

Article

Problems in Developing Accounting and Control Methods for Property, Plant and Equipment

Xushmuradov Oman

1. Acting professor of the department of "Accounting and audit, PhD in economics, Karshi state technical university

*Correspondence: o.xushmuradov@gmail.com

Abstract: Property, plant and equipment is a key element of the productive capacity of business entities and the reliability of its accounting and control has an impact on financial reporting and asset management. With the convergence of the IFRS and the growth of digital technologies, uniformity of approaches in determining PPE recognition, measurement, depreciation, monitoring and control gain importance in Uzbekistan. Useful lives and residual values and depreciation methods may fail to keep up with the changing asset-use patterns and technological obsolescence, and conventional approaches may not reflect differences between accounting records and the technical and economic condition of assets. The aim is to investigate the current methods of PPE accounting and control, explore practical difficulties that arise and propose recommendations for enhancing the methods using digital technologies. A comparison of IAS 16, IPSAS 45 and Uzbekistan's NAS 5 reveals similarities in method and differences in the frameworks; illustrative calculations illustrate that the method chosen for valuing an asset at a depreciation amount differently affects the carrying amounts of the assets and the timing of the depreciation expense. The results also suggest the integration of accounting information, asset location, technical condition of the asset, asset utilization, asset repair, asset modernization and financial-tax differences. The study offers an integrated model of digital accounting and control throughout the life cycle of PPEs, which is based on the use of digital identification, automated reconciliation and applications of AI analytical tools. The proposed approach may enhance the reliability and timeliness of accounting information, internal control, and decision making that is economically motivated in regards to asset modernization, replacement, and renewal.

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1. Introduction

The structural transformations taking place in the global economy, the intensification of competition, the accelerating pace of technological advancement, and the digitalization of production processes require business entities to develop new mechanisms for the efficient utilization of available economic resources. International experience demonstrates that, amid the diversification of ownership structures and the deepening of market relations, the competitiveness of enterprises largely depends on the effective management of long-term assets that constitute their productive capacity, the continuous modernization of their technical and technological base, and the application of efficient accounting and control methods. From this perspective, improving the

methods of accounting for and controlling property, plant and equipment (PPE) in line with contemporary economic requirements is of considerable scientific and practical importance.

Property, plant and equipment represent one of the key economic resources within the non-current assets of business entities and form the material and technical foundation of production and service activities. Their composition, technical condition, carrying amount, useful life, and level of utilization directly affect an enterprise's production capacity, labor productivity, cost of production, financial performance, and investment attractiveness. Therefore, PPE should be examined not merely as a separate object of accounting, but also as a strategically important resource that contributes to the long-term economic potential, financial stability, and sustainable development of a business entity.

The regular renewal of the active component of PPE, optimization of its structure, increased utilization of production capacity, and technological modernization are essential prerequisites for improving enterprise performance. These processes contribute to more intensive utilization of labor resources, optimization of production costs, implementation of resource-efficient technologies, more effective use of production capacity, and, ultimately, stronger financial stability. At the same time, the physical deterioration and technological obsolescence of PPE, as well as delays in its modernization or replacement, may increase production costs, reduce product competitiveness, and adversely affect financial performance. This necessitates not only reliable accounting for the movement and utilization of PPE but also the development of effective control mechanisms.

PPE generally represents a significant proportion of the assets of business entities and generates economic benefits over more than one reporting period. In accounting terms, the depreciable amount of an asset is allocated systematically over its useful life in accordance with the pattern in which the asset's future economic benefits are expected to be consumed. Accordingly, the reliability of financial reporting is directly influenced by the appropriateness of accounting judgments and procedures relating to the recognition of PPE, initial and subsequent measurement, determination of useful lives and residual values, selection of depreciation methods, identification of impairment indicators, revaluation, and derecognition. Consequently, improving the methodological framework for PPE accounting and control is essential for enhancing the relevance, reliability, and decision-usefulness of accounting information.

At the same time, the rapid pace of technological advancement increases the likelihood that useful lives and depreciation parameters determined using conventional approaches may, in some cases, no longer correspond to the actual economic conditions in which assets are used. As technologies evolve rapidly, certain items of property, plant and equipment may become technologically obsolete before they are physically worn out. Consequently, discrepancies may arise between the carrying amount, useful life, and depreciation parameters recognized in accounting records and the actual technical and economic condition of the asset. This situation requires a shift away from formal and generalized approaches to PPE accounting toward differentiated approaches that take into account the functional characteristics, intensity of use, technical condition, and expected pattern of consumption of the economic benefits embodied in each asset.

In the context of digital transformation, one of the most promising ways to address this issue is to integrate modern information technologies into PPE accounting and control. In particular, maintaining information on the movement and technical condition of PPE within an integrated database, continuously monitoring the intensity of asset utilization, digitalizing inventory procedures, and applying intelligent data analytics can improve the timeliness of control procedures and the reliability of accounting information. Moreover, the growing capabilities of artificial intelligence for assessing the

technical condition of assets and identifying potential failures or declines in operating efficiency at an early stage provide a methodological basis for moving from traditional retrospective control toward a preventive and predictive control model.

The structural and technological transformations taking place in the real sector of Uzbekistan's economy have further increased the importance of the efficient use and management of PPE. However, the statistical indicators originally used in this section do not provide a sufficiently robust basis for directly concluding that the share of real-sector assets increased nearly fourfold between 2010 and 2025 or that the proportion of production- and service-related assets within total PPE increased from 6-8% in 2013 to 18–20% in 2025 [1]. Therefore, to avoid an unsupported interpretation, these figures should not be retained in the final version of the article. Instead, the analysis should rely on directly comparable official indicators of investment in fixed assets and gross fixed capital formation, which are examined in the subsequent analytical section of the study.

The growing scale of investment and capital formation, in turn, increases the importance of ensuring the appropriate recognition and measurement of PPE in accounting records and strengthening control over its existence, movement, technical condition, and utilization. In practice, particular attention should be paid to reconciling accounting records with the actual technical condition of individual assets, economically substantiating their useful lives and residual values, aligning depreciation methods with the expected pattern of consumption of economic benefits, improving the reliability of inventory procedures, and integrating digital technologies into accounting and control processes. These issues require further methodological development in order to enhance both the reliability of financial reporting and the effectiveness of asset management.

Accordingly, the purpose of this study is to examine the existing methodological approaches to accounting for property, plant and equipment, identify problems associated with organizing control over their movement and utilization, and develop scientifically grounded practical recommendations for improving PPE accounting and control methods through the application of digital technologies. Achieving this objective involves systematizing theoretical and methodological approaches to the recognition and measurement of PPE, depreciation, determination of useful lives and residual values, and control over the existence and movement of assets; identifying methodological problems encountered in practice; and developing control approaches based on modern digital and information technologies.

2. Materials and Methods

The study employs systematic and comparative analysis, analysis and synthesis, grouping, comparison, quantitative calculation, and graphical methods to investigate approaches to improving the accounting and control of property, plant and equipment (PPE). The requirements of national and international accounting standards are comparatively examined to identify methodological similarities and differences in the recognition, measurement, depreciation, and control of PPE. The effects of alternative depreciation methods on the carrying amount of assets and financial performance are assessed using illustrative calculations. Based on the synthesis of the theoretical and analytical findings, an integrated accounting and control model covering the entire life cycle of PPE is developed.

2.1 Literature Review

Accounting for property, plant and equipment (PPE) is an important and relatively complex area of accounting, encompassing a set of interrelated processes, including recognition, classification, initial and subsequent measurement, depreciation, capitalization of subsequent expenditures, impairment assessment, and derecognition. Since PPE constitutes a significant component of the productive capacity and economic potential of business entities, the reliability of accounting information relating to these

assets directly affects not only the quality of financial reporting but also the assessment of asset utilization efficiency and the formulation of well-founded management decisions.

A clear understanding of the economic substance of PPE is essential for examining the theoretical and methodological foundations of its accounting. In Uzbekistan, the recognition, measurement, and accounting treatment of PPE are governed by national accounting regulations, including National accounting standard No. 5, *Property, plant and equipment* [2]. In international practice, the accounting treatment of PPE is primarily governed by IAS 16 *Property, plant and equipment* [3]. The literature reviewed indicates that further convergence of national accounting practices with internationally recognized principles remains an important direction for improving the methodological framework for PPE accounting.

Various aspects of PPE accounting have been examined in the national academic literature by M. Ostanakulov [4], A. Mamajonov [5], S. Mehmonov, D. Ubaydullayev [6] and other scholars. Their studies address issues such as the recognition of PPE, determination of initial cost, and the accounting treatment of expenditures related to repairs, reconstruction, and other subsequent activities. Although these studies have made an important contribution to the theoretical and methodological foundations of PPE accounting, further development of these approaches remains necessary in the context of economic digitalization, automation of accounting processes, and the introduction of modern asset-control mechanisms.

G.M. Rakhimova considers the classification of property, plant and equipment (PPE) to be an important methodological aspect of the effective organization of accounting and auditing. The author notes that, in accordance with IAS 16, the classification of PPE should reflect the nature and use of assets in an entity's operations, with assets of a similar nature and use grouped into separate classes. Such classes may include land; land and buildings; machinery and equipment; ships; aircraft; motor vehicles; furniture and fixtures; and office equipment. In Uzbekistan, the use of the national classifier of fixed assets for accounting, taxation, and statistical purposes provides a regulatory basis for systematizing information on PPE and organizing appropriate control procedures [7].

In defining the economic substance of PPE, its tangible nature, long-term use, and capacity to generate future economic benefits are regarded as fundamental characteristics. The literature generally describes PPE as tangible assets used for more than one period in the production of goods, performance of work, provision of services, or for administrative and other operating purposes. Consistent with this approach, IAS 16 defines property, plant and equipment as tangible items held for use in the production or supply of goods or services, for rental to others, or for administrative purposes, and expected to be used during more than one period [8].

In the international accounting literature, the identification of PPE is generally based on such characteristics as tangible form, long-term use in business operations, and the intention to use the assets in operating activities rather than hold them for resale in the ordinary course of business. From an accounting perspective, however, the existence of future economic benefits should be considered primarily within the broader framework of asset recognition and measurement. This approach makes it possible to view PPE not merely as physical objects but as economic resources controlled by an entity and capable of contributing to its future economic benefits.

L.V. Babakova examines the role of PPE in improving the operational efficiency of business entities, with particular emphasis on the intensity of asset utilization and the proper organization of accounting. According to the author, PPE forms the production and technical base of an enterprise and directly influences its production capacity, utilization of labor resources, level of material costs, and overall financial performance. Therefore, the reliable accounting treatment of transactions relating to the acquisition

and recognition of PPE, depreciation, revaluation, repairs, lease-related transactions, and disposal is of particular importance. Babakova further emphasizes that effective asset management requires management to have access to complete, objective, timely, and sufficiently detailed economic information on the existence, movement, and condition of PPE. Accordingly, the proper organization of PPE accounting and control plays a crucial role in establishing a reliable information base for management decision-making [9].

G.Yu. Kasyanova characterizes PPE as tangible assets used over an extended period in business operations and identifies depreciation as one of the key accounting mechanisms associated with their long-term use [10]. From the perspective of contemporary accounting methodology, this proposition should be interpreted more precisely: depreciation does not represent the mechanical transfer of an asset's physical wear to the cost of products, works, or services. Rather, it represents the systematic allocation of the depreciable amount of an asset over its useful life, reflecting the expected pattern in which the asset's economic benefits are consumed. This interpretation provides a more accurate methodological basis for linking depreciation policy with the economic substance of PPE utilization.

A.M. King considers the reliable determination of the value of property, plant and equipment (PPE) to be an important methodological foundation for organizing both accounting and internal control. According to the author, under the traditional accounting approach, PPE is initially recognized at cost, subsequently depreciated over its useful life, and derecognized upon disposal or when the asset is no longer expected to generate economic benefits. King also emphasizes the importance of assessing an asset for impairment when indicators exist that its carrying amount may not be recoverable. This approach highlights the close informational relationship between PPE accounting and internal control and demonstrates that ensuring the reliability of information on the value, existence, and condition of assets is one of the key functions of an effective internal control system [11].

S. Shubina, P. Piskunov, B. Nitsenko, O. Miroshnyk and D. Pelykh examine PPE management as an integrated process encompassing the development, adoption, and implementation of managerial decisions concerning the formation, efficient utilization, renewal, and reproduction of fixed assets, as well as control over the implementation of such decisions. The authors argue that the effectiveness of PPE management largely depends on the quality of accounting and analytical information, with accounting, analysis, and audit serving as key functional components of management information support. They further emphasize that, under conditions of uncertainty and risk, accounting and analytical support should not be limited to compliance with financial and tax reporting requirements but should also contribute to achieving an enterprise's tactical and strategic objectives. Accordingly, the authors propose an accounting and analytical framework based on the comprehensive assessment of the composition, dynamics, and technical condition of PPE, its renewal and utilization efficiency, and its effects on production volume, sales, profit, and profitability as an important means of strengthening control over asset utilization [12].

S.L.M. Sitio substantiates the need for the digitalization of PPE accounting and control by examining practical problems such as unreliable information on the actual location of assets, delays in recording asset movements, and discrepancies between accounting records and the physical condition or location of assets. The author notes that spreadsheet-based accounting becomes increasingly difficult when an enterprise manages a large number of assets across multiple organizational units, particularly with respect to data processing and the calculation of asset values and depreciation. To address these limitations, the study proposes a web-based fixed asset management system that enables more timely monitoring of asset movements and locations, improves the reliability of accounting information, and facilitates more effective accounting and

audit procedures. From this perspective, the automation of PPE accounting can be regarded not merely as a means of reducing the administrative workload of accounting personnel but also as an instrument for continuous asset control, timely reporting, and the creation of a reliable information base for managerial decision-making [13].

Recent studies increasingly examine improvements in PPE accounting beyond the conventional issues of recognition and measurement, focusing on the integration of depreciation policy, internal control, accounting analytics, and digital technologies within a unified system. I.Tsiutsiak and A. Tsiutsiak [14] demonstrate that integrating digital technologies into PPE accounting and financial reporting processes can improve the accuracy and timeliness of accounting information. Y. Gorokhovets, V. Gryn, and Y. Skrobina [15] emphasize the need to coordinate the measurement, depreciation, revaluation, and inventory procedures for PPE within an entity's accounting policy. T.V. Zyryanova and E.V. Manakova [16] identify initial measurement, depreciation, repair expenditures, and derecognition as important areas of internal control and propose step-by-step control procedures for these accounting processes. G.Jumayeva and S.Bovoboyev [17] further argue that integrating PPE measurement, depreciation, and revaluation processes with digital accounting systems and internal control mechanisms can enhance the reliability of accounting information and improve the efficiency of asset utilization [18]. Taken together, these studies support the development of PPE accounting as an integrated accounting and control system covering the entire asset life cycle, rather than as a set of isolated accounting procedures.

3. Results

In the context of the deepening of market relations at the global level and intensifying competition, the financial stability, investment attractiveness, and production potential of business entities largely depend on the composition, technical condition, and utilization efficiency of the property, plant and equipment (PPE) that constitutes their material and technical base. PPE represents a significant component of an entity's assets that is used over the long term and contributes to the generation of economic benefits, while providing the material and technical foundation for production and service activities. Consequently, the value and composition of PPE can significantly affect the size and structure of an entity's assets, cost of production, financial performance, profitability, and other financial and economic indicators.

The economic substance of PPE and the multifaceted nature of related transactions require the application of scientifically grounded methods for the appropriate recognition, classification, measurement, accounting, and control of these assets. In this regard, reliable determination of initial cost, appropriate capitalization of subsequent expenditures, reasonable estimation of useful lives and residual values, selection of a depreciation method that reflects the expected pattern of consumption of the asset's economic benefits, and, where applicable, revaluation and recognition of impairment losses, together with effective control over asset movements, are essential conditions for the faithful representation of PPE in financial statements. In particular, the expanding implementation of International financial reporting standards (IFRS) in Uzbekistan not only increases the importance of organizing PPE accounting in accordance with internationally accepted principles but also places greater emphasis on the reasonableness and consistency of professional judgments and accounting estimates.

The findings of the study indicate that several interrelated characteristics should be considered simultaneously when determining the economic substance of PPE. First and foremost, PPE comprises tangible assets held by a business entity for use in the production or supply of goods or services, for rental to others, or for administrative purposes, and expected to be used over more than one period. Such assets generally participate in multiple operating or production cycles while retaining their physical form

throughout their use. From an accounting perspective, the consumption of the economic benefits embodied in a depreciable asset is reflected through the systematic allocation of its depreciable amount over its useful life. Accordingly, depreciation should be regarded not merely as a consequence of physical deterioration, but as an accounting mechanism designed to reflect the expected pattern in which the asset's economic benefits are consumed.

From this perspective, accounting for property, plant and equipment (PPE) should not be limited merely to recording their existence and value. The accounting system should generate integrated and interrelated information on each asset's acquisition, recognition and placement into use, movement between organizational units, technical condition, modernization and reconstruction, depreciation, and eventual derecognition. The faithful representation and reliability of such information should, in turn, be supported by an internal control system based on the regular reconciliation of accounting records with the actual existence, location, and condition of PPE.

Based on the analysis, it is appropriate to systematize the specific features of organizing PPE accounting according to the following interrelated dimensions: economic substance, recognition, measurement, depreciation, documentation, analytical accounting, and control. This approach makes it possible to conceptualize PPE accounting not as a collection of separate accounting procedures, but as an integrated accounting and control system covering the entire life cycle of an asset. The interrelationships among these elements are systematized in figure 1.

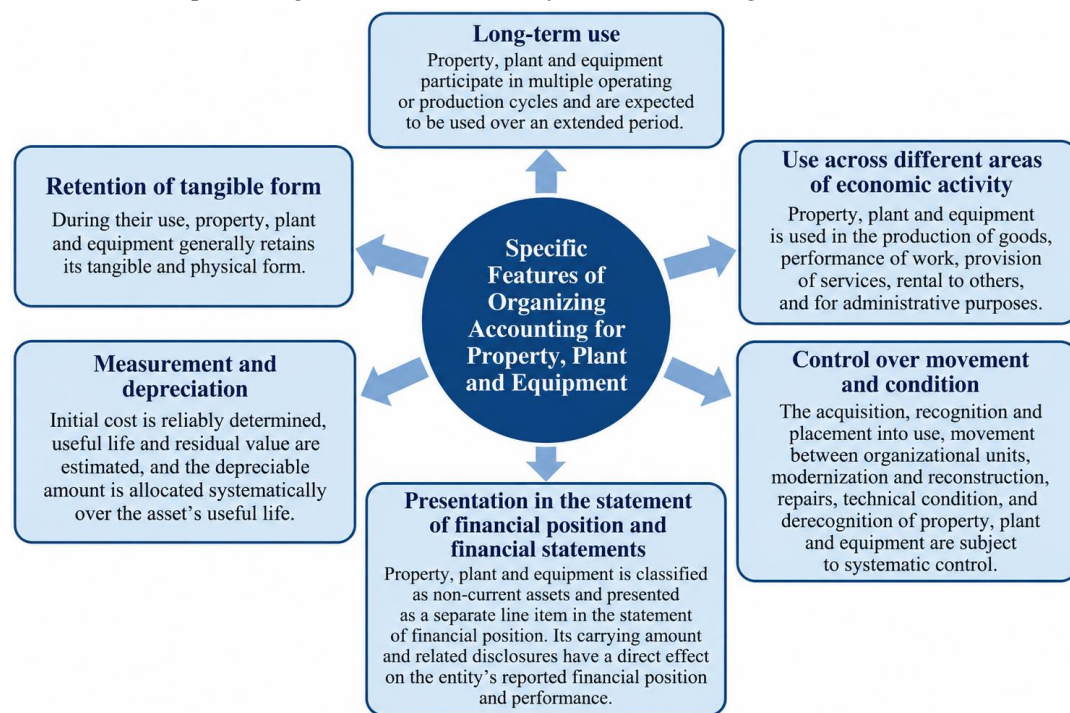


Figure 1. Specific features of organizing accounting for property, plant and equipment (source: developed by the author).

As shown in figure 1, accounting for property, plant and equipment (PPE) extends beyond merely recording their tangible form and long-term use. Reliable determination of initial cost, reasonable estimation of useful life and residual value, depreciation, control over asset movements and technical condition, and faithful representation in financial statements constitute an interconnected accounting and control process. In particular, the increasing integration of digital technologies into accounting practice creates broader opportunities to automate these processes, monitor PPE movements on a timely basis, and improve the reliability of accounting information. At the same time, as the national accounting system converges with international standards, these

characteristics highlight the need for consistent methodological approaches to the recognition, measurement, depreciation, and financial reporting of PPE.

This need is becoming increasingly significant amid the rapid development of the digital economy, automation of accounting and financial reporting processes, and continued convergence of Uzbekistan's national accounting framework with international standards. Creating a transparent information environment for foreign investors, deepening the integration of the national economy into the global economic system, and ensuring the international comparability of financial statements impose new requirements on accounting methodology. Under these conditions, a comparative examination of the recognition, measurement, depreciation, and financial reporting of PPE under national and international accounting standards is of particular scientific and practical importance.

At the international level, IAS 16 *Property, plant and equipment* provides the principal accounting framework for PPE in entities applying IFRS, whereas IPSAS 45 *Property, plant and equipment* establishes the corresponding requirements for public-sector entities applying International Public Sector Accounting Standards. These standards establish methodological principles for the recognition, initial and subsequent measurement, depreciation, impairment considerations, and derecognition of PPE. However, the specific nature of public-sector activities requires a broader perspective when assessing the benefits embodied in such assets. In the public sector, PPE is not necessarily held primarily to generate direct economic returns; it may instead be used to provide social, educational, healthcare, cultural, infrastructure, and other public services. Accordingly, the public-sector framework recognizes the concept of service potential alongside future economic benefits when considering the economic substance and use of assets.

In national accounting practice, the accounting treatment of property, plant and equipment (PPE) is regulated by National accounting standard No. 5, *Property, plant and equipment*, approved by Order No. 133 of the Minister of Economy and finance of the Republic of Uzbekistan dated June 14, 2024. The closer alignment of the recognition and measurement requirements established by this standard with international accounting principles contributes to improving the reliability and comparability of national financial reporting information. From this perspective, a comparative examination of IAS 16, IPSAS 45, and NAS 5 is methodologically important for identifying opportunities to apply international approaches within Uzbekistan's national PPE accounting framework.

Under IAS 16, PPE comprises tangible items held for use in the production or supply of goods or services, for rental to others, or for administrative purposes and expected to be used during more than one period. In recognizing an item as PPE, its economic substance must be considered together with the applicable recognition criteria. In particular, recognition requires that it be probable that future economic benefits associated with the item will flow to the entity and that the cost of the item can be measured reliably.

NAS 5 similarly applies recognition criteria relating to the probability of obtaining future economic benefits and the ability to measure the cost of an asset reliably. This indicates a degree of methodological convergence between the national and international accounting frameworks regarding the economic substance of PPE recognition. However, such convergence does not imply that the requirements of the standards are identical. A criterion-based comparative analysis of initial and subsequent measurement, revaluation, depreciation, impairment, component accounting, derecognition, and financial statement disclosures provides a more precise basis for identifying methodological similarities and differences among the respective frameworks.

The characteristics systematized in figure 1 demonstrate that determining the economic substance of PPE is methodologically interconnected with its recognition,

reliable measurement, subsequent accounting, and control. Recognition of an item as PPE represents the starting point for subsequent measurement, depreciation, impairment assessment, and presentation and disclosure in financial statements. Accordingly, as Uzbekistan's national accounting system continues to converge with international standards, identifying both common principles and methodological differences in the recognition and accounting treatment of PPE is of particular importance.

This need is further reinforced by the rapid development of the digital economy, the automation of accounting and financial reporting processes, and the continuing convergence of the national accounting framework with international standards. Creating a transparent information environment for foreign investment and ensuring the international comparability of financial statements require scientifically grounded approaches to the recognition and measurement of PPE. From this perspective, a comparative analysis of IAS 16, IPSAS 45 and NAS 5 makes it possible to identify both methodological convergence and framework-specific features. IAS 16 defines PPE as tangible items held for use in the production or supply of goods or services, for rental to others, or for administrative purposes and expected to be used during more than one period. In the public-sector context, IPSAS 45 extends the analytical perspective by recognizing that assets may embody not only future economic benefits but also service potential, reflecting their role in delivering public services.

Table 1. Comparative characteristics of the recognition and accounting criteria for Property, plant and equipment under IAS 16, IPSAS 45, and NAS 5

Comparative criterion	IAS 16 "Property, plant and equipment"	IPSAS 45 "Property, plant and equipment"	NAS 5 "Property, plant and equipment" (Uzbekistan)	Comparative analysis / result
Scope	Financial reporting by entities applying IFRS.	Public-sector entities applying IPSAS.	Accounting by organizations in the Republic of Uzbekistan within the scope of NAS 5.	Although the scope of entities differs, the frameworks share broadly comparable methodological foundations for PPE accounting.
Economic substance of PPE	Tangible items held for use in the production or supply of goods or services, for rental to others, or for administrative purposes and expected to be used during more than one period.	Tangible assets used by a public-sector entity and capable of embodying future economic benefits or service potential.	Tangible assets used for more than one year in business activities, production, performance of work, provision of services, administrative and socio-cultural functions, or for rental.	NAS 5 explicitly uses a period of more than one year, whereas IAS 16 uses the concept of more than one period; IPSAS 45 additionally reflects public-sector service potential.
First recognition	It is probable that future economic	It is probable that future economic	It is probable that future economic	A distinctive feature of the public-sector

critereon	benefits associated with the item will flow to the entity.	benefits or service potential associated with the item will flow to the entity. The item can be measured in accordance with the applicable measurement requirements; public-sector transactions may require consideration of transaction-specific measurement bases.	benefits associated with the asset will flow to the organization.	approach is the explicit inclusion of service potential.
Second recognition criterion	The cost of the item can be measured reliably.		The initial cost of the asset can be measured reliably.	Reliable measurement is a fundamental recognition consideration across the frameworks, although the detailed measurement requirements differ.
Initial measurement	Initially measured cost.	at cost, subject to specific IPSAS requirements for transactions in the public sector.	Initially measured initial cost.	The common methodological principle is initial recognition on a measurement basis reflecting the resources attributable to acquiring or constructing the asset.
Purpose of use	Production or supply of goods or services, rental to others, or administrative purposes.	Generation of economic benefits and/or delivery of public services through service potential.	Production, performance of work, provision of services, administrative and socio-cultural functions, and rental.	NAS 5 includes socio-cultural functions, which in some respects brings its scope of use closer to the public-sector perspective.
Expected period of use	More than one period.	More than one reporting period / long-term use in public-sector operations.	More than one year.	The concepts are substantively similar, although the time criterion is expressed differently.
Accounting	Supports	Requires	Provides the	The control

and control significance	reliable measurement of carrying amount, depreciation, impairment, derecognition, and related disclosures.	control not basis for system should only over asset value and condition but also over the asset's capacity to provide services.	accounting for the existence, movement, value, and transactions related to PPE.	address not only monetary measures but also the asset's purpose, actual condition, movement, and utilization.
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(Source: developed by the author based on a comparative analysis of IAS 16, IPSAS 45, and National accounting standard No. 5 of the Republic of Uzbekistan)

The comparative information presented in table 1 indicates that, although international and national standards share common methodological principles for the recognition of PPE, differences remain in their scope and in the interpretation of the benefits expected from an asset. In particular, the public-sector framework explicitly incorporates service potential alongside future economic benefits as an important consideration in the economic substance and use of an asset. This provides a broader basis for interpreting public-sector PPE than is typically applied to assets held by commercial entities.

In accordance with IPSAS 45, an item of property, plant and equipment (PPE) is recognized when it satisfies the applicable asset recognition and measurement requirements, including consideration of the future economic benefits or service potential embodied in the asset. A distinctive feature of the public-sector approach is that the usefulness of an asset is not determined solely by its ability to generate direct economic returns. For example, educational, healthcare, cultural, and other social infrastructure assets may not directly generate revenue; nevertheless, they have economic and social significance because of their capacity to provide public services. Accordingly, the concept of service potential is particularly important in assessing the economic substance of public-sector assets.

Within Uzbekistan's national accounting framework, the recognition and accounting treatment of PPE are governed by NAS 5, *Property, plant and equipment*. Under the standard, an asset's tangible nature and its intended use in the production of goods, performance of work, provision of services, management activities, environmental protection, rental to others, or other activities associated with achieving an organization's objectives are important considerations in determining whether it should be classified as PPE. In addition, the asset is expected to be used for more than one year or throughout a normal operating cycle exceeding twelve months and to provide future economic benefits to the organization.

The appropriate determination of the unit of account is also directly relevant to the effectiveness of PPE control. Under NAS 5, the inventory item is used as the unit of accounting for PPE. An inventory item may comprise a separate asset together with all of its accessories and attachments, a structurally separate item designed to perform an independent function, or a combination of structurally interconnected items that can perform a specific function only when used together. This approach provides an information basis for maintaining analytical records on the existence, location, movement, and technical condition of each item of PPE.

The designation of an inventory item as the unit of account is particularly important for the organization of internal control over PPE. Assigning an individual identification code to an asset enables its entire life cycle to be systematically tracked – from acquisition and placement into use to movement between organizational units, repairs and modernization, physical inventory procedures, and eventual derecognition. Thus, the inventory item serves not only as a technical unit of accounting but also as the

primary element of item-level control over PPE. In a digital accounting environment, such identification can further support electronic inventory records, automated tracking of asset movements, and continuous reconciliation between accounting data and the actual status of assets.

At the same time, the existence of the economic characteristics associated with PPE does not necessarily mean that every tangible long-term asset must be accounted for as a separate item of PPE in all circumstances. Where an asset falls below a capitalization threshold established in accordance with the applicable national accounting requirements and the entity's accounting policy, its accounting treatment should be determined by the relevant standard and the entity's consistently applied accounting policy. This demonstrates the need to consider the economic substance, expected period of use, materiality, and applicable capitalization criteria in an interconnected manner. Similarly, capital investments that have not yet resulted in an asset available for its intended use, as well as non-current assets classified as held for sale under the applicable accounting framework, should be distinguished from PPE on the basis of their economic substance, current condition, and intended use.

The preceding analysis demonstrates that the effective organization of PPE accounting cannot be based solely on recognition criteria. To reflect adequately the economic substance, functional purpose, and patterns of use of these assets, PPE should also be grouped according to appropriate classification criteria. Such classification enhances the analytical capacity of accounting information and creates the information base required to monitor the composition and structure of PPE, its movement, technical condition, and utilization efficiency.

Accordingly, it is methodologically appropriate to classify PPE according to economic sector affiliation, tangible and functional characteristics, role in production and operating processes, ownership or rights of use, utilization status, and other economically relevant characteristics. These classification criteria constitute the next methodological stage in organizing PPE accounting and developing appropriate control methods.

The preceding analysis indicates that the recognition criteria for property, plant and equipment (PPE) constitute the initial stage of their accounting treatment. However, because PPE differs in composition, economic function, utilization status, and ownership or rights of use, objects should be grouped according to appropriate classification criteria in order to generate comprehensive analytical information. Such classification not only systematizes accounting information but also provides an information basis for controlling asset movements, technical condition, and utilization efficiency. Based on the findings of the study, the classification criteria most commonly applied in practice are summarized in table 2.

Table 2. Classification criteria for Property, plant and equipment and their accounting and control significance.

Classification criterion	Groups	Accounting and control significance
Economic sector affiliation	Industry, agriculture, trade, services, transport, construction, social sector, and other sectors.	Enables the composition, value, and utilization efficiency of PPE to be assessed with due regard to sector-specific characteristics.

Classification criterion	Groups	Accounting and control significance
Tangible and natural composition	Buildings, structures, machinery and equipment, vehicles, production and household equipment, bearer plants/perennial plantings, land, and other relevant classes.	Supports analytical accounting by asset type and control over the structural composition of PPE.
Functional role and participation in production or operating processes	Assets directly involved in production or service delivery and assets that create the conditions necessary for those processes.	Facilitates analysis of the contribution of PPE to production capacity, operational performance, and efficiency.
Ownership and rights of use	Assets owned by the entity, assets used under lease arrangements, and assets controlled or used under other legal rights.	Supports appropriate recognition and presentation of owned assets, right-of-use assets where applicable, and related obligations in accordance with the relevant accounting framework.
Utilization status	Assets in use, temporarily idle, under repair, undergoing modernization or reconstruction, or held in conservation/mothballing status.	Provides information required to monitor the actual condition and movement of assets and assess their level of utilization.

(Source: developed by the author based on the results of the study)

The information presented in Table 2 demonstrates that the classification of PPE is not merely a technical element of accounting but also an instrument for differentiating control procedures. In particular, grouping assets by tangible composition helps identify objects of analytical accounting; classification by utilization status facilitates monitoring of their actual technical and operational condition; and grouping by functional role supports assessment of their contribution to production and operating results. Accordingly, the results of classification provide a methodological basis for the subsequent measurement of PPE and the reliable recognition of changes in its carrying amount.

One of the key elements of PPE accounting and control is the reliable measurement of assets in monetary terms. The initial cost of an asset represents the amount at which it is recognized at initial recognition and includes expenditures directly attributable to acquiring or constructing the asset and bringing it to the location and condition necessary for it to operate in the manner intended by management. In subsequent reporting periods, under the cost model, the carrying amount is determined after taking into account accumulated depreciation and accumulated impairment losses.

Under the cost model, the carrying amount of PPE may be expressed as follows:

$$CA = C - AD - AIL$$

CA – carrying amount of the item of PPE;

C – cost (initial cost) of the item of PPE;

AD – accumulated depreciation;

AIL – accumulated impairment losses.

In this context, the term “carrying amount” should be used rather than “residual value.” In international accounting terminology, residual value is the estimated amount that an entity would currently obtain from disposal of an asset, after deducting the estimated costs of disposal, if the asset were already of the age and in the condition expected at the end of its useful life. The formula above, by contrast, determines the carrying amount, i.e., the amount at which the asset is recognized after deducting accumulated depreciation and accumulated impairment losses.

Under the revaluation model, the carrying amount of an item of property, plant and equipment (PPE) is based on its fair value at the date of revaluation and is subsequently adjusted for accumulated depreciation and accumulated impairment losses. Accordingly, the concepts of “replacement cost” and “revalued amount” should not be treated as synonymous, since they differ in economic substance and in their purpose within the accounting framework.

Because PPE is used over an extended period, the economic benefits embodied in such assets are consumed across multiple reporting periods. However, an asset’s physical deterioration cannot be equated directly with the economic contribution it makes to production or service delivery in a particular reporting period. Therefore, accounting applies depreciation as a mechanism for the systematic allocation of an asset’s depreciable amount over its useful life.

The depreciable amount is determined by deducting the asset’s residual value from its cost, or from another amount substituted for cost:

$$DA = C - RV$$

DA – depreciable amount;

C – cost of the asset (or another amount substituted for cost, where applicable);

RV – residual value.

The depreciation method should reflect as closely as possible the pattern in which the future economic benefits embodied in the asset are expected to be consumed by the entity. In practice, commonly applied methods include the straight-line method, the diminishing-balance method, and the units-of-production method. Where permitted by the applicable national accounting requirements and the entity’s accounting policy, the sum-of-the-years’-digits method may also be used.

Straight-line method. Under the straight-line method, the depreciable amount is allocated evenly over the asset’s useful life. This method is appropriate when the economic benefits embodied in the asset are expected to be consumed relatively evenly from period to period.

Diminishing-balance method. Under the diminishing-balance method, depreciation expense is higher in the earlier periods of an asset’s useful life and decreases in subsequent periods. This method is appropriate when the pattern of consumption of economic benefits is expected to be greater during the earlier years of the asset’s use.

Sum-of-the-years’-digits method. This is an accelerated depreciation method under which depreciation is determined by applying a fraction based on the asset’s remaining useful-life years to the sum of the years of its useful life. As a result, depreciation expense is higher in the earlier years and gradually decreases in subsequent years.

Units-of-production method. Under this method, depreciation is calculated in proportion to the asset’s actual level of use, such as units produced, volume of work performed, operating hours, or another relevant measure of activity. It is particularly appropriate when actual output or usage provides a better representation of the consumption of economic benefits than the passage of time.

The effects of these depreciation methods on financial performance are not identical. Under the straight-line method, depreciation expense is distributed evenly across periods, whereas accelerated methods generally result in higher depreciation expense during the earlier years of use. Consequently, the selected method may affect the timing of changes in the carrying amount of PPE, cost of production, and reported financial performance. The depreciation method should therefore be selected on the basis of the expected pattern of consumption of economic benefits rather than merely for computational convenience.

To illustrate these effects, a hypothetical PPE item is assumed to have an initial cost of UZS 200 million, a residual value of UZS 20 million, and a useful life of five years. Under the straight-line method, the depreciable amount of UZS 180 million is allocated evenly over five years, resulting in annual depreciation of UZS 36 million. For comparative purposes, the diminishing-balance method applies an accelerated annual rate of 40% (twice the straight-line rate of 20%). Depreciation is calculated on the carrying amount at the beginning of each period, subject to the condition that the asset's final carrying amount does not fall below its residual value of UZS 20 million. This hypothetical example provides the basis for comparing the effects of the two methods on the carrying amount of PPE and the timing of depreciation expense.

Table 3. Changes in the carrying amount of PPE under the straight-line and diminishing-balance methods, UZS million.

Period	Straight-line method	Diminishing-balance method
Initial	200.00	200.00
Year 1	164.00	120.00
Year 2	128.00	72.00
Year 3	92.00	43.20
Year 4	56.00	25.92
Year 5	20.00	20.00

(Source: author's calculations)

The data presented in Table 3 demonstrate that the choice of depreciation method causes the carrying amount of PPE to decline at different rates over its useful life. Under the straight-line method, the carrying amount decreases uniformly across periods, whereas under the diminishing-balance method a larger proportion of the decline occurs during the earlier years of use. To illustrate these differences more clearly and provide a visual comparison of the effects of the depreciation methods on the carrying amount of the asset, the calculation results are presented graphically in figure 2.

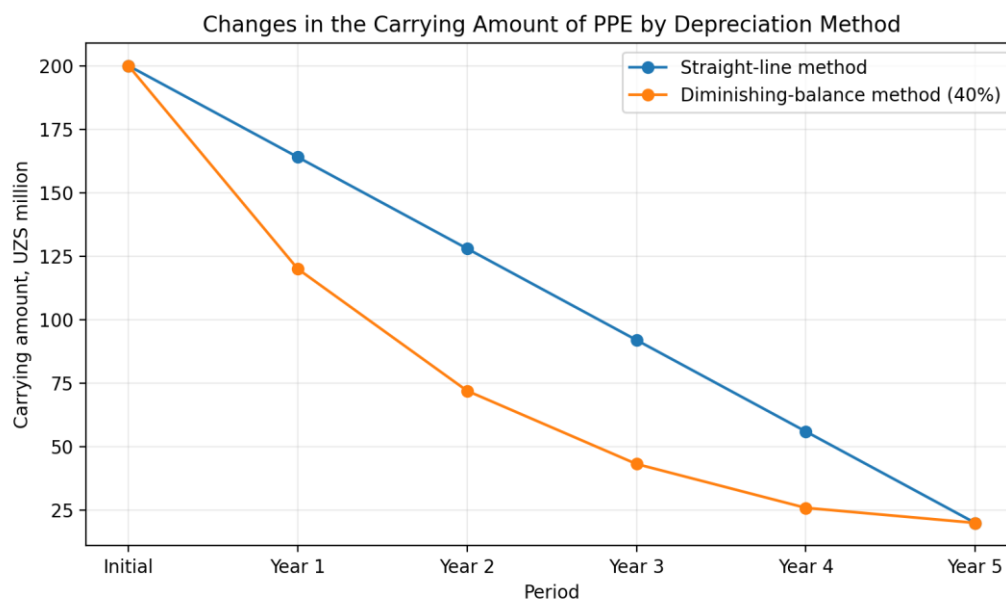


Figure 2. Changes in the carrying amount of PPE by depreciation method

(Source: developed by the author based on the calculations in table 3).

The dynamics illustrated in Figure 2 confirm the calculations presented in Table 3 and demonstrate that the selected depreciation method has a significant effect on the carrying amount of PPE and the timing of depreciation expense across reporting periods. Under the straight-line method, because the depreciable amount is allocated evenly over the useful life, the carrying amount is UZS 164 million at the end of Year 1 and UZS 128 million at the end of Year 2. Under the diminishing-balance method, the corresponding amounts decline to UZS 120 million and UZS 72 million, respectively. Thus, under the latter method, the carrying amount decreases substantially faster during the first two years than under the straight-line method.

This difference is even more evident in the timing of depreciation expense. Under the straight-line method, depreciation of UZS 36 million is recognized in each of the first two years. Under the diminishing-balance method, depreciation expense amounts to UZS 80 million in Year 1 and UZS 48 million in Year 2. Consequently, cumulative depreciation for the first two years totals UZS 72 million under the straight-line method and UZS 128 million under the diminishing-balance method, meaning that the accelerated method recognizes UZS 56 million more depreciation during the first two years.

The results indicate that, under the diminishing-balance method, higher depreciation expense in the earlier years of an asset's useful life results, all else being equal, in lower accounting profit during those periods. In later years, as depreciation expense decreases, this effect is reversed. While the straight-line method distributes the effect of depreciation on financial performance relatively evenly across periods, the diminishing-balance method may provide a more faithful representation of the economic substance of assets for which a larger proportion of the embodied economic benefits is expected to be consumed during the earlier stages of use. Accordingly, the depreciation method should be selected on the basis of the expected pattern of consumption of economic benefits rather than solely on the basis of its effect on reported profit.

Accordingly, the selection of a depreciation method should be regarded not merely as a computational technique but as an element of accounting policy that is intended to faithfully reflect in financial reporting the expected pattern in which the economic benefits embodied in an asset are consumed. This conclusion is directly related to the

improvement of accounting and control methods for property, plant and equipment (PPE).

To provide a more detailed quantitative assessment of this conclusion, the effects of the two depreciation methods in the hypothetical example above were compared separately for each year. This comparison makes it possible to identify the periods in which the differences between the carrying amounts generated by the two methods are greatest. The calculation results are presented in Table 4 and provide an information basis for assessing the implications of depreciation-method selection for asset measurement and subsequent accounting and control procedures.

Table 4. Changes in the carrying amount of PPE by year (Hypothetical example), UZS million.

Year	Straight-line method	Diminishing-balance method (40%)	Difference
1	164.0	120.0	44.0
2	128.0	72.0	56.0
3	92.0	43.2	48.8
4	56.0	25.9	30.1
5	20.0	20.0	0.0

(Source: author's calculations)

The data in Table 4 confirm that the selected depreciation method affects not only annual depreciation expense but also the carrying amount reported at each reporting date. Under the diminishing-balance method, the carrying amount declines more rapidly during the first two years than under the straight-line method, and the difference between the two methods reaches its maximum of UZS 56.0 million at the end of year 2. In subsequent periods, the difference gradually narrows, and by the end of the useful life the carrying amount under both methods equals the residual value of UZS 20.0 million. This result demonstrates that the depreciation method should be justified by the expected pattern of consumption of the asset's economic benefits and that the appropriateness of this choice should be reviewed regularly within the entity's accounting policy and internal control system.

The reliability of depreciation accounting, in turn, is directly associated with the appropriate organization of synthetic and analytical accounting for PPE. At business entities, information on PPE is summarized in the relevant general ledger accounts, while analytical records maintained for each inventory item make it possible to generate detailed information on the existence, movement, value, and technical condition of assets. In addition to supporting the preparation of financial statements, such information is an important source for reconciling accounting records with the actual existence of PPE and for exercising internal control over the safeguarding and intended use of assets.

From this perspective, assessing the actual condition of PPE requires an interrelated analysis of indicators concerning asset composition and structure, technical condition, intensity of use, renewal, and derecognition or disposal. In manufacturing entities, the share of machinery and technological equipment may be an important indicator of production capacity, whereas in service activities and the social sector, buildings, structures, and other infrastructure assets may account for a larger proportion of PPE. Such structural differences demonstrate the need to consider the sector-specific characteristics of an entity and the functional purpose of its assets when evaluating PPE utilization efficiency.

Rapid scientific and technological progress and the continuing development of digital technologies increase the risk not only of physical deterioration but also of technological and commercial obsolescence of PPE. Therefore, decisions on asset renewal should not be based solely on physical condition. Technological efficiency, production capacity, operating costs, intensity of use, and compatibility with contemporary technologies should also be considered. Decisions on the renewal and modernization of PPE based on such indicators can contribute to more efficient use of investment resources and strengthen the entity's long-term competitiveness.

Depreciation policy is also an important component of the PPE management system. A depreciation method is not intended to mechanically reproduce the physical deterioration of an asset; rather, it should reflect as faithfully as possible the expected pattern in which the economic benefits embodied in the asset are consumed. Accordingly, the straight-line method is appropriate when economic benefits are expected to be consumed relatively evenly across periods, whereas other depreciation methods may be economically justified for assets whose intensity of use or pattern of consumption of economic benefits varies significantly over time.

The appropriate determination of the depreciation method and related accounting estimates directly affects the reliable measurement of cost of production and financial performance. Differences in the timing of depreciation expense may result in different patterns of expenses and accounting profit across reporting periods for the same asset. Therefore, the reasonableness of professional judgments used to determine useful life, residual value, and the depreciation method, the consistency of these accounting estimates with actual conditions of asset use, and their periodic review should constitute specific objects of internal control.

The results of the analysis indicate the need to integrate the analytical and control functions of accounting for property, plant and equipment (PPE). In this context, accounting information for each inventory item should be linked to its actual location, technical condition, intensity of use, and repair and modernization history. The use of digital identification and automated information systems makes it possible to track PPE movements on a timely basis, improve physical inventory procedures, and promptly identify discrepancies between accounting records and the actual condition of assets.

Accordingly, improving PPE accounting requires moving beyond the traditional view of accounting as merely a means of recording completed business transactions and preparing financial statements. PPE accounting should be developed as an integrated accounting and control system covering the entire asset life cycle, including recognition, measurement, use, depreciation, monitoring of technical condition, modernization, impairment assessment, and derecognition. Such an approach can improve the timeliness and reliability of accounting information while expanding the capacity of management to assess asset utilization efficiency and make well-founded decisions regarding timely renewal and modernization.

Improving PPE accounting and control requires, first of all, the reliable determination of initial cost, reasonable estimation of useful life and residual value, appropriate distinction between current expenses and expenditures that qualify for capitalization, and selection of a depreciation method consistent with the expected pattern of consumption of the asset's economic benefits. Methodological deficiencies in these processes may adversely affect the reliability of information on the carrying amount of PPE, depreciation expense, and financial performance. It is therefore important to examine PPE accounting and control in conjunction with the investment resources available for asset renewal and modernization.

PPE comprises long-term tangible assets that form an important part of an enterprise's productive capacity, while investment in fixed capital is one of the key economic factors supporting the expansion of production capacity, technological

renewal, and improvements in labor productivity. From this perspective, the macroeconomic dynamics of fixed capital investment provide an important analytical basis for assessing the broader investment environment within which enterprises form opportunities for the renewal and modernization of PPE.

Updated data of the National Statistics Committee of the Republic of Uzbekistan for 2025 indicate that investment activity related to fixed capital formation remained substantial. In particular, the share of investment in fixed assets in GDP amounted to 34.9% in 2024 and 32.6% in 2025. This decline does not imply an absolute contraction in investment activity, because gross fixed capital formation at current prices reached UZS 629,130.7 billion in 2025, while its growth rate in real terms was 110.5% relative to the previous year.

A joint assessment of these indicators shows that fixed capital formation continued to expand in 2025 in both nominal-volume and real-growth terms, although the share of investment in fixed assets in GDP decreased by 2.3 percentage points compared with 2024. This suggests that opportunities for PPE renewal should not be assessed solely through the investment-to-GDP ratio; rather, investment volume, real growth, sources of financing, and the technological composition of investment should be evaluated comprehensively.

Table 5. Dynamics of selected indicators related to fixed capital formation in Uzbekistan, 2024–2025 [18].

Indicator	2024	2025	Change / interpretation
Share of investment in fixed assets in GDP, %	34.9	32.6	–2.3 percentage points
Gross fixed capital formation at current prices, UZS billion	541,964.7	629,130.7	+87,166.0 UZS billion
Growth rate of gross fixed capital formation, % of previous year	131.3	110.5	Growth remained positive, but the rate slowed

(Source: compiled by the author based on data from the SIAT database of the National Statistics Committee of the Republic of Uzbekistan)

The data in Table 5 show that, although the share of investment in fixed assets in GDP declined in 2025, the nominal volume of gross fixed capital formation increased by UZS 87,166.0 billion compared with 2024. At the same time, a real growth rate of 110.5% indicates that positive dynamics in fixed capital formation were maintained. However, the decrease in the growth rate from 131.3% in 2024 to 110.5% in 2025 indicates a relative slowdown in the pace of investment growth. These macroeconomic indicators should be interpreted as characteristics of the broader fixed-capital formation environment and should not be equated directly with enterprise-level PPE renewal indicators.

According to the full-year data for 2025, gross fixed capital formation reached approximately UZS 629.1 trillion, indicating an expansion of the macroeconomic investment base supporting the acquisition of new property, plant and equipment (PPE), modernization of existing production capacity, and technological renewal. However, this macroeconomic indicator should not be equated with the PPE renewal ratio reported or calculated at the enterprise level. Assessing the actual degree of PPE renewal requires additional analysis of the value of newly acquired or commissioned assets, the value of PPE at the end of the year, disposals, accumulated depreciation, and indicators of technical condition.

The scale of these investment processes also creates new requirements for accounting and internal control systems. Growth in newly acquired assets and modernization of existing PPE increases the need for appropriate recognition, reliable determination of initial cost, proper distinction between subsequent expenditures that qualify for capitalization and those recognized as current-period expenses, reassessment of useful lives and residual values where changes in estimates are warranted, and timely control over asset movements. Thus, sustained investment activity objectively reinforces the need to improve the methodology of PPE accounting and control.

The findings of the study indicate that, in applying the existing methodological framework for PPE accounting, attention should be directed not only toward generating financial reporting indicators but also toward the effective use of accounting information for asset management and control. In particular, integrating initial and subsequent measurement, capitalization, depreciation, impairment, modernization, and derecognition within a unified information system enhances the managerial relevance of PPE information.

Accordingly, a priority direction for improving PPE accounting and control should be the integration of accounting information with the actual technical and operational condition of assets, digital monitoring of their entire life cycle, and transformation of the resulting information into inputs for investment and management decision-making.

The need to improve PPE accounting and control is also determined by the presence of areas requiring professional judgment in the recognition, measurement, depreciation, and accounting treatment of subsequent expenditures. In particular, accounting estimates and judgments concerning which expenditures should be included in the initial cost of an asset, whether subsequent expenditures should be recognized as current-period expenses or capitalized, how useful life and residual value should be estimated, and which depreciation method should be applied directly affect the faithful representation of financial reporting information. These processes should therefore be regarded not merely as technical accounting procedures but as important objects of internal control.

In the context of digital transformation, the significance of these issues is increasing further. Automated generation and analysis of PPE information, digital monitoring of asset movements and technical condition, automation of depreciation calculations, and integration of information relating to investment projects within a unified system impose qualitatively new requirements on accounting. In particular, decisions on modernizing existing machinery and equipment or acquiring new technological assets require accounting information to be linked with the asset's technical condition, intensity of use, operating performance, and expected economic benefits.

The classification of PPE is another important methodological area of accounting and control. The mere existence of a tangible form is not, by itself, sufficient to recognize an item as PPE. The purpose for which the asset is used, its expected useful life, the probability of future economic benefits, reliable measurement of its cost, and the recognition and capitalization criteria established by the applicable national accounting framework and the entity's accounting policy should be considered collectively. In particular, for relatively low-value tangible assets, consistent application of the applicable national standard and the entity's accounting policy, including any appropriately established capitalization threshold, is important for ensuring the consistency and comparability of accounting information.

Methodological uncertainty in classification may also affect the subsequent accounting treatment of assets. Incorrect classification creates a risk of inappropriate initial and subsequent measurement, depreciation expense, carrying amount, cost of production, and financial performance. Therefore, the recognition and classification process should include a distinct control stage in which accounting information is

reconciled with the technical and economic characteristics of the asset and its intended use.

Depreciation accounting is also an area that requires a high degree of professional judgment. If an asset's useful life, residual value, or depreciation method is determined in a manner that does not appropriately reflect the expected pattern of consumption of the economic benefits embodied in the asset, depreciation expense may be allocated inappropriately across reporting periods. This may give rise to a risk of material misstatement affecting such indicators as the cost of production, the carrying amount of the asset, and accounting profit. Accordingly, periodic assessment of the reasonableness of useful lives, residual values, and depreciation methods should constitute an important element of internal control over property, plant and equipment (PPE).

The derecognition of PPE also requires specific control procedures. The fact that an asset is fully depreciated, or conversely that depreciation has not yet been fully recognized, does not in itself constitute an economic basis for derecognition. A decision to derecognize an asset should be based on the applicable accounting requirements, including disposal of the asset or the absence of expected future economic benefits from its use or disposal, while also taking into account its technical condition, operational usability, and appropriately documented circumstances. Such an approach can reduce control risks associated with premature or insufficiently substantiated derecognition of assets.

Differences between financial accounting and tax rules for depreciation constitute another important methodological aspect of PPE accounting. For financial reporting purposes, differences between the carrying amount of an asset and its tax base may, in certain circumstances, give rise to temporary differences. Where the relevant recognition criteria are satisfied, such differences may result in the recognition of deferred tax assets or deferred tax liabilities. Therefore, reconciling financial accounting and tax information relating to PPE, maintaining analytical records of temporary differences, and controlling their effects on financial statements are important functions of the accounting system.

Based on the findings of the study, it is proposed that the methodological problems of PPE accounting and control be systematized through the following sequence: recognition and classification → initial measurement → capitalization of subsequent expenditure → determination of depreciation parameters → reconciliation and monitoring of differences between financial and tax accounting → monitoring of technical condition → derecognition.

Integrating these stages into a unified control chain within a digital information environment makes it possible to continuously reconcile accounting data for each inventory item with its actual technical and operational condition. As a result, PPE accounting can evolve from a system focused primarily on financial reporting into an integrated accounting and control mechanism that provides relevant information for assessing asset utilization efficiency and supporting management decisions concerning modernization, replacement, and renewal.

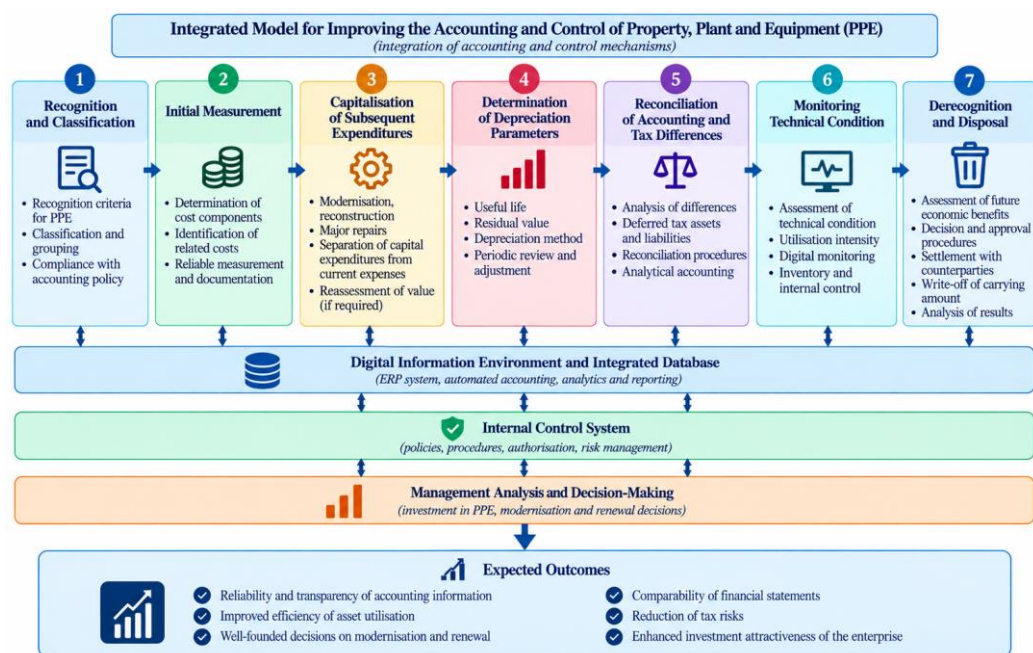


Figure 4. Model for improving accounting and control of Property, plant and equipment (Developed by the author).

The integrated accounting and control model proposed in Figure 4 makes it possible to combine, within a unified information and control system, the processes covering the entire life cycle of property, plant and equipment (PPE), from recognition and classification through initial and subsequent measurement, capitalization of subsequent expenditure, determination of depreciation parameters, reconciliation and monitoring of differences between financial and tax accounting, digital monitoring of technical condition, and ultimately derecognition. This approach contributes to improving the reliability and timeliness of accounting information, strengthening internal control, and providing a scientifically grounded information basis for management decisions concerning the modernization, replacement, and renewal of PPE.

Accordingly, based on the synthesis of the theoretical and practical analyses conducted and the results of the proposed model, the following principal conclusions and practical recommendations of the study were formulated.

4. Conclusions

Based on the synthesis of the theoretical, methodological, and comparative analyses conducted, as well as the results of the integrated model developed for improving the accounting and control of property, plant and equipment (PPE), the following scientific conclusions and practical recommendations were formulated.

First, in addition to maintaining PPE accounting in accordance with applicable laws, regulations, and accounting standards, it is necessary to strengthen its information-analytical and control functions. Accounting information should serve not only for the preparation of financial statements but also for assessing the existence, movement, technical condition, and utilization efficiency of each inventory item and for supporting management decision-making.

Second, in developing depreciation policy for PPE, depreciation should not be equated mechanically with the physical deterioration of an asset. Instead, the depreciation method should reflect the expected pattern in which the economic benefits embodied in the asset are consumed. Useful life, residual value, and the depreciation method should be determined with due consideration of the technical and economic characteristics of the asset and the intensity of its use and should be reviewed periodically in accordance with applicable accounting requirements. This contributes to

the faithful representation of depreciation expense, the carrying amount of assets, and financial performance.

Third, under conditions of digital transformation and technological renewal, decisions on the modernization of PPE should not be linked solely to accumulated depreciation or depreciation charges. Decisions on asset renewal should be based on a comprehensive assessment of technical condition, production capacity, intensity of use, operating costs, technological efficiency, and the availability of investment resources. This approach can improve the targeted allocation of investment resources toward assets with stronger expected economic returns and operational benefits.

Fourth, analytical control over temporary differences arising from differences between financial accounting and tax rules for PPE depreciation should be strengthened. Automated identification of differences between the carrying amount of an asset and its tax base, calculation of the resulting deferred tax assets and liabilities where the relevant recognition criteria are satisfied, and their appropriate presentation in financial statements can improve the reliability of accounting information.

Fifth, the digitalization of PPE accounting should not be limited to automating individual transactions. It is proposed to integrate the following stages within a unified digital information environment: recognition and classification → initial measurement → capitalization of subsequent expenditure → determination of depreciation parameters → reconciliation and monitoring of differences between financial and tax accounting → monitoring of technical condition → derecognition. Such a system enables continuous reconciliation of accounting information for each inventory item with its actual technical and operational condition.

Sixth, to improve control over PPE, it is advisable to introduce digital identification of assets, electronic inventory cards, automated updating of information on asset movements and locations, recording of repair and modernization histories, and automated reconciliation of physical inventory results with accounting records. These mechanisms can strengthen control over the safeguarding of assets and enable timely identification of discrepancies between accounting data and actual conditions.

Seventh, artificial intelligence technologies should be used in PPE accounting not merely as tools for automating calculations but also as analytical and predictive instruments. In particular, integrated analysis of technical and accounting data can support the forecasting of maintenance needs, identification of circumstances requiring review of useful lives and depreciation parameters, and management decisions concerning modernization, replacement, or renewal of assets.

Overall, the approach proposed in this study is aimed at transforming traditional PPE accounting, which primarily records business transactions and supports financial reporting, into an integrated accounting, control, and management information system covering the entire life cycle of an asset. Implementation of this approach can improve the reliability and timeliness of accounting information, strengthen the effectiveness of internal control, support objective assessment of PPE utilization, and provide an information base for economically justified decisions concerning modernization and renewal.

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