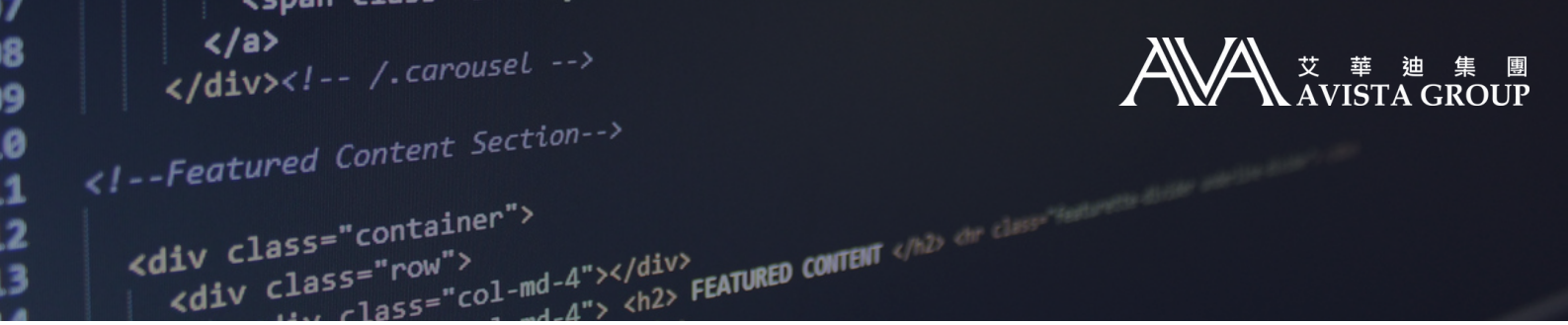
Overview of Data Assets Valuation Methods

1. Introduction

With the release of the "Opinions of the Central Committee of the Communist Party of China and the State Council on Building a More Perfect System and Mechanism for Market-Oriented Allocation of Factors" on April 9, 2020, data has been recognized as one of the five major production factors, alongside land, labor, capital and technology. Quantifying data assets can effectively help businesses understand the value of their existing data assets and identify the fundamental elements that can increase data value, thereby enhancing their competitive advantage and equity value in the industry. Compared to traditional asset types, the value of data assets is influenced by factors such as the quality and availability of the data itself, as well as market demand and application scenarios, due to its uncertainty and timeliness. To facilitate data assets transactions, the Shanghai Data Exchange was officially established on November 25, 2021, aiming to create a leading domestic data trading platform, promote the orderly circulation and value exploration of data resources, cultivate the data factor market, and facilitate the healthy development of the digital economy. On August 21, 2023, the Ministry of Finance officially released the "Interim Provisions on Accounting Treatment of Enterprise Data Resources" ("Provisions"), which will be implemented from January 1, 2024. According to the Provisions, enterprises should account for and report data resource-related transactions and events in accordance with relevant provisions of enterprise accounting standards, considering the purpose of data resource holding, formation methods, business models, and the expected consumption of economic benefits related to data resources. In response to this, under the guidance of the Ministry of Finance, the China Appraisal Society issued the "Guidelines on Data Assets Valuation" ("Guidelines") on September 8, 2023, which will be implemented from October 1, 2023. Against this backdrop, the valuation of data assets faces new challenges, and data assets' valuation has become an indispensable and crucial link in promoting data capitalization and the development of the data assets market.



2. Differences between Data Assets and Traditional Intangible Assets

	Data Assets	Traditional Intangible Assets
Production Method	Naturally generated through the operational activities of a business, such as customer transaction records, website visit logs, social media interactions, etc.	Generated through significant investments of time, money, and effort by businesses or individuals, such as patents, trademarks, copyrights, etc.
Value Source	Their value primarily comes from the information and insights they contain. By analyzing this data, businesses can gain a better understanding of market trends, customer needs, and areas for product optimization, enabling them to formulate more effective strategies.	Their value primarily comes from the exclusive rights they provide, such as patent rights, trademark rights, etc. These rights help businesses protect their intellectual property and prevent others from copying or infringing upon it.
Value Enhancement	Data assets offer more flexible and diverse ways of adding value. Their potential value can be continuously discovered through techniques like data mining and machine learning. They can also be monetized through data sharing and trading.	Relatively fixed.
Management Difficulty	Data assets management is more challenging as it involves multiple aspects such as data collection, storage, processing, analysis, and security. Privacy protection and compliance requirements also need to be considered.	Management is relatively simpler, mainly involving maintenance, updates, and rights protection.
Lifecycle	Data assets have relatively shorter lifecycles because their value and significance can change with technological advancements and changes in business models.	Traditional intangible assets generally have longer lifecycles. For example, a patent may last for more than ten years.
Substitutability	Data assets are generally not completely replaceable, but their value may be reduced due to a decline in data quality or an increase in data acquisition costs.	Traditional intangible assets may face the risk of being replaced, as new technologies or products may supersede existing patents or trademarks.

3. Data Assets Valuation Process Exploration

Establishing a Comprehensive Framework and Defining the Valuation Object

01 Identifying and Inventorying Current Data Assets

02 Determining Data Attributes

03 Identifying the Contributions of Data Assets to the Enterprise

04 Future Application Directions of Data Assets

01/ Identifying and Inventorying Current Data Assets

For data valuation purposes, company need to first complete an summarize of their own data assets. OperationallyIn particular, they can start by listing all data assets and categorizing them based on their types, formats, sources, quality, and other attributes.

02/ Determining Data Attributes

By conducting an inventory of data assets, enterprises can clarify the purpose of each data asset data asset and its contribution to the organization.

03/ Analysis of Value Manifestation and Exploration of Data Assets with Various Valuation Methods

The value of data assets will be reflected in terms of their impact on the growth, returns, and risks of the company. Valuation advisory firms can assist companies in conducting in-depth analysis of their data assets in these three aspects, helping them uncover the underlying value of their data assets.

The valuation of data assets, in accordance with guidance, can be approached from three perspectives: cost approach, income approach, and market approach.

- **Cost Approach**

When evaluating the value of data assets using the cost approach, it is generally based on the replacement cost of the data assets. This includes the initial costs, direct costs, indirect costs, opportunity costs, and relevant taxes. The value of the valuation object is determined by considering value adjustment factors such as inflation and depreciation.

Cost Approach Model Example:
$P = C * \delta$

Where:
P = Value of the evaluated data assets
C = Replacement cost of the data assets, including initial costs, direct costs, indirect costs, opportunity costs, and relevant taxes. Initial costs include planning costs, direct costs include ongoing costs incurred during the process of data collection and processing to form the asset, and indirect costs include software and hardware procurement costs, infrastructure costs, and public management costs that are directly related to the data assets or can be reasonably allocated.
δ = Value adjustment factor. The value adjustment factor is a coefficient that adjusts for the differences between the expected condition of the data assets with all inputs and the actual condition of the data assets on the valuation date.

- **Income Approach**

When applying the income approach, Valuation advisory firms need to understand the application scenarios or business models chosen by market participants and the valuation objectives of the data assets to determine the type of value and valuation methods for the data assets. In the application of the income approach, it is necessary to consider the revenue increase or cost savings driven by the data assets, as well as the value contribution of other tangible and intangible assets and allocate value reasonably. In terms of model selection, direct income approach, royalty rate method, multi-period excess earning method, and incremental cash flow method can be used depending on their applicability. The expected income period of the data assets needs to be determined by considering factors such as legal protection period, contractual agreements, the generation and update time of the data assets, and its timeliness.

Income Approach Model Example:

Direct Income Approach

Based on the projected income directly generated from the evaluated data assets. This approach is suitable when the application scenarios and business models of the evaluated data asset data assets are relatively independent, and the direct income generated by the data assets's corresponding service or product can be reasonably forecasted.

P = $\sum_{t=1}^{n} R * (1+i)^{-t}$ + Tax Amortization Benefit ("TAB")
P = Value of the evaluated data assets；
R = Value of the evaluated data assets;
i = Discount rate (aligned with R)；
t = Useful life of the data assets.

Royalty Rate Method

Based on the total income, it is then divided among the evaluated data asset data assets and other assets that contribute to the total income. The profit-sharing rate typically includes revenue sharing rate and profit-sharing rate. This method can be used when the income generated by other related asset elements cannot be measured separately.

Based on revenue sharing rate：
P = $\sum_{t=1}^{n} R * k1 * (1+i)^{-t}$ + TAB
Based on profit sharing rate：
P = $\sum_{t=1}^{n} r * k2 * (1+i)^{-t}$ + TAB
P = Value of the evaluated data assets；
R = Annual revenue；
r = Annual profit；
k1 = revenue sharing rate;
k2 = profit sharing rate;
i = Discount rate (aligned with R)；
t = Useful life of the data assets.

Multi-Period Excess Earning Method

Multi-Period excess earning method is a method of estimating the expected income of the evaluated data asset data assets by considering the excess income attributed to it. Firstly, the overall income generated by the data asset data assets and other contributing assets is calculated. Then, the contribution of other related assets is deducted from the overall income to determine the excess income. This method is typically applicable when the evaluated data asset data assets can be reasonably allocated with other data assets, intangible assets, and tangible assets in the asset group, and there is still a surplus compared to the overall or normal income of the enterprise or asset group.

$P = \sum_{t=1}^{n} (R - C) * (1 + i)^{-t}$ + TAB

P = Value of the evaluated data assets ;
R = Overall income generated by the data asset data assets and other contributing assets ;
C = Total contribution income from other related assets (such as current assets, fixed assets, intangible assets, and combined labor);
i = Discount rate (aligned with R) ;
t = Useful life of the data assets.

Incremental Cash Flow Method

It determines the expected income of the data asset data assets based on the anticipated future incremental income. This incremental income is derived from comparing the performance of the entity with the evaluated data asset data assets to the performance of the entity without the data assets. It involves comparing the profits or cash flows obtained from using the data asset data assets with the profits or cash flows obtained without using the data asset data assets and considering the difference as the incremental income corresponding to the evaluated data assets. The incremental income approach is typically applicable in data asset data assets valuation under two scenarios: firstly, when the data asset data assets can generate additional measurable cash flows or profits for the entity, such as by enabling the entity to effectively develop new businesses or enhance the additional cash flows or profits of existing businesses; secondly, when the data asset data assets can result in measurable cost savings for the entity, such as through the implementation of cost reduction through embedded big data analytics models.

$P = \sum_{t=1}^{n} (R1 - R2) * (1 + i)^{-t}$ + TAB

P = Value of the evaluated data assets ;
R1 = The annual profit generated with the data assets ;
R2 = The annual profit generated without the data assets ;
i = Discount rate (aligned with R) ;
t = Useful life of the data assets.
Discount rate: When determining the discount rate, the following factors are primarily considered: 1) Uncertainty in profit distribution and legal restrictions and constraints in the business environment; 2) Quality, application, and potential legal risks of the data asset data assets itself.

- **Market Approach Method:**

Based on comparable transaction prices and corresponding adjustment factors. This approach is typically applicable when there are active public market transactions as a basis. It is important to consider the comparability between the valuation object and comparable transaction cases in terms of data rights, data transaction markets and methods, data scale, application areas, application regions, and remaining years, and make adjustments for any differences.

P= Comparable data assets transaction amount × Adjustment factors

Challenges in Data Asset Data assets Valuation:

Cost Approach	Income Approach	Market Approach
There is a weak correspondence between the cost and value of data assets. The value of data assets can continue to increase while the cost may be low, making it difficult to effectively measure the value of the asset.	There is significant uncertainty in estimating future income for data assets, making it difficult to accurately assess their expected returns.	Data assets lack general and relatively uniform transaction scenarios, making it difficult to determine their value using market-based approaches. The variety of transaction modes and application scenarios for data assets, as well as the difficulty in establishing substitution relationships between different data assets, further complicate the valuation process.
Data assets costs and depreciation are challenging to estimate due to the lack of standardized data and varying data quality.	The estimation of the useful life of data assets is challenging, as their timeliness and relevance can be difficult to determine.	Data assets require security and privacy protection, which limits the comparability of transactions.
Lack of industry-wide profit margins for data assets.	Data assets have different values in different application scenarios, requiring appropriate assumptions to be made.	The market for data assets is still developing, resulting in limited market activity and transaction data.

04/ Future Directions of Data Asset Data assets Application

Through the evaluation of existing data assets, businesses can quantitatively assess the impact and value of different types of data assets in their development. This allows businesses to prioritize valuable data assets for further upgrades to maximize their utility. For data assets that have no value, businesses can discontinue further investments to minimize losses.

Currently, data assets valuation still faces many challenges. As an important component of data assets management, research on data assets valuation needs to continue to deepen and improve. We need to explore theoretical innovations, conduct practical validations, and continuously enhance the operability, reliability, and accuracy of the valuation process.

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