Asia Pacific Science Press

Asia Pacific Economic and Management Review
ISSN(O):3005-9275
ISSN(P):3005-9267
Vol. 3 No.5 (2026)

A Study on Innovation and Optimisation Pathways in Accounting Measurement Theory against the Background of Data Assets Being Recognised on the Balance Sheet

Yingrui Xu*

School of Management, Xi'an University of Engineering, Xi'an, Shaanxi, 710000, China

Corresponding author: Yingrui Xu, 15545288533@163.com

Copyright: 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY-NC 4.0), permitting distribution and reproduction in any medium, provided the original author and source are credited, and explicitly prohibiting its use for commercial purposes.

Abstract: The recognition of data assets on the balance sheet is a core element of the market-oriented reform of data elements, and the implementation of the "Interim Provisions on Accounting Treatment for Enterprise Data Resources" is driving a transformation in traditional accounting measurement theory. Data assets are characterised by their intangible nature, the ability to be replicated indefinitely, marginal costs approaching zero, and value dependent on specific application scenarios; as such, a historical cost-oriented measurement framework is ill-suited to them. In practice, this has led to difficulties such as ambiguous boundaries for cost allocation, disputes over the classification of intangible assets versus inventory, a lack of basis for amortisation and impairment testing, and structural gaps in information disclosure.

Keywords: Data Assets; Accounting Measurement; Optimisation Strategies

Published: Nov 4, 2026

DOI: https://doi.org/10.62177/apemr.v3i5.1860

1. The Intrinsic Link Between the Recognition of Data Assets on the Balance Sheet and Accounting Measurement

The recognition of data assets on the balance sheet is, in essence, an accounting process whereby data resources that meet the definition of an asset are incorporated into the financial reporting framework; accounting measurement, meanwhile, serves as both the technical prerequisite and the core constraint for the successful recognition of data assets on the balance sheet. The two are mutually dependent and deeply interlinked (Zhou, C, 2025)[1]. The core challenge of recognising data assets in financial statements lies not in asset recognition, but in precise measurement. Traditional measurement theory emphasises reflecting the "input value" of assets, whereas the core value of data assets lies in their "future output value"; their value creation does not depend on physical depreciation, but rather on data iteration, application in specific scenarios and continuous empowerment. The inclusion of data assets in financial statements compels accounting measurement theory to shift from a "cost-oriented" to a "value-oriented" approach, driving comprehensive innovation in measurement attributes, logic and principles; it is the core driving force behind the evolution of accounting theory in the digital economy era.

2. The Recognition of Data Assets on the Balance Sheet: An Innovative Breakthrough in Traditional Accounting Measurement Theory

2.1 Innovation in the Fundamentals of Accounting: The Evolution from a Static Accrual Basis to a Dynamic Value-Matching Approach

Traditional accounting measurement is based on the static accrual basis, recognising costs and measuring values at the time a transaction occurs, and is suited to the accounting of one-off transactions and assets with stable values (Chen, L., Zhang, F, 2015) [2]. Data assets, however, possess distinctive characteristics such as being intangible, infinitely replicable, having marginal costs approaching zero, and their value being highly dependent on contextual applications. Strictly adhering to a single historical cost measurement basis is no longer sufficient to capture the value characteristics of data elements: On the one hand, investments in the collection, cleansing, de-identification and modelling of self-developed data resources are predominantly indirect and hybrid in nature; part of their value stems from spontaneous accumulation during business operations, lacking an independent and distinguishable transaction price, making it difficult for historical cost to reflect their true economic value. On the other hand, the value of data assets fluctuates dynamically in response to market conditions, business models, data quality and regulatory policies; historical cost merely records past investments and fails to reflect changes in future economic benefits. The inclusion of data assets on the balance sheet drives innovation in the measurement framework, overcoming the limitations of measurement at a fixed point in time and facilitating a shift from "static measurement at the transaction point" to "dynamic value matching across the entire life cycle". By balancing historical inputs with future returns, it reconstructs the temporal and value logic of accounting measurement.

2.2 Innovations in Measurement Attributes: The Transition from a Single Historical Cost Approach to a Multi-Factor Hybrid Measurement Approach

Traditional accounting measurement is primarily based on historical cost, relying on authentic transaction documents to ensure reliability. However, as data assets often originate from scenarios without explicit transaction consideration—such as in-house research and development, internal processing, and free sharing—historical cost fails to reflect their true economic value. Furthermore, given that their future earning capacity far exceeds the initial investment, relying solely on historical cost would severely underestimate the value of data assets. Consequently, both academia and the professional community have reached a consensus on a multi-dimensional hybrid measurement framework combining historical cost, present value of future returns, market fair value and net realisable value: initial measurement is based on actual inputs—such as purchase prices, data anonymisation and cleaning, and storage and maintenance costs—to ensure rigour; subsequent measurement incorporates the present value of future returns method, forecasting and discounting future economic returns to dynamically capture changes in value and address the shortcomings of historical cost. This has led to the establishment of a multi-attribute hybrid measurement framework comprising "historical cost + fair value + present value of future benefits" (Li, S., Li, J., 2026; He, Y., 2023) [3][4]: initial recognition utilises historical cost to ensure compliance, whilst subsequent holding and utilisation incorporate the present value of future benefits and fair value for dynamic adjustments, balancing reliability and relevance and overcoming the limitations of a single measurement attribute.

2.3 Innovation in Metering Logic: A Comprehensive Shift from a Loss-Reduction Approach to a Value-Added Approach

Traditional accounting measurement is rooted in the logic of value depreciation of tangible assets. Relying on a framework of depreciation and amortisation, it incorporates factors such as physical wear and tear and functional obsolescence into its calculations, reflecting the pattern whereby the value of assets gradually diminishes with use. Data assets, however, as a new form of digital factor of production, are characterised by their intangible nature, absence of physical wear and tear, and capacity for unlimited reuse and iterative upgrading; their value fluctuations transcend the trajectory of traditional assets, which are subject to the principle that "use equals wear and tear, and recognition on the books equals depreciation". Academic research indicates that, far from depreciating during use, data assets-through continuous accumulation, cleansing and iteration, algorithmic optimisation and reuse across multiple scenarios-constantly refine their data dimensions, enhance their accuracy and broaden the scope of their applications, exhibiting an incremental characteristic whereby "the more they are used, the more dynamic they become, and the more value they generate"(Liu, D. et al, 2026)[5].

Consequently, the recognition of data assets on the balance sheet moves away from a depreciation- and amortisation-centred, depletion-based measurement logic. Rather than focusing on the periodic allocation of historical cost and the deduction of depreciation, it adopts a value-appreciation-oriented approach, using data quality, application efficiency, iteration maturity,

sustainable empowerment capabilities and future cash flow returns as the core measurement criteria, thereby dynamically capturing the evolution of value throughout the entire life cycle of data assets. This shift has driven a paradigm shift in the underlying thinking of accounting measurement, fundamentally reversing the lagging paradigm of traditional accounting—which "accounts for past inputs and measures historical depreciation"—and establishing a wholly new measurement system that "anticipates future value and dynamically calibrates appreciation". This has significantly enhanced the adaptability and explanatory power of accounting information regarding changes in the value of digital assets, constituting a core breakthrough in accounting measurement theory against the backdrop of the marketisation of data as a production factor.

2.4 Innovation in Measurement Objectives: Moving from a Reliability-First Approach to a Balanced Approach That Harmonises Reliability and Relevance

Traditional industrial accounting measurement takes reliability as its core objective, prioritising the authenticity and traceability of data and the verifiability of supporting documents, whilst to some extent sacrificing the relevance of information. Against the backdrop of the digital economy and market-oriented reforms of the data factor, the inclusion of data assets on the balance sheet has restructured the logic of trade-offs in accounting measurement, breaking away from the traditional single-minded preference for absolute reliability and achieving a dynamic balance and synergistic alignment between the two key measurement objectives(Chen, C., Wang, P.,2026)[6]. On the one hand, whilst maintaining the baseline requirement of reliability, strict adherence to the principle of objective transactions is observed in stages such as the initial recognition of data assets, cost allocation and process-based accounting; the reliability of information is underpinned by authentic supporting documents and standardised accounting procedures; on the other hand, it places particular emphasis on enhancing the relevance of accounting information. By introducing dynamic measurement methods such as present value of future cash flows and fair value, it fully discloses the growth potential, application value in specific scenarios and future profit potential of data assets. This enables financial statements to reflect, in a forward-looking manner, an enterprise's digital asset reserves and core competitiveness, thereby balancing the dual accounting objectives of fulfilling fiduciary duties and ensuring decision-usefulness, and addressing the shortcomings of traditional measurement models—namely, the lag in data asset value information and the insufficient reference value for decision-making.

3. Current Challenges in the Theoretical Framework for Accounting Measurement Following the Recognition of Data Assets on the Balance Sheet

3.1 The Blurred Boundary between Cost Accumulation and Allocation in Initial Measurement

The primary challenge facing the initial measurement of data assets lies in the difficulty of clarifying the boundaries between cost aggregation and allocation. On the one hand, data assets are typically "by-products"; most arise as by-products of an enterprise's day-to-day production and business operations. A single data resource may serve both production management and market analysis, making it difficult to precisely distinguish and separately allocate the costs of data assets from those of production and business operations. On the other hand, the development of data assets involves a variety of cost items, including labour costs, the cost of purchased data, equipment acquisition and consultancy services; moreover, a single expenditure may be shared across different data projects. The absence of a reasonable allocation method means that the attribution of costs relies heavily on subjective judgement.

3.2 The Dispute over the Classification of "Intangible Assets" and "Inventory" in Accounting

Although the "Interim Provisions on the Accounting Treatment of Enterprise Data Resources" classifies data based on the purpose of holding, business model and the manner in which economic benefits are consumed—with data for internal use or for external licensing without a transfer of ownership classified as intangible assets, and data products intended for sale recognised as inventory—controversy persists in practice.

On the one hand, data is intangible yet identifiable, meeting the definition of an intangible asset; it is suitable for internal reuse or ongoing licensing and is amortised periodically; however, data undergoes rapid iteration and its value depreciates swiftly, making it difficult for traditional amortisation models to keep pace with these value fluctuations. If such data were uniformly classified as intangible assets, this could lead to an overestimation of the carrying amount and fail to reflect the substantive nature of external sales. On the other hand, the inventory framework applies to data products held for sale, which

are measured at cost and transferred upon sale; however, data can be replicated indefinitely; a single set of raw data can give rise to multiple products, and there is no physical consumption, which conflicts with the "consumption and circulation" characteristics of inventory. Particularly in hybrid scenarios where licence sales and outright sales are intertwined, and where usage rights are retained after partial sale, it is difficult for enterprises to determine whether the transaction constitutes a licensing service or a transfer of ownership. This can easily lead to misclassification, and some listed companies have also had to make subsequent corrections and adjustments to their account classifications.

3.3 Methodological Dilemmas regarding Amortisation Methods and Impairment Testing in Subsequent Measurement

Once data resources are classified as intangible assets, the standard requires them to be systematically and reasonably amortised over their useful lives; however, traditional amortisation logic is significantly at odds with the characteristics of data assets. Data is highly time-sensitive and rapidly evolving, and its value is greatly influenced by market conditions, regulatory policies and data quality; consequently, the consumption of economic benefits is neither steady nor linear. Whilst the straight-line method is simple and straightforward, it struggles to reflect the reality of rapid value depreciation or a pattern where value is high initially and then drops sharply later on; alternative methods, such as the unit-of-production method and accelerated amortisation, lack mature and practical measurement criteria. As data assets do not possess "unit of production" that is quantifiable in the traditional sense, it is difficult for enterprises to objectively measure the rate at which economic benefits are consumed. Estimating useful life is also highly dependent on subjective judgement and lacks objective reference standards, creating a risk of artificial manipulation of the amortisation period.

The contradictions are even more pronounced at the impairment testing level. Both data resources classified as intangible assets and data products classified as inventory require a comparison of their carrying amounts with their recoverable amounts or net realisable values. However, as data assets lack an active public trading market and, in the vast majority of cases, do not have fair market quotations, the calculation of recoverable amounts relies heavily on forecasts of future cash flows. These forecasts are subject to numerous uncertainties, including the data compliance environment, changes in industry demand, technological advancements and compliance risks, resulting in a high degree of subjectivity in the selection of parameters. Data assets recognised as intangible assets must be categorised into two types: those with a finite useful life and those with an indefinite useful life. Those with an indefinite useful life do not require amortisation but must undergo annual impairment testing; however, in practice, it is difficult to objectively determine whether a useful life can be established. For data products classified as inventory, there is similarly a lack of reliable basis for determining net realisable value when provisioning for impairment; as data can be replicated indefinitely at a marginal cost approaching zero, traditional inventory impairment measurement logic cannot be directly applied.

3.4 The Structural Discrepancy between Mandatory and Voluntary Disclosure in Information Disclosure

Under the current accounting framework, mandatory disclosure of data resources primarily centres on accounting outcomes such as recognition classifications, amortisation policies, impairment assessments and carrying amounts, focusing on on-balance-sheet figures and the selection of accounting policies; however, no mandatory disclosure requirements have yet been established for underlying key non-financial information, such as data ownership, compliance of sources, quality dimensions, asset boundaries, application scenarios and compliance risks-making it difficult for financial statement users to assess the authenticity of data asset values and the level of risk. At the same time, enterprises have considerable scope for voluntary disclosure, allowing them to disclose additional information such as business value, commercial prospects, governance capabilities and revenue forecasts at their own discretion. This has created a structural mismatch: mandatory disclosure is insufficient to identify compliance and value volatility risks, whilst voluntary disclosure is highly selective. Enterprises performing well tend to emphasise positive developments, whilst those with ownership irregularities, quality defects or uncertain revenue streams tend to avoid sensitive information, resulting in a disclosure pattern characterised by "reporting the good news but not the bad"

4. Pathways for Optimising Accounting Measurement Theory in the Context of Data Asset Recognition

4.1 Refine the Rules for Cost Allocation and Apportionment, as Well as the Measurement Boundaries

Within the framework of current guidelines, the rules for allocating expenditure relating to data resources across existing cost and expense accounts should be further clarified, distinguishing between directly attributable costs and indirect costs requiring apportionment. A data resource catalogue and management ledger should be established to standardise, from the outset, the identification and recording of data-related expenditure arising from associated business activities; 'Data processing volume or equipment usage time' may be introduced as the basis for allocating infrastructure costs, whilst "service staff man-hours" may serve as the basis for allocating labour costs. For data resources shared across multiple scenarios, data relationship analysis techniques may be utilised to map out data processing and circulation chains, thereby achieving objective cost allocation through the application of reasonable allocation coefficients.

4.2 Refining the Rules for the Classification and Presentation of Data Assets in Financial Statements

Enterprises should, taking into account the expected pattern of consumption of the economic benefits associated with data assets, adopt methods such as the straight-line method, accelerated amortisation or the unit cost method, and apply them consistently across different accounting periods, with a view to achieving a balanced allocation of revenue and costs over time. With regard to the transfer of inventory costs, as the same data asset is typically sold multiple times, some scholars have proposed adopting the "planned revenue percentage method" used in the film and television industry, whereby the carrying amount of inventory is transferred based on the proportion of actual revenue from each sale relative to the total estimated revenue; a reclassification mechanism triggered by changes in business models should be established, with account classifications adjusted promptly when the purpose of holding changes from own use to held for sale, or from sale to licensing, and the reasons for reclassification, the amounts involved and the impact on profit or loss for the current period disclosed in the notes to the financial statements. By refining standards, clarifying scenarios and implementing supporting reclassification measures, errors in account classification and subsequent corrective adjustments can be reduced, thereby enhancing the consistency and comparability of data asset presentation.

4.3 Optimising the Subsequent Measurement, Amortisation and Impairment Testing of Data Assets

Firstly, if the value of a data resource is consumed uniformly over its useful life, the straight-line method may be adopted; if the data is highly time-sensitive, undergoes rapid iteration, and its value is high initially before declining sharply later on, the accelerated amortisation method should be adopted; if the depletion of value is directly related to usage or processing volume, the unit cost method may be adopted, and once a method has been selected, it should be applied consistently across all accounting periods; Secondly, the estimation of useful life should be based on a multi-dimensional assessment framework that takes into account business models, update frequency, timeliness, technological iteration and comparable competitive products. For data resources with high update frequencies and time-sensitive nature, a shorter useful life may be set, subject to annual review and adjustment, to avoid artificial manipulation of the useful life. During impairment testing, for data resources recognised as intangible assets, the focus should be on comparing the carrying amount with the recoverable amount; the calculation of the recoverable amount should incorporate a mechanism for adjusting parameters based on factors such as the data compliance environment, changes in industry demand and technological iteration. For data products recognised as inventory, when providing for impairment, should take into account the specific nature of data, where the marginal cost of replication approaches zero; the determination of net realisable value requires a comprehensive assessment based on historical selling prices, market supply and demand, and the status of data updates, whilst utilising third-party professional assessments and industry valuation parameter databases to minimise the influence of management's subjective judgement.

4.4 Establish a Robust Mechanism for Tiered Disclosure of Data Assets

In response to the structural gap between the inadequacy of mandatory disclosure and the selective nature of voluntary disclosure, enterprises should redefine the scope of disclosure and refine their disclosure frameworks. Firstly, the scope of mandatory disclosure should be expanded. In addition to accounting outcomes such as recognition classifications, amortisation policies, impairment assessments and carrying amounts, core underlying information, including data ownership,

the chain of authorisation for data acquisition, data quality metrics, business application scenarios, compliance risk exposures and key assumptions underlying impairment testing-should be included in mandatory disclosures, enabling users of financial statements to independently assess the reasonableness of carrying amounts. Secondly, a tiered framework of "basic mandatory disclosure plus value-added voluntary disclosure" should be established: the basic tier ensures that essential information, such as ownership, compliance and risk is disclosed without omission; voluntary disclosure should be encouraged regarding data governance capabilities, commercial value and expected returns, whilst forward-looking statements must be accompanied by mandatory warnings regarding material uncertainties. Thirdly, a negative list approach to disclosure requirements is established: any circumstances involving defects in ownership, significant compliance penalties or restrictions on the use of core datasets must be disclosed in a timely manner and may not be withheld on the grounds of trade secrets. By raising the threshold, implementing tiered disclosure and applying list-based constraints, sufficient grounds are provided for investors and audit firms to assess the true value of data assets.

5. Conclusion

In the era of the digital economy, data assets have become a core factor of production driving the high-quality development of enterprises. To address the challenges of accounting measurement arising from the inclusion of data assets in financial statements, standard-setting bodies, regulatory authorities, enterprises and third-party professional organisations must collaborate to refine cost allocation and apportionment rules, specify accounting classifications and presentation, optimise subsequent measurement and impairment testing, and improve tiered disclosure mechanisms, thereby promoting the standardisation and normalisation of data asset recognition. As market-oriented reforms of the data sector deepen and accounting measurement theory continues to evolve, the development of an accounting measurement system tailored to the characteristics of data assets will inevitably accelerate, providing a solid institutional foundation for the high-quality development of the digital economy.

Funding

No

Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

Reference

[1] Zhou, C. (2025). Exploration of data assets in listed companies: Recognition, measurement, and disclosure. China Science and Technology Investment, 34, 76–78.

[2] Chen, L., & Zhang, F. (2015). The jungle of accounting theory and escaping the jungle dilemma. Friends of Accounting, (9), 6–10.

[3] Li, S., & Li, J. (2026). Breaking the dilemma of data asset measurement: Based on asset specificity and data value chain theory. Finance and Accounting Monthly, (9), 102–107.

[4] He, Y. (2023). Research on the construction of enterprise data asset measurement system in the context of digital economy. Huxiang Forum, (5), 116–124.

[5] Liu, D., Zhou, G., & Li, W. (2026). New trends in university research on data asset valuation. China Appraisal Journal, (1), 4–12, 16.

[6] Chen, C., & Wang, P. (2026). Discussion on the revision of China's basic accounting standards in the digital economy: From the perspective of data resources recognition on financial statements. Finance and Accounting Monthly, 47(3), 36–45.