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## NATIONAL STANDARDS OF ACCOUNTING AND REPORTING IN THE ERA OF DIGITALIZATION OF THE ECONOMY

**Abstract.** The paper offers the author's view on national accounting and reporting standards in the context of economy's digitalization. The key trends of digitalization and its impact on accounting are considered — both globally and in Ukraine. The leading technologies that have emerged as a result of the digitalization trend and their impact on accounting and reporting are highlighted. Examples of best practices from developed countries on the new technologies' application in the context of accounting and reporting are provided. A specific focus of the paper is on crypto-assets' accounting. Features of accounting and reporting depending on the nature of certain types of crypto-assets are presented. The best industry practices and positions of leading audit companies in crypto-assets' accounting and reporting are summarized. Examples of developed countries' legislative practices regarding crypto-assets' accounting, reporting and taxation are given. A review of laws and regulations on crypto-assets in Ukraine is performed. Relevant accounting standards that could be applied while considering various aspects of crypto-assets are highlighted. It is identified that the application of effective regulatory frameworks and guidelines is a key challenge in the context of crypto-assets' accounting and reporting. List of questions is presented for a researcher or practitioner to pose in the context of determining the approach to crypto-assets' accounting and reporting. An example of token's accounting in accordance with the existing accounting standards in Ukraine is given. The best practices for external audit of crypto-assets as a part of companies' financial statements audit are summarized. Potential risk areas for external audit in the context of crypto-assets are outlined. The author's vision of the potential evolution directions for national accounting standards in the context of economy's digitalization is presented.

**Keywords:** national accounting standards, digitalization, blockchain, crypto-assets, token.

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## НАЦІОНАЛЬНІ СТАНДАРТИ ОБЛІКУ ТА ЗВІТНОСТІ В ЕРУ ЦИФРОВІЗАЦІЇ ЕКОНОМІКИ

**Анотація.** Запропоновано авторський погляд на національні стандарти бухгалтерського обліку та звітності в контексті цифровізації економіки. Розглянуто ключові тенденції цифровізації та її вплив на бухгалтерський облік як у світі, так і в Україні.

Висвітлено провідні технології, які з'явилися в результаті тенденції цифровізації та їхній вплив на бухгалтерський облік і звітність. Наведено приклади передового досвіду з розвинених країн щодо застосування нових технологій у контексті бухгалтерського обліку та звітності. Особливу увагу приділено обліку криптоактивів. Представлено особливості обліку та звітності залежно від характеру окремих видів криптоактивів. Узагальнено найкращі галузеві практики і позиції провідних аудиторських компаній щодо обліку та звітності криптоактивів. Наведено приклади законодавчої практики розвинених країн щодо обліку, звітності та оподаткування криптоактивів. Проведено огляд законів і нормативних актів щодо криптоактивів в Україні. Висвітлено відповідні стандарти бухгалтерського обліку, які можна було б застосувати при розгляді різних аспектів криптоактивів. Визначено, що застосування ефективної нормативно-правової бази та рекомендацій є ключовою проблемою в контексті обліку і звітності криптоактивів. Наведено перелік запитань для дослідника або практика в контексті визначення підходу до обліку та звітності криптоактивів. Наведено приклад обліку токена відповідно до наявних в Україні стандартів бухгалтерського обліку. Узагальнено найкращі практики зовнішнього аудиту криптоактивів у рамках аудиту фінансової звітності компаній. Окреслено потенційні зони ризику зовнішнього аудиту в контексті криптоактивів. Представлено авторське бачення потенційних напрямів еволюції національних стандартів бухгалтерського обліку в контексті цифровізації економіки.

**Ключові слова:** національні стандарти бухгалтерського обліку, цифровізація, блокчейн, криптоактиви, токен.

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**Introduction.** Digitalization is among the top trends affecting the way the modern world lives and conducts business. Digitalization sparks changes and new opportunities — such innovations as blockchain and crypto-assets could not be imagined a decade ago. Digitalization also affects the way traditional business is conducted — new aspects have to be accounted for and reflected in the right manner. National standards of accounting are caught in between of these massive changes spurred by digitalization — as they have to stay relevant and reflect the state of the fast-changing environment in which companies, individuals, governments, regulation bodies operate.

**Literature review and the problem statement.** Concerning digitalization and its impact on national accounting standards there is a substantial number of research papers.

As Mancini [1] states: «digitalization is not only a technological innovation, but it also implies a different philosophy in the way in which companies manage their business and processes». Ubiquity, Openness and Sharing are in the basis of digitalization [1]. Hence the way companies conduct their business and report also changes — data and financial results become widely available to stakeholders and general public.

Al-Htaybat [2] stresses that quality and relevance of accounting information improves due to usage of technology, i.e. shortened period of financial statements preparation and real-time availability of accounting data for various user groups. Technological change should be taken into consideration both in evolvent of an accounting profession and evolution of accounting standards.

Tekbas [3] proposes a concept of «Accounting Engineering», i.e. a redesign of the accountancy profession in light of technological developments, such as digitalization, Artificial Intelligence, and the Fourth Industrial Revolution. Accounting Engineering philosophy should be applied to pushing forward accounting standards evolution, namely reflection of key contemporary trends (real-time access, virtual meta-world, data-driven decision making), new needs of economic agents, changing economic environment in general.

**The aim of the present article** is to study peculiarities of national accounting standards under digitalization and propose ways of developing national accounting standards under

**Research results.** For a better understanding the specifics of national accounting standards under digitalization, it is first of all necessary to assess the landscape of change provoked by digitalization mega-trend.

Recent survey by KPMG [4] of Ukrainian companies' chief executives states that more than a third of Ukrainian CEOs report that the pandemic has accelerated the digital transformation. In terms of rankings, the most successful was the operating activities' digitalization (39% of respondents) and creation of new digital business models and revenue streams (36% of respondents). However, this research [4] indicates that world progress in terms of digitalization has been much more intense: 80% of respondents globally report that the pandemic has accelerated the digital transformation in their companies.

Ukraine actively integrates into digitalization regulatory landscape. Ukraine has already joined EU Program «*Interoperability Solutions for European Public Administrations 2 (ISA)*», project «*e-CODEX*», project «*e-Invoicing*», initiative «*Single Digital Gateway*». Ensuring electronic interaction for state information resources and interoperability development are among the major challenge for the development of e-government in Ukraine.

Further, the *Concept of Ukraine's digital economy and society development in 2018—2020* has been approved by the order of the Cabinet of Ministers of Ukraine № 67-p as of 17.01.2018.

One of the major results of digitalization is an advancement in data management, data transfer and data communication. There are several key technologies emerging as a result of digitalization, namely Artificial Intelligence, Big Data, Blockchain, Continuous Accounting.

*Artificial Intelligence* is a system of machine intelligence as opposed to human natural intelligence; it is usually applied towards more structured and repetitive tasks where human knowledge and expertise could be accumulated and applied to a standardized framework. Artificial intelligence saves accounting staff's time on repetitive tasks allowing for more strategic and insightful tasks.

*Big Data* is an approach towards analyzing large data sets that could not be processed in a conventional way using traditional software. Big Data first of all affects the ways financial statements are prepared and audited; it also allows for more advanced and complex analytics, supporting managerial decision-making process. Big Data allows for a drastic increase in quality of work, i.e. increased efficiency of accounting staff, decreased time of reporting, enhanced and deepened analytics on available data.

*Blockchain* is a technology accessing the same information in real-time from different sources. For accounting purposes Blockchain could be used for security and speed-of-action purposes.

*Continuous Accounting* is a technology-based approach towards managing accounting cycle which emphasizes real-time processing and deepened analysis of accounting data. The aim is to make accounting more strategic through embedding automation, control, and period-end tasks within day-to-day activities. That supports various stakeholders' demands for comprehensive and real-time reporting. As a result, accounting standards would sooner or later transition from periodic basis of accounting and traditional reporting concerning only financial results to a more comprehensive view encompassing strategic, consumer, environmental aspects [5].

Digitalization of accounting encompasses new concepts of information processing and transmission, including eXtensible Business Reporting Language (XBRL). XBRL is a digital and open standardized language applied to financial statements. XBRL allows financial data readability by any software, improving transparency and efficiency. Increased flexibility of information, stakeholder involvement, are among advantages of XBRL, overpowering disadvantages of digital reporting, i.e., information overload, accuracy, and security.

Considering XBRL adoption, researchers focus on the taxonomy XBRL issue. Bonollo [6] conducts analysis whether XBRL could be easily adopted by Italian public sector. Researchers outline that standard digital format for disclosure is attractive for several reasons, i.e., cost reduction, mandatory control enhancement; increased transparency. Key aspect in adopting XBRL in public sector is defining a standard classification system of financial information (XBRL

taxonomy) for several different AISs used by public organizations. Paper [6] considers aspects of coding systems used by public organizations (e. g. COFOG, Classification of the Functions of Government; SIOPE, Information System on Public Organizations' Operations; The Integrated Chart of Accounts) in terms of a possible use as a basis for the XBRL taxonomy development. As a result, researchers identify the Integrated Chart of Accounts as the most appropriate coding system for this purpose; its codes are sufficiently analytical and shared and it may offer a list of items for the XBRL taxonomy.

In turn there is another study on degree of compatibility of XBRL taxonomy for companies adopting IFRS conducted by Fradeani [7]. Paper focuses on translation and possible extension of taxonomy. It is outlined that official translation does not imply the use of a specific terminology, and possibility of taxonomy's extension represents a way for overcoming that particular issue. Hence, without translation issue eradicated for IFRS XBRL taxonomy, that could pose some rigidity for IFRS financial disclosure.

All these new technologies allowed for a wide spread of crypto-assets. Crypto-assets development poses not only benefits, yet also certain challenges, among them crypto-assets' regulation — more specifically crypto-assets valuation and accounting — being one of the key challenges.

For accounting purposes two major groups of crypto-assets are outlined:

- Crypto-currency (synthesis of blockchain technology, transaction protocol, and digital virtual currency);
- Blockchain equivalents (tokenized tangible assets; virtual assets; servicing tools (providing rights for goods and services); transactional tools (providing rights for financial instrument); hybrid assets (possessing characteristics of multiple crypto-asset sub-categories).

Crypto-assets classification gives basis for clear standards on its recognition, accounting, valuation, taxation. Crypto-assets being a quick-evolving and non-stable economic category demands a comprehensive and evolving approach based on current economic environment's state. Big4 accounting firms have in general a common standing on crypto-assets classification (based on their issued whitepapers), namely, Big4 accounting firms have share an idea on treating crypto-assets under current GAAP as intangible assets not subject to amortization or fair value accounting, rather crypto-assets are subject to periodic impairment testing. Big4 accounting firms' generalized view on crypto-assets accounting essence is presented in *Table*.

Table

#### Big4 accounting firms' generalized view on crypto-assets accounting essence

Big4 accounting firm	Classification	Subsequent measurement
Deloitte	Intangible asset other than goodwill	Subject to impairment testing; no amortization; impairment losses to the income statement; no unrealized gain recognition
EY	Intangible asset other than goodwill	Subject to impairment testing; no amortization; impairment losses to the income statement; no unrealized gain recognition
KPMG	Intangible asset other than goodwill	Subject to impairment testing; no amortization; impairment losses to the income statement; no unrealized gain recognition
PwC	Intangible asset other than goodwill	Subject to impairment testing; no amortization; impairment losses to the income statement; no unrealized gain recognition

Source: compiled by authors based on [8—11].

EY [9] states that the holder of crypto-assets would need to consider the general disclosures required by IAS 1 «*Presentation of Financial Statements*» when compliance with the specific requirements of the relevant IFRS is insufficient to enable users of financial statements to understand the impact of crypto-assets on the entity's financial position and financial performance [9].

Crypto-assets being an intangible asset are not a subject to a number of accounting standards — which could not be applied to crypto-currencies since the following accounting standards consider only tangible assets, namely:

- IAS 16 «*Property Plant and Equipment*» applies to tangible items;
- IAS 40 «*Investment Property*» applies to land, buildings, or both;

- IAS 41 «*Agriculture*» applies to biological assets referring to agricultural activity.

This leaves the following accounting standards to be considered for crypto-assets:

- IAS 7 «*Statement of Cash Flows*», IAS 32 «*Financial Instruments: Presentation*» — cash and cash equivalents;
- IAS 8 «*Accounting Policies, Changes in Accounting Estimates and Errors*» — developing an accounting policy for crypto-assets;
- IAS 38 «*Intangible Assets*»;
- IFRS 9 «*Financial instruments*».

Digital asset accounting guidelines have been also actively considered by accounting industry bodies. Namely, AICPA [12] developed a practice aid document «*Accounting for and auditing of digital assets*» in 2019 concerning crypto-assets accounting approach. AICPA proposes to classify digital assets as indefinite-life intangibles. In terms of revenue accounting, AICPA provides an example when a company purchases a tangible good from another company in exchange for a digital asset, with no variable consideration, so that transaction is within the scope of the revenue standard ASC 606 «*Revenue from Contracts with Customers*». As a result, assets would be measured as of the contract inception date; that value would be used to record the revenue upon transfer of the good.

Considering digital assets' taxation issue, the US tax authority Internal Revenue Service (IRS) published *Notice 2014-21* [13], stating the following: «for federal tax purposes, virtual currency is treated as property; general tax principles applicable to property transactions apply to transactions using virtual currency». Further, IRS in 2019 published *Revenue Ruling 2019-24* [14] considering virtual currency transactions. That new guidance provided details on the accounting and calculation of gains and losses on virtual currency transactions. IRS' classification of digital assets as general property creates multiple potentials for a capital gain, or loss, for a taxpayer; taxpayer must generally calculate capital gain on each transaction. Taking into account uncertainty on crypto-assets' taxation, a conservative approach to digital asset tax reporting is considered as preferable.

Crypto-assets regulation is also considered by Ukrainian authorities. *Draft Law on Amendments to the Tax Code of Ukraine on Taxation of Transactions with Crypto Assets* (№ 2461 as of 15.11.2019) aims to interpret such terms as «crypto-asset», «cryptocurrency transaction», «token», «profit from cryptocurrency transactions», «virtual asset», etc. establishing a framework for crypto-assets regulation and accounting.

In general, EY [9] provides the following list of questions to pose while designing accounting approach towards crypto-assets:

- Local laws and regulations;
- Analysis of which party has legal title to the crypto-assets;
- Status of the crypto-assets in the event of the custodian's insolvency (i.e., are the crypto-assets available to general claims from the custodian's creditors in the event of bankruptcy);
- Contractual limitations on crypto-assets' use and transfer by the custodian, including whether the custodian is required to keep matching holdings of crypto-assets at all times;
- Whether the arrangement allows for co-mingling of client and custodian crypto-assets (i.e., is the custodian required to keep its clients' crypto-assets into a different digital wallet from its own crypto-assets);
- Whether there are requirements imposed on the custodian regarding appropriate record keeping and internal controls (e.g., the custodian is required to maintain separate records of transactions and holdings of crypto-assets for each depositor);
- Whether the agreement with the client makes it clear that the custodian is holding the crypto-assets in the capacity of an agent;
- Whether the access to clients' crypto-assets require a multi-signature authorization by both the client and the custodian;
- Whether the custodian bears the security risk (i.e., is the custodian obligated to reimburse the client for any crypto-assets lost in a security breach).

Hence, there is a key issue of designing a relevant regulatory framework for crypto-assets accounting. Due to the fact that there are no special accounting guidelines that would directly relate to crypto-assets, researchers and practitioners should refer to relevant international standards of IAS, and existing national standards. More specifically, paragraph 7 of IAS 8 «*Accounting Policies, Changes in Accounting Estimates and Errors*» may be of guidance while determining a standing on crypto-assets accounting approach design — requiring the use of a specific IFRS, if applicable.

It's worthwhile to mention that since there are differences in the rights and obligations associated with specific crypto-assets, its accounting may be subject to different standards — depending on the entity's approach and use purposes regarding those assets. In order to design a relevant accounting methodology for each specific type of crypto-asset, it is necessary to assess the purpose of the crypto-asset's acquisition (sources of its origin), expected term of its use; crypto-asset's liquidity level.

Presently, there is no direct authoritative guidance by the Financial Accounting Standards Board (FASB) regarding how companies that possess crypto-assets should recognize, record, or report these assets. A number of key financial reporting challenges are outlined:

- Determining appropriate balance sheet classification;
- Determining whether crypto-assets should be carried at fair value or historical cost subject to impairment testing;
- Establishing whether gains (or losses) should be recognized in earnings or in other comprehensive income;
- Considering a need for valuation account or other contra asset account for crypto-currency held by third parties;
- Selecting what exchange or source of price information would be used for valuing a crypto-asset.

Key issue is that crypto-assets may possess certain characteristics belonging to different groups of assets. For instance, crypto-currency is not necessarily a form of cash — it rather combines characteristics of both cash, and financial instrument, intangible asset, investment. So a specific crypto-currency should be classified due to its specific use purpose (for instance, Bitcoin — investment, Litecoin — means of payment, etc.).

Accounting methodology design for crypto-assets should also consider entity's type of business activity — for instance, entities that accumulate Bitcoin as investment should be treated in a different way compared to entities mining Bitcoin or performing Initial Coin Offering of tokens.

Thus, a specific approach should be employed concerning different cases. However, a comprehensive framework should be developed as there is a growing interest for crypto-asset transactions on behalf of companies, individuals and general public. Regulators and accounting industry bodies should ensure consistent application of accounting approaches towards crypto-asset transactions, as well as sufficient disclosure in financial statements. New objects' presentation in financial statements requires not just «cosmetic» additions to existing standards and guidelines, but rather there should be a design of new taxonomy principles. Meanwhile for the time being, entities should seek a professional advice from multiple reliable sources for a reliable methodology for crypto-asset valuation and further reflection in financial statements.

There is a possible approach for accounting a token under Ukrainian national accounting standards. Due to the fact that there are no special accounting standards that would directly address crypto-assets, researchers and practitioners should refer to current national and international standards and apply the established approaches. Under Ukraine's accounting standards, as the useful life of the token as a flash drive carrier exceeds one year, it has to be considered as a non-current tangible asset. As a rule, value of the token as a flash drive carrier does not exceed UAH 20000, thus it belongs to low-value non-current tangible assets (subaccount 112 «*Low-value non-current tangible assets*»). All costs associated with acquiring low-value non-current tangible assets are initially capitalized on subaccount 153 «*Acquisition (manufacture) of other non-current tangible assets*». Depreciation of tokens should be included in overhead costs (account 92). In accordance with paragraph 27 of UAS 7 «*Fixed assets*», the depreciation of long-term tangible assets may be

accrued immediately — at 100% of its value in the first month of use of the asset, or its 50% value written off in the first month, and the remaining 50% — in the month of disposal. Token's depreciation should be included in overhead costs (account 92 «*Administrative cost*»). Token's value is included in accounted costs (due to long-term tangible assets' depreciation) and automatically reduces Income Tax base. Operations for software products' supply are temporarily exempt from VAT (till 1 January 2023) (paragraph 26-1 of subsection 2 of section XX of Tax Code of Ukraine) — Tax Code of Ukraine includes, in particular, cryptographic means of information protection.

There is another key issue regarding crypto-assets, namely its auditing. Accounting firm RSM [15] proposes the following conduct for auditing digital assets:

- «Auditor has to *judge Blockchain as a ledger* — in particular its relevance and reliability; auditor must also carry out certain procedures to determine an entity's rights and obligations over a wallet address; auditor has to study what information is going into the blockchain, what controls are around the blockchain» [15];

- «Auditor has to conduct certain *procedures to determine an entity's rights and obligations over a wallet address* — considering that wallets may be anonymous; methodology for identifying of fraud risk should be developed in case of fraudulent booking the balances within that wallet on multiple statement entities and providing that wallet address to separate auditors looking at the separate financial statements; entity has to provide sufficient evidence for actually having the right to control or move the assets that are in the wallet» [15];

- «Auditor has to determine whether an entity has *exclusive custody of a digital asset* or if it uses a third-party provider — considering cybersecurity risks involved, especially in case of using third-party trading platforms» [15].

**Conclusions.** All in all, while designing a relevant accounting guideline for considering crypto-assets' recognition, reporting, valuation, taxation both technological aspect, and essence of the particular type of transaction should be considered. Existing body of knowledge and current accounting standards must be a basis for determining accounting guideline towards crypto-assets.

While considering disclosure and reporting, policies on crypto-assets should be disclosed to a wide range of stakeholders, i.e. companies, investors, accounting researchers and practitioners, and others. In addition to a better transparency, that also provides an additional safeguard against potential fraud or mismanagement, lawsuits and public scandals.

Presently, accounting industry bodies are only in the process of reviewing the accounting approaches and guidelines towards crypto-assets. This lack of consistency, while presenting challenges for a wide range of stakeholders, also provides an opportunity for proactive organizations to express their leadership on the matters of accounting standards regarding crypto-assets.

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