Accounting, Auditing and Finance (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/accaf.2025.060120
ISSN 2616-3136 Vol. 6 Num. 1

Research on Evaluation of Data Assets of Communication Enterprises Based on Excess Return Method

Yichang Liu[1,a]

[1]*College of Business and Economy, Australian National University, Canberra, Australia*
[a]*1175388355@qq.com*

Keywords: Data Assets, Evaluation, China Mobile, Excess Return Method, Analytic Hierarchy Process

Abstract: With the vigorous development of information technology and digital economy, China has entered the digital China era. Under the background that data elements have increasingly become the core driving force of enterprise development, this paper takes China Mobile as an example to study the value evaluation of data assets of communication enterprises. This paper constructs the data asset value evaluation model based on the excess return method, and analyzes the value composition of data assets from multiple dimensions by combining with the analytic hierarchy process, so as to clarify the contribution of each element to the enterprise income. On the one hand, the evaluation method proposed in this paper provides theoretical support and practical reference for the formulation of data asset management policies of relevant regulatory departments; On the other hand, it is beneficial for enterprises to have a clearer understanding of the value of data assets, make better use of data elements, and provide decision-making basis for the rational allocation and utilization of data resources. It is of great significance for enterprises to improve the enterprise data asset evaluation system and promote the maximization of the value of enterprise data assets.

1. Introduction

At present, China has entered a new economic era of digital economy, in which "data is the new oil" is also a new driving force to promote the development of digital economy. In 2022, China's production data volume ranked second in the world, accounting for 10.5% of the global data output. The scale of China's big data assets reached 1.57 trillion yuan. Obviously, in this context, the value of data assets gradually highlights, injecting new development vitality into enterprises, and becoming an important support for enterprise competitiveness and social development. At the same time, data value evaluation has become an important cornerstone for the construction of data trading market.

However, compared with the wide application of data assets, the research on its value evaluation is still in its infancy. In view of its inherent particularity, high complexity and continuous dynamic changes, it is obviously different from tangible assets and other types of intangible assets, and the traditional value evaluation methods are difficult to apply directly. Therefore, the special research on the value evaluation of data assets is particularly urgent and important, which can provide valuable guidance for enterprises and society, and also promote the orderly circulation and value mining of

data assets.

The existing data asset valuation research mainly focuses on the innovation of traditional valuation methods and derivative methods, which can be roughly divided into relative valuation model and absolute valuation model. Lei Xiaoqiao proposed that the relative valuation model is mainly composed of market method and value sharing method, while the absolute valuation model is mainly composed of income method and cost method. In the traditional evaluation methods, the market method focuses on constructing the data asset evaluation index system and obtaining the data asset evaluation value through modification[1]. He can believes that in the absence of market transaction cases, the cost method is more applicable, providing a reference for the monetary measurement and cost collection of the seller's data product pricing or data asset costs[2]. Xu Yanchang proposed that the income method mostly calculates the present value of income directly from the perspective of excess income brought by data assets to enterprises[3]. In addition to the traditional valuation method, Yue takes the logistics enterprise as a research case and divides the value of its data assets into three different parts. It is believed that the market method is used to evaluate the value of data assets in transactions, the discount model of excess return is used to evaluate the value of data assets that big data technology and data resources bring benefits to enterprises, and the option pricing model is used to calculate the potential income of data assets that cannot be measured by the income method [4].

2. The theoretical framework of telecom enterprise data asset valuation

According to the analysis of traditional evaluation methods and their applicability, this paper determines the excess return method as the main evaluation tool of data assets. In the operation of the enterprise, various assets work together to form the overall profitability of the enterprise. Based on this, this paper first determines the overall income level of the enterprise, and uses the idea of cut difference, that is, the overall income of the enterprise is decomposed into the contribution value of different assets according to the source. By deducting the direct impact of on balance sheet intangible assets, fixed assets and current assets on enterprise income one by one, we can identify and quantify the excess return brought by off balance sheet intangible assets. For enterprises, off balance sheet intangible assets are mostly combined to generate income, so they are also called combined intangible assets.

Data assets are off balance sheet combined intangible assets. After determining the value of off balance sheet portfolio intangible assets, the weight of data assets in the portfolio is given by analytic hierarchy process, and the data asset sharing rate is obtained.

2.1 Valuation of intangible assets of enterprise portfolio using excess return method

The excess return method takes a reverse approach, subtracting the overall income of the enterprise from the income generated by other assets other than the required assets, and then reasonably discounting to obtain the asset value. The specific formula is as follows:

$$V = \sum_{i=1}^{n} \frac{F}{(1+i)^n}$$
$$F = (R_1 - R_2) \tag{1}$$

V-the value of the appraised assets; F-excess return; i-discount rate; n-income years; R1- overall income of the enterprise; R2- contribution of other assets except the appraised assets

2.2 AHP to determine the weight of data assets

After analyzing the traditional evaluation methods and their applicability, it is considered that it is difficult to directly separate the data assets from the overall assets, so the analytic hierarchy process (AHP) is introduced to combine quantitative and qualitative methods. The basic idea of applying this method in this paper is to establish an index system, establish three levels, the target level, the index level, and the scheme level, and use the satty1-9 scale method to determine the proportion of each level of index, calculate the weight proportion of the evaluated data assets in the intangible assets of the enterprise portfolio, and separate it from it, as shown in Figure 1.

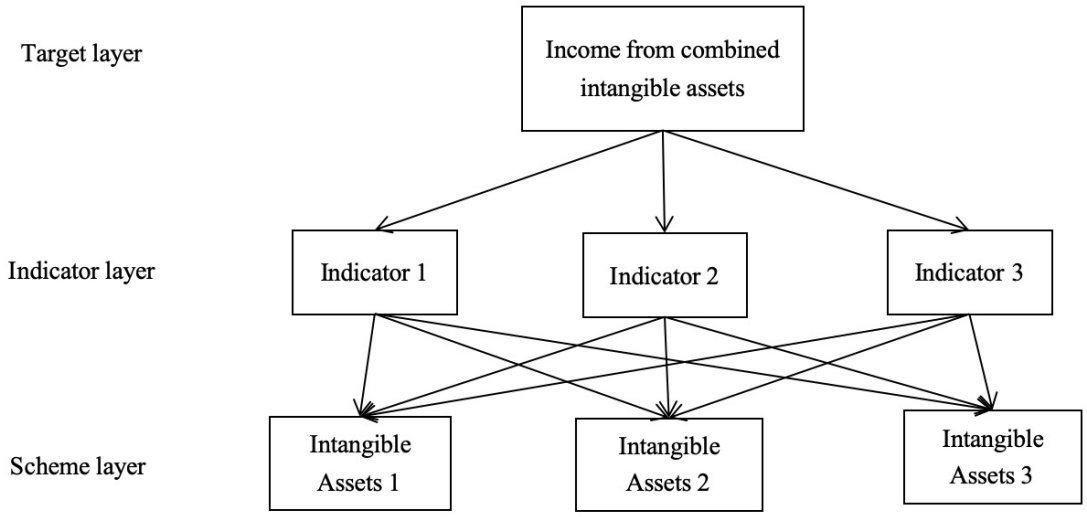

Figure 1 Hierarchy chart

Table 1 Satty1-9 Scale table

Importance (In the same level, factor A is compared with factor B, ...)	Quantization
equally important	1
slightly important	3
relatively important	5
strongly important	7
extremely important	9

Table 2 Comparison judgment matrix

Indicator factors	Factor X_1	Factor X_2	…	Factor X_n
Factor X_1	1	X_{12}	…	X_{1n}
Factor X_2	$1/X_{12}$	1	…	X_{2n}
⋮	⋮	⋮	⋮	⋮
Factor X_n	$1/X_{1n}$	$1/X_{2n}$	…	1

In this paper, the method of questionnaire survey is adopted, and experts are invited to judge the importance of pairwise comparison between indicators according to the provisions of quantitative

values and the indicator hierarchy chart. Each indicator is given the corresponding score relatively professionally, and the obtained survey data are sorted out to build a judgment matrix, as shown in Table 1 and Table 2.

After obtaining the single-level judgment matrix, the Excel formula method is used for normalization, and the weight ω of relevant index factors is calculated. A is the judgment matrix, λmax represents its maximum eigenvalue, and n represents its order. The specific formula is as follows:

$$A\omega = A\lambda$$

$$\lambda_{\max} = \sum_{i=1}^{n} \frac{[A\omega]_i}{n\omega_i} \tag{2}$$

Subjective factors can easily affect the factor score, so it is necessary to check the consistency of the judgment matrix to make the judgment score more accurate and reasonable. The following indicators are involved:

① Consistency index CI

The calculation formula is as follows:

$$\mathrm{CI} = \frac{\lambda_{\max} - \mathrm{n}}{\mathrm{n} - 1} \tag{3}$$

② Random consistency index RI

It can be found from the following table 3:

Table 3 RI values

n order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41	1.46	0.49	0.52	1.54	1.56	1.58	1.59

③ Consistency ratio CR

The calculation formula is as follows:

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} \tag{4}$$

It is necessary to compare the calculated CR with 0.1. When CR<0.1, the judgment matrix passes the consistency test. That is, the judgment matrix is consistent, the eigenvector of the matrix can be used as the weight vector, and the weight is feasible.

To sum up, the brief flow chart of AHP model construction is as follows shown in Figure 2.

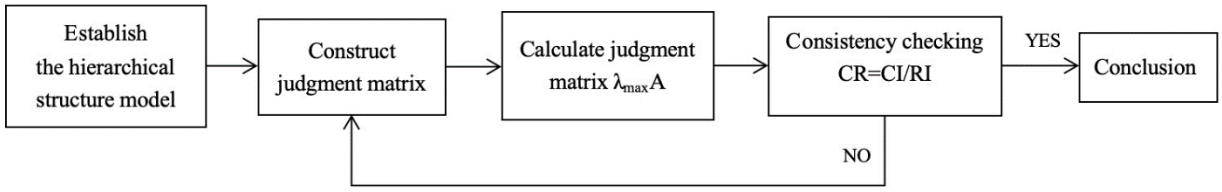

Figure 2 Construction flow chart of Analytic Hierarchy Process model

3. Determination of important parameters in the model

3.1 Enterprise free cash flow

Free cash flow is the remaining cash flow of an enterprise after deducting all operating expenses and capital expenditures (expenses made by the enterprise to purchase, maintain or improve fixed assets). It is an important indicator to measure the financial health and profitability of enterprises. It is usually used to evaluate the long-term value and profit model of enterprises. The calculation formula is shown in the table 4 below:

Table 4 Calculation formula

	Operating income
minus:	Operating costs
	Taxes and surcharges
	Period expenses
	Income tax expense
equal to:	Net profit
minus:	Capital expenditure
	Increase in working capital
plus:	Depreciation and amortization
equal to:	Free cash flow of enterprises

3.2 Income period

In this study, it refers to the time period when data assets can generate profitable returns. As a relatively new asset in the appraisal, data assets currently have no complete and authoritative laws and regulations. In addition, data has timeliness, and data assets also have different values due to timeliness. Therefore, the definition of the income period should be carefully analyzed and judged according to the specific circumstances of the appraised object.

3.3 Discount rate

3.3.1 Method for determining discount rate

The discount rate used to calculate the present value of data assets has the specificity of data assets, and the discount rate of the entire enterprise cannot be directly used to discount data assets. This paper adopts a valuation strategy based on the disassembly of return rate. The core step is to analyze the overall return rate of the enterprise, that is, to determine the weighted average cost of capital of the enterprise first, and then identify and eliminate the investment return rate generated by tangible assets such as current assets and fixed assets, so as to extract the investment return rate of portfolio intangible assets.

However, due to the particularity of the communication industry and data assets of the appraised enterprise China Mobile, this paper selects several comparable enterprises in the industry, calculates the weighted average capital costs of China Mobile and the comparable companies respectively, and obtains their respective rates of return on intangible assets through the formula. Finally, the average value of several enterprises is the discount rate of the data assets of the appraised enterprise. As follows:

Including: i- return on intangible assets of the appraised enterprise;

ij - comparable company j return on intangible assets.

$$i = \sum_{j=1}^{n} \frac{i_j}{n} \tag{5}$$

3.3.2 Process of determining discount rate

① Calculate the weighted average capital WACC of the appraised enterprise and comparable companies, and the formula is:

$$WACC = K_e \frac{E}{D+E} + K_d(1-T)\frac{D}{D+E} \tag{6}$$

Including: D- bond value;
E- equity value;
T- income tax rate;
K_d- cost of debt capital;
K_e- cost of equity capital.

This paper uses the capital asset pricing model considering the enterprise specific risk return rate to determine the cost of equity capital. The formula is as follows:

$$K_e = R_f + \beta \times (R_m - R_f) + R_s \tag{7}$$

Including: R_f - risk free rate of return;
R_m - market risk return rate;
(R_m- R_f) - excess risk return rate;
β- Risk coefficient;
R_s - enterprise specific risk return rate.

Since CAPM model is usually used for investment portfolio, the estimation of its return risk is generally lower than that of a single company, so the enterprise specific risk return RS is added here.

② Calculate and compare the return on investment of intangible assets of the company

The formula is as follows:

$$i_j = \frac{WACC - W_c i_c - W_f i_f}{W_j} \tag{8}$$

Including: W_C - the ratio of current assets of the company to total assets;
I_C - return on investment of current assets;
W_f - the ratio of the company's fixed assets to total assets;
I_f - return on investment of fixed assets;
W_j - ratio of other assets of the company to total assets =(1- W_c - W_f)

In o rder to define the discount rate of data assets and distinguish it from the discount rate of the overall assets of enterprises, this paper adopts the market environment analysis method from the perspective of industry. This method comprehensively considers the characteristics of the industry and relevant influencing factors, making the valuation of data assets more realistic and instructive, and improving the accuracy and reliability of the evaluation results.

3.4 Contribution value of other assets

3.4.1 Contribution value of current assets

Current assets refer to assets that are usually recovered within an operation cycle, such as monetary capital, inventory and accounts receivable. In this paper, the return on investment is used to calculate the annual contribution of current assets. The contribution of current assets is calculated as follows:

$$\begin{aligned}&\text{Annual contribution of current assets}\\&=\text{annual average balance of current assets}\\&\times\ \text{return on investment of current assets}\\&\text{Annual average balance of current assets}\\&=(\text{beginning balance of current assets}\\&\quad+\text{ending balance of current assets})\end{aligned}\tag{9}$$

3.4.2 Contribution value of fixed assets

The contribution value of fixed assets usually includes the depreciation compensation of fixed assets and the investment income of the asset. Due to the lack of data, this paper uses a relatively convenient calculation formula:

$$\begin{aligned}&\text{Annual contribution of fixed assets}\\&=\text{predicted value of fixed assets}\\&\times\ \text{contribution rate of intangible assets on the balance sheet}\end{aligned}\tag{10}$$

3.4.3 Contribution value of intangible assets on the balance sheet

Similar to the measurement method of contribution value of fixed assets, it consists of income from intangible asset investment and amortization compensation. In this paper, the following similar formulas are also used for calculation:

$$\begin{aligned}&\text{Annual contribution of intangible assets on the balance sheet}\\&=\text{predicted value of fintangible assets on the balance sheet}\\&\times\ \text{contribution rate of intangible assets on the balance sheet}\end{aligned}\tag{11}$$

4. China mobile data assets appraisal

4.1 Company profile

China Mobile Communications Group Co., Ltd., founded in 2000, has the first network coverage and customer base in the world, and has successfully served nearly 1billion users. Its wide network scale, large number of customers, strong profitability and high brand value are all in the leading position in the industry, and its market value is also among the top telecom operators in the world.

China Mobile has always been driven by innovation and constantly strengthened its technology R&D and innovation capabilities. In 2023, China Mobile's revenue has exceeded trillion yuan, and its net profit has increased by 5% year-on-year. This is most likely the result of digital transformation and the rich development of digital content. After the continuous popularization of

5g and Gigabit networks, digital content has become a new growth point of mobile profits. In the future, China Mobile is likely to expand new businesses in digital content, cooperate with upstream and downstream industries, and continue to improve the 5g ecological chain.

After understanding, analysis and research, China Mobile's core competitiveness is mainly reflected in five aspects: data assets, human resources, customer resources, management level and others (technology research and development, brand influence, etc.), which are reflected in the creation of enterprise value through three aspects: income increase, cost savings, and enterprise competitiveness improvement.

4.2 Determination of evaluation parameters

4.2.1 Income period

Base period: This paper takes the financial report data from 2019 to 2023 as the base period for subsequent prediction

Forecast period: according to the layout and development of China Mobile's research on 6G concept and the current demand for information network, 5g, smart home, etc., China Mobile is expected to grow significantly in the next five years.

However, in the long run, data assets have certain timeliness and iterative accumulation. Combined with the operation level of China Mobile and the overall industry development of the communication industry, China Mobile does not necessarily maintain a sustainable high-speed growth state, and the assets have time value. A long prediction period will greatly affect the accuracy of the prediction and evaluation results.

Therefore, this paper divides the income period into two stages. The period from 2024 to 2028 is a rapid growth period, and after 2028, it will enter a stable growth period.

4.2.2 Future cash flow

① Prediction of operating revenue

By observing the quarterly operating income statement of China Mobile, we can see that there may be a certain correlation between it and time, and there may be seasonal changes. Due to the lack of operating income data of some quarters in 2019 and 2020, but the time series data has the requirement of consistency, so we select the operating income data of China Mobile from the fourth quarter of 2020 to the fourth quarter of 2023, and use the time series prediction method to predict.

In order to avoid pseudo regression, the ADF stationarity test of time series data is carried out, and the test results are as follows: $p=0.921>0.1$,The original hypothesis cannot be rejected and the sequence is unstable. Therefore, the first-order difference is applied to the series. After the first-order difference, the operating income data $p=0.000<0.01$. Through the ADF test, that is, the series is stable, so the time series prediction model including seasonal variation components is established, and the first-order difference ARIMA model is obtained. The model fitting statistics $r2=0.92$, with good fitting degree. The fourth quarter operating revenue from 2024 to 2028 is predicted by the model, and the quarterly data are added and summarized to obtain the predicted revenue from 2024 to 2028, as shown in the table 5 and table 6 below.

Table 5 Forecast of China Mobile's operating revenue from 2024 to 2028

Unit: 100 million yuan

year	2024	2025	2026	2027	2028
operating income	10835.41	11577.73	12320.05	13062.37	13804.69

② Prediction of other data

Table 6 Operating costs of China Mobile from 2019 to 2023

Unit: 100 million yuan

year	2019	2020	2021	2022	2023	average value
Operating income	7459.17	7680.7	8482.58	9372.59	10093.09	-
Operating costs	5128.08	5332.6	6039.05	6768.63	7243.58	-
Proportion	68.75%	69.43%	71.19%	72.22%	71.77%	70.67%

This paper mainly uses the percentage of sales revenue method to predict the operating costs. By calculating the proportion of China Mobile's operating costs in operating revenue from 2019 to 2023, the analysis shows that the proportion of operating costs in revenue has fluctuated little in the past five years. Therefore, this paper uses the average proportion of operating costs in operating revenue from 2019 to 2023 of 70.67% as the predicted proportion of China Mobile's operating costs from 2024 to 2028. The prediction results are shown in the table 7 below.

Table 7 Operating cost forecast of China Mobile from 2024 to 2028

Unit: 100 million yuan

year	2024	2025	2026	2027	2028
Operating income	10835.41	11577.73	12320.05	13062.37	13804.69
Proportion of operating costs	70.67%	70.67%	70.67%	70.67%	70.67%
Operating costs	7657.38	8181.98	8706.58	9231.18	9755.77

At the same time, the analysis of other data shows that the fluctuation of various costs and expenses is small. Combined with the future development trend, this paper takes the average proportion of various costs and expenses in the operating revenue from 2019 to 2023 as the predicted proportion of various costs and expenses in the operating revenue from 2024 to 2028, and the results are shown in the table.

The same is true for other projects. In addition, in the prediction of income tax expense, China Mobile has many subsidiaries at home and abroad, which should be considered according to different tax preferential policies. In the prediction of capital expenditure and increase in working capital, the data over the years fluctuate significantly. The comprehensive enterprise is in a good and stable trend in the future. The extreme value is eliminated, and then the average value of the proportion of past projects in income is selected for determination, as shown in table 8 and table 9.

Table 8 Forecast of business tax, surcharges and various costs of China Mobile from 2024 to 2028

Unit: 100 million yuan

year	2024	2025	2026	2027	2028
Operating income	10835.41	11577.73	12320.05	13062.37	13804.69
Proportion of taxes and surcharges	0.32%	0.32%	0.32%	0.32%	0.32%
Taxes and surcharges	34.24	36.58	38.93	41.27	43.62
Proportion of sales expenses	5.95%	5.95%	5.95%	5.95%	5.95%
Selling expenses	644.97	689.15	733.34	777.53	821.71
Proportion of administrative expenses	6.18%	6.18%	6.18%	6.18%	6.18%
Administrative expenses	669.40	715.26	761.11	806.97	852.83
Proportion of R&D expenses	1.79%	1.79%	1.79%	1.79%	1.79%

Research &development expenses	193.96	207.25	220.54	233.83	247.12
Proportion of financial expenses	-0.81%	-0.81%	-0.81%	-0.81%	-0.81%
Financial expenses	-87.68	-93.68	-99.69	-105.70	-111.70

Table 9 Forecast of China Mobile's contribution to other assets from 2024 to 2028

Unit: 100 million yuan

year	2024	2025	2026	2027	2028
Contribution to current assets	226.47	246.74	268.34	291.29	315.59
Contribution of fixed assets	307.72	315.81	324.41	333.53	343.16
Contribution of intangible assets	20.86	21.79	22.78	23.83	24.94

4.2.3 Discount rate

In this paper, China Telecom and China Unicom, whose industries are similar to China Mobile, are selected as comparative companies for analysis.

The risk-free yield Rf adopts the annualized interest rate of the five-year savings bond issued in 2023, i.e. 2.75%; Using the average return rate of Shanghai stock index and the average profit rate of Shenzhen stock index in recent ten years as the index closest to the market portfolio, the market risk return rate Rm=7.77%; Enterprise risk coefficient β is checked through choice financial terminal; The specific risk rate Rs usually covers two main dimensions: scale risk and operation risk. According to CAPM formula, the cost of equity capital of China Mobile is calculated as follows:

$$K_e=2.75\%+0.61\times(7.77\%-2.75\%)+1\%=6.81\%$$

Then, taking the 2023 five-year bank loan interest rate of 4.75% as the debt capital cost of the enterprise, the weighted average capital cost of China Mobile is calculated by unifying among the comparison Enterprises:

$$WACC=6.81\%\times66.39\%+4.75\%\times(1-23.62\%)\times33.61\%=5.74\%$$

Similarly, the return on intangible assets of the three enterprises is calculated, and the average value is used as the prediction basis of China Mobile. The final calculation result is 10.37% , as shown in Table 10.

Table 10 Return on intangible assets of China Mobile and comparison companies in the industry

Company name	Proportion of current assets W_c	Return on current assets R_c	Proportion of fixed assets W_f	rate of return on fixed assets R_f	Proportion of intangible assets W_i	WACC	Return on intangible assets R_i
China Mobile	28.91%	4.35%	38.92%	4.20%	32.17%	5.74%	8.86%
China Telecom	15.28%	4.35%	54.26%	4.20%	30.46%	5.21%	7.44%
China Unicom	20.26%	4.35%	51%	4.20%	28.74%	7.28%	14.80%
average value	10.37%						

4.3 determination of data asset sharing rate

In combination with the above, the hierarchy system of intangible assets of China Mobile portfolio is as follows shown in Figure 3:

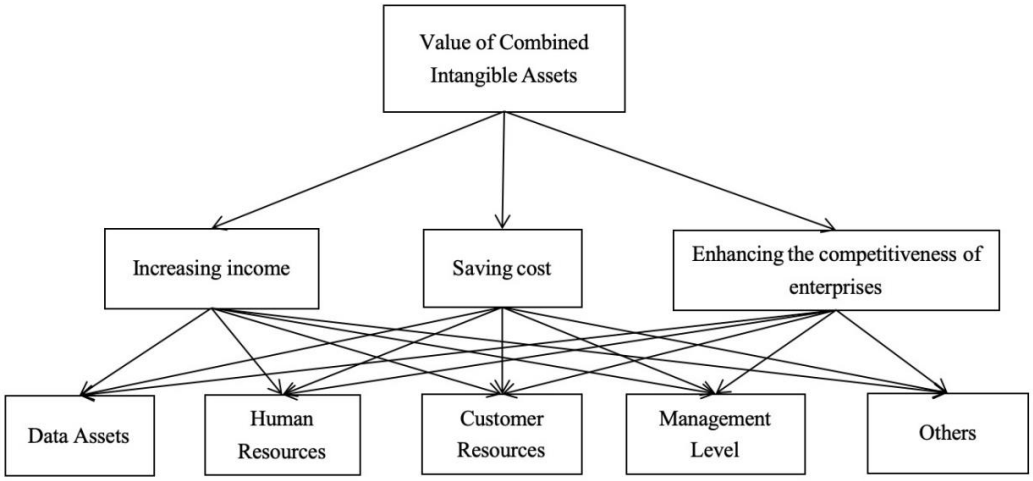

Figure 3 Hierarchical structure of intangible assets of China Mobile portfolio

The hierarchical structure system and design questionnaire were sent to a total of 10 respondents, including professionals in the asset appraisal industry, practitioners in the telecommunications industry, students who understand the analytic hierarchy process and university teachers. After normalization, calculation, consistency test, optimization and adjustment, a consistent matrix was obtained. The weight summary is shown in the table 11 below.

Table 11 Summary table of AHP index weights

	Indicator layer	Weight	Scheme layer	Weight	Weight to total objective
Value of off balance sheet combined intangible assets	income increase	0.1203	Data assets	0.1391	0.0167
			human resources	0.0999	
			Customer resources	0.1975	
			Management level	0.3326	
			other	0.2308	
	cost saving	0.2029	Data assets	0.1386	0.0281
			human resources	0.0983	
			Customer resources	0.1933	
			Management level	0.3534	
			other	0.2164	
	Improvement of enterprise competitiveness	0.6768	Data assets	0.1471	0.0996
			human resources	0.1183	
			Customer resources	0.2057	
			Management level	0.3025	
			other	0.2264	

After sorting and adding, the weight of China Mobile's data assets to off balance sheet portfolio intangible assets under the analytic hierarchy process is:

$$K=0.0167+0.0281+0.0996=0.1444$$

That is, the data asset sharing rate is 0.1444.

4.4 Data asset value calculation and result analysis

Now, after deducting the contribution value of current assets, the contribution value of fixed assets and the contribution value of intangible assets on the balance sheet from the free cash flow of China Mobile's future enterprises predicted above, the excess return of the combined intangible assets is obtained, which is multiplied by the weight proportion of data assets in the combined intangible assets calculated by the analytic hierarchy process, discounted, and then added to finally obtain the value of China Mobile's data assets.

The specific calculation table 12 is as follows:

Table 12 China mobile data assets calculation table

Unit: 100 million yuan

year	2024	2025	2026	2027	2028
Free cash flow	1478.14	1579.41	1680.67	1781.94	1883.20
minus: Contribution of current assets	226.47	246.74	268.34	291.29	315.59
Contribution of fixed assets	307.72	315.81	324.41	333.53	343.16
Contribution of intangible assets on the balance sheet	20.86	21.79	22.78	23.83	24.94
equal to: contribution of off balance sheet portfolio intangible assets	923.08	995.07	1065.14	1133.28	1199.51
Data asset sharing rate	0.1444				
Discount rate	10.37%				
Present value of data assets	120.77	117.96	114.40	110.28	105.76
total	569.16				

According to the previous analysis, the future economic development and the sustainable development of the digital economy will promote the development of China Mobile's data assets. After 2028, China Mobile's data assets will enter a stable development period. As for the growth rate of data assets, this paper selects reference to the growth rate of GDP to determine the value of data assets in the stable period. Affected by the epidemic in 2020, GDP fell to 2.24%, and rapidly rose to 8.45% in 2021. After several years of fluctuations, the epidemic ended in 2023, and the GDP growth rate was 5.2%, and economic development will gradually return to good. To sum up, the growth rate of the sustainability period after 2028 is proposed to be 6%. The calculation process is as follows:

$$\text{Value in stable growth period}=\frac{1199.51\times(1+6\%)}{(10.37\%-6\%)\times(1+10.37\%)^{5}}\times 0.1444$$

$$=2565.31 \text{ (trillion yuan)}$$

$$\text{Value of Data assets}=569.16+2565.31=3134.47 \text{ (trillion yuan)}$$

According to the calculation results, the value of China Mobile's data assets is 313.447 billion yuan. Although the data assets have not been listed in the enterprise's financial statements at present, the results of analysis and calculation show the high value of data assets, which not only confirms the core position of data assets in communication enterprises, but also reveals the important component of data assets as intangible assets in the overall income of enterprises. The value contributed by data assets has become one of the key factors for the sustainable development and competitive advantage of enterprises. This is enough to remind enterprises that reasonable management of data assets will help enterprises improve the quality of products and services, and ultimately realize value realization and maximize value.

5. Conclusion

Under the background of the data age and the continuous development of the trading market, the data assets of telecom enterprises are full of vitality and play an obvious role in the overall value of enterprises. If the value of data assets is applied and played well, it can bring many positive effects to enterprises.

Based on the characteristics of the evaluated enterprises and data assets, this paper selects and establishes a data asset value evaluation model combining excess return method and analytic hierarchy process.

Although the research results are reasonable, due to the lack of capacity and incomplete information resources, this study still has some limitations:

First of all, as far as the model is concerned, many indicators are predicted by the ratio method, and the predicted value is likely to change greatly, or even change greatly under the influence of some uncertainties or sudden external events, which will lead to inaccurate evaluation;

Secondly, in the application of AHP, the weight of indicators is mainly obtained by subjective scoring. Although it includes some professional practitioners, it still lacks objectivity. In addition, due to the actual conditions, the respondents are not all professional experts who have a thorough understanding of the appraised enterprise or AHP, data assets, etc., so they may lack a deeper and clearer understanding of the real situation of the appraised enterprise and the analytic hierarchy process system, making the scoring lack of accuracy and reliability.

Combined with the above deficiencies, the following suggestions are made:

① The huge amount of data makes it difficult to handle and complex, so in the future, we should also strengthen data processing, classification, analysis, processing and other aspects, improve the overall efficiency and quality, and better help enterprises, individuals and society use data;

② We should strengthen the training of data talents, obtain the support of more professionals, and make the evaluation more comprehensive and refined. We hope that more experts and scholars can devote themselves to this field to supplement and improve the deficiencies existing in the current research, such as defining the basic concepts uniformly to ensure the consistency and accuracy of the research, and then building a scientific, practical and universally applicable data asset value evaluation system to provide strong support and impetus for the development of the whole economy and society;

③ In the future, there will be more methods of data asset management, improve the data asset management system, improve the efficiency of enterprises, individuals and society in the use of data assets, give better play to the value of data assets, maximize more and better benefits, and inject new vitality into social and economic development.

References

[1] Lei Xiaoqiao, Zhang Fang. Research on data asset valuation based on income present value method [J]. statistics and information forum, 2023, 38 (05): 3-13.
[2] He can. Discussion on the value evaluation of enterprise data assets [J]. accounting study, 2024, (04): 140-142.
[3] Xu Yanchang. Research on the value evaluation of Haier Zhijia data assets [D]. Lanzhou University of Finance and economics, 2023.
[4] TIAN Y, KONG Q B, MIAO X P, et al. Evaluation on power information data asset management system based on BP neural network[J]. International Journal of Thermofluids, 2023, 20.