Original Research Article

Exploring data asset value assessment of commercial banks in the context of digital transformation

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Abstract: Under the background of digital transformation, data asset valuation of commercial banks has become a core topic in the financial field.Based on the theory of new factors of production, data as the fifth major factor of production, the banking industry is accelerating business data transformation and value deepening through data precipitation and digital technology integration.In this paper, we systematically sort out the classification characteristics of data assets, use comparative analysis to assess the applicable boundaries of the market method, cost method and income method, and build an optimized income method model in combination with industry practice, so as to put forward a path to improve the management capability of data assets, which will help digital transformation and competitiveness enhancement.

Keywords: Asset valuation; Data assets; Commercial banks; Digital transformation

1. Introduction

Since the 21st century, with the leap in computer storage capacity and breakthroughs in Internet technology, digital technologies such as big data and artificial intelligence have accelerated the penetration of various industries.Against this backdrop, the scale of data collection and storage in commercial banks has seen explosive growth, accumulating massive raw data assets and building a solid foundation for business data transformation. The Fourth Plenary Session of the 19th CPC Central Committee established data as a factor of production for the first time in 2019, accelerating the release of its value potential, and driving the vigorous development of the digital economy.Meanwhile, the data-intensive banking industry has quietly launched its digital transformation, aiming to deeply explore the value of data and enhance its digital operation capability and core competitiveness.

American scientist Alvin Toffler[1] proposed in 1983 that every great leap in human technology is a wave, and technological progress makes the amount of data more and more, which will affect all aspects of socio-economic development, and he called this era as the era of big data.Ellis[2] proposed that data asset is a kind of asset that can bring tangible or intangible profits for enterprises, if utilized, it is elevated to the strategic height of the enterprise to help managers make correct decisions.According to Minfeng Lu[3], commercial banks should process and integrate their internal data to form valuable data assets and implement specialized asset management strategies.This not only effectively enhances the role of data assets in optimizing the bank's business operations and internal management processes, but also realizes the transformation of market value through the trading of data assets, opening up new revenue channels for commercial banks.

Some commercial banks have already explored the evaluation of data assets, and China Everbright Bank, Bank of Shanghai, and Hengfeng Bank have released a research report on data asset estimation, and all three banks have elaborated on the content and methodology of data asset evaluation for commercial banks, but there are differences in their evaluation methods as well as in their evaluation systems.In February 2024, the China

Banking Association released the "Guidelines for Valuation of Data Assets in the Banking Sector"which constructed a The data asset valuation framework applicable to commercial banks, but from the disclosed annual reports of listed commercial banks in 2024, there are obvious differences in individual assessment results, and the issue of measuring the value of data assets of commercial banks is still worthy of in-depth exploration.

2. Classification and characteristics of commercial bank data assets

2.1. Commercial bank data asset classification

Commercial bank data asset management is a strategic management activity based on the value-driven transaction of data elements.According to the characteristics, value types and processing methods of commercial bank data assets, data assets are categorized into original, process and application data assets, with original data assets subdivided into externally acquired and internally collected categories, and application data assets subdivided into revenue enhancement and statistical support categories.

2.1.1. Raw data assets

Detailed data obtained by commercial banks through external acquisition and internal collection constitute the raw data assets of commercial banks.In order to optimize the management process and enhance the convenience of data processing, these raw data assets can be further subdivided into two subcategories: externally acquired and internally collected.

Externally acquired data assets are acquired through procurement, sharing, or web crawling.This type of data cannot be applied directly, but needs to be cleaned and processed to fit into the bank's data governance system and effectively complement the internally collected data.

Internally collected data assets originate from the bank's daily business activities, including manually entered business information and automatically collected data from equipment.The core constraint in the transformation of this type of data elements lies in the maturity of the bank's digital infrastructure, which requires standardized access to the full volume of data through system integration to lay the foundation for subsequent value mining.

2.1.2. Process data assets

Process-type data assets are in the transition stage between original-type data assets and application-type data assets, providing cleaned and unified summary data for further development and application of data. Process data assets can be processed once and reused many times through data warehouses, big data platforms and other advanced technologies, effectively avoiding repeated investment of resources. Such assets form a highly reusable data asset layer through systematic governance, which significantly improves the efficiency of subsequent in-depth development and provides high-value data resource support for commercial banks and other organizations.

2.1.3. Application data assets

Application data assets are oriented to actual data needs, and personalized statistics or data products are obtained through data aggregation, mining and other processing methods to support business-related work and revenue enhancement.Considering the correspondence with revenue, they are subdivided into revenue enhancement and statistical support categories.

Revenue enhancement data assets refer to data resources that can directly empower business and generate revenue, such as data models and products.Among them, algorithmic models have a wide range of application scenarios, support a variety of business decisions, and have become the most core type of data assets in the banking industry.

Statistical support data assets are derivative resources formed based on the deep processing of raw data. Through multi-source data integration and modeling analysis, they can systematically assess operational effec-

tiveness, precipitate operational experience and build a quantitative decision support system.While enhancing the efficiency of business synergy, these assets can provide a scientific basis for strategic decision-making and realize the closed loop of operation optimization.

2.2. Characteristics of commercial bank data assets

Data assets of commercial banks, in addition to the characteristics of identifiability, non-physicality, non-consumability, timeliness, processability, shareability, unlimited replication, dependency and value dynamics that are common to data assets in general, have the following characteristics that are in line with the industry situation.

2.2.1. Efficiency

Data assets can generate excess profits for banks by increasing the efficiency of system operations and reducing operation and maintenance costs.This efficiency is due to the continuous advancement of science and technology, which not only enhance the performance of databases, but also effectively reduce their maintenance costs.

2.2.2. Riskiness

This is mainly manifested in the dual dimensions of endogenous risk and revenue uncertainty.The R&D link is constrained by technical limitations and knowledge barriers, and there is the risk of non-controllable R&D failure;the revenue level is due to the acceleration of technology iteration and market environment fluctuations, forming the chain effect of data asset economic life cycle compression and value depreciation, which together constitute the technology-market double constraint mechanism of asset value preservation.

2.2.3. Co-benefit

This means that the database terminal can be used simultaneously by different subjects at different locations. By setting up different accounts and passwords, multiple users can log in and use the same database terminal at the same time, which greatly improves the efficiency and convenience of data use. At the same time, different personnel within the same organization can also log in to the database terminal at the same time using the same account and password, further reflecting its co-benefit characteristics.

3. Methods for assessing the value of data assets in commercial banks

Currently, academic research on data asset valuation in commercial banks focuses on the discussion and improvement of the applicability of data asset valuation methods.Dombrow[4] argued as early as 1999 that the market approach can be used to evaluate data assets if a sufficiently active market exists, on the contrary, the market approach will be limited.Rihui Ouyang and Minxuan Yu[5] constructed an excess return model combined with the hierarchical analysis method, which firstly strips the return contribution of off-balance-sheet intangible assets from total return and determines the proportion of off-balance-sheet intangible assets accounted for by data assets through the AHP method.Menggen Chen[6] and others introduced the multi-period excess earnings method, which determines the value of data assets by calculating the enterprise's excess earnings in the development period of the data assets and using the revenue sharing rate to strip the value contribution of other assets, and ultimately determines the value of the data assets by discounting and accumulating them.

The valuation methods for data assets of commercial banks include the cost method, the income method, the market method, and a number of derivative methods.However, if you want to reasonably appraise the value of the data assets of a commercial bank, you need to analyze the applicability of these methods in a comprehensive manner and choose the appropriate one for the appraisal.

3.1. The market approach and its applicability

The basic idea of the market approach is to recognize the value of assets based on the market price of similar assets in the open market. The market approach makes full use of the information on the transaction prices of similar assets and adopts the ideas of comparison and analogy to estimate the value of the assets under appraisal. The specific formulas are set out below:

Appraised value = market price of similar data assets multiplied by a correction factor

The market approach requires valuation based on mature cases in the industry and correction of differences by analogy.The prerequisites for implementation include: a mature trading environment and more than three comparable cases and detailed information on the reference asset.At present, the market approach to assessing data assets of commercial banks is difficult to realize at this stage, mainly because data assets have variable value, and different banking entities and different business models will lead to different results in the creation of the value of data assets;and at present, the data assets of commercial banks do not have a sufficiently active trading market, and there are no trading examples to analyze and compare together.Therefore, it is difficult to ensure the effectiveness of using the market approach in evaluating data assets of commercial banks.

3.2. The cost approach and its applicability

The cost approach is an appraisal method that determines the value of data assets based on the current technical and economic conditions by accounting for the costs and expected profits required to rebuild or acquire the data assets, and by deducting the wear and tear and physical depreciation of their use.The specific formulas are as follows:

**Appraised value = Replacement cost - Substantial depreciation -
Functional depreciation - Economic depreciation**

The cost approach has the advantage of simplicity of operation, but it has certain limitations: first, it may underestimate the actual value of data assets, especially when the cost of data is low and the potential value is high;second, it is based on historical cost accounting only, ignoring synergistic effects between assets and value-added gains;third, it does not cover off-balance-sheet intangibles, and there is a large deviation from the evaluation of subjects with a high percentage of intangibles, such as high-technology enterprises.Therefore, it is necessary to supplement the assessment of the value of data assets with other methods.

3.3. The income approach and its applicability

The income approach is a calculation method of data asset valuation obtained through the projected valuation of the income generated by the data asset in the future, combined with a discount rate. The calculation of the income approach centers on the expected earnings, the number of years of earnings, and the discount rate, with the specific formulas as follows:

$$DAV = \sum_{t=1}^{n} \frac{Ft}{(1+i)^t} \times \beta$$

DAV is the appraised value of data asset, Ft is the expected return, i is the discount rate, t is the return period, β is the quality level of the data asset and the adjustment factor for the period of commissioning.

The advantage of the income approach is that it takes into account the time value and risk factors and has a wider scope of application. In contrast, the valuation results of the income approach are more capable of reflecting the ability of managers and the development potential of the company.At present, the incremental income method, EVA method, and excess earnings method derived from the traditional income method are also beginning to be widely used.

4. Conclusion

Comparison of the valuation methods reveals that the cost approach is limited by the complexity of multi-dimensional cost composition and measurement, the market approach is constrained by the problem of insufficient trading activity, and the income approach is more applicable after optimization.Therefore, commercial banks need to build a valuation system that fits the characteristics of data elements and realize value quantification through dynamic modification of the income model.meanwhile, in the process of digital transformation, we should strengthen the construction of data asset management capacity, deeply integrate the valuation method with business scenarios, and continue to explore the value realization path of data assets in the fields of intelligent risk control and precision marketing, so as to enhance the effectiveness and market competitiveness of financial services by data-driven.Future research needs to focus on the dynamic mechanism of the evolution of data asset value and the transmission effect of its interaction with the real economy.

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