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Research on Data Asset Valuation of Liquor Enterprises under the Background of Digital Transformation: A Case Study of Luzhou Laojiao

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Abstract

Given the intangible and uncertain nature of data assets, their valuation remains in an exploratory stage, and a unified, objective regulatory framework has yet to be established. Based on the traditional Multi-period Excess Earnings Method (MEEM), this study fully considers the unique attributes of data assets and incorporates the logic of the Residual Method to deconstruct and analyze value components, thereby constructing a data asset valuation model suitable for enterprises undergoing digital transformation. Taking Luzhou Laojiao, a representative enterprise in the digital transformation of the liquor industry, as the case study, this research forecasts its excess earnings from 2024 to 2028 and discounts them to the valuation base date. The final calculated value of the company's data assets is approximately 5.72 billion RMB. The results indicate that by clearly distinguishing the discount rates of data assets from other intangible assets, this model can more accurately calculate the excess earnings contributed specifically by data assets. This provides a methodological reference for the valuation of data assets in liquor enterprises and holds positive significance for promoting the transaction, circulation, and optimized management of data assets.

Keywords

Data Assets; Multi-period Excess Earnings Method (MEEM); Residual Method; Valuation; Luzhou Laojiao; Digital Transformation.

1. Research Background

With the rapid development of the digital economy,data has become a core factor of production driving corporate growth and shaping competitive advantage.The Fourth Plenary Session of the 19th CPC Central Committee first categorized data as a factor of production,marking a fundamental shift in its status within the economy and society.In 2023,the Ministry of Finance and other authorities successively released the Provisional Provisions on Accounting Treatment Related to Enterprise Data Resources[1] and the Guiding Opinions on Data Asset Valuation[2].These documents have advanced the capitalization process of data resources at the institutional level,laying a solid foundation for the market-oriented allocation of data elements in China.Against this backdrop,the intrinsic demand for enterprises to conduct value assessments of their own data assets has become increasingly apparent. Objective and reasonable valuation not only helps enterprises gain deep insights into the strategic value of data assets-enhancing data management efficiency and decision-making accuracy-but also provides investors with a more comprehensive basis for judging corporate value.

However,the characteristics of data assets-such as intangibility,processability,and value volatility-pose significant challenges to traditional cost measurement and valuation methods. The lag in valuation practice stands in contradiction to the rapid development of corporate data assets, leading to deviations in cost accounting and value measurement, which to some extent constrains the high-quality development of the digital economy. Therefore, it is particularly

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urgent to explore and construct a set of valuation methods suitable for the unique characteristics of data assets.

Currently, the Income Approach remains one of the mainstream methodologies for evaluating data assets; however, the key to its application lies in how to accurately isolate the contribution of data assets from the overall corporate earnings. Existing research often evaluates data assets and other intangible assets as a single entity, failing to fully account for their unique risks. In view of this, based on the Multi-period Excess Earnings Method (MEEM), this paper introduces the logic of the Residual Method to attempt to separate data assets from other assets for independent valuation. Innovatively, this study sets a specific discount rate for data assets that is distinct from the overall discount rate of intangible assets, thereby more accurately reflecting their specific risk and return profiles. Taking Luzhou Laojiao, a typical liquor enterprise, as a case for empirical analysis, this research aims to provide new perspectives for the data asset valuation of enterprises undergoing digital transformation and offer a reference for promoting the circulation and value release of data elements.

2. Problem Statement

2.1. Data Assets and Their Characteristics

As research on data assets continues to deepen, the academic community has developed different points of emphasis in defining their conceptual characteristics, yet a core consensus is becoming increasingly clear and well-defined. For instance, Chen Gang et al. (2024)[3] emphasize that the formation of a data asset must undergo a complete process from "resourcization" to meeting specific asset recognition criteria. From an accounting perspective, Qin Rongsheng (2020)[4] defines it as a current data resource controlled by an enterprise through past events that can bring future economic benefits. Zhang Chi[5] provides a detailed summary of the fundamental characteristics of data assets, covering multiple dimensions such as economic value, intangibility, shareability, uncertainty, diversity, timeliness, redundancy, and non-depletability. According to the Guiding Opinions on Data Asset Valuation issued by the China Appraisal Society, data assets are explained as data resources legally held or controlled by a specific subject that can continuously generate economic income, characterized by typical features such as intangibility, dependency, shareability, processability, and value volatility. Based on the aforementioned regulations and the fundamental characteristics of assets, this paper defines data assets as: a collection of data resources formed by an enterprise through past transactions or events, for which the enterprise has legal ownership or control, and which are expected to bring economic benefits through direct monetization, decision support, or operational efficiency improvements, and whose cost or value can be reliably measured.

2.2. Traditional Methods and Limitations of Data Asset Valuation

Currently, the practice of data asset valuation still primarily draws upon the three classical methods of intangible asset valuation: the Cost Approach, the Market Approach, and the Income Approach. However, the unique attributes of data assets-especially within the context of the digital transformation of traditional sectors like the liquor industry-render these methods significantly limited when applied directly.

The Cost Approach is a technical pathway that assesses asset value by estimating the current replacement cost (RC) as of the valuation base date, systematically subtracting various forms of value depreciation. For liquor enterprises such as Luzhou Laojiao, data assets may originate from substantial investments in ERP (Enterprise Resource Planning) systems, CRM (Customer Relationship Management) systems, online malls, and social media operations. Utilizing the Cost Approach for valuation can only account for the infrastructure construction costs and operational maintenance expenses of these systems; however, it fails to capture the core value

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generated after integration-such as consumer profiling, channel dynamics, and market trend forecasting. The brand value of liquor is highly dependent on consumer loyalty and market reputation. These forms of "soft power" driven by data assets are virtually impossible to reflect through historical or replacement costs.

The fundamental logic of the Market Approach is that the value of the appraised asset can be indirectly reflected by the prices of similar assets already traded in the market, with the Principle of Substitution at its core. During the valuation process, based on the selection of appropriate comparable objects, the reference price must be adjusted according to the specific characteristics of the enterprise being appraised to arrive at a value conclusion grounded in market evidence. However, the data assets of liquor enterprises possess highly distinct industry characteristics-for example, microbiological monitoring data derived from century-old fermentation pits, unique brewing process parameters, and precision profiles of high-net-worth consumer groups. These data sets lack comparability with the user behavior data owned by internet companies or the IoT (Internet of Things) data of industrial enterprises. Consequently, it is difficult to find suitable comparable cases and adjustment parameters within the Market Approach, rendering the application of this method nearly unfeasible in the liquor industry.

The Income Approach determines value by forecasting the future excess earnings generated by data assets and discounting them to the valuation base date. This method aligns directly with the fundamental definition of asset value and possesses a solid theoretical foundation, making it a relatively ideal baseline method for data asset valuation. The profit growth of liquor enterprises is the collective result of powerful brand equity, traditional craftsmanship, distribution networks, and data assets. Simply attributing the overall corporate earnings to data assets would severely overestimate their value; conversely, an inability to effectively isolate these assets would underestimate their contribution.

In summary, traditional valuation methods each have deficiencies when applied to the data assets of liquor enterprises: the Cost Approach underestimates value, the Market Approach lacks the necessary market conditions, and the Income Approach faces the dilemma of contribution decomposition. This fully demonstrates the necessity of methodological innovation based on the Income Approach to construct a valuation model capable of accurately identifying and measuring the contributory value of data assets.

Consequently, many domestic scholars have proposed various model improvements based on the aforementioned valuation methods to develop new technical pathways. Li Yonghong and Zhang Shuwen (2024)[6] systematically analyzed the strengths and weaknesses of valuation methods, utilizing the Analytic Hierarchy Process (AHP) and Grey Relational Analysis to overcome obstacles in the Market Approach before establishing a model to analyze data value. Liu Qi et al.[7] conducted research on Enterprise Data Asset Valuation (EDAV) using the Market Approach, with the basic logic of evaluating the EDAV of similar enterprises by adjusting factors such as technology, capacity, and value density. Building upon these efforts, this paper will introduce the logic of the Residual Method based on the Multi-period Excess Earnings Method (MEEM), aiming to resolve this core challenge.

3. Construction of the Data Asset Valuation Model for Liquor Enterprises

3.1. Model Construction

The general logic of the model construction is to utilize the Multi-period Excess Earnings Method (MEEM) as the theoretical foundation and apply the Residual Method to isolate the value of data assets from the overall corporate earnings. Given the specific risks associated with data assets, such as ambiguous ownership and blurred cost boundaries, the discount rate for data assets should differ from the overall discount rate applied to other general intangible

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assets. Based on this premise, this study employs the Residual Method for decomposition, thereby determining the value of data assets within the context of multi-period excess earnings.

$$V_{DA} = \sum_{t=1}^{n} \frac{(V - V_a - V_b - V_c - V_d)}{(1+i)^t} \quad (1)$$

Where:V_{DA} refers to the value of corporate data assets;V refers to the Free Cash Flow (FCF) of the enterprise;V_A,V_B,V_C refer to the contributory value of current assets, fixed assets, other intangible assets (excluding data assets),and human resources, respectively;i refers to the discount rate for data assets;n refers to the remaining useful life (or projection period) for valuation.

3.2. Rate of Return

The Rate of Return Decomposition Method is employed to subtract the rates of return of tangible assets and general intangible assets from the enterprise's overall rate of return, thereby "back-calculating" the rate of return for off-balance-sheet (OBS) intangible assets. The detailed steps are as follows: first, calculate the enterprise's Weighted Average Cost of Capital (WACC); then, deduct the investment returns attributable to current assets, fixed assets, and on-balance-sheet intangible assets from the WACC; finally, derive the rate of return for off-balance-sheet intangible assets through this residual calculation.

$$WACC = R_e \times \frac{E}{E+D} + R_d \times \frac{D}{D+E} \times (1 - T) \quad (2)$$

Where:
E represents the equity capital;D represents the debt capital;T represents the corporate income tax rate;R_d represents the return on debt capital;R_E represents the return on equity capital.

$$R_e = R_f + \beta(R_m - R_f) \quad (3)$$

Where:
R_f represents the risk-free rate of return;R_m represents the market rate of return;β denotes the systematic risk coefficient (or market risk coefficient).

$$i_{DA} = \frac{WACC - {}_a \times i_a - W_b \times i_b - W_c \times i_c}{W_{DA}} \quad (4)$$

Where:
W_{DA} represents the proportion of data assets in total assets;i_{DA} refers to the return on investment (ROI) for data assets, namely the specific discount rate for data assets;W_a,W_b,W_c represent the proportions of current assets, fixed assets, and on-balance-sheet intangible assets in total assets, respectively;i_a,i_b,i_c represent the rates of return for current assets, fixed assets,and on-balance-sheet intangible assets, respectively.

3.3. Model Variables and Definitions

In the calculation process, Free Cash Flow to the Firm (FCFF) consists of the net cash flow generated from operating activities minus necessary capital expenditures. From an economic perspective,it represents the residual cash flow available to capital providers after the

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enterprise has met its daily working capital requirements and critical investment needs. The calculation rules for Free Cash Flow are shown in the table below,see Table 1.

Table 1. Calculation Rules for FCFF

Calculation Rules	Account
	Operating Revenue
-	Operating Cost
	Taxes and Surcharges
	Selling Expenses
	Administrative Expenses
	Financial Expenses
=	Earnings Before Interest and Taxes
-	Income Tax Expense
	Capital Expenditure
	Increase in Working Capital
+	Depreciation and Amortization
=	Free Cash Flow

Contributory Value of Current Assets. Considering that the lifecycle of current assets is relatively short, they generally do not incur physical or functional depreciation and are expected to be fully recovered within a predictable period; therefore, asset impairment or wear-and-tear is not considered in the calculation. Based on this premise, the contributory value of current assets only accounts for the return on investment. It is calculated by multiplying the annual average balance of current assets by the rate of return on current assets. Here, the rate of return on current assets is represented by the one-year bank lending rate of the year in which the valuation base date is located.

Contributory Value of Fixed Assets. In the course of daily production and operations, the depreciation and wear-and-tear of fixed assets are objectively inevitable. Consequently, an enterprise must accrue monthly depreciation on the book value of these assets until their value reaches zero (after deducting the estimated residual value). Therefore, the contributory value of fixed assets is composed of the sum of depreciation compensation and the return on investment. Since the depreciation cycle for fixed assets is typically set at five years or longer, to ensure the rationality and fairness of the calculation, the rate of return on investment is calculated based on the bank lending rate for terms of five years or more.

Contributory Value of On-Balance-Sheet Intangible Assets. The contributory value of on-balance-sheet intangible assets consists of two components: amortization compensation and return on investment. Given that the amortization period for intangible assets typically exceeds five years, the five-year bank lending rate is selected to calculate the contributory value of these assets.

Contributory Value of Human Resources. Within the composition of the contributory value of off-balance-sheet intangible assets, the excess earnings created by human resources hold a significant position and constitute one of the key components. The contributory value of human resources is the product of the annual labor investment and the labor contribution rate. The annual labor investment is determined based on the annual "Employee Benefits Payable" (or

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Staff Remuneration Payable) recorded in the corporate financial statements. As for the labor contribution rate, the value is derived by referring to the average talent contribution rate established during the process of China's economic growth, which serves as the core benchmark.

4. Application of the Multi-period Excess Earnings Method (MEEM) for Data Asset Valuation in the Liquor Industry: A Case Study of Luzhou Laojiao

The selection of Luzhou Laojiao Co., Ltd. as the research subject is primarily based on two considerations. First, the company is a leading enterprise in the Chinese liquor industry with a long brand history, offering broad industry representativeness. Second, Luzhou Laojiao has actively promoted digital transformation in recent years, accumulating extensive data resources in supply chain management, precision marketing, and consumer services. Its data assets, therefore, possess significant research value.

According to public annual reports, Luzhou Laojiao achieved steady growth in operating revenue from 2019 to 2023, with a marked improvement in its ranking among the Top 500 Chinese Enterprises, demonstrating strong market resilience and development potential. This robust fundamental performance provides a stable predictive basis for evaluating the future earning capacity of its data assets.

More importantly, Luzhou Laojiao's digital transformation strategy has created the necessary conditions for the formation and value appreciation of its data assets. Through initiatives such as constructing digital marketing platforms, optimizing supply chain management systems, and deepening consumer data analytics, the company has systematically transformed the data generated across all production and operation stages into valuable resources. This provides practical feasibility for this study to evaluate the value of its data assets based on the Residual Method. Therefore, selecting Luzhou Laojiao as the case enterprise is both highly typical and methodologically sound.

4.1. Basic Matters of Data Asset Valuation

1) Purpose of Valuation: To perform an asset valuation of the data assets owned by Luzhou Laojiao Co., Ltd.

2) Object of Valuation: The data assets of Luzhou Laojiao Co., Ltd.

3) Valuation Base Date: December 31, 2023

4) Value Type: Market Value

5) Valuation Assumptions:

(i) Going Concern Assumption: It is assumed that Luzhou Laojiao's business operations remain stable and will continue as a going concern in the foreseeable future.

(ii) Stability Assumption: It is assumed that relevant interest rates and corporate income tax rates will remain stable throughout the projected earnings period.

4.2. Valuation Process of Data Assets for Liquor Enterprises

4.2.1. Determination of the Benefit Period

Focusing on the data assets of liquor enterprises, and to estimate their value more objectively and accurately, the benefit period is set from 2024 to 2028, based on the annual reports of Luzhou Laojiao Co., Ltd. from 2019 to 2023. The forecasting model in this study follows the principle of parsimony: Operating revenue is extrapolated using a simple linear regression model constructed via the Ordinary Least Squares (OLS) method; all other variables are estimated based on the historical average of their respective proportions to operating revenue.

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4.2.2. Determination of Excess Earnings.

(1) Forecasting Free Cash Flow to the Firm (FCFF).This study selects the public financial data of Luzhou Laojiao from 2019 to 2023 as the research sample. A simple linear regression equation constructed via Ordinary Least Squares (OLS) is employed to estimate the company's operating revenue and operating costs for the period from 2024 to 2028. The predictive equations derived in this paper are as follows:

Operating Revenue $=645680718.210132\times X^{2}-2606111118710.485840\times X^{1}+2629726174968586.5\times X^{0}$

Operating Cost $=79090212.475277\times X^{2}-319533687770.569275\times X^{1}+322741267873939.625\times X^{0}$

In forecasting the company's Free Cash Flow (FCF) for the next five years, the average historical proportions to operating revenue for various items, including the four major expenses and capital expenditures (CapEx), are utilized as the core measurement basis. The applicable corporate income tax rate for Luzhou Laojiao is set at 25%. By integrating the aforementioned foundational data and tax standards, the specific results for Luzhou Laojiao's free cash flow over the next five years have been calculated; the detailed breakdown is presented in Table 2.

Table 2. A Projection of Free Cash Flow to the Firm (FCFF) for Luzhou Laojiao(2024–2028)
(Unit: 10 Million CNY)

Account	2024	2025	2026	2027	2028
Operating Revenue	3740.5	4565.5	5519.6	6602.9	7815.3
-: Operating Cost	415.0	485.3	571.3	673.2	791.0
Taxes and Surcharges	504.4	615.6	744.3	890.3	1053.8
Financial Expenses	-41.2	-50.3	-60.8	-72.8	-86.1
Selling Expenses	668.3	815.7	986.2	1179.7	1396.4
Administrative Expenses	178.2	217.5	263.0	314.6	372.4
R&D Expenses	24.0	29.3	35.4	42.3	50.1
=: Total Profit	1991.8	2452.4	2980.3	3575.4	4237.9
Income Tax Rate	25.00%				
=: Net Profit	1493.9	1839.3	2235.2	2681.6	3178.4
+: D&A	77.0	94.0	113.7	136.0	161.0
-: Capital Expenditure	447.5	546.2	660.4	790.0	935.0
-: Changes in Working Capital	740.8	904.1	1093.1	1307.6	1547.7
FCFF	382.6	483.0	595.4	720.0	856.6

(2) Forecasting the Contributory Value of Fixed Assets

To calculate the contributory value of fixed assets for Luzhou Laojiao, an analysis was first conducted based on the company's financial data from 2019 to 2023. The results indicate that the depreciation of fixed assets accounts for approximately 1.64% of the operating revenue; this ratio is defined as the fixed asset depreciation compensation rate. Regarding the structure of capital expenditures, it was found that fixed asset capital expenditure accounts for 7.08% of revenue, a proportion used to project the company's fixed asset capital expenditures for the 2024–2028 period.

This study selects the bank lending rate for terms over five years (4.2%) as of the valuation base year to serve as the return on investment (ROI) for fixed assets. Consequently, the fixed asset investment returns for the next five years can be derived. Finally, by summing the fixed

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asset depreciation compensation and the investment return, the contributory value of fixed assets for Luzhou Laojiao from 2024 to 2028 is obtained, as detailed in Table 3.

Table 3. Projection of Contributory Value of Fixed Assets for Luzhou Laojiao(2024–2028)
(Unit: 10 Million CNY)

year	2024	2025	2026	2027	2028
Operating Revenue	3740.5	4565.5	5519.6	6602.9	7815.3
Fixed Asset Depreciation as % of Revenu	1.64%				
Amortization/Depreciation Compensation	61.5	75.0	90.7	108.5	128.4
Opening Balance of Fixed Assets	861.3	831.5	795.2	751.2	698.6
Capital Expenditure	447.5	546.2	660.4	790.0	935.0
Fixed Asset Capital Expenditure	31.7	38.7	46.7	55.9	66.2
Closing Balance	831.5	795.2	751.2	698.6	636.4
Average Balance	846.4	813.4	773.2	724.9	667.5
Rate of Return	4.20%				
Return on Investment	35.5	34.2	32.5	30.4	28.0
Contributory Value	97.0	109.2	123.2	139.0	156.5

(3)Forecasting the Contribution Value of Current Assets

In the preliminary analysis of financial indicators, the average ratio of the increase in current assets to operating income was calculated to be 23.46%. This average serves as the benchmark for forecasting the scale of Luzhou Laojiao's current assets over the next five years. The return on investment (ROI) for current assets is set at 3.65%, based on the 2023 one-year bank loan interest rate. By combining the determined average ratio with the ROI data, the projected contribution value of Luzhou Laojiao's current assets for the next five years can be derived, as shown in Table 4.

Table 4. Projected Contribution Value of Current Assets for Luzhou Laojiao (2024–2028)
Unit: 10 Million CNY

year	2024	2025	2026	2027	2028
Operating Income	3740.5	4565.5	5519.6	6602.9	7815.3
Increase in Total Assets	1407.6	1718.0	2077.1	2484.7	2940.9
Beginning Current Assets	4535.8	5413.4	6484.4	7779.3	9328.4
Increase in Current Assets	877.5	1071.1	1294.9	1549.0	1833.5
Ending Current Assets	5413.4	6484.4	7779.3	9328.4	11161.8
Average Balance	4974.6	5948.9	7131.9	8553.8	10245.1
Return on Investment	3.65%				
Earnings	181.6	217.1	260.3	312.2	373.9

(4)Forecasting the Contribution Value of Intangible Assets

Based on the data from 2019 to 2023, the average ratio of intangible asset amortization to operating income was calculated at 0.19%, which is utilized as the compensation return rate for intangible assets. For the forecast of intangible asset capital expenditure (CAPEX) over the next five years, this study adopts the historical average of 1.78% as the estimation benchmark. The investment return rate for intangible assets is set at 4.2%, based on the five-year-plus bank loan interest rate corresponding to the valuation date. By summing the calculated intangible asset compensation return and the investment return, the projected contribution value of

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Luzhou Laojiao's intangible assets for the forthcoming five years is derived, as presented in Table 5.

Table 5. Projected Contribution Value of Intangible Assets for Luzhou Laojiao (2024–2028) Unit: 10 Million CNY

year	24	25	26	27	28
Operating Revenue	3740.5	4565.5	5519.6	6602.9	7815.3
Amortization to Revenue Ratio	0.19%				
Compensation Return	7.3	8.9	10.8	12.9	15.2
Beginning Balance of Intangible Assets	339.8	340.5	341.3	342.4	343.6
Capital Expenditure	447.5	546.2	660.4	790.0	935.0
Intangible Asset CAPEX	8.0	9.7	11.8	14.1	16.7
Ending Balance	340.5	341.3	342.4	343.6	345.1
Average Balance	340.1	340.9	341.8	343.0	344.3
Return Rate	4.20%				
investment Return	14.3	14.3	14.4	14.4	14.5
Contribution Value	21.6	23.2	25.1	27.3	29.7

(5)Forecasting the Contribution Value of Human Resources

Regarding off-balance sheet intangible assets, apart from the data assets studied in this paper, only human capital is considered. Taking into account Luzhou Laojiao's investment in employee compensation, the ratio of human capital to revenue is assumed to be 2.29%. The return rate is calculated at 24.49%, based on the model of talent contribution rate in economic growth developed by Ma Ning and Wang Xuanhua [8]. Consequently, the human capital contribution values for Luzhou Laojiao from 2024 to 2028 are derived, as shown in Table 6.

Table 6. Projected Human Capital Contribution Value for Luzhou Laojiao (2024–2028) Unit: 10 Million CNY

year	24	25	26	27	28
Operating Revenue	3740.5	4565.5	5519.6	6602.9	7815.3
Human Capital Investment	85.6	104.5	126.3	151.1	178.9
Return Rate	24.49%				
Contribution Value	21.0	25.6	30.9	37.0	43.8

(6)Determination of the Return Rate

This paper selects Wuliangye, Kweichow Moutai, and Laobaigan as peer benchmarks. In calculating the Weighted Average Cost of Capital (WACC) for Luzhou Laojiao over the next five years, the risk-free rate is based on the 2023 five-year Treasury bond yield. The market expected return is derived from the historical average geometric return of the CSI 300 Index via the Choice financial terminal, valued at 7.56%. The cost of debt is set at 4.2%, corresponding to the 2023 five-year bank lending rate. These indices are likewise sourced from the Choice financial terminal. By substituting the aforementioned parameters into the formula, the WACC for comparable companies of Luzhou Laojiao can be calculated, as shown in Table 7.

Table 7. Calculation of Weighted Average Cost of Capital (WACC) for Comparable Companies

Company Name	D/(D+E)	E/(D+E)	Rd	Rf	Rm	β	Re	T	WACC
Wuliangye Yibin Co., Ltd.	20.00%	80.00%	4.20%	2.97%	7.56%	1.4377	9.57%	25.00%	8.29%
Kweichow Moutai Co., Ltd.	17.88%	82.12%	4.20%	2.97%	7.56%	1.0656	7.86%	25.00%	7.02%
Luzhou Laojiao Co., Ltd.	34.38%	65.62%	4.20%	2.97%	7.56%	1.4711	9.72%	25.00%	7.46%
Hebei Hengshui Laobaigan Liquor Co., Ltd.	49.37%	50.63%	4.20%	2.97%	7.56%	1.291	8.90%	25.00%	6.06%

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Based on the calculated WACC for the peer industry, the proportions of current assets, fixed assets, and intangible assets for the three benchmark enterprises are assumed to be their average values over the past five years. In the calculation process, the return on current assets is set at 3.65%, and the return on fixed assets is set at 4.2%. Based on these conditions, the average return on intangible assets for the three enterprises is determined to be 56.20%. The specific data are presented in Table 8. Utilizing the calculated on-balance sheet intangible asset return rate of the peer industry and applying the data asset formula, the final return on data assets for Luzhou Laojiao is derived, as shown in Table 9.

Table 8. Calculation Table for Average Industry Return on Intangible Assets

Company Name	WACC	W_{ca}	R_{ca}	W_{fa}	R_{fa}	W_{ia}	R_{ia}
Wuliangye Yibin Co., Ltd.	8.29%	89.96%	3.65%	4.33%	4.20%	5.71%	84.38%
Kweichow Moutai Co., Ltd.	7.02%	85.62%	3.65%	7.56%	4.20%	6.82%	52.45%
Hebei Hengshui Laobaigan Liquor Co., Ltd.	6.06%	57.43%	3.65%	16.72%	4.20%	10.27%	31.76%
Average							56.20%

Table 9. Calculation of Return on Data Assets for Luzhou Laojiao

Company Name	WACC	W_{ca}	R_{ca}	W_{fa}	R_{fa}	W_{ia}	R_{ia}	W_{da}	R_{da}
Luzhou Laojiao Co., Ltd.	7.46%	62.34%	3.65%	14.90%	4.20%	5.23%	56.20%	17.54%	9.26%

(7) Valuation Results of Data Asset Appraisal

Based on the aforementioned model and forecasted data, the excess earnings from Luzhou Laojiao's data assets for the period 2024 to 2028 are discounted to determine the market value of the data assets as of the valuation date. As illustrated in the table, the model estimates the value of Luzhou Laojiao's data assets at 5.72 billion RMB. This result clearly reveals that data assets, as an independent and significant economic resource, hold a substantial position within the overall value of the enterprise.

Further analysis of the trend in excess earnings from data assets reveals a rapid and significant upward trajectory, rising from 615 million RMB in 2024 to 2.527 billion RMB by 2028. This trend is consistent with the projected growth of Luzhou Laojiao's operating revenue, providing strong evidence that the value of data assets increases in tandem with the deepening of digital operations and the expansion of business scale. This demonstrates a distinct value-added effect inherent in data assets.

Table 10. Calculation of Data Asset Value for Luzhou Laojiao (2024–2028) Unit: 10 Million CNY

year	2024	2025	2026	2027	2028
Free Cash Flow	382.6	483.0	595.4	720.0	856.6
CV_{ca}	181.6	217.1	260.3	312.2	373.9
CV_{fa}	97.0	109.2	123.2	139.0	156.5
CV_{ia}	21.6	23.2	25.1	27.3	29.7
CV_{hr}	21.0	25.6	30.9	37.0	43.8
Excess Earnings of Data Assets	61.5	107.9	155.9	204.5	252.7
Discount Rate	9.26%				
Discount Factor	0.9152	0.8377	0.7667	0.7017	0.6422
Present Value	56.3	90.4	119.5	143.5	162.3
Total	572.0				

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These valuation results not only quantitatively confirm that Luzhou Laojiao's investment in digital transformation has culminated in data assets of considerable economic value, but also provide a crucial quantitative reference for management to optimize data strategies and for investors to comprehensively assess enterprise value. Refer to Table 10.

4.2.3. Sensitivity Analysis of Valuation Results

To ensure the reliability of the valuation results and examine the impact of changes in key model parameters on the appraised value, this study conducts a sensitivity analysis on the most critical parameter: the discount rate for data assets. By adjusting the baseline discount rate of 9.26% upward and downward by 10% and 20% respectively, the data asset value was recalculated. The results are presented in Table 11.

Table 11. Sensitivity Analysis of Luzhou Laojiao's Data Asset Valuation Model

Unit: 10 Million CNY

	Fluctuation in Discount Rate	r	Data Asset Value	Fluctuation in Asset Value
Scenario 1	-20%	7.41%	607	6.12%
Scenario 2	-10%	8.33%	589	2.97%
Base Case	0%	9.26%	572	0%
Scenario 3	+10%	10.19%	555	-2.97%
Scenario 4	+20%	11.11%	540	-5.59%

The analysis indicates that the value of data assets is negatively correlated with the discount rate, though the resulting fluctuations in value remain relatively moderate. When the discount rate decreases by 10% and 20%, the data asset value rises to 5.89 billion and 6.07 billion RMB, representing increases of 3.04% and 6.15%, respectively. Conversely, when the discount rate increases by 10% and 20%, the value decreases to 5.85 billion and 5.4 billion RMB, with declines of 2.86% and 5.60%.These results show that within a ±20% fluctuation range of the discount rate, the maximum change in data asset value does not exceed ±6.2% This suggests that the valuation model is not extremely sensitive to variations in the discount rate parameter, demonstrating strong robustness in the appraisal results. This characteristic enhances the reliability and practical reference valameter estimation.

5. Conclusion and Implications

In the context of the digital economy, this study focuses on the valuation challenges of data assets within traditional enterprises-specifically the liquor industry-undergoing digital transformation. Through theoretical analysis and case studies, the following conclusions and implications have been derived:

The multi-period excess earnings model constructed based on the Residual Method effectively addresses the critical challenge of isolating and measuring data asset value from the overall corporate earnings. By differentiating the discount rate of data assets from that of other intangible assets, the model more accurately reflects the unique risk and return characteristics of data resources. The valuation results indicate that as of the valuation date, the market value of Luzhou Laojiao's data assets is approximately 5.72 billion CNY. Furthermore, the excess earnings are projected to maintain a rapid growth trend over the next five years. This quantitatively validates the significant contribution of data assets to enterprise value and their inherent potential for appreciation.

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