Asia Pacific Science Press

Critical Humanistic Social Theory
ISSN(O):3005-9291
ISSN(P):3005-9283
Vol. 3 No.1 (2026)

Practical Risks and Standardized Governance of Data Asset Capitalization for Construction Enterprises

Jian Wu*

Wuhan Luda Construction Engineering Testing Co., Ltd., Intermediate Engineer, 430100, Wuhan, Hubei, China

Corresponding author: Jian Wu

Abstract: Data asset capitalization for construction enterprises is a comprehensive systematic project involving the whole project lifecycle, multiple stakeholders, and cross-domain collaboration. The standardization of its operation is directly linked to the quality of financial accounting of construction enterprises, the effectiveness of investor decision-making, and the efficiency of industry supervision. Currently, this process is confronted with several prominent challenges: the absence of clear data ownership confirmation hinders the advancement of data capitalization in construction enterprises; inadequate adaptability of accounting methodologies triggers practical operational risks; lagging legal systems exacerbate potential compliance hazards in engineering data security; and the risk of earnings manipulation threatens the financial stability of construction projects. In light of these issues, this paper proposes that the whole-process risk prevention and standardized governance of data asset capitalization for construction enterprises can be achieved through three core approaches: formulating a full-lifecycle operational guideline for data asset capitalization, improving the legal framework for data assets in the construction industry, and establishing a robust supervision and disclosure mechanism for engineering data.

Keywords: Whole-Process Management; Construction Enterprises; Data Asset Capitalization of Construction Enterprises; Engineering Financial Risks

Published: Feb 5, 2026

DOI: https://doi.org/10.62177/chst.v3i1.1051

1.Introduction

Data asset capitalization for construction enterprises refers to the systematic presentation of data resources—legally controlled by construction enterprises during the engineering survey, design, construction, operation and maintenance phases, and capable of generating economic benefits—in financial statements in accordance with accounting standards. This practice provides a foundational basis for enterprise value evaluation, project decision-making, and industry supervision. With the deep integration of construction industrialization and digitalization, technologies such as Building Information Modeling (BIM), the Internet of Things (IoT), and big data have been extensively applied in the engineering and construction sector, generating massive volumes of engineering data resources. As a core production factor for construction enterprises, the capitalization of engineering data has emerged as a pivotal issue in the industry's transformation. It not only offers new pathways for cost control, schedule optimization, and quality traceability, but also poses profound challenges to the traditional accounting system [1].

It is noteworthy that although China promulgated and implemented the Interim Provisions on Accounting Treatment Related

to Enterprise Data Resources (hereinafter referred to as the Interim Provisions) in August 2023, which clearly stipulates that enterprise data assets shall primarily comply with the standards for intangible assets and inventories as well as relevant disclosure requirements, the distinctive characteristics of construction industry data—such as strong scenario dependence, long lifecycle, and multi-stakeholder involvement—have led to numerous controversies in academia and practice regarding data ownership confirmation, valuation methodologies, and security compliance[2]. Moreover, existing research lacks risk pre-assessment and systematic solutions tailored to the construction context. From the perspective of whole-process management, this paper focuses on the practical risks of data asset capitalization for construction enterprises and explores safeguard paths that are compatible with industry-specific characteristics. Figure1: Comparing NBA achievements of Jordan and LeBron.·

2.Practical Risks of Data Asset Capitalization for Construction Enterprises

2.1 Operational Impediment: Operational Risks Triggered by the Lack of Accounting Methodologies

The absence of targeted accounting methodologies impedes the process of data asset capitalization for construction enterprises and further induces operational risks in corporate accounting. The sources and formation mechanisms of such risks are mainly manifested in the following three aspects.

First, the inherent attributes of construction enterprise data assets lead to fragmentation in the accounting treatment paths, resulting in divergent outcomes and discrepancies in the valuation of data assets both within individual enterprises and across different enterprises [3]. According to the Interim Provisions, construction enterprise data assets can be classified as either intangible assets or inventories depending on specific application scenarios and practical needs. However, the Interim Provisions lack explicit stipulations on the timing and conditions for such classification, which creates substantial difficulties in practical operations. This ambiguity leaves excessive subjective judgment and discretionary space for construction enterprises and their accountants, thereby increasing the likelihood of measurement deviations in data asset valuation. For instance, an independently developed engineering quality traceability database by a construction enterprise meets the "identifiability" criterion for intangible assets, yet it also possesses the "salability" feature of inventories when used to provide operation and maintenance data services to project owners.[4] The absence of classification criteria tailored to the construction sector grants excessive discretionary power in accounting treatment, potentially leading to significant valuation differences for homogeneous data assets in the financial statements of different enterprises (e.g., Enterprise A classifies a BIM model as an intangible asset, while Enterprise B categorizes it as inventory), with self-evident adverse consequences.

Second, there is a lack of clear regulations or reference standards for valuation and asset recognition methodologies that align with the essential attributes of construction enterprise data assets. As a means of manifesting the value of data as a production factor, data asset capitalization should conform to the inherent nature, attributes, and characteristics of data. Nevertheless, current valuation methods for construction enterprise data assets in China still largely follow the logic and framework of the cost approach, income approach, and market approach, failing to break away from the path dependence of traditional measurement models[5]. Given the substantial differences between construction enterprise data assets and traditional resources in terms of resource reusability, physical form, and transaction methods, traditional valuation approaches exhibit two major limitations. On the one hand, the cost approach fails to account for implicit inputs. The value of a BIM model stems not only from the procurement cost of modeling software, but also from the accumulated experience of engineers and cross-departmental collaboration costs, which cannot be fully measured by the traditional cost approach. On the other hand, the income approach faces the problem of lifecycle mismatch[6]. The economic benefits generated by engineering data often span the entire project lifecycle (e.g., the value of operation and maintenance data may not materialize until 5–10 years after construction completion), which conflicts with the accounting periodicity assumption. Third, the market approach lacks reference standards: the construction data transaction market remains underdeveloped, with extremely few transaction cases for homogeneous data (e.g., metro construction monitoring data), making it difficult to infer value based on market prices.

Finally, procedural norms and supporting measures for data asset capitalization in construction enterprises are in urgent need of improvement. Under the framework of existing laws, regulations, accounting standards, and the Interim Provisions, the accounting subjects, basic standards, statement presentation rules, and information disclosure requirements for data asset capitalization have been basically clarified[7]. However, detailed rules are lacking for key links such as initial measurement

(e.g., value splitting of shared data between the government and construction enterprises in PPP projects), subsequent measurement (e.g., capitalization of update costs for operation and maintenance phase data), and disposal (e.g., accounting treatment of data archiving or destruction upon project completion). Meanwhile, the industry lacks essential infrastructure such as professional data valuation institutions and engineering data trading platforms, leaving accountants in construction enterprises at a loss when dealing with complex engineering data. Consequently, construction enterprises and their accounting personnel often face numerous obstacles in practical operations, with operational risks continuously accumulating and escalating.

2.2 Safeguard Lag: Data Security and Compliance Risks Arising from Outdated Legal Systems

A prerequisite for the reasonable measurement of construction enterprise data assets is the establishment of sound and stable control over such assets by enterprises, i.e., placing data assets in a safe and compliant environment. From a micro perspective, the unstable measurement of construction enterprise data assets is likely to lead to disorderly competition in the construction data factor market. In particular, construction enterprises that take data assets as their core business may arbitrarily seize market share through algorithms, traffic advantages, and other means, thereby forming data monopolies. Subsequently, these enterprises may usurp the discourse power of market pricing based on their dominant market position and erode the interests of disadvantaged construction enterprises through price manipulation, exclusive transactions, and priced acquisitions. From a macro perspective, the reasonable measurement of construction enterprise data assets involves the issue of national asset preservation. Without legal safeguards for data security and compliance, there is a high risk of leakage or loss of construction enterprise data assets during cross-border flows, which would harm national economic interests and the fundamental interests of citizens, and even threaten national economic and social order. Therefore, corresponding risks must be taken seriously and effectively prevented[8].

Nevertheless, data asset capitalization for construction enterprises is a complex and specialized comprehensive systematic project that requires long-term investment and dynamic management. Its implementation demands interdisciplinary knowledge and theories in construction engineering, accounting and finance, law, and science and technology, resulting in significant complexity and particularity. Coupled with the considerable flexibility inherent in the Interim Provisions, academia and practice have diverged sharply on the presentation of construction enterprise data assets in balance sheets. It can be said that the Interim Provisions have played a “pioneering signal” role in promoting data asset capitalization for construction enterprises. However, specific practical approaches, methodological applications, and implementation paths for accurately expressing construction enterprise data assets through accounting language still require further exploration by enterprises and the market. Given the lack of precedent for data asset capitalization in the construction sector domestically and the absence of mature international solutions for reference, relevant legal provisions can only provide principled guidance at the macro level for the time being, with gradual refinement to follow as practical experience and case studies accumulate. The lag in the legal system has hindered the resolution of practical problems, prompting accountants and researchers to raise critical questions: Is it objectively scientific to classify construction enterprise data assets as either intangible assets or inventories? If such classification is feasible, what criteria should be used to distinguish between the two categories?.

2.3 Terminal Concern: Accumulation of Earnings Manipulation Risks Threatening the Financial Security of Construction Enterprises

It is a natural motivation and inherent pursuit of construction enterprises, driven by profit maximization, to optimize their financial statements to present a more favorable “data profile” for investors’ scrutiny. The complexity, opacity, and non-exclusivity of construction enterprise data assets have provided ample room for earnings manipulation, while also creating significant pressure and obstacles for audit and regulatory authorities [9]. An analysis of the methods employed by construction enterprises to manipulate earnings through data assets reveals diverse and sophisticated tactics. However, their essence lies in the deliberate introduction of biases in the value recognition of data assets, thereby inducing misjudgments among financial statement readers regarding the true value of enterprise data assets. The practical harms of earnings manipulation through data assets by construction enterprises are mainly reflected in two aspects. On the one hand, excessive flexibility in price adjustment disrupts risk management and business decision-making for market participants. When data is transacted as an

asset, due to the lack of reliable and sufficient pricing cases and benchmark data, the transferors of construction enterprise data assets generally tend to set transfer prices significantly higher than the actual value of the data, resulting in inflated data asset prices. This exposes transferees to increased asset risks and hidden dangers in economic activities such as value investment, asset-backed financing, foreign debt repayment, collateralized mortgage, and listing and mergers and acquisitions. On the other hand, excessive flexibility in price adjustment enables construction enterprises to use data assets as a tool for earnings management, achieving management objectives such as labor cost control and performance reward limitation through amortization and impairment adjustments of data assets. It is worth noting that when construction enterprise data assets are capitalized as intangible assets, their valuation remains relatively stable. In contrast, when classified as inventories, there is considerable room for adjustment in subsequent impairment testing and other processes, leading to highly uncertain outcomes.

In summary, the inherent uncertainty of data asset capitalization for construction enterprises has created a crisis and challenge to the accuracy and impartiality of earnings value assessment. Without systematic methods and standards based on the specific characteristics of construction enterprise data assets and supported by clear ownership confirmation, data asset capitalization will become a breeding ground for earnings manipulation risks, which will continue to accumulate until they threaten the financial security of construction enterprises.

3.Standardized Governance of Risks in Data Asset Capitalization for Construction Enterprises

3.1 Methodological Improvement: Formulating a Full-lifecycle Operational Guideline for Data Asset Capitalization

First, establish and improve the organizational framework for data asset management and risk control in construction enterprises. It is recommended to adopt a flat, cross-departmental, and project-based parallel organizational structure, with functional units covering strategic management, organizational coordination, asset operation, detailed execution, and risk control [10]. Among these, the strategic management unit is primarily responsible for deliberating on key decisions related to data asset management; the organizational coordination unit oversees the coordination of inter-departmental work during data asset mobilization and operation; the asset operation unit formulates operational strategies based on the lifecycle stages of data assets, while the detailed execution unit is responsible for the ultimate implementation of these strategies; and the risk control unit serves as the “ballast” for the entire data asset management process.

Second, build and cultivate a high-caliber professional team for data asset management in construction enterprises. It is essential to ensure that team members possess comprehensive interdisciplinary professional skills and knowledge in data technology, data law, and data finance[11]. They should be capable of understanding data products and services, while also mastering professional technologies for data quality identification and testing, data standard formulation and improvement, and data regulation interpretation and application. This will ensure the professionalism, scientificity, and accuracy of the data asset capitalization process.

Finally, formulate and implement refined internal management systems for data assets in construction enterprises. A hierarchical, classified, and graded management system can be established following the framework of “general principles—management measures—detailed rules”. The general principles section should clarify the subjects, powers, responsibilities, and objectives of data asset management; the management measures section should stipulate the processes, standards, and norms for data asset management; and the detailed rules section should further specify the requirements for each link of practical operations under the framework of management measures and provide standardized template tools.

3.2 Legal Safeguard: Improving the Supporting Legal System for Construction Enterprise Data Assets

First, the state and local governments should improve the legal system for the security of construction enterprise data assets. The protection of construction enterprise data assets is a systematic project integrating technical governance and legal governance, which requires the provision of legal system supply and improvement [12]. Efforts should be made to encourage the development and innovation of technologies and application tools for data asset management in construction enterprises.

For example, national or local laws and regulations on the promotion of scientific and technological progress can be leveraged to provide policy, funding, technical, and service support for encryption technologies such as data encryption keys, data desensitization, and privacy-preserving computation, as well as security protection technologies including software and hardware security shields, emergency data destruction, and post-disaster rapid recovery systems.

Second, the state and local governments should ensure adequate legal supply for fair competition in the construction enterprise data asset market. During the circulation and utilization of construction enterprise data assets, issues related to anti-monopoly and anti-unfair competition are likely to arise.[13] Therefore, relevant legal provisions should be updated in a timely manner to include clauses protecting the competitive order of construction enterprise data assets, so as to regulate monopolistic practices, predatory behavior, and collusion in the data asset market, thereby safeguarding consumer rights and national public interests.

Finally, the state and local governments should implement legal safeguards for the rights and interests of construction enterprise data assets. In the process of managing data assets, construction enterprises inevitably involve the processing of personal data and public data. When collecting and processing personal data, enterprises should be urged to adhere to the principle of informed consent, and use and process data in accordance with explicitly stated purposes and conditions to avoid excessive data usage. When collecting and processing public data, enterprises should be required to strictly comply with national regulations on declaration and approval procedures[14]. In summary, the state and local governments should balance the development and regulation of construction enterprise data assets, properly coordinate the relationship between data security, personal data protection, and public data development, and promote the capitalization of construction enterprise data assets in accordance with laws and regulations.

3.3 Collaborative Governance: Improving the Supervision and Disclosure System for Construction Enterprise Data Assets

First, construction enterprises should promptly disclose abnormal, special, or concentrated issues arising in the practical operation of data asset capitalization, and provide sufficient and necessary explanations to form a multi-level, high-density repository of practical cases [15]. For example, clear guidelines and publicly available typical cases should be provided regarding the criteria and methods for classifying data assets as either inventories or intangible assets. Based on the actual characteristics of different data assets, explicit standards should be formulated to determine whether the costs incurred in acquiring and maintaining data assets should be expensed or capitalized, which should be promptly publicized and disclosed. This will enable all market participants to timely grasp the changes in the value of construction enterprise data assets based on the disclosed information.

Second, construction enterprises should focus on conducting detailed special disclosure of the accounting treatment and statement presentation of data assets. In particular, specific details such as the impairment and amortization periods and methods of data assets should be disclosed as comprehensively and specifically as possible, so as to avoid sudden, large-scale, and catastrophic asset impairment caused by earnings manipulation. Although the Interim Provisions have made stipulations on the disclosure of data assets, this disclosure adopts a “mandatory + voluntary” model, which leaves certain flexibility and regulatory gaps. The original intention of this model is to ensure basic disclosure requirements while encouraging enterprises to proactively practice data altruism by disclosing more financial information. However, this voluntary disclosure mechanism often lacks long-term motivation and sustainability, thus failing to achieve its intended purpose and becoming a non-binding initiative. Efforts should be made to minimize such non-binding clauses.

Finally, construction enterprises should establish sound internal review and management mechanisms, adhere to the bottom line of legal compliance and ethical standards for data utilization, and gradually build a system for maintaining the legal, compliant, and sustainable value creation of digital resources. Based on internal corporate governance, enterprises should take the initiative to avoid litigation risks arising from data ownership disputes and data circulation and utilization. In addition, enterprises should consider the information needs of stakeholders regarding data assets and disclose financial and operational information as comprehensively as possible in their corporate reports.

Conclusion

This study explores the practical risks and standardized governance of data asset capitalization for construction enterprises from a whole-process management perspective. As a core practice for the construction industry's digital transformation, data asset capitalization poses challenges to the existing accounting, legal, and regulatory systems. It is plagued by interrelated risks—operational risks from inadequate accounting methodologies, security compliance risks due to outdated laws, and earnings manipulation risks threatening financial stability—rooted in construction data's uniqueness and the lag between institutional supply and practical needs. To mitigate these risks, this paper proposes a three-dimensional governance system: formulating full-lifecycle operational guidelines to make up for accounting deficiencies, improving the legal framework to ensure institutional guarantees, and optimizing supervision-disclosure mechanisms to curb earnings manipulation. This integrated closed-loop system is practically significant for advancing standardized data asset capitalization and the industry's digital transformation. This study has limitations. It adopts normative analysis due to the underdeveloped construction data market and insufficient empirical data, with untested governance effectiveness. Additionally, it lacks in-depth exploration of differentiated risks across construction sub-sectors. Future research may verify governance paths via typical enterprise cases, explore sub-sector differentiated strategies, and focus on cross-border data flow. It is expected to enhance the standardization of data asset capitalization and boost the construction industry's high-quality development.

Funding

Special Research Project on Ecological Protection and High-Quality Development of the Yellow River Basin in Shandong Province: "Research on the Dynamic Inheritance Path of Yellow River Culture Based on the Coordination of Architectural Protection and Rule of Law——Taking the Construction of Intangible Cultural Heritage Towns and Activated Utilization of Cultural Relics Resources as Examples" (Project No.: HLB2025006)

Conflict of Interests

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

Reference

[1] Peng, C. M. (2024). The Internal Mechanism and Development Path of Data Factorization. Administration Reform, (12), 49-58. https://doi.org/10.14150/j.cnki.1674-7453.2024.12.005.

[2] Yang, Z. Q., Zhao, X. Y., Liao, W. Z., et al. (2024). Research on the Data Assetization Framework of Construction Enterprises Based on Intelligent Construction. Architecture Technology, 55(09), 1147-1152. https://doi.org/10.13731/j.jzjs.2024.09.1147.

[3] Shi, X. Y. (2026). Financial Informatization Construction and Application for Financial Risk Control of Construction Enterprises. China Collective Economy, (02), 177-180. https://doi.org/10.20187/j.cnki.cn/11-3946/f.2026.02.038.

[4] Cao, X., Xiao, H. Y., Jiang, Y. H. (2025). Analysis on the Collaborative Path of Enterprise Data Asset Capitalization in the Digital Economy Era. Finance and Accounting Monthly, 46(24), 44-50. https://doi.org/10.19641/j.cnki.42-1290/f.2025.24.006.

[5] Du, M. J., & Dong, Y. (2024). Research on the Path of Data Asset Rights Protection for Chinese Enterprises. Finance and Accounting Monthly, 45(23), 123-128. https://doi.org/10.19641/j.cnki.42-1290/f.2024.23.018.

[6] Zhang, J. X., Zhao, F. Y., Li, H., et al. (2023). Research on Improving the Digital Competitiveness of Construction Enterprises. Construction Economy, 44(12), 93-98. https://doi.org/10.14181/j.cnki.1002-851x.202312093.

[7] Wang, H. C., & Zhao, Y. X. (2019). Supplier Selection of Construction Enterprises Based on BP Neural Network in the Big Data Environment. Journal of Civil Engineering and Management, 36(03), 27-33. https://doi.org/10.13579/j.cnki.2095-0985.20190531.001.

[8] Sun, H. B. (2022). Research on the Design of Information Management System for Construction Enterprise Dispute Cases. Construction Economy, 43(04), 81-87. https://doi.org/10.14181/j.cnki.1002-851x.202204081.

[9] Li, Q. (2025). Research on Construction Project Bidding Strategy Based on Big Data. Building Materials Development Guide, 23(22), 79-81. https://doi.org/10.16673/j.cnki.jcfzdx.2025.0980.

[10] Yao, J. Q., & Wu, H. X. (2025). Practical Exploration of Enterprise Digital Transformation—An Exploratory Case Study Based on China Construction Fifth Engineering Bureau Co., Ltd. Hebei Enterprise, (11), 53-56. https://doi.org/10.19885/j.cnki.hbqy.2025.11.012.

[11] Liu, S. Q. (2025). Research on Electrical Equipment Integration Technology in Construction Engineering Intellectualization. Urban Construction Theory Research (Electronic Edition), (27), 76-78. https://doi.org/10.19569/j.cnki.cn119313/tu.202527026.

[12] Li, S. L. (2025, July 21). Construction of Financial Early Warning Model for Construction Enterprises Under the Background of Big Data and Its Application. China Industry News, (015). https://doi.org/10.28076/n.cnki.ncgyb.2025.000660.

[13] Weihao S, Xiaopeng D, Haizhe Y, et al. (2025) A Multianalytical Approach to Identifying Influential Factors in Data Sharing among International Construction Enterprises.Journal of Construction Engineering and Management,151(11). https://doi.org/10.1061/JCEMD4.COENG-17029.

[14] Guo X, Zheng D, Huang D, et al. (2025) Research on Influencing Factors of Digital Transformation of Construction Enterprises Based on SEM and fsQCA Methods.Buildings,15(18):3302-3302. https://doi.org/10.3390/BUILDINGS15183302.

[15] Walter S. (2025) Estimating companies' GHG emissions using information from individual financial accounts and building data. Statistical Journal of the IAOS,41(2):305-316. https://doi.org/10.1177/18747655251341456.