

Case:

Asset in place or the development potential: The value assessment of HX scientific and technical corporation¹

Abstract:

Mr. Qi, the founder of a high-tech enterprise, after a hard business and exploration, now the HX technology company he founded has developed into a good scale, become the excellent reputation in the industry. However, Mr. Qi hope the company to be able to accelerate the development, be the industry leader, then Qi thinks of making the company be listed to expand the scale, but a high and new technology enterprise with high growth, intangible assets and other characteristics, using the traditional evaluation method has certain limitation, and if only care about the present value of the assets of enterprises value will has some limitation. When Qi was in a dilemma, professional consultant Li put forward some solutions for HX technology company to make the company's evaluation value more reasonable.

Keywords: value assessment; listed company; asset in place; development potential

0 Introduction

On January 1, 2019, the clock struck zero. New year comes as promised, the fireworks were blazing outside the window, the whole city was of a myriad twinkling lights and lively, the company was jubilant. All departments were proud to say their performance of last year and the and the goal of this new year, listened to this, Mr. Qi was so pleased, looking at the companies which were built bit by bit is so good now. "2019 is another new beginning." Mr. Qi recalled the experienced since graduation, lost in thought.....

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1. This case is written by Li Guang,Zhai Shengbao,Kang Yawen,Qiu Liya from Anhui University of Finance and Economics.The authors have the right to sign, modify and adapt the text.
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 4. This case is for classroom discussion only and does not imply or suggest the effectiveness of certain managerial behaviors.

1 From employment to entrepreneurship, first display in the industry

As a fresh college grad, Mr. Qi began to make the trade of car fittings. From getting into trouble on all sides to later have a large number of stable customers, Qi had accumulated a lot of interpersonal connections in this industry, was also very familiar with products. As the trade business grows, Qi had the idea of starting a business. He knows that as long as he finds the right team, starting a business is not a difficult thing. In 2004, Qi decided to start his own business. In the early stage of entrepreneurship, he spent most of the capital on hiring professional technical research and development personnel, and started his own business with a small team of five people in a small office.

During those years, Mr. Qi accumulated lots of experience and customers, so the road of entrepreneurial is going well, the company's development is rising steadily and the areas involved are also expanding. Development so far, Mr. Qi has a large scale of high-tech companies -- HX technology company. HX technology is a system supplier integrating the research and development, manufacturing, sales and service of electric vehicle electrical components. The company mainly sells MTF pedal accelerator, logistics truck parts, motor controller and other parts. Since its establishment in 2004, after 15 years of efforts and hard work by Mr. Qi, it has developed into a company with good reputation and strong competitiveness in the industry.

HX technology's total assets have grown considerably since the beginning of the company, and its non-current assets have doubled in value. In recent years, the sales revenue and profit of HX technology company have been rising steadily and its development has been smooth. However, new competitors are constantly entering the market and the competition among peers is becoming increasingly fierce. If the company does not expand its scale, it is likely to be snatched up by competitors in the future. If a company wants to develop into a leader of the industry in the future, it must keep developing continuously. This problem of lack of financing is more and more prominent. Only rely on the company's internal financing will make the turnover not sufficient, so which one should Mr. Qi choose, step forward or be satisfied with the status quo?

“Qi, what are you thinking of?” His thoughts were pulled back by the staff around. Looking back on this journey, although he made a lot of efforts, he always felt that everything was worth it when saw that the company was thriving. But how can he make the company take a step forward? Mr. Qi had an idea in the heart...

2 Continue developing, development potential gradually manifested

In January 2019, HX technology company held its annual meeting, which was attended by all shareholders. The company's performance in the previous year was steady, so the executives present were all smiling. Mr. Qi said the New Year's company plan to everyone: “HX technology company has now developed to a relatively stable stage, which is inseparable from the efforts of everyone present. As the new year begins, let us also start a new, I have an idea want to discuss with you, I think our enterprise can take a step to a higher level, coincides with the countries promote the development of high and new technology enterprise, our company can consider to achieve a high quality of the listed under the policy, this will bring a bigger development space to our company. After the listing, we can expand our business scope, increase the number of our patents, and enrich our team members. With my understanding of the market, I am confident that in the next three years after the listing, the company will become a leader in the industry!”

After Qi's speech, he discussed the current development status of the company and industry analysis together with senior managers. The high-tech industry is unpredictable, if we don't go ahead as soon as possible, no one knows the danger we will meet in the future. After the discussion, the shareholders voted, and the proposal was finally agreed by almost all the shareholders, and it was decided that the first discussion meeting of the company's listing was scheduled on January 31, 2019.

After deciding to go public, Mr. Qi consulted a lot of materials and found that one of the most important parts in the process of going public is to evaluate the value of the enterprise. However, since the internal personnel of HX technology company do not have the professional knowledge and experience of value assessment, Mr. Qi contacted an accounting firm in Hefei and hired a professional consultant Li. In the assessment of enterprise value, different types of companies need to use different valuation methods. In order to better understand the HX technology company, Li consultants went to the company to have some investigations and asked Qi some situations about the company's present research and development, market conditions,

management team, etc., knew that the company in the next two years will launch new products within the territory, and analyzed the financial data with the financial department in recent years, have the basic know of the company.

3 Value assessment, different methods have different prices

January 31, 2019, the Spring Festival's atmosphere has been very strong, manager Qi held the listing discussion meeting as scheduled. The participants included all the shareholders of the company, the head of the financial department and consultant Li. Under the presided by Qi, financial department first reported company's financial situation of the past four years to everybody, the company's profit increased steadily overall, Qi said to everybody: "last year, in addition to steadily selling the products which are already available, the R&D team is also studying on the hot products, a product is expected to be launched at the end of this year or early next year, I predict this new product will bring sales increase afterwards."

Hearing this, the people present began to argue, "If the company chooses to go public at this time, can the valuation value of the company be accurate? What if the new product affects the company's valuation?" Mr. Zhang asked. And then everyone suddenly got lost in thought, yeah, how to judge the uncertain value, and is this going to affect the company going public? "Don't worry, the future value of the company is predictable. For a high-tech company like HX, the future development potential should be considered as same as the present value of the company's assets."

"What is the typical company's approach to valuation?" Mr. Zhang asked.

Consultant Li said: "At present, China's common enterprise value assessment methods are cost method, market method, income method. However, high-tech enterprises have some characteristics of their own, such as a large proportion of intangible assets, fewer comparable enterprises of the same type in the market, a mismatch between income and cost, high risk and rapid development. All these characteristics determine the limitations of traditional valuation methods in the valuation of high-tech enterprises."

Mr. Qi listened, put forward a question: "Then what do we have in our company that don't apply to the traditional assessment method?"

"Cost method, for example, has some rationality and reliability in the

evaluation of enterprises with a large proportion of tangible assets. However, HX technology company has small proportion of tangible assets, and intangible assets cannot be accurately calculated, so it is not suitable for our company.” Counselor Li replied.

“The market method requires looking for similar companies in an open and active market. However, China's GEM market has just started, and the capital market cannot reach the evaluation accuracy required by the market method. And high-tech enterprises will go through the stages of start-up, growth, maturity and decline, each stage of the enterprise's operating conditions and degree of development are completely different, so it is very difficult to find a very qualified enterprise in the domestic market.” Counselor Li said.

“Income method is the mainstream method of enterprise value assessment nowadays. Compared with cost method and market method, it can reflect the future profitability of enterprises and reveal the intrinsic value of enterprises. When an enterprise uses the income method for evaluation, the more changes it faces in the future, the greater the risk, the higher the discount rate, and the smaller the value of the enterprise.” Consultant Li then added.

“Is it suitable to value our company based on the present value of assets in place?” Qi asked.

Counselor Li replied: “According to the financial statements over the past few years, only based on the company's assets value is not accurate, although the company has developed these years, not fully shown in the financial statements, there is not much increase in the value of current assets on the statements, only about 20% from 2015. That's why I think only on the present value of the assets to reflect the value of your company is not accurate, I will choose the enterprise value assessment method suitable for your company based on the actual situation of your company and considering the influencing factors of the company's value assessment.”

4 End

In March, consultant Li came to HX technology company with the evaluation report to discuss the value assessment issues with Mr. Qi. Qi is astounded after seeing those reports, “how can the final result in different assessment method differ

so much? How much is our company worth?” Li explained to Qi, “different methods are based on different data, some of them depend on the present value of the company's assets more, some of them value the potential of the company's future development more. For a high-tech enterprise like HX, it is not reasonable to only look at the present value of assets. In addition, the company will launch new products in the next two years, and the profit will increase significantly. In my opinion, it is more realistic to evaluate the company combined its future development potential.” Qi agreed, and discussed with a few other shareholders, decided to believe Li, chose the most reasonable evaluation report, and began to prepare for the listing of the company.

(Number of words of the case's text: 2262)

Appendix 1: The balance sheet of HX technology company (simple list)

Unit: Yuan

Year	2015	2016	2017	2018
Current assets:				
Bank and cash	4,104,805.6 4	6,030,470.9 4	7,374,186.9 5	4,654,783.0 1
Notes receivable	457,372.50	2,044,119.8 9	4,211,632.8 0	4,209,442.5 0
Account receivables	10,186,471. 14	10,057,011. 27	18,203,589. 17	17,209,603. 94
Other receivable	7,770,105.9 3	-345,869.07	142,340.33	2,650,111.4 3
Inventory	2,580,120.8 9	530,435.37	687,386.36	1,552,500.7 7
Total current assets	25,098,876.	18,316,168.	30,619,135.	30,276,441.

	09	40	59	63
Non-current assets:				
Fixed assets	4,859,175.0 9	5,147,482.7 9	5,691,381.5 9	6,168,196.5 8
Less: Accumulated depreciation	3,748,986.6 5	4,019,725.2 0	3,610,141.4 1	3,854,817.6 2
Construction in progress	121,615.40	0.00	0.00	0.00
Fixed assets to be disposed of	0.00	0.00	12,904.16	0.00
Total non-current assets	1,231,803.8 4	1,127,757.5 9	2,094,144.3 3	2,313,378.9 6
Total assets	26,330,679. 93	19,443,925. 98	32,713,279. 92	32,589,820. 59
Current liability:				
Short-term loans	9,750,000.0 0	3,000,000.0 0	3,000,000.0 0	0.00
Accounts payable	6,060,891.8 6	11,199,653. 70	19,305,736. 44	19,777,679. 13
Payroll payable	0.00	0.00	594,061.65	662,963.76
Taxes payable	141,547.22	201,472.91	349,606.70	144,839.57
Other payable	131,971.10	133,903.98	167,746.70	640,195.13
Total current liability	16,084,410. 17	14,535,030. 59	23,417,151. 48	21,225,677. 58
Non-current liability:				
Long-term loans	5,400,000.0	0.00	0.00	0.00

	0			
Total non-current liability	5,400,000.00	0.00	0.00	0.00
Total liability	21,484,410.17	14,535,030.59	23,417,151.48	21,225,677.58
Owners' equity:	0.00	0.00	0.00	0.00
Paid in capital	4,500,000.00	4,500,000.00	7,500,000.00	7,500,000.00
Capital reserves and retained profit after appropriation	346,269.77	408,895.40	1,796,128.44	3,864,143.01
Total owners' equity	4,846,269.77	4,908,895.40	9,296,128.44	11,364,143.01
Total liability and equity	26,330,679.93	19,443,925.98	32,713,279.92	32,589,820.59

Appendix 2: The income statement of HX technology company (simple list)

Unit: Yuan

Year	2015	2016	2017	2018
Revenue	64,066,695.29	84,744,608.46	95,976,873.98	99,565,384.58
Less: Cost of sales	56,909,000.93	77,941,096.67	84,497,695.11	85,585,631.97
Less: Sales tax	143,546.84	200,695.79	377,539.37	282,486.38
Less: Selling expense	1,190,604.50	1,568,057.48	2,627,895.26	2,982,019.37
Less: G&A expense	5,301,499.56	4,071,987.44	6,630,483.95	8,225,057.36
Less: Finance	471,854.18	898,744.22	191,327.19	120,001.28

expense				
Profit from operation	50,189.30	64,026.89	1,651,933.11	2,370,188.24
Add: Non-operating income	12,300.00	7,500.00	0.00	269,976.41
Less: Non-operating expense	0.00	0.00	15,000.00	46,912.16
Profit before tax:	62,489.30	71,526.89	1,636,933.11	2,593,252.49
Less: Income tax	4,309.53	7,087.94	242,814.38	388,987.88
Net profit	58,179.77	64,438.95	1,394,118.74	2,204,264.61

Teaching Notes:

Asset in place or the development potential: The value assessment of HX scientific and technical corporation

I. Teaching Aims and Purpose

1. This case is mainly applicable for teaching in Corporate Finance, Finance Management, Advanced Finance Management and Management Accounting.

2. Applicable targets of this case: this case is applicable for MPAcc, MBA, EMBA, undergraduates in accounting and financial management, graduate students and enterprise financial management personnel.

3. The teaching purpose of this case is to make students understand the influencing factors and methods of HX technology company's value assessment.

Through the analysis and discussion of the case, it helps students understand the following important knowledge points: (1) value assessment in cost method, market method and income method; (2) influencing factors of enterprise value assessment; (3) evaluation methods and program design process of high-tech enterprises.

II. Thinking Questions

1. What are the preconditions, characteristics and applicable scope of the cost method, market method and income method of enterprise value assessment?
2. Based on the actual situation of HX technology company, what are the influencing factors of technology companies' value assessment?
3. Based on the actual situation of HX technology company, what is the applicable method for the value assessment of technology companies?
4. Based on the actual situation of HX technology company, develop an enterprise value assessment plan for HX technology company.

III. Analytical Thinking

The idea of case analysis can be seen in figure 1.

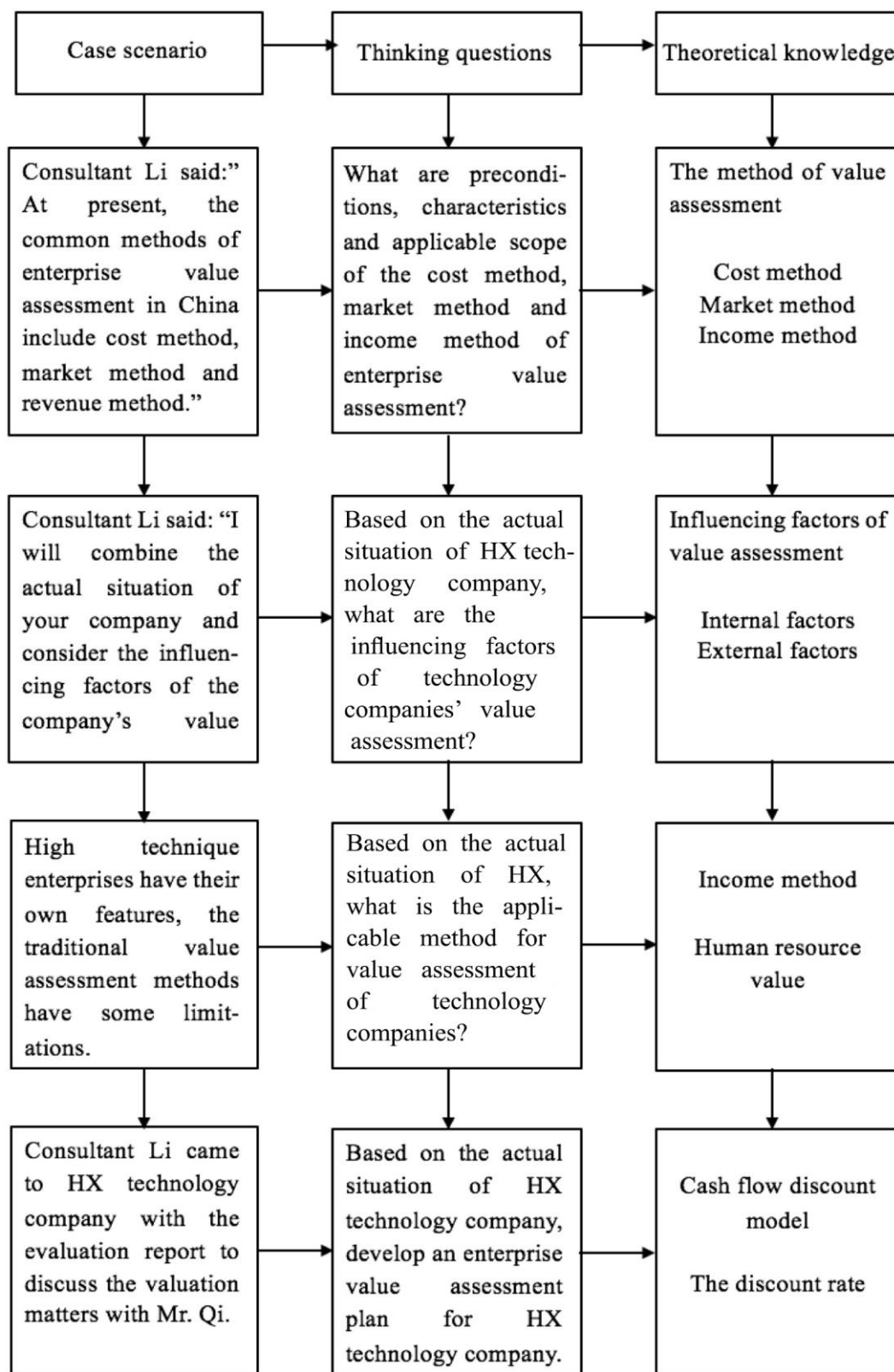


Figure1 Thinking framework

IV. Theoretical Basis and Analysis

1. What are the preconditions, characteristics and applicable scope of the cost method, market method and income method of enterprise value assessment?

(1) Cost method

Cost method, also known as replacement method, is to estimate the replacement cost of an enterprise in its value assessment, and then look for all kinds of depreciation factors existing in the enterprise, which will be deducted from the replacement cost.

The preconditions of the cost method are as follows: 1. It requires that the assets of the enterprise are still in the state of continuous use or assume the state of continuous use at the time of assessment; 2. It is required to have available historical data; 3. It must be able to determine the cost of forming asset value.

The advantages of cost method: 1. The results of cost method evaluation are often presented in the form of balance sheet, which is relatively easy for most people to grasp; 2. Under the cost method, the value of each asset needs to be evaluated, so as to comprehensively reflect the asset value of the enterprise; 3. Cost method has advantages in selling enterprises, because most buyers pay more attention to the quality of assets in terms of profits and assets; 4. The results of cost method is easy for accounting treatment.

The disadvantages of cost method: 1. Cost method blurs the boundary between the overall value of an enterprise and the value of individual assets. Under the cost method, the enterprise value can only be determined according to the total price of various assets, while ignoring the value of various intangible assets paid in the production and operation of the enterprise. 2. The cost method is more from the perspective of input, without taking into account the actual efficiency, operational efficiency and the level of management. Therefore, it is easy to appear that similar enterprises will have the same value if they invest the same amount; 3. It is difficult to determine the real value of assets that cannot be replaced due to the inability to obtain the corresponding historical data.

Cost method has a wide range of application, in principle, for all asset business for the purpose of asset replacement and compensation. Specifically, except for single assets and special-purpose assets, this method can be used to evaluate special assets that are difficult to calculate future income and assets that are difficult to

obtain market reference.

(2) Market method

The market method refers to that the assessed enterprise selects the comparable enterprise of the same industry and the same scale in the capital market, and makes appropriate adjustment to the important index of the comparable enterprise according to its actual situation, and the adjusted comparable enterprise value is the market value of the assessed enterprise.

The preconditions of the market approach are: 1. There needs to be a fully developed and active asset market; 2. Assets and reference materials comparable to the appraised assets in the existing functions and market conditions in the open market, and the transaction time of reference materials and the time interval between the base date of appraisal are not long. Data such as indicators and technical parameters that are comparable between the reference and the assessed asset can be collected. 3. The number of reference generally requires more than 3, the transaction price of the reference must be real, the reference transaction price should be the result of normal transactions, the reference and the assessed assets can be replaced generally.

Advantages of the marketing method: 1. Simple principle, easy to understand and master. It is also one of the three basic assessment methods recognized internationally. 2. It can objectively reflect the current market situation of the asset, and its appraisal parameters and indicators are directly obtained from the market. The appraisal value can better reflect the actual market price and the trend of market price changes; 3. The evaluation results are easily accepted and understood by all parties.

Disadvantages of the market method: 1. Strict requirements for the market environment, it needs an open and active market as the basis; 2. In the comparison of influencing factors and the adjustment of differences, it is often greatly influenced by the subjective factors of the evaluators, which affects the accuracy of the evaluation results to a certain extent; 3. This method only applies to assets which are based on the value of assets, and is not applicable to professional machinery and equipment, most intangible assets, and some assets appraisal subject to strict restrictions of regions and environment.

Market method applies to the assessment which is on the basis of market value.

You can use the market method as long as you satisfy the preconditions of the market method.

(3) Income method

Income method, also known as the method of estimate or the method of return reduction, refers to the expected future income of the assessed asset, which is then returned to its current value with an appropriate discount rate.

The preconditions of the income method: 1. The expected future income of the appraised asset can be predicted and measured in currency; 2. The risk taken by the asset owner in obtaining the expected return can also be predicted and measured in monetary terms; 3. The expected profit years of the appraised assets can be predicted.

Advantages of the income method: 1. It fully considers the future income of assets and the time value of money, and can truly and accurately reflect the value of the enterprise; 2. The discount process of the expected future income of assets is consistent with the investment process, which is easily accepted by both parties.

Disadvantages of the income method: 1. The use of income method is often limited by many conditions, so its scope of use is relatively small, and it is usually applicable to the evaluation of the overall assets of an enterprise and the single operational assets that can predict future earnings; 2. It is difficult to predict the future income and risk return rate of assets, and it is easy to be affected by subjective judgment and future unforeseeable factors.

The income method is applicable to the evaluation of the overall value of an enterprise, or the evaluation of individual assets that can predict future earnings or special assets that cannot be replaced, such as the listing, merger, reorganization, separation and merger of enterprises.

2. Based on the actual situation of HX technology company, what are the influencing factors of enterprise value assessment?

(1) Internal factors

I. Enterprise assets, including tangible assets and intangible assets. Generally speaking, the more assets an enterprise controls, the greater its future development potential and profitability will be.

II. Profitability, through the current profitability and the trend of future

development of the enterprise to determine the corporate profits after several years. At the same time through the reasonable calculation of the cost of capital rate, discount to the evaluation date, so as to obtain the value of the enterprise.

III. The level and quality of the management team. If the management team can lead the whole enterprise to conduct R&D and market expansion in a reasonable and orderly way, the enterprise will have greater development potential. Reasonable evaluation of the management team is also an important factor affecting the enterprise value and future development ability.

IV. The quality and ability of core technicians and other employees, the quality, structure and technical proficiency of core technicians and other employees will also affect the enterprise value.

(2) External factors

I. The industry status of an enterprise, the position of an enterprise in the same industry is a key factor for enterprise value. Generally speaking, if an enterprise enters the same industry relatively early, it can be exposed to more scenarios, market threats and development opportunities. At the same time, with the acceleration of social progress, the threshold for enterprises to enter the industry is becoming lower and lower. If enterprises enter the industry at this time, they will have little market space, which is not conducive to the future development of enterprises. Enterprises in a dominant position in the industry often have greater value.

II. National industrial policies. The long-term development trend of the enterprise in the host country partly depends on the national industrial policies. Different countries have different policies for the same industry. Even a country has different policies for different industries. For example, the current hot Internet industry is strongly supported by the state, so its enterprise value is often very high. The case company selected in this paper belongs to the High-tech industry, and the recent policies on this industry around the world, including China, are also conducive to its development, which indicates that the enterprise value of this industry is usually very high.

III. National tax policy. In order to support the development of high-tech enterprises, enterprises that have been recognized and managed by high-tech enterprises can enjoy preferential tax policies. Tax policy directly affects the cash

flow of enterprises, thus affecting the value of enterprises.

IV. The development of capital market. Capital market development will directly affect the enterprise value evaluation and the choice of evaluation methods, for example, China's capital market development is not yet perfect, the situation of the information asymmetry is widespread, so it's not wise for high-tech enterprise to use market method in value assessment.

3. Based on the actual situation of HX technology company, what is the applicable method for the value assessment of HX technology company?

HX technology company is a national high-tech enterprise. The difficulties in high-tech enterprise evaluation and the commonly used evaluation methods in the field of assets evaluation determine that high-tech enterprises cannot adopt evaluation methods as general enterprises, so they should find a new way to find an evaluation method suitable for high-tech enterprises. However, such enterprise value is often reflected in the expected future earnings and the value of human resources.

(1) Use income method to assess the expected future income of high-tech enterprises

High-tech enterprises in the initial stage will put a large amount of capital into the research and development projects and the manufacturing of new products. At this time the enterprise cash flow is mostly zero or even negative, so often can not be evaluated by income method. In addition, the development of enterprises is extremely unstable, and the general expected return is asymmetric, while the real option method emphasizes the asymmetry of return, so it can be used to evaluate the enterprises in the initial stage. When the enterprise develops to the growth stage, as most of the enterprises are still unlisted, the value calculated by the market method is often biased. And the enterprise is also in the beginning stage, no historical data, so it is not appropriate to use the cost method to evaluate. Therefore, we can use income method to evaluate high-tech enterprises. After the development in the initial stage, the enterprise has already made clear its market target and planned an accurate business plan, and the volatility of enterprise earnings gradually slows down. By analyzing the business status, market position and financial status of the case object, the income method is adopted to evaluate the value of HX technology company.

(2) An important factor influencing the value assessment of high-tech enterprises—— human resource value assessment

For high-tech enterprises, the biggest competitive advantage is the human resources, especially for the growth of high-tech enterprises. If high-tech enterprises have the personnel with knowledge and technology, they will plan new scientific research ideas and projects from time to time, which will make the enterprise in the leading position in the industry. For the high-tech enterprises in the growth stage, the period with more active scientific research ability is full of talents. Therefore, it is very necessary to evaluate the human resources of high-tech enterprises, otherwise the value of enterprises will be underestimated.

4. Based on the actual situation of HX technology company, develop an enterprise

value assessment plan for HX technology company.

Fisher (1930) proposed the discounted cash flow model (DCF), which assumed that future returns were fixed and did not explain the current applied capital cost ratio. This model indicates to future scholars that it is the most critical to reasonably determine the cash flow and capital cost ratio by using cash flow discount. Therefore, scholars improve the DCF model in these two aspects: on the one hand, William Sharpe et al. put forward the capital asset pricing model (CAPM), and the proposal of weighted capital cost provides the corresponding theoretical basis for the calculation of discount rate. On the other hand, the decision tree method is proposed to analyze the uncertain cash flow in the future. In the paper published by Modigliani and Miller (1958,1960), cash flow and discount rate were clearly explained, namely MM theory. According to this theory, future income tax should be considered, and weighted capital cost should be defined and discussed accurately. The continuous improvement and application of the theory make the enterprise value assessment theory constantly applied in practice.

According to the difference between the two key factors of the cash flow discount model, it can be divided into several forms: Williams (1938) proposed the dividend discount model, which can reflect the current value of the company's stock through future dividend discount; The word "equity" of the free cash flow to equity model (FCFE) indicates that the model reflects the value of the company's equity, and the corresponding cash flow is the equity cash flow, and the discount rate is the equity capital cost. Different from the FCFE model, the free cash flow for the firm model (FCFF) reflects the overall value of the company. The cash flow is the

residual cash flow that can be distributed to all stakeholders of the enterprise after meeting the reinvestment demand. The discount rate discount should use the weighted cost of capital ratio. More and more scholars have applied it into practice.

According to the analysis in question 3, the income method is adopted to evaluate the value of HX technology company. The specific evaluation scheme is as follows.

(1) Conditions for the applicability of the income method

I. Applicability of the general situation

According to the comprehensive analysis above in the external environment and the financial status and so on various aspects of HX technology companies' industry, we found that HX technology company assessed assets have the following characteristics: (1) the company has strong solvency and profitability, relevant policy is beneficial to the development of the company, has the conditions for going concern; (2) future earnings can be measured by currency, which means that the company's operating income, cost and gross margin can be properly predicted; (3) future expenses can be measured and estimated through currency, which also means that the company's sales expenses, financial expenses, administrative expenses and other expenses can be estimated.

II. Assess the applicability of the purpose

The purpose of this assessment is to help the HX technology successfully listed companies so as to provide reference, to reflected the overall value of HX technology companies objectively and truly, is not only using single asset value for a simple value, but to the comprehensive reflect HX technology company, industry situation and market environment and financial conditions by means of overall value, namely to make the enterprise as a whole, use the overall profitability to reflect the total value of the enterprise.

III. Applicability of relevant parameters of income method

The financial data evaluated are all the unpublished data of HX technology company, which has strong practical significance. The external conditions of the income method for evaluation are relatively mature, and the use of income method for the value assessment of HX technology company also conforms to the provisions of value evaluation. Using the income method can reflect the overall value of the enterprise.

(2) Determination of enterprise free cash flow

I. Sales revenue forecast

HX technology company entered the industry early and after more than 10 years it has accumulated a lot of experience in technology, strategy and other aspects. This indicates that the company will play an increasingly important role in the industry. Therefore, based on the current situation, future development strategy and social environment, as well as the company's sales revenue in the four years from 2015 to 2018, we can predict the sales revenue of HX technology company in the next few years.

II. Cost forecast

Through the communication with the financial manager of HX technology company, we know that the annual investment in R&D and innovation of the company is maintained at about 10%, and the company promises that this spending will remain at about 10% in the next five years. The company has not adopted the latest financial reporting system, so the research and development expenses in 2015-2018 and in the future are still the secondary subsidiary items of management expenses.

HX technology divides expenses into three categories: sales expenses, financial expenses and administrative expenses. There is a certain degree of proportional relationship between expenses and income. Therefore, based on the relationship between three expenses and operating income, then according to the future development of the company to predict the future expense.

III. Forecast of working capital

A measure of working capital refers to company's current assets minus its current liabilities. Working capital is whether the cash generated by a company's current assets is sufficient to cover its current liabilities within the next 12 months (including 12 months). If the number is positive, it means the company has enough money to cover maturing liabilities. On the contrary, if it is negative, it indicates that the enterprise lacks sufficient funds. Therefore, working capital is an indicator to measure the short-term liquidity of an enterprise.

In the process of long-term development, working capital and operating revenue will present a linear trend, so use working capital and operating revenue of HX technology companies during 2015-2018 to make a regression analysis, working

capital as a dependent variable Y, operating revenue as the independent variable X, and the regression model between them can be used to forecast the company's working capital.

IV. Forecast of asset expenditure

Asset expenditures refer to the expenditures needed to purchase or produce with a useful life of more than one period (including one year), including productive expenditures such as fixed assets, intangible assets and production equipment, as well as non-productive expenditures such as office supplies. However, both the maintenance capital expenditure and the growth capital expenditure are proportional to the operating income scale in the current period, so the regression analysis of the two can be conducted to obtain the trend equation to determine the asset expenditure in the next five years.

The net value of the newly added fixed assets, intangible assets and deferred income tax assets in the current year are selected to determine the capital expenditure in the current year, which is taken as the dependent variable X and the business income as the independent variable Y. Therefore, the predicted linear equation and the forecast value of future capital expenditure of working capital are obtained.

V. Depreciation and amortization forecast

The predicted value of depreciation and amortization should have a certain correlation with the capital expenditure. Through the aggregate of depreciation and amortization and capital expenditure in 2015-2018 to conduct the regression analysis. Set the combined count of depreciation and amortization as the dependent variable Y and the capital expenditure as the independent variable X, so as to obtain the linear equation and future depreciation and amortization values.

VI. Determination of free cash flow

The free cash flow of a company refers to the cash flow of the company after paying income tax and operating expenses and before deducting the remuneration of creditors and equity investors. On the basis of EBIT, the formula is as follows:

$$\text{Free cash flow} = \text{EBIT} * (1-T) + \text{Depreciation and amortization} - \text{Capital expenditure} - \text{Increase in working capital}$$

(3) Determination of discount rate (WACC)

External financing of the company includes financing from creditors and equity

investors, and for investors, they hope to get corresponding remuneration in the capital investment. The creditor wants to get a certain reward on the basis of ensuring the safety of the principal. Due to the large default risk of the debt, the expected reward of the creditor will include the compensation amount of the default risk, namely the debt cost. Similarly, the cost of equity capital refers to the expected return on equity investment and also includes the compensation for the risk of default. Generally speaking, the cost of capital of a company should include the cost of debt and the cost of equity, which is expressed by the weighted average cost of capital (WACC). The specific formula is:

$$WACC = K_i \times W_i + K_e \times W_e$$

Where, K_i is the cost of debt capital; K_e is the cost of equity capital; W_i represents the proportion of long-term and short-term debts of the company in total assets; W_e represents the proportion of equity capital in a company's total assets.

(4) Evaluation results under the FCFF model

Finally, according to the prediction results of free cash flow, the following can be obtained by substituting it into the phased growth model:

$$FCFF = \sum_{n=1}^t \frac{R_n}{(1+WACC)^n} + \frac{R_n(1+g)}{WACC-g} \times \frac{1}{(1+WACC)^n}$$

(5) Human resource value assessment

Human resource is an important factor for the development of high-tech enterprises. Therefore, based on the enterprise value determined by cash flow discount, the human resource value of HX technology company is simply calculated. We use the economic value method to determine the value of the enterprise. In the economic value method, the most important thing is to distinguish between human resources and material resources. Total resources are determined by the total assets at the end of the current period.

In recent years, while the company attracting high-end talents, it has also begun to increase its investment in the training of employees, especially in the training of R&D personnel. Therefore, the recruitment fee and training fee will continue to grow. For employees' compensation, with the introduction of high-end talents, the company's compensation will also start to increase. However, from another

perspective, the continuous deepening of automation indicates that the number of ordinary employees in the company will gradually decrease, so the salary of employees will increase at a slower rate in the future. For total assets, the growth of total assets is basically consistent with the operating income, so the total assets are predicted according to the ratio between them.

According to the formula of the economic value method, we also need to determine the discount rate and expected return, and use the FCFF method to evaluate the value of the enterprise. Therefore, WACC is selected as the discount rate, and the formula can be obtained by substituting:

$$V_2 = \frac{R_1 M_1}{(1+r)} + \frac{R_2 M_2}{(1+r)^2} + \dots + \frac{R_n M_n}{(1+r)^n} = \sum_{n=1}^t \frac{R_n M_n}{(1+r)^n}$$

Where, V_2 represents the value of human resources, R_t represents the expected earnings of the enterprise, M_t represents the proportion of human resources in total assets, t represents the period, and r represents the discount rate.

(6) Based on the FCFF model, we also consider about the human resource, that is, the sum of the two is the enterprise value of HX technology company.

5. Background information

(1) Introduction to HX technology company

HX technology company is located in Hefei, which is the supporting base of electric vehicle electrical system. Since the company was founded in 2004, after more than ten years of efforts and hard work, the company has developed into a system suppliers integrating the research and development, manufacturing, sales and service of electric vehicle electrical components; In 2007, the company purchased 23,000 square meters of land in Hefei ShuangFeng industrial park. In 2013, the company purchased two factories in Jiahai industrial park in Hefei and built the production base.

(2) Product line of HX technology company

As a designated agent of Curtis products in the United States, the company is responsible for the provision, technical support and after-sales service of Curtis

electronic control integrated products. It has the ability and quality assurance to provide a full series of Curtis products. Meanwhile, it independently develops and produces various electric components such as electric vehicle instruments/accelerators /DCDC converters/intelligent charging machines/vehicle wiring harnesses. The main supporting services are for electric forklift/electric car/electric sightseeing car/sanitation car/golf cart/police patrol car/tractor and some special electric vehicles.

(3) Philosophy of HX technology company

Respect customers, understand customers, continue to provide products and services beyond customer expectations, do customers forever partners. Firmly believe that the interests of customers are the interests of the company, establish the "win-win" concept, which is the company adhering to and advocates. As a guarantee of high quality, with strong technical support and excellent pre-market after-sales service, to provide customers with the integration of the high quality service, achieve win-win and common development with customers, at the same time the company continue adhering to the "customer first" purpose and "quality as the guarantee, service as the life" management policy, market-oriented as a fundamental business philosophy, for customers to understand and familiar with, and approved, trust companies.

6.Key points

1. Key knowledge points :(1) methods of enterprise value assessment; (2) influencing factors of enterprise value assessment; (3) valuation methods of high-tech enterprises; (4) discounted cash flow model and enterprise value evaluation scheme.

2. Ability improvement points: guided students to try and apply other methods of value assessment of HX technology company according to cases and relevant references.

7.Suggested class plan

Teaching design	Schedule	Concrete content

Before class	About 260 minutes	<ol style="list-style-type: none"> 1. Set up case study groups: 5 to 7 members one group; Select a team leader, who will carry out specific division of labor among team members and lead team members to participate in case discussion. 2. Knowledge reserve: study some relevant theoretical knowledge about value assessment. 3. Industry background: understand the development status of the technology company industry. 4. Case reading and problem discussion: all members of the group read the case comprehensively and discussed relevant issues. 5. Speech outline: prepare the speech outline and other relevant materials and contents according to the assigned content.
In class	About 120 minutes	<ol style="list-style-type: none"> 1. Preface to class (about 5 minutes): the teacher defines the theme of case discussion; 2. Class discussion: <ol style="list-style-type: none"> (1) Group discussion (about 10 minutes): inform the speech requirements, and designate speakers; (2) Group speech (about 10-15 minutes for each group, and the overall time is controlled at about 75 minutes): and the teacher shall provide guidance when necessary; Appoint reviewers to comment on group presentations; (3) Guide the whole class to have divergent thinking, expand thinking, expand the learning horizon (control time in about 20 minutes); 3. Conclusion: according to the situation, give the main ideas of expanding thinking. (about 10 minutes)
After class	About 220 minutes	<ol style="list-style-type: none"> 1. According to the pre-class preparation, class discussion content to organize; 2. Combined with the discussion and research of the

		group and one's own understanding to comb again; 3. Adopt the formation of group reports and make more specific case analysis reports. The content of the report includes team members, division of labor, solutions to problems, countermeasures and Suggestions.
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8. Follow-up of the case

The enterprise value assessment report provided by consultant Li is based on the time node of March 2019, and the time of the enterprise going public is unaware, and the value of the company will certainly change when it goes public. Consider that not going to a consulting firm for a reassessment can save money and, more importantly, keep the business secret. Mr. Qi decided to lead staffs to learn the relevant theoretical knowledge of asset appraisal, especially the appraisal method, and be able to understand and flexibly apply the value assessment method to accurately evaluate the company value when the company is listed.

9. Blackboard writing design

Blackboard layout using a blackboard, the specific design is as follows: the whole blackboard is divided into six areas, concise write each group's point of view, for the analysis and evaluation of the following summary. The views of each group are distributed as follows:

Group 1 views	Group 2 views	Group 3 views
Group 4 views	Group 5 views	Group 6 views

10. Necessary teaching equipment and materials

Equipment: multimedia teaching equipment (computer, projector, screen, etc.).

Materials: each student has a case paper material and teaching PPT; Each group has 6 pieces of A4 paper and several markers.

11. Main references of this case

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(Number of words of the case's text: 5510)