, but has also transformed paradigms of asset valuation, control, and transfer, thereby creating a distinct class of assets that requires adapted accounting and governance methods. This study aims to theoretically substantiate the prerequisites for the emergence of digital assets in the digital economy and to identify a structured system of factors that influence digital transformation and the establishment of digital assets as an accounting object. The research employs systemic and structural-functional approaches to analyse interactions among technological, economic, regulatory, and institutional factors that generate digital assets. The evolution of digital technologies – in particular distributed ledgers, tokenization, automation, and algorithmic platforms – has produced new forms of economic value that differ from traditional assets in their modes of creation, rights affirmation, and transfer of control. The technological shift alters approaches to identification, recognition, valuation, and disclosure in financial reporting, underscoring the need to adapt accounting frameworks to the conditions of the digital economy. Within the scope of the study, a three-tier classification of factors –drivers, enablers, and barriers – is proposed, integrating temporal and functional dimensions of the digital environment and analysing impact mechanisms on market infrastructure, liquidity, risk management, and accounting and disclosure requirements. The proposed approach supports professional judgment, formalizes accounting procedures, and improves comparability of financial reporting. Findings have both theoretical and practical implications for accounting standard-setting, internal control, and audit practice amid digital transformation.*

Keywords**:** *digital transformation, digital assets, digital economy, accounting for digital assets, asset recognition, asset valuation, tokenization, blockchain, disclosure requirements.*

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1. Problem statement.

Digital transformation fundamentally changes the ways of creating, storing, and transferring economic benefits, which imposes new requirements for defining accounting objects. The implementation of distributed ledger technologies, smart contracts, tokenization of claim rights, and digital identification alters traditional notions of an asset's form of existence, methods of control verification, and mechanisms for obtaining future economic benefits. In approaches to asset recognition in accounting, the focus shifts from material substance to the digital representation of rights recorded in information systems. The importance of technological infrastructure as the environment in which the asset exists increases, influencing valuation methods, approaches to classification, recognition, and disclosure in reporting. Thus, digital transformation acts not as a background process but as a determining factor in shaping the methodological foundations of accounting for digital assets, affecting both their economic nature and the tools for their accounting representation.

2. Review of recent research and publications addressing the problem.

A review of the scientific literature indicates an interdisciplinary, yet fragmented, nature of research on the relationship between digital transformation and the emergence of digital assets as an accounting object. Documents and interpretations of the IFRS Foundation [1], positions of the IASB [2], and analytical materials of professional organizations [3–4] emphasize the need to unify approaches to the recognition and valuation of digital assets, yet leave open questions regarding their conceptual place within the elements of financial statements. Regulatory studies by ESMA [5], EBA [6], MiCA [5–6], as well as works by Dragomir V. [7], Zetzsche D. & Sinnig J. [8], Florek-Paszkowska A. & Ujwary-Gil A. [9] detail the legal frameworks for crypto-asset circulation but do not ensure the integration of these rules with accounting methodology.

Conceptual studies on digital transformation by Vial G. [10], Verhoef P. et al. [11], Reis J. & Melao N. [12], Tapscott D. & Tapscott A. [13], Obydiennova T. & Vasiliev V. [14], and Krutova A. et al. [15] substantiate the profound impact of digital technologies on business models and asset structures [16], whereas empirical research by Li Z. et al. [17], Vignieri V. & Santoni R. [18], Li J. [19], Zhang Y. & Wang S. [20] links digitalization with the quality of accounting information and financial performance but does not address disclosure in non-financial reporting [21]. Studies by Lazea G.-I. et al. [22], Habib N. [23], Heiling J. [24], Romashko O. [25], Fomina O. et al. [26], and Atree M. & Tripathy N. [27] on the accounting of crypto and digital assets focus on specific aspects of classification, valuation, and disclosure, yet do not provide a comprehensive conceptual model for their emergence as accounting objects under digital transformation. Mnykh O. et al. [28] highlight the necessity of considering national characteristics of digital infrastructure and intellectual capital [29]. Gligor D. et al. [30] draw attention to the "dark side" of digitalization, which also requires deeper study.

3. Identification of previously unresolved aspects of the general problem.

Despite the considerable body of research devoted to digital transformation of the economy and the development of digital assets, there is still no comprehensive approach in the academic literature to substantiating their establishment as an independent object of accounting. Unresolved remain the issues of a holistic understanding of the relationship between digital transformation and the technological nature of digital assets, the consideration of the range of factors that determine their emergence, functioning, and economic value, as well as the systematic alignment of these processes with the existing criteria for asset recognition in accounting.

4. Purpose of the article (research objectives).

The objective of the study is to theoretically substantiate and systematize the impact of digital transformation on the formation of digital assets as an accounting object, as well as to develop a structured classification of factors and determinants to enhance the certainty of accounting decisions.

The study employs a combination of general scientific and specialized methods, including: methods of theoretical generalization and systematization – to develop conceptual provisions regarding the impact of digital transformation; analysis and synthesis – to examine the characteristic features of the contemporary concept of "digital" and the significance of digital transformation; comparative analysis – to contrast the influence of various factors on digital transformation; abstraction and logical modeling – to assess the impact of factors on the recognition of digital assets as accounting objects; and elements of a heuristic approach – to formulate conclusions and recommendations.

5. Presentation of the main research findings.

In contemporary scientific approaches, digital transformation is considered a systemic phenomenon that shapes new models of organizational behavior and economic interaction [10], as well as a strategy for adapting to the conditions of the digital economy, rather than merely the technical implementation of digital solutions [17]. In particular, researchers emphasize that the introduction of digital technologies without changes in management practices and corporate culture yields only short-term effects [9]. Successful digital transformation requires the integration of technological, strategic, and human resources [3].

The emergence of personal computers, network technologies, the Internet, and mobile devices in the second half of the 20th century gave rise to the so-called digital revolution – an era in which information is systematically encoded, stored, and transmitted in digital form, while social practices, business models, and government services undergo radical transformation [12]. The term "digital" is no longer limited to the technical characteristic of discrete data representation but refers to the combination of technologies, infrastructure, data processing methods, and new socio-economic practices that emerge around digital data and services [18] (Fig. 1).

These features allow "digital" to be considered not only as a technological characteristic but as a comprehensive socio-economic and institutional paradigm that alters the mechanisms of value creation, recording, and transfer. Properties such as discreteness, networked structure, programmability, technological convergence, and institutional transformation provide the foundation for the emergence of new types of economic resources, particularly digital assets, and determine the specifics of their subsequent development as independent accounting objects.

It is important to distinguish related but distinct concepts [35]:

- *Digitization* – the technical process of converting analog information into digital form as a basic technical phenomenon, for example, scanning documents, encoding signals in binary format, etc.
- *Digitalization* – the use of digital data and technologies to introduce changes in processes, services, and products; a broader concept than mere digitization.
- *Digital transformation* – the systemic and strategic transformation of organizations, economic sectors, and society under the influence of digital technologies and associated changes in the economic and social environment.

The OECD (Organisation for Economic Co-operation and Development) emphasizes that digitisation constitutes the technical foundation, digitalization refers to the application of technologies in processes, and digital transformation represents a complex, cross-sectoral change that requires policy, infrastructure, and human competencies [34]. Accordingly, as

information and communication technologies have developed, the meaning of "digital" has evolved and now denotes not only a method of data encoding but also a broader set of technological, organizational, and societal changes that generate new forms of value creation and distribution.

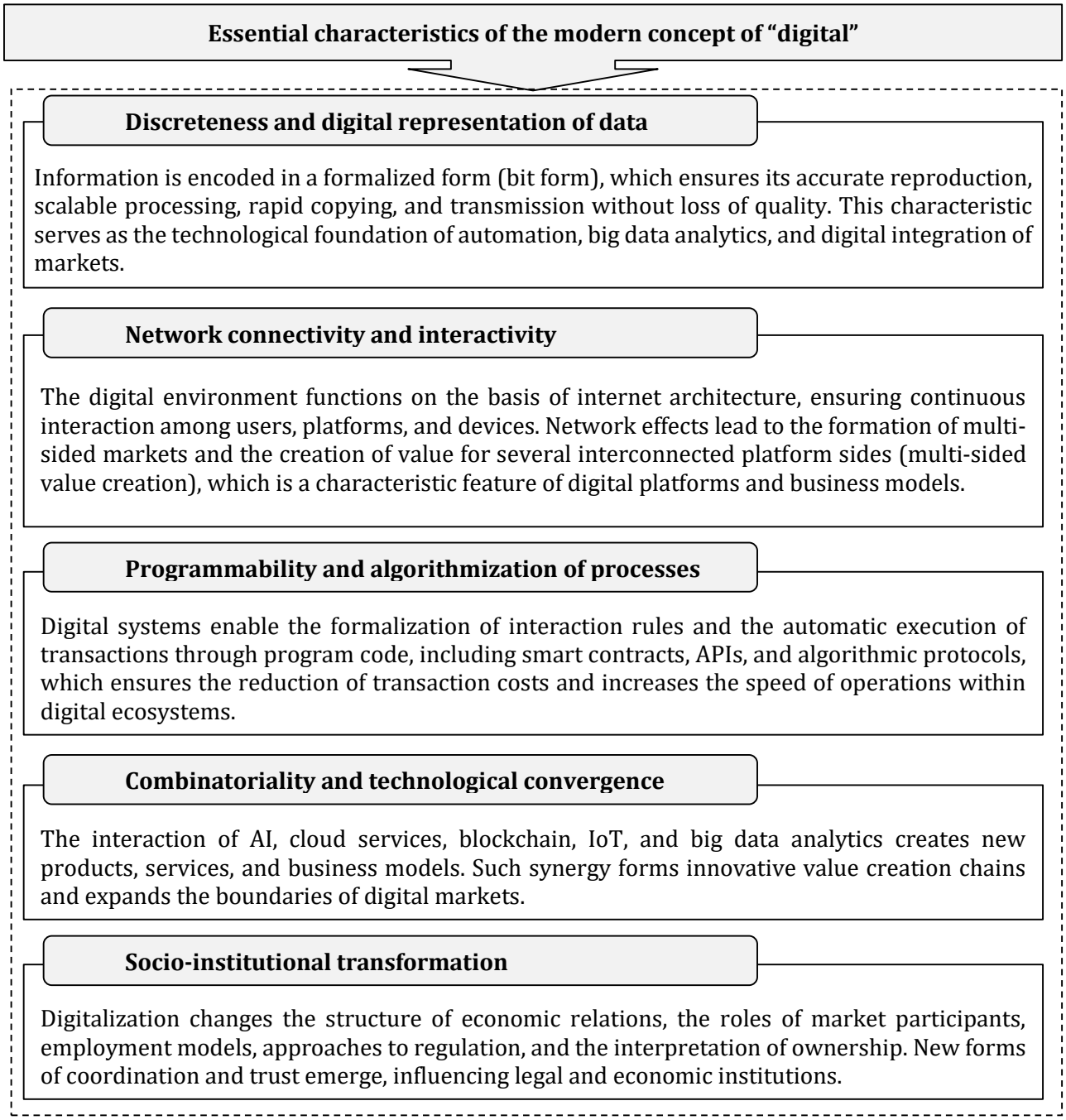

Fig. 1. Characteristic features of the modern concept of "digital"

Source: based on [10, 12, 18, 31, 32, 33, 34].

Digital transformation is a comprehensive process implemented through the adoption of digital technologies, changes in business models, managerial practices, and the creation of new forms of interaction among economic actors. It encompasses not only the technical deployment of IT tools but also profound qualitative changes in the structure, culture, and operational processes of enterprises and public administration. Digital transformation is rightly considered a strategic factor of competitiveness, as it enables firms and countries to adapt to the new challenges of the information economy, ensure faster market access, increase

operational efficiency, and generate new sources of value. At the same time, the essence of transformation lies in the reconfiguration of existing processes based on digital technologies, rather than merely in the automation of individual tasks (Fig. 2).

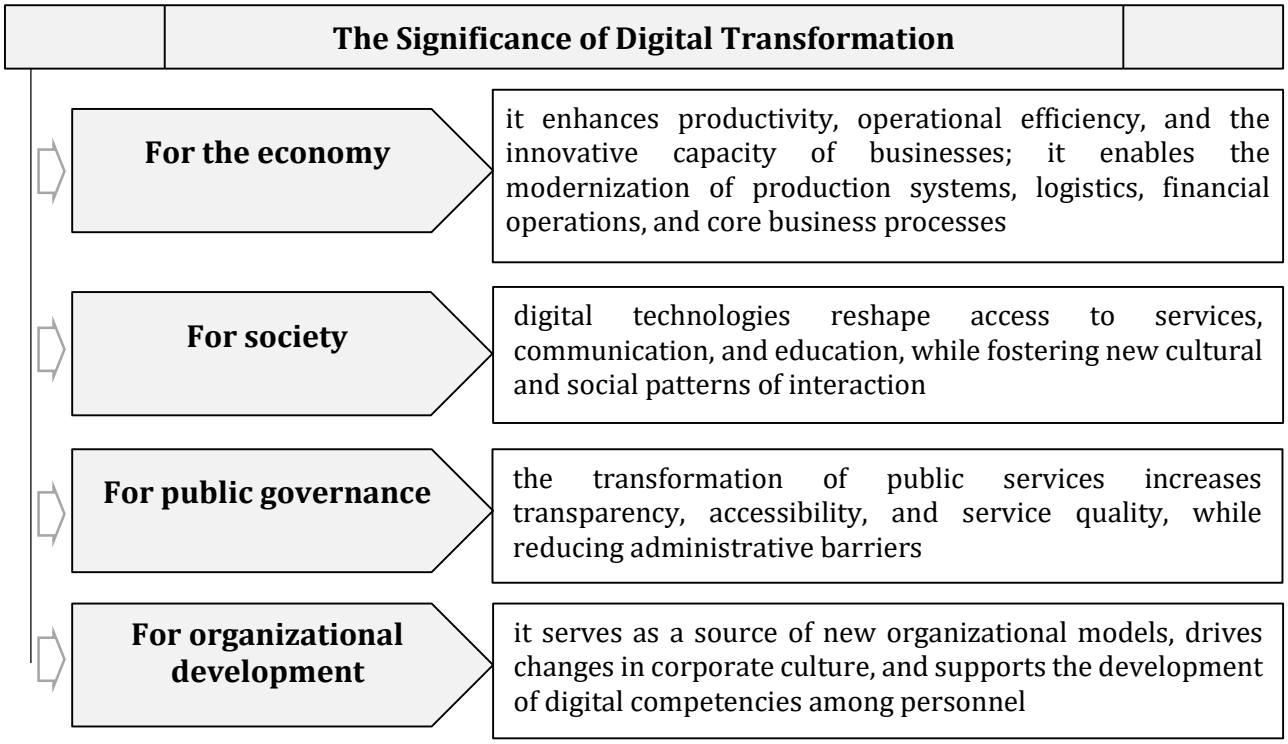

Fig. 2. The key significance of digital transformation

Source: based on [18, 31, 35].

In summary, digital transformation represents not merely technological modernization, but a systemic renewal of the functioning of entities and structures aimed at creating sustainable, adaptive, and competitive models within a digital environment.

Digital transformation has established the technological, economic, and institutional preconditions for the emergence of digital assets (cryptocurrencies, tokens, NFTs, digital rights, etc.) while simultaneously presenting accounting theory and practice with a range of new challenges: defining the identity of the accounting object, establishing recognition criteria, selecting measurement methods, specifying disclosure requirements, and implementing verification procedures. The development of regulatory frameworks, standards, interpretations, frameworks, and regulations by authorities (IFRS, FASB, MiCA, ESRB, OECD guidance) gradually creates a structured framework, yet significant methodological gaps remain.

It is important to note that digital assets are not only a product of digital transformation but also act as a factor accelerating it. They stimulate:

- the digitalization of business processes and management systems;
- the development of new financial platforms and tokenized markets;
- increased transparency and enhanced accounting and reporting requirements for market participants;
- innovative business models;
- the formation of digital culture and competencies.

Thus, today “digital” signifies not merely a method of encoding information but a paradigm for the functioning of the economy and society, in which data, algorithms, and networks form the foundation of institutional and market relations.

As an independent category, digital assets gained substantive definition in the 2010s under the influence of the institutionalization of blockchain technologies and the development of tokenized economic relations. The starting point was the emergence of Bitcoin (2008–2009), which demonstrated the possibility of creating decentralized digital units with cryptographically verified control and transaction recording in a distributed ledger. The subsequent development of blockchain platforms, particularly with the introduction of smart contracts (Ethereum, 2013–2014), expanded the functionality of these units, transforming them into programmable carriers of property rights and obligations [27]. The next stage involved the formation of markets for tokenized rights, including non-fungible tokens, which solidified the perception of digital units as objects of purchase, sale, investment, and accounting recognition. Consequently, in the latter half of the 2010s, the term digital assets was used as a general category for identified digital resources whose existence and circulation are ensured by cryptographic and programmatic mechanisms of distributed systems.

The strategic stage of digitalization changed the approach to understanding ownership and accounting objects. Decentralized ledgers, smart contracts, and tokenization formalized digital assets as an independent category. Under the influence of digitalization, traditional interpretations of asset recognition criteria [2]: control, future economic benefits, and reliability of valuation – require revision. Cryptographic verification of rights replaces classical legal-establishment mechanisms, while volatility and technological dependency complicate valuation. Further consolidation of digital assets within the accounting system depends on the synchronization of technological development and regulatory decisions. There is an evident need for a specialized accounting standard that specifies the legal status of digital assets and the requirements for their representation in financial reporting, taking into account all contemporary features and the impact of digitalization.

For a comprehensive understanding of the environment in which digital assets operate, an in-depth analysis of systemic factors, enablers, and barriers of digital transformation is required. The focus is placed on three dimensions: drivers of technological development, institutional and financial enablers, and constraining factors, with the aim of identifying causal relationships that determine the speed, quality, and scale of innovation diffusion. This analytical structure allows for the prioritization of policy decisions, investments, and scientific research that influence the recognition of digital assets as full-fledged accounting objects and their disclosure in financial reporting. Distinguishing factors according to their role, from enablers to constraints, facilitates a comprehensive understanding of the integration of technologies into corporate governance, accounting, and auditing.

Thus, we first consider the driving forces, drivers, push factors, events, or changes that created a significant impetus for the initiation and rapid transition of enterprises, organizations, and economic sectors to scalable digital activity. Drivers are not always long-term. Some resemble tipping points that shift managerial priorities and accelerate investments in digital solutions [10]. In many cases, push factors create the conditions for transitioning from experimental initiatives to large-scale implementation (Table 1).

Table 1. Drivers, push factors of digital transformation and their impact on the emergence of digital assets

Drivers, push factors	Characteristics	Impact on digital transformation	Impact on the emergence of digital assets
Emergence of distributed ledger technology (DLT, blockchain) and smart contracts	*Decentralized* data recording systems with *cryptographic transaction validation* and programmable execution conditions; distributed immutable ledgers; cryptographic proof of ownership	Transform the architecture of trust (trustless or trust-minimized); enable new interaction models without a centralized intermediary; create the technical foundation for asset tokenization	Directly form *new classes of digital assets* (cryptocurrencies, utility tokens, security tokens, NFTs); define mechanisms of *control*, rights transfer, and *transparency* of circulation
Cloud computing and service-based IT models (IaaS, PaaS, SaaS)	Provision of computing resources on an *on-demand model* with flexible scalability and pay-per-use access to ready-made platforms	Reduces capital expenditures on IT infrastructure; accelerates the implementation of digital solutions; enables small and medium-sized enterprises to experiment with complex services; supports flexible development and operation models for digital services, CI/CD and DevOps practices	Creates *technical infrastructure* for custody services, on-chain data analytics, and market-making platforms; *reduces operational costs* for digital asset service providers
Development of digital telecommunications infrastructure (broadband access, 4G/5G, fiber-optic networks)	*Increased bandwidth*, reduced data transmission latency, expanded mobile coverage and connection stability	Forms the foundational infrastructure of the digital economy; enables scaling of online services, real-time data processing, development of IoT and digital platforms	Increases *accessibility* of digital asset transactions; ensures *continuity* and high transaction speed; *lowers entry barriers* for users and providers of payment and tokenized services
Platformization and network effects	Expansion of *multi-sided digital platforms* (marketplaces, social networks, finance) that unite different user groups and generate cross-network effects	Restructures value creation and distribution channels; concentrates access to consumers; standardizes digital interactions	Platforms create *internal economies* where digital assets function as means of *settlement, reward, or access rights*, increasing the liquidity of certain tokens
Decline in marginal cost of computing and data storage (Moore + cloud economics)	Long-term trend of *decreasing cost* of computing resources and software development	Enables broad use of analytics tools, AI, IoT; makes projects economically viable with lower capital investments	Reduces barriers to *creating infrastructure* for issuance and circulation of digital assets; stimulates development of tokenization startups
Globalization of digital markets and intensification of competition	Integration of markets through digital channels and *increasing competition* from technology-oriented companies	Stimulates investment in digital business models and innovations to maintain competitiveness	Increases *demand for cross-border digital instruments*; promotes development of infrastructure for international token circulation
Socio-behavioral transformations (digitalization of consumption and labor)	Transition of users and employees to *digital interaction channels*; growing expectations regarding mobility and service convenience	Accelerates digitalization of business processes and transformation of customer interaction models; remote work speeds up automation and digitalization of internal processes	Contributes to the spread of electronic payments, digital wallets, and *simplified forms of digital asset* usage
Regulatory institutionalization of the digital asset market (MiCAR)	*Formation of a regulatory framework* defining the legal status and rules of circulation of digital assets	Increases legal certainty of digital markets; creates conditions for scaling or restricting digital business models	Defines *classification criteria*, *custody* requirements, *reporting* obligations, and participation of institutional investors; influences *accounting* recognition
Key technological innovations (Bitcoin, Ethereum, etc.)	Practical implementation of *decentralized digital system* concepts	Demonstrates viability of new trust and exchange models; generates investment interest in digital solutions	Establishes primary models of *issuance, trading, and market pricing* of digital assets
Crisis shocks (economic, geopolitical, war, COVID-19 pandemic)	Events that *shift priorities* (security, resilience) and increase the importance of resilience, diversification, and infrastructure security	Accelerate adoption of digital channels as tools of adaptation and business continuity; position digitalization as a resilience measure	Influence demand and *perception of digital assets* as alternative or speculative stores of value

Source: based on [10, 11, 12, 13, 35]

Table 1 demonstrates that technological and market drivers (infrastructure, DLT, platformization, cost reduction), together with socio-behavioral transformations, create technical capacity (on-chain existence) and market demand for digital assets; however, without targeted support, these opportunities remain fragmented. For this reason, institutional, financial, and educational enablers are identified and presented in Table 2, as they transform the initial impulse into sustainable, scalable diffusion of technologies and markets.

Table 2. Institutional, financial and technological enablers of the sustainable diffusion of digital technologies and their impact on digital assets

Enabler	Characteristics	Impact on digital transformation	Impact on digital assets
Public investment and national digital strategies	*Targeted public funding*, subsidies, investment in telecommunications infrastructure, competence centers, innovation and research (*R&D*) support programs	Provide the infrastructural and policy foundation for the large-scale deployment of digital services; reduce the risk premium for private investors	Facilitate the creation of *national infrastructure* for the circulation of digital assets (registries, pilot platforms, regulatory sandboxes); enhance *institutional trust*
Inflows of financial resources (venture, private, institutional)	*Venture capital funds*, corporate investments, private investors, M&A activity (*Mergers and Acquisitions*)	Ensure financing for startup scaling and R&D; accelerate the commercialization of innovative solutions	Financing creates an *ecosystem* (launchpads, exchanges, custody services); increases *liquidity* and market depth of digital assets (*Depth of Market, DoM*)
Technical standardization and interoperability	Implementation of open protocols, harmonized APIs (*Application Programming Interfaces*), industry technical standards and exchange formats	Reduces integration costs; enhances compatibility of solutions and ecosystem scalability	Enables asset transfer across platforms; reduces transaction costs and fosters the formation of *cross-platform markets*
Development of human capital and education systems	*Educational programs*, professional certifications, corporate academies, cooperation between *universities and business*	Increases IT competence of organizations; reduces implementation risks and strengthens innovation capacity	Develops *expertise* for custody, audit, risk management and digital asset product development; improves *service quality*
Regulatory clarity and pilot environments	*Legislative initiatives*, regulatory *sandboxes* and guidelines (Markets in Crypto-Assets Regulation, MiCAR)	Provides legal clarity; enables targeted experimentation under regulatory oversight; reduces legal uncertainty	Facilitates *institutional participation in the digital asset* market; defines *frameworks* for custody models and product implementation
Developed market infrastructure (liquidity, exchanges, market-making)	Availability of *centralized and decentralized exchanges*, liquidity pools, market makers and clearing mechanisms	Enhances market functionality; reduces transaction spreads and supports efficient price discovery	Increases the *attractiveness of digital assets* as investment instruments and reduces *market risks* for large participants
Trust infrastructure (custody, KYC and AML insurance)	*Key storage technologies* and services, customer *verification* procedures, insurance products and operational controls	Creates conditions for the secure provision of digital services and reduces operational risks	A key factor for institutional entry: the availability of reliable *custody solutions* and *compliance* mechanisms broadens the range of market participants
Integration of payment channels and financial systems	*Linkages with banking infrastructure*, payment networks, stablecoins and payment providers	Facilitates the integration of digital solutions into everyday financial flows; reduces liquidity barriers	Ensures rapid conversion and settlement; enhances the functional capacity of *digital assets as a means of payment or settlement*
Methodological guidance, audit procedures and accounting standards	Practical *guidance* on valuation, disclosure and audit; positions of *international and national bodies* (IFRIC; FASB; IFRS Foundation)	Provide a methodological basis for financial reporting and audit; reduce information uncertainty for market participants	Establishment of *clear rules* for *recognition, measurement and disclosure* in reporting facilitates the *accounting* of digital assets and reduces *audit* risks
Market-based financial incentives (tax, grants, infrastructure support programs)	Tax incentives, infrastructure development *grants, innovation acceleration programs*	Stimulate investment in technologies and shorten time-to-market	*Encourage* the creation of *market services* for digital assets and *accelerate* their commercial *deployment*

Source: based on [9, 10, 12, 29, 35].

Table 2 confirms that public investment, capital inflows, expansion of infrastructure and standardization, and workforce development stimulate the adoption of digital solutions and contribute to the formation of a market niche for digital assets. At the same time, profound constraints are present, namely technical, legal, and social risks that may neutralize the positive effects of the enablers. A detailed analysis of these barriers is provided in Table 3. The identification of constraints and a targeted policy aimed at overcoming them constitute a necessary condition for the stable development of digital markets and the integration of digital assets into the financial infrastructure.

Table 3. Constraining factors (barriers) of digital transformation and their impact on digital assets

Barrier	Characteristics	Impact on digital transformation	Impact on digital assets
Digital divide (uneven access)	Regulatory, geographic and socio-economic *disparities in access* to the internet, devices and services	Limits the scale of implementation, reduces inclusiveness and creates regional "lagging" innovation zones	*Localizes demand and liquidity*; complicates the development of mass digital asset markets and financial inclusion
Skills and managerial capability shortages	Lack of specialists in blockchain, cybersecurity, analytics and digital governance	Increases the risk of technical errors and failed projects; extends Time-to-Value (TTV)	Weakens the operational *reliability* of custody, audit and risk management services related to digital assets
Legacy IT systems	Monolithic ERP systems, fragmented databases, *absence of API interfaces*	Complicates the integration of new services; requires significant investment in reengineering	Hinders reconciliation between on-chain data and official registries; increases the *risk of reporting discrepancies*
Regulatory uncertainty and fragmentation of the legal environment	Divergent national approaches to classification, valuation, taxation and recognition of digital resources; *lack of international harmonization* (different implementation of MiCAR)	Increases compliance costs; restrains cross-border services and business scaling	Complicates *classification and accounting recognition* of assets; increases legal and tax risks (IFRS Foundation; MiCA regulation)
Cybersecurity threats, fraud and market manipulation	Cyber threats: key attacks, exchange breaches, smart contract exploit vulnerabilities (DDoS attacks), liquidity manipulation, *money laundering*	Undermines user and investor trust; requires significant expenditure on cybersecurity	Major incidents disrupt markets of specific tokens, increase insurance premiums and *reduce institutional attractiveness*
Technical scalability constraints	Limited throughput of DLT networks, issues of energy efficiency and *data transmission latency*	Constrain application in high-frequency and mass-use scenarios; provoke architectural trade-offs (sharding, side-chains)	Increase transaction costs and delays; *limit the use of digital assets* in mass payment scenarios
Market volatility and macroeconomic shocks	*Short-term market crashes,* currency crises, inflation spikes	Reduce funding for transformation; shift investment priorities in digital projects	Increase *loss risk* for digital asset holders; *reduce liquidity* during crisis periods; complicate valuation
Ethical, privacy and legal constraints	*Data privacy issues*, algorithmic discrimination, personal data rights, ethical aspects of AI use	May lead to public resistance and additional regulatory restrictions; requires enhanced oversight and regulation	Restrict certain tokenization models (e.g., personal data); strengthen *disclosure requirements* and rights structuring
Energy and environmental risks	*High energy consumption* of certain DLT protocols; need to comply with environmental regulations	May limit the deployment of energy-intensive solutions in regions with strict environmental requirements	Stimulate a transition to less *energy-intensive protocols* and affect the long-term acceptability of assets
Lack of standardized audit and accounting practices	Limited methodologies for verification of transactions in DLT environments (on-chain audit); *absence of standardized procedures* for confirming existence, ownership rights and control over digital assets; underdeveloped audit practices of custody providers	Reduces trust in financial reporting; complicates the establishment of effective internal control and risk management systems; restrains participation of institutional investors	Complicates confirmation of *ownership and control*; creates *uncertainty* regarding *valuation and disclosure* in financial statements, thereby reducing institutional willingness to hold digital assets

Source: based on [12, 30, 35].

The barriers listed in Table 3 have both technical and institutional characteristics and often reinforce one another. Accelerating sustainable diffusion requires a comprehensive strategy: investment in infrastructure and human capital, regulatory alignment and standardization of accounting and auditing methodologies, enhancement of cyber resilience, and efforts to reduce the digital divide. Only a coordinated policy that simultaneously addresses technical, legal, and social dimensions will enable the integration of digital assets into a sustainable financial infrastructure without excessive systemic risks.

As observed, the emergence of digital assets results from the multidimensional interaction of technological, market, and institutional factors. Technological drivers create technical capacity and new economic forms; however, without financial incentives and regulatory clarity, their scale remains limited. Conversely, the existence of rules and infrastructure does not unlock potential without competencies and technical interoperability. Barriers often produce cascading effects: regulatory uncertainty, shortage of qualified personnel, insufficient substantiation of accounting judgments, and the absence of audit procedures to verify the reliability of financial reporting increase risks and reduce institutional participation, thereby slowing overall market development. To integrate digital assets into the conventional financial infrastructure, the following priorities are essential: (1) harmonization of regulatory approaches and standardization of technical interfaces; (2) development of trust infrastructure (custody, KYC, AML, insurance) and audit methodologies; (3) investment in human capital and R&D; (4) measures to bridge the digital divide and enhance cyber resilience; (5) assessment of the environmental impact of technological solutions. From the perspective of accounting and corporate governance, these measures should establish the prerequisites for unambiguous classification, well-founded recognition, reliable measurement, and proper disclosure of digital assets in financial reporting. Coordinated public policy, developed standards, and transparent market regulation aimed at simultaneously strengthening incentives and mitigating barriers are key to ensuring that digital assets become a sustainable component of the financial system rather than a fragmented or systemically risky phenomenon.

Thus, the proposed three-level classification of factors according to the criterion “drivers – enablers – barriers” represents a new integrative approach to analyzing digital transformation and its impact on the formation of digital assets as an object of accounting. Unlike fragmented descriptions of technological, economic, and regulatory factors, the proposed classification combines a temporal-functional dimension (the interrelation of initiation – diffusion – institutionalization) with the operationalization of impact mechanisms: for each factor, a clear description of the mechanism of action and the expected consequences for infrastructure, market liquidity, risk management capacity, and requirements for digital assets is provided.

The scientific novelty of the obtained results is as follows:

– for the first time, a three-level classification of digital transformation factors (“drivers – enablers – barriers”) is proposed, which, unlike existing approaches, integrates technological, economic, and institutional aspects into a unified analytical framework;

– the approach to analyzing the impact of digital transformation has been improved by combining a temporal-functional dimension (initiation – diffusion – institutionalization) with the identification of specific mechanisms of influence on digital assets;

– further development has been achieved in substantiating the relationship between transformation factors and the characteristics of digital assets (liquidity, risks, infrastructure), which makes it possible to formalize their impact on accounting decisions;

– a framework for the development of readiness assessments and operational triggers for decision-making regarding the recognition, measurement, and disclosure of digital assets in financial reporting has been proposed.

This approach enables the subsequent development of readiness assessment criteria and operational triggers for accounting decisions regarding recognition, measurement, and

disclosure, thereby contributing to the methodology of digital asset accounting and the practical standardization of audit procedures.

The practical significance of the proposed classification lies in its potential to serve as a foundation for the development of scorecards or risk matrices, audit checklists, readiness indices for the use of AI, and monitoring of ethical implications for accounting, to be integrated into corporate decision-making processes and internal control systems. In the long term, this will facilitate standardized disclosure and enhance the comparability of financial reporting. Regulators will obtain a functional instrument for prioritizing measures, determining which enablers should be introduced first and which barriers should be addressed as a priority. Institutional investors will gain additional criteria for assessing the operational risks of assets or platforms, while custody service providers and exchange infrastructure operators will receive guidance in defining technical and procedural compliance requirements, thereby simplifying licensing and supervisory processes.

The impact on the establishment of digital assets as an object of accounting lies in the fact that the proposed classification provides a practical and theoretical basis for addressing key accounting issues: identification of the accounting object, recognition criteria, appropriate measurement methods, and the scope of disclosures. The combination of trigger factors and drivers (demonstrating technical and market viability), enablers (ensuring sustained institutional and financial support), and barriers (defining risks and constraints) allows for the development of a contextual logic for applying existing standards and designing new ones. In particular, the presence of an active market, adequate custody mechanisms, and regulatory clarity may support the application of fair value measurement. Conversely, the absence of these elements justifies a more prudent approach to measurement and disclosure. In this way, abstract characteristics of a digital asset are translated into concrete accounting decisions.

6. Conclusions.

Digital transformation, as a complex phenomenon encompassing technological, organizational, social, and economic changes, has multidimensional significance: enhancing productivity and economic competitiveness, improving access to social and public services, and shaping new organizational models and corporate culture. The main prerequisites of digital transformation include technological progress (AI, IoT, Big Data), shifting consumer expectations, global competition and integration, the readiness of enterprises and organizations for digital change, the pursuit of more efficient resource utilization, and broader socio-economic development. The level and quality of transformation depend on the degree of coordination among infrastructure, capital, human resources, and regulatory clarity.

The study confirms that the formation of the conceptual essence of “digital asset” results from the systemic interaction of distributed ledger technologies, tokenization mechanisms, and automated algorithms that transform the ways rights are recorded, value is transferred, and economic relations are organized. A digital asset emerges not merely as a new instrument of circulation, but as a structurally distinct object of economic reality – programmatically determined, network-verified, and algorithmically governed. This technological foundation reshapes approaches to identifying control, confirming ownership rights, measuring value, recognizing, classifying, and disclosing digital assets in accounting. Digital assets generate a positive feedback effect by accelerating the pace of digital transformation at both the enterprise and macroeconomic levels.

The proposed three-level classification of factors «drivers – enablers – barriers» forms a coherent methodological framework for analyzing the impact of digital transformation on the emergence of digital assets as objects of accounting. It enables the linkage of technological, economic, and regulatory market conditions with specific accounting decisions regarding the recognition, measurement, and disclosure of digital assets. This approach ensures a logical transition from characteristics of the market environment to the determination of control, the

existence of an active market, reliable custody mechanisms, and the degree of regulatory formalization, all of which are essential for selecting appropriate valuation methods and disclosure scope in financial reporting. The classification provides a foundation for developing practical tools for internal control and auditing, enhances comparability of reporting, facilitates alignment between professional judgment and regulatory approaches, formalizes accounting procedures, and strengthens the justification of adopted decisions.

Future research should focus on developing a unified classification of digital assets that accounts for their technological architecture and economic function; designing methodologies for initial and subsequent measurement that reflect volatility and the algorithmic nature of these instruments; and examining the impact of tokenization of real-world assets on corporate finance structures and capital markets.

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ВПЛИВ ДІДЖИТАЛ ТРАНСФОРМАЦІЇ НА СТАНОВЛЕННЯ ЦИФРОВИХ АКТИВІВ ЯК ОБ'ЄКТА БУХГАЛТЕРСЬКОГО ОБЛІКУ

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Анотація. *Діджитал трансформація виступає каталізатором виникнення цифрових активів, створивши технологічну, економічну та соціальну основу для їх появи. Вона не лише дозволила реалізувати нові фінансові та нефінансові інструменти, але й змінила парадигму оцінки цінності, контролю та обігу активів, формуючи унікальний об'єкт, що потребує адаптованих методів бухгалтерського обліку та управління. Метою дослідження є теоретичне обґрунтування передумов виникнення цифрових активів у цифровій економіці та визначення системи факторів, які різносторонньо впливають на діджитал трансформацію та становлення цифрових активів як об'єкта бухгалтерського обліку. У дослідженні використано системний та структурно-функціональний підходи, що дозволило проаналізувати взаємодію технологічних, економічних, регуляторних та інших чинників генерування цифрових активів. Еволюція цифрових технологій, зокрема розподілених реєстрів, токенізації, автоматизації, поширення алгоритмів, спричинили формування нових форм економічної вартості, які відрізняються від традиційних активів способом створення, підтвердження прав та передачі контролю. Технологічна природа цифрових активів трансформує підходи до їх ідентифікації, визнання, оцінювання та розкриття у фінансовій звітності, актуалізуючи потребу в адаптації методології обліку до умов цифрової економіки. У межах дослідження запропоновано трирівневу класифікацію факторів впливу на діджитал трансформацію та становлення цифрових активів з виділенням драйверів, стимулів та бар'єрів, що поєднують часово-функціональний вимір розвитку цифрового середовища з аналізом механізмів впливу на інфраструктуру ринку, ліквідність, управління ризиками та вимоги до бухгалтерського обліку і розкриття. Запропонований підхід сприяє підвищенню обґрунтованості професійного судження, формалізації облікових процедур і забезпеченню порівнянності фінансової звітності. Отримані результати мають теоретичне та прикладне значення для розробки стандартів обліку цифрових активів, розвитку процедур внутрішнього контролю та аудиту в умовах діджитал трансформації.*

Ключові слова: *діджитал трансформація, цифрові активи, цифрова економіка, облік цифрових активів, визнання активів, оцінювання активів, токенізація, блокчейн, вимоги до розкриття інформації.*

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://sepd.tntu.edu.ua/images/stories/pdf/2026/26ssmaia.pdf

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