Software Project and Process Management

Software Engineering Economics

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1 Price&Pricing

Depending on the needs and behaviors of customers and customers in a particular market, companies may benefit from price reductions or price increases. Finding the right pricing strategy is an important factor in a successful operation. Therefore, at the beginning of the ICE project financial assessment, we specified our pricing strategy.

1.1 Factors Affecting Pricing

Pricing There are eight basic factors to consider, which are as follows:

Figure 1: Factors Affecting Pricing

1.2 Six Steps For Pricing Decision

Compare the software's top 5 pricing strategies, namely personalized pricing, group pricing, version pricing, Belling pricing, and usage-based pricing. We develop a seven-step process to determine our pricing strategy.

1. **Organization and market objectives**

1. An easy-to-use, responsive online exam system

2. More conducive to communication between students and teachers, such as the ability to inform students of the examination time, after the examination can be published online answers and questions for students' reference.

3. Reduce the time and money spent preparing for each exam: there is no need to copy the test papers, and the collation and revision of the papers is more available.

2. **Determining the pricing objective**

- survial
- maximize benefits
- maximum market share

3. **Considering the demand**

- elasticity
- the relationship between price and demand
- the sensitivity for demand to price
- adjust business strategy in real time

4. **Estimating the cost in 4 aspests mentioned in The National Standard**

- direct labor costs
- direct non-labor costs
- indirect labor costs

- indirect non-labor costs

5. **Analysis competitor's price strategy**

- competitor's costs
- competitor's prices
- competitor's market share compare to me
- competitor's market share to the whole market
- competitors products

6. **Legal and regulatory issues**

By law, we may not distribute illegal information on websites, such as disinformation, reactionary, pornography, etc., so we need an administrator to review the content, which can also lead to more labor costs.

1.3 Determine the Final Price Strategy

1. **Selecting the final pricing method**

There are 6 method of pricing we can choose

- Cost bonus
- Billing Unit Law
- Distinguish pricing
- Dynamic pricing
- Bundled pricing

After considering the pricing object and the identified requirements, we finally chose the differentiated pricing method.

In general, the demand for use is strong for some large number of organizations, such as the schools and governments. These large organizations can benifit more from using the system , such as saving more time, human costs, money . In addition, they have more access to our system, which brings more burden to the server, and they afford to pay large fees, so we charge they high prices.

On the contrary, for some self-employed, or smaller after-school remedial classes, the use of the system will not be so frequent, the number of visitors will not be large, the burden on the server is small, and their purchasing power is relatively limited, so the charge will be much less. Even in order to attract more users, the system will be free for individual users for a certain amount of time and a certain number of times to use.

By taking into account the competitor's price and profit margin, we have finally determined that we will recover costs within four years and then start making a profit at an annual interest rate of more than 20

2. Setting the price by using **3 Cs Strategic Triangle Model**

Figure 2: 3 Cs Strategic Triangle Model

For large organizations:

First, these large organizations that want to use our platform should pay at least $3,000$ a year to gain access, and then if they use it more than the limit we set for a year, we will consider increasing the charge for the next year. Once an organization has purchased the right to use it, its personnel (e.g. teachers, students, etc.) have free access to our system.

For individual teachers or small organizations (small exam organizers)::

When the system first goes on-line, we permit users to launch a free trial for a period of time so that users can understand our system and it will make them sticky to our system. After the free trial, we offer small organizations the following payment options:

- Service A: 68 yuan per month, up to 200 exams.

- Service B: 98 yuan per year, up to 5,000 exams.

For students taking the exam: They can sign up for an account for free, and can apply for courses with authorized users (two users above) . The system will remind them of the time of exam before each exam.

Students can also choose to pay to become our VIP to obtain question analysis for each exam, and the system evaluates individual abilities based on the exam and gives recommendations accordingly. The price is set at 10 yuan per month and 50 yuan for the whole year.

2 Cost&Costing

2.1 Statement

Before the content of the financial management document, we first explain our basic conditions and premises:

1. Our company is an independent Internet company with the goal of developing an examination platform. In the beginning, it may not focus on revenue, but on the number of users. After delivery, we will continue to maintain and improve the system.

2. The development cycle of the exam platform began on March 10 and will last about four months (17 weeks as planned).

3. Let's say our staff trains the test platform administrator for three weeks, and it only takes place during the first month of the development cycle.

4. Apply for a loan at the beginning of the development process.

5. The length of the recorded financial data is 5 years.

2.2 Effort Estimation

2.2.1 Function points estimation

This project adopts the project estimation method based on Function Points, focusing on the value of information domain, external input, external output, external query, internal logic document, external interface file identification and counting. We use IFPUG standard to analysis Function Points of our project, the steps are as following:

1. Identify project scope and boundaries

2. Use usecase diagrams to visualize the use cases(According to the scope and boundaries, but we make some adaptive adjustment here)

3. According to the five basic function types, we can get the **unadjusted function points**(based on both the mind map and the usecase diagram)

4. The complexity matrix is calculated based on the complexity of the external user types, and the functions points of each complexity level are obtained by multiplying the number of external user types by the score value. As a result, we got the total UFP: 157.

5. The adjustment factor VAF is determined acccording to the 14 basic system characteristics by **Relative Complexity Adjustment Factor(RCAF)**, and the adjustment factor is applied to the unadjusted function point. Then we calculate the adjusted function points as follow:

Then we can get VAF(Value Adjustment Factor) by

$$VAF = 0.65 + (0.01 * SUM(score)) = 0.97$$

6. Finally, we can get FP by

$$FP = UFP * VAF = 94.09$$

2.2.2 Development Effort Estimation

Use equation method to estimate development workload:

The regression equation established based on the benchmark data is shown in the following formula:

$$UE = C \times S^a/(22 \times 8)$$

UE is the unadjusted workload, the unit is man-month

C is the benchmark productivity, the unit is man-hour/function point

表 3.1 软件开发生产率基准数据明细

软件开发生产率详细信息（单位：人时/功能点）				
P10	P25	P50	P75	P90
2.30	3.99	7.19	12.48	17.44

Figure 3: Software development productivity benchmark data details

This sheet refers to the Benchmark data of China's software industry in 2020.

I choose the P_{25}, P_{50}, P_{75} as the range of the adjustment factor.

S is the software scale, and the unit is the function point (that is, corresponding to the adjusted function point above)

According to the specification, it is assumed to work 8 hours per day and 22 days per month

Converted workload:

$$AE = UE \times A \times IL \times L \times T$$

A: Application field adjustment factor, the value range is 0.8-1.2;

IL: Software integrity level, the value range is 1.0-1.8;

L: Development language adjustment factor, the value range is 0.8-1.2;

T: Maximum team size factor, with a value range of 0.8-1.2;

The above four adjustment factors are all taken as 1.0 in this project.

According to the above calculation process,the converted workload are as below: (unit is person-month)

$$AE_{low} = 2.13$$

$$AE_{median} = 3.84$$

$$AE_{high} = 6.67$$

2.2.3 Operation and Maintenance Effort Estimation

The operation and maintenance cost measurement benchmark database based on China's software industry also needs to measure the scale first, and then calculate the workload and cost.

As can be seen from the above, the estimated results of software scale are as follows:

$$S = 94.09FP$$

Through the reference, we found a similar workload calculation method:

__Workload AE = adjusted scale × adaptive adjustment factor × operation and maintenance level requirements factor × operation and maintenance ability factor × operation and maintenance system characteristics factor__

Productivity adjustment factor: Median productivity of software operation and maintenance based on industry benchmark data is 0.86 hr /FP.

表 3.3 应用软件运维生产率基准数据明细

应用软件运维生产率详细信息（单位：人时/功能点）				
P10	**P25**	**P50**	**P75**	**P90**
0.30	0.53	0.86	1.46	2.08

Figure 4: Median productivity of software operation and maintenance based on industry benchmark data

This sheet refers to the Benchmark data of China's software industry in 2020.

I choose the P_{25}, P_{50}, P_{75} as the range of the adjustment factor.

Factors required for operation and maintenance levels: value 0.95.

Operation and maintenance capacity coefficient: value 1.00.

Operation and maintenance system characteristic coefficient: value 1.14.

The calculation process is the same as above

The converted workload (unit is person-month):

$$AE_{low} = 0.28$$

$$AE_{median} = 0.46$$

$$AE_{high} = 0.78$$

2.3 Development Cost Estimation

2.3.1 Direct Labor Cost Estimation

Direct labor costs include wages, bonuses, welfare and other human resources costs of project team members of the developer. Among them, the project members include all the R & D or support personnel involved in the project R & D process, such as project manager, demand analyst, designer, developer, tester, deployer, user document writer, quality assurance personnel, configuration manager, etc. Part-time staff engaged in project research and development shall be converted into human resource cost according to the proportion of project workload to total workload.

表 3.7 典型城市软件开发人月费率基准数据明细

城市名称	基准人月费率（单位：元）	城市类别
北京	30134	A
重庆	22488	C
上海	29508	A
天津	24716	B
长春	20828	D
成都	21474	C
大连	23738	C
广州	26365	B
哈尔滨	21772	C
杭州	26969	B
济南	21753	C
南京	25943	B
宁波	24336	B
青岛	22727	C
沈阳	22456	C
深圳	28464	A
武汉	22380	C
厦门	24967	B
西安	23596	C
长沙	23695	C
合肥	21015	C
昆明	22536	C
石家庄	19970	D
苏州	26535	B
太原	22083	C

Figure 5: Benchmark data details of man month rate for software development in typical cities

According to this sheet, the standard unit price per person month is 29508 yuan/month.

Expenses include direct labor costs for software development, indirect labor costs, some indirect non-labor costs and reasonable profits, excluding direct non- labor costs.

2.3.2 Direct non-labor Cost Estimates

Direct non-labor costs mainly include:

1. Office expenses, that is, the administrative office expenses incurred by the developer to develop this project, such as office supplies, communications, mailing, printing, conferences, etc.;

2. Travel expenses, that is, travel expenses incurred by the developer to develop this project, such as transportation, accommodation, and travel subsidies;

3. Training fee, that is, the cost of special training arranged by the developer for research and development of this project;

4. Business expenses, that is, expenses incurred by the developer in order to complete the R&D work of this project, such as hospitality fees, review fees, inspection fees, etc.;

5. Procurement fee, that is, the developer needs to purchase special assets or services for the development of this project, such as special equipment fee, special software fee, technical cooperation fee, patent fee, etc.;

6. Others, that is not listed in the above project but it is the cost of the developer to develop this project.

Cost Category Amount (unit:yuan)		
	Office Supplies	2000
	Communication fee	1200
	Printing fee	500
Office expenses	Total	3700
	Transportation fee	0
	Accommodation fee	0
Travel expenses	Total	0
	Training fee	1000
Training fee	Total	1000
	Review fee	1200
	Inspection fee	300
Service fee	Total	1500
	Equipment rental fee	0
	Software purchase fee	800
	Equipment purchase fee	18000
Purchase fee	Total	18800
Total		25000

Figure 6: Direct non-labor Cost Estimates

2.3.3 Indirect Labor Cost Estimation

Indirect labor cost refers to the allocation of human resources costs of non-project team personnel who serve the overall needs of develop management. Including the allocation of wages, bonuses, benefits, etc. of R&D department managers, project management office (PMO) personnel, engineering process group (EPG) personnel, product planners, organization-level quality assurance personnel, organization-level configuration management personnel, etc.

In this project, the indirect labor cost is set to 0.

2.3.4 Indirect non-labor Cost Estimates

Indirect non-labor cost refers to the non-labor cost allocation that the developer does not incur for a specific project, but serves the overall R&D activities. Including the rent of the R&D site of the developer, water and electricity, and property, the allocation of the daily office expenses of the R&D personnel, and the rental, maintenance, and depreciation of various R&D office equipment.(In this project, we predict that the indirect non-labor cost is zero)

In this project, the indirect non-labor cost is set to 0.

2.3.5 Total Development Cost Estimate

According to the calculation formula of software development cost:

$$SDC = DHC + DNC + IHC + INC$$

SDC: Software development cost, in RMB:

DHC: Direct labor cost, in RMB:

DNC: Direct non-labor cost, in RMB:

IHC: Indirect labor cost, in RMB:

INC: Indirect non-labor costs, in RMB.

The sheet of caculation is as below:

序号	科目名称	数值	单位	备注
1	规模估算——初始功能点	97.00	功能点	采用功能点法计数
2	规模变更调整因子	0.97		
3	规模估算——调整后功能点	94.09	功能点	
4	基准生产率	3.99	人时/功能点	P_25
5		7.19	人时/功能点	P_50
6		12.48	人时/功能点	P_75
7	未调整工作量	2.13	人月	下限，C4*C5/(22*8)，每月工作22天，每天工作8小时
8		3.84	人月	中值，C4*C6/(22*8)，每月工作22天，每天工作8小时
9		6.67	人月	上限，C4*C7/(22*8)，每月工作22天，每天工作8小时
10	应用领域调整因子	1.00		办公业务处理
11	软件完整性级别	1.00		无特别规定
12	开发语言调整因子	1.00		HTML，CSS，Javascript，Java
13	团队规模调整因子	1.00		无特别规定
14	调整后工作量	2.13	人月	下限，C8*C11*C12*C13*C14
15		3.84	人月	中值，C9*C11*C12*C13*C14
16		6.67	人月	上限，C10*C11*C12*C13*C14
17	人月基准单价	29508.00	元/人月	数据来自2020年软件行业基准数据
18	直接非人力成本	25000.00	元	含差旅费，办公费等
19	预算（软件开发成本）	87942.43	元	下限，C15*C17+C18
20		138422.57	元	中值，C16*C17+C18
21		221872.55	元	上限，C17*C17+C18

Figure 7: Total Development Cost Estimate

If we choose the median value of the result range, the calculated software development cost:

$$SDC = 138422.57 yuan$$

2.3.6 Verification

The benchmark unit price of a function point is 1,245.19 yuan/function point (based on the median of statistical data in Beijing, the cost includes direct labor cost, indirect labor cost, indirect non-human cost and reasonable profit for software development, but **does not include direct non-human cost**) The unit price basis of function points in other regions can be converted by referring to the corresponding relationship with the monthly rate of the person in Beijing.

$$1245.19 \div 30134 \times 29508 = 1219.32yuan$$

Therefore, the benchmark unit price of a function point in Shanghai is 1219.32 yuan. With the data, we can use the method that "Based on the results of scale estimation and the comprehensive unit price of scale, the sum of direct labor costs and indirect costs is directly calculated, plus direct non-human costs, to obtain software development costs" , we can compute that

$$SDC = 1219.32 * 94 = 114616.08$$

The software development cost is 114616.08 yuan As the $SDC - DNC = 138422.57 - 25000 = 113422.57yuan$, which is similar to the result using the benchmark unit price of a function point.

2.4 Operation and Maintenance Cost Estimation

2.4.1 Labor Cost Estimation

表 3.8 典型城市应用软件运维人月费率基准数据明细

城市名称	基准人月费率（单位：元）	城市类别
北京	24855	A
重庆	19540	C
上海	25207	A
天津	20523	B
长春	16665	D
成都	18188	C
大连	20755	C
广州	22789	B
哈尔滨	18346	C
杭州	23104	B
济南	17713	C
南京	20946	B
宁波	19165	B
青岛	19354	C
沈阳	19231	C
深圳	24535	A
武汉	17430	C
厦门	20959	B
西安	20305	C
长沙	19919	C
合肥	18908	C
昆明	18729	C
石家庄	16882	D
苏州	22265	B
太原	18644	C

Figure 8: Benchmark data details of man month fee rate for typical urban application software operation and maintenance

According to the sheet above, the application software operation and maintenance benchmark person monthly rate in Shanghai is 25207 yuan/month. Expenses include direct labor costs for software development, indirect labor costs, some indirect non-labor costs and reasonable profits, excluding direct non-labor costs.

(Workload during operation and maintenance period **0.46 person-months**)

2.4.2 Non-labor Cost Estimates

Rental fee	2000
Utilities fee	2000
Equipment Maintenance fee	3000
Property costs	0
Daily office expenses	0
Communication fee	0
Printing fee	300
Travel expenses	1000
Advertisement fee	2000
Total	10300

Figure 9: Non-labor Cost Estimates

Therefore, the total operation and maintenance cost is

$$25207 * 0.46 + 10300 = 21895.22yuan$$

2.4.3 Verification

The benchmark unit price of function points is 124.20 yuan/function point (based on the median of statistical data in Beijing area, the cost includes direct labor cost, indirect labor cost, indirect non-labor cost and reasonable profit of application software operation and maintenance, but does not include direct non-labor cost and reasonable profit. Labor cost. The unit price basis of function points in other regions can be converted by referring to the corresponding relationship with the monthly rate of the person in Beijing).

$$124.20 \div 24855 \times 24207 = 120.96yuan$$

Therefore, the benchmark unit price of a function point in Shanghai is 1219.32 yuan. With the data, we can use the method that "Based on the results of scale estimation and the comprehensive unit price of scale, the sum of direct labor costs and indirect costs is directly calculated, plus direct non-human costs, to obtain software development costs" , we can compute that

$$SDC = 120.96 * 94 = 11370.24yuan$$

As the $SDC - DNC = 21895.22 - 10300 = 11595.22yuan$, which is similar to the result using the benchmark unit price of a function point.

2.5 Source of Budgets

source	Ourselves	ICBC	Total
Amount	¥122,264.83	¥63,000.00	¥185,264.83
Type	Originator	Liability	

Figure 10: Source of Budgets

2.6 Repayment Strategies

If you want to repay 63,000 yuan, and consider that the annual interest rate is 4.75% (medium and long-term loans: one to five years, including five years), which is equivalent to a monthly interest rate of 0.396%, and the plan is to pay off in five years.

2.6.1 Equivalent Principal

For this method, the loan payment is equal to the sum of principal and interest. For fixed principal loans, the loan repayment amount will decrease during the loan term. The principal included in each payment remains unchanged, but the interest decreases during each payment period. The fixed principal loan plan is also called "fixed principal falling interest loan amortization plan".

3 Financial analysis

3.1 Cash Flow

3.1.1 Statements of Cash Flow

Before using the techniques we learned from the course based on Professor Huang's lectures, we made some statements about our cash flow:

1. Each cash flow is calculated at the end of the year.
2. For cash flow for the 12 months from 2020 to 2022, we have identified one season as a software development cycle.
3. For 3 years of cash flow, estimated costs and sales are based on the first year's data.
4. The first four months are development months and the other month is maintenance months.

5. Rental costs increase in different places with inflation.

6. According to the national software industry policy, we don't have to pay taxes for the first two years. The tax rate for the third year is 12.5 per cent.

7. The basic cash flow formula we use is:

$$CashFlowt - Total - TotalOutLowt - CashFlowt - 1$$

8. The salaries of our team members are growing at a rate of 10

Based on the above 9 statements, we provide cash flow for the first three years of the company and global cash flow for the first three years.

1. First, we divide cash flow into two areas.

* Cash flow inflows

* Cash flow outflow

2. As for the total sales of the product, we divide it into the three parts mentioned in **Part II: 2.2.2 Development Effort Estimation**. As regards development costs and operating costs , we divide the development costs into the labour costs and non-labour costs mentioned in Part TWO : **2.2.3 Estimation** of operational and maintenance efforts .

3. We then translate our point into another aspect, dividing the cash flow statement into three parts:

* Operating cash flow

* Investment cash flow

* Financing cash flow

We convert the total sales of products that flow into these cash flows and expand non-labour costs to 10 sections (office expenses, travel expenses, employee training, service charges, equipment and software purchases, rent, utilities, equipment maintenance, property charges, daily office expenses). In addition, we have expanded investment inflows and investment outflows to include several themes. Third, the start-up funds, loans and other related financing into the financing cash flow.

From the second form of cash flow statement, we can understand the details of cash flow more intuitively, and we can also understand the importance of cash flow more meaningfully.

3.1.2 Yearly Cash flow of the next 5 years

基本报表一 项目投资现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥292,274.95
1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.2	回收固定资产余值					¥4,800.00
1.3	回收无形资产余值					¥67,474.95
1.4	回收流动资金					¥30,000.00
2	现金流出	¥182,264.83	¥85,352.77	¥101,152.77	¥107,472.77	¥113,792.77
2.1	建设投资（不含建设期利息）	¥152,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2	流动资金	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.3	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
2.4	营业税金及附加	¥0.00	¥6,600.00	¥9,900.00	¥11,220.00	¥12,540.00
2.5	维持运营投资	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3	所得税前净现金流量	¥-182,264.83	¥14,647.23	¥48,847.23	¥62,527.23	¥178,482.19
4	累计所得税前净现金流量	¥-182,264.83	¥-167,617.59	¥-118,770.36	¥-56,243.12	¥122,239.07
5	调整所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
6	所得税后净现金流量	¥-182,264.83	¥14,647.23	¥48,847.23	¥56,377.13	¥171,019.47
7	累计所得税后净现金流量	¥-182,264.83	¥-167,617.59	¥-118,770.36	¥-62,393.22	¥108,626.24
	计算指标：					
所得税前	项目财务内部收益率	17%				
	项目财务净现值(i=8%)	¥50,001.79	元	＞0		
	动态投资回收期(含建设期)	4.32	年			
所得税后	项目财务内部收益率	15%		>10%		
	项目财务净现值(i=8%)	¥40,402.28	元			
	动态投资回收期(含建设期)	4.36	年	<5年		

Figure 11: Project investment cash flow statement

基本报表二 项目资本金现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥292,274.95
1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.2	回收固定资产、无形资产余值	¥0.00	¥0.00	¥0.00	¥0.00	¥72,274.95
1.3	回收流动资金	¥0.00	¥0.00	¥0.00	¥0.00	¥30,000.00
2	现金流出	¥124,736.08	¥93,295.27	¥105,952.77	¥118,422.87	¥186,055.49
2.1	项目资本金	¥122,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2	借款本金偿还	¥0.00	¥3,000.00	¥0.00	¥0.00	¥60,000.00
2.2.1	流动资金贷款本金偿还	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
2.2.2	短期借款本金偿还	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
2.3	借款利息支付	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
2.4	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
2.5	税金及附加	¥0.00	¥6,600.00	¥9,900.00	¥11,220.00	¥12,540.00
2.6	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
3	净现金流量	¥-124,736.08	¥6,704.73	¥44,047.23	¥51,577.13	¥106,219.47
3.1	净现金流量累计	¥-124,736.08	¥-118,031.35	¥-73,984.11	¥-22,406.98	¥83,812.49
	计算指标：					
	项目资本金财务内部收益率	18%		>10%		
	项目资本金财务净现值(i=8%)	¥35,419.89	元	>0		

Figure 12: Project investment cash flow statement

基本报表四 财务计划现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	**经营活动净现金流量**	**¥0.00**	**¥42,542.45**	**¥79,742.45**	**¥88,472.35**	**¥102,039.73**
1.1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.1.2	补贴收入					
1.1.3	其他流入					
1.2	现金流出	¥0.00	¥57,457.55	¥70,257.55	¥81,527.65	¥87,960.27
1.2.1	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
1.2.2	税金及附加（扣除增值税）	¥0.00	¥600.00	¥900.00	¥1,020.00	¥1,140.00
1.2.3	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
1.2.4	其他流出					
2	**投资活动净现金流量**	**¥-182,264.83**	**¥-21,895.22**	**¥-21,895.22**	**¥-21,895.22**	**¥-21,895.22**
2.1	现金流入	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2	现金流出	¥182,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2.1	建设投资	¥152,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2.2	维持运营投资					
2.2.3	流动资金	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2.4	其他流出					
3	**筹资活动净现金流量**	**¥182,793.58**	**¥13,952.72**	**¥17,095.22**	**¥17,095.22**	**¥-42,904.78**
3.1	现金流入	¥185,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
3.1.1	项目资本金	¥122,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
3.1.2	贷款	¥60,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3.1.3	债券					
3.1.4	短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3.1.5	其他流入					
3.2	现金流出	¥2,471.25	¥7,942.50	¥4,800.00	¥4,800.00	¥64,800.00
3.2.1	各种利息支出	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
3.2.2	偿还债务本金	¥0.00	¥3,000.00	¥0.00	¥0.00	¥60,000.00
3.2.2.1	偿还贷款本金	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
3.2.2.2	偿还短期借款本金	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
3.2.3	应付利润	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3.2.4	其他流出					
4	**净现金流量(1+2+3)**	**¥528.75**	**¥34,599.95**	**¥74,942.45**	**¥83,672.35**	**¥37,239.73**
5	**累计盈余资金**	**¥528.75**	**¥35,128.71**	**¥110,071.16**	**¥193,743.52**	**¥230,983.25**

Figure 13: Financial plan cash flow statement

We can see that we won't be profitable until the fifth year. But then you can start making money, and the profit margin can reach a very high level.

3.2 Depreciation and Amortization

To develop our ICE online physical gaming site, we spent $136 on hardware (devices) and 2000$ on software, so we have to discuss their depreciation and amortization when calculating profits.

3.2.1 Depreciation

Depreciation is not really an example of cash flow, it refers to a decline in the value of fixed assets. Depreciation is assessed in the established method. We use the "decrease in balance depreciation" method mentioned in Professor Huang's lecture. The formula is as follows: Depreciation Year (t) s .book value year (t-1). Book value year(t) - Conquest Company . . . (1 s a)t We have a depreciation rate of19

辅助报表四 固定资产折旧估算表							
序号	项目/年份	1（开发期）	2	3	4	5	折旧率
1	设备及工器具						19%
1.1	当年新增固定资产原值	¥20,000.00	¥0.00	¥0.00	¥0.00	¥0.00	
1.2	当年折旧费	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00	
1.3	固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00	
2	年折旧费合计	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00	
3	年末固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00	
	设备及工器具的折旧年限为5年，残值率5%						
	设备及工器具购置费来自辅助一						

Figure 14

3.2.2 Amortization

The software we purchase at the beginning of development should be managed as an intangible asset. They are calculated at their annual cost of use, similar to depreciation of fixed assets, and should be amortized.

We calculate amortization using the straight-line amortization method. The formula is as follows:

$$Amortization = (Acquisitions - PasnawagValue)$$

The book value year(t) is conquered (t s amortized).

辅助报表五 无形资产摊销估算表

序号	项目/年份	1（开发期）	2	3	4	5	摊销率
1.	软件平台与应用软件开发费						20%
1.1	当年新增无形资产原值	¥113,422.57	¥0.00	¥0.00	¥0.00	¥0.00	
1.2	年摊销费	¥0.00	¥22,684.51	¥22,684.51	¥22,684.51	¥22,684.51	
1.3	无形资产净值	¥113,422.57	¥90,738.06	¥68,053.54	¥45,369.03	¥22,684.51	
2	软件增强开发与运维费						20%
2.1	当年新增无形资产原值	¥0.00	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22	
2.2	年摊销费	¥0.00	¥4,379.04	¥8,758.09	¥13,137.13	¥17,516.18	
2.3	无形资产净值	¥0.00	¥17,516.18	¥30,653.31	¥39,411.40	¥43,790.44	
3	工程建设其他费用						20%
3.1	当年新增待摊销费用	¥5,000.00	¥0.00	¥0.00	¥0.00	¥0.00	
3.2	年摊销费	¥0.00	¥1,000.00	¥1,000.00	¥1,000.00	¥1,000.00	
3.3	无形资产净值	¥5,000.00	¥4,000.00	¥3,000.00	¥2,000.00	¥1,000.00	
4	年摊销费合计	¥0.00	¥28,063.56	¥32,442.60	¥36,821.65	¥41,200.69	
5	年末无形资产净值	¥118,422.57	¥112,254.23	¥101,706.85	¥86,780.42	¥67,474.95	
	均按照五年摊销，无残值						

Figure 15

3.3 Income statement

1. According to national policy, there is no tax for the first two years and 12.5% of VAT for the third year.
2. Depreciation, miscellaneousness and amortisation have all declined over the years.
3. We pay team members monthly.
4. From the second year on, our profit margin was greater than 0.
5. As can be seen from the total net income, net income increased year by year.

基本报表三 利润与利润分配表

序号	项目/年份	1（开发期）	2	3	4	5
1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
2	税金及附加（扣除增值税）	¥0.00	¥600.00	¥900.00	¥1,020.00	¥1,140.00
3	总成本费用	¥2,471.25	¥93,663.60	¥110,400.15	¥119,779.19	¥129,158.24
4	补贴收入	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
5	利润总额（1-2-3+4）	¥-2,471.25	¥5,736.40	¥38,699.85	¥49,200.81	¥59,701.76
6	弥补以前年度亏损	¥0.00	¥2,471.25	¥0.00	¥0.00	¥0.00
7	应纳所得税额（5-6）	¥-2,471.25	¥3,265.15	¥38,699.85	¥49,200.81	¥59,701.76
8	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
9	净利润（5-8）	¥-2,471.25	¥5,736.40	¥38,699.85	¥43,050.71	¥52,239.04
10	期初未分配利润	¥0.00	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95
11	可供分配利润（9+10）	¥-2,471.25	¥3,265.15	¥41,475.23	¥78,304.65	¥118,798.00
12	提取法定盈余公积金	¥0.00	¥326.51	¥4,147.52	¥7,830.47	¥11,879.80
12.1	法定盈余公积金累计额	¥0.00	¥326.51	¥4,474.04	¥12,304.50	¥24,184.30
13	可供投资者分配利润（11-12）	¥-2,471.25	¥2,938.63	¥37,327.70	¥70,474.19	¥106,918.20
14	应付优先股股利	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
15	提取任意盈余公积金	¥0.00	¥163.26	¥2,073.76	¥3,915.23	¥5,939.90
15.1	任意盈余公积金累计额	¥0.00	¥163.26	¥2,237.02	¥6,152.25	¥12,092.15
16	应付普通股股利	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
17	各投资方利润分配	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
18	未分配利润（9-12-14-15-16-17）	¥-2,471.25	¥5,246.62	¥32,478.57	¥31,305.01	¥34,419.34
18.1	未分配利润累计额	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95	¥100,978.30
19	息税前利润（利润总额+利息支出）	¥0.00	¥10,678.90	¥43,499.85	¥54,000.81	¥64,501.76
20	息税折旧摊销前利润（息税前利润+折旧+摊销）	¥0.00	¥42,542.45	¥79,742.45	¥94,622.45	¥109,502.45
所得税：	获利年度起计算，第一年至第二年免征企业所得税，第三年至第五年按照25%税率减半征收					
	提取法定公积金比例	0.1				
	提取任意盈余公积金比例	0.05				
计算指标：	项目年平均利润率	55.91%				
	项目年平均利税率	70.83%				

Figure 16

辅助报表八 借款还本付息计划表						
序号	项目/年份	1（开发期）	2	3	4	5
1	借款					
1.1	年初贷款本金余额	¥0.00	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00
1.2	年初短期借款本金余额	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
1.3	当年贷款	¥60,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.4	当年短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.5	当年应计利息	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
1.6	当年贷款还本付息					
	其中： 还本	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
	付息	¥2,400.00	¥4,800.00	¥4,800.00	¥4,800.00	¥4,800.00
1.7	当年短期借款还本付息					
	其中： 还本	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
	付息	¥71.25	¥142.50	¥0.00	¥0.00	¥0.00
1.8	年末贷款本金余额	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00
1.9	年末短期借款本金余额	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2	还本资金					
2.1	利润	¥-2,471.25	¥5,736.40	¥38,699.85	¥49,200.81	¥59,701.76
2.2	折旧	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00
2.3	摊销	¥0.00	¥28,063.56	¥32,442.60	¥36,821.65	¥41,200.69
2.4	短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3	还本资金合计	¥528.75	¥37,599.95	¥74,942.45	¥89,822.45	¥104,702.45
	贷款年利率说明：					
	五年贷款年利率8%					
	短期贷款年利率4.75%					

Figure 17: Balance sheet

3.4 Balance Sheet

Since the balance sheet is based on accuracy data, we should select a specific point in time for analysis. In the calculation below, we select December 31 of each year as the checkpoint to calculate the balance sheet.

In intangible assets, we must consider intellectual assets. Here, we search for information about intellectual assets. This is because the value of knowledge assets is difficult to measure, so there is no need to consider amortization.

The formula in the textbook

$$Totalassets - Totalavailability - Totalowner's equity$$

基本报表五 资产负债表							
序号	项目/年份	1（开发期）	2	3	4	5	
1	**资产**	**¥182,793.58**	**¥207,425.20**	**¥268,020.27**	**¥332,966.20**	**¥347,100.46**	
1.1	流动资产	¥44,371.01	¥78,970.96	¥153,913.42	¥237,585.77	¥274,825.51	
1.1.1	现金	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00	
1.1.2	应收账款	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00	
1.1.3	基本预备费	¥13,842.26	¥13,842.26	¥13,842.26	¥13,842.26	¥13,842.26	
1.1.4	累计盈余资金	¥528.75	¥35,128.71	¥110,071.16	¥193,743.52	¥230,983.25	
1.2	固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00	
1.3	无形资产净值	¥118,422.57	¥112,254.23	¥101,706.85	¥86,780.42	¥67,474.95	
2	**负债及所有者权益**	**¥182,793.58**	**¥207,425.20**	**¥268,020.27**	**¥332,966.20**	**¥347,100.46**	
2.1	负债	¥63,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00	
2.1.1	短期借款余额	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00	
2.1.2	贷款	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00	
2.2	所有者权益	¥119,793.58	¥147,425.20	¥208,020.27	¥272,966.20	¥347,100.46	
2.2.1	资本金	¥122,264.83	¥144,160.05	¥166,055.27	¥187,950.49	¥209,845.71	
2.2.2	资本公积金						
2.2.3	法定盈余公积金累计额	¥0.00	¥326.51	¥4,474.04	¥12,304.50	¥24,184.30	
2.2.4	任意盈余公积金累计额	¥0.00	¥163.26	¥2,237.02	¥6,152.25	¥12,092.15	
2.2.5	未分配利润累计金额	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95	¥100,978.30	
	资产等于负债及所有者权益						
	计算指标：						平均值
	资产负债率（5年平均值）	34.47%	28.93%	22.39%	18.02%	0.00%	20.76%

Figure 18

You can see that the average balance sheet ratio is15.37%,which is within our acceptable range.

4 Risk Analysis

4.1 Expected Earned Present Value Method

This product has a five-year development period plus an operating period. Whether it is profitable depends on the following two factors:

1. Market conditions may remain normal, or may be up or down;
2. Competitors may not have time to launch similar competitive products Competitive products may also be launched; the probability of each factor may occur as follows:

市场状况	概率
低迷	0.2
正常	0.5
高涨	0.3

竞品状况	概率
无竞品	0.4
有竞品	0.6

Figure 19: Market situation probability distribution

The above two factors can form a total of six kinds of results, and the corresponding probability of each result is as follows:

市场状况 / 竞品状况	低迷（0.2）	正常（0.5）	高涨（0.3）
有竞品（0.6）	结果1（0.12）	结果2（0.3）	结果3（0.18）
无竞品（0.4）	结果4（0.08）	结果5（0.2）	结果6（0.12）

Figure 20: Competition products and market situation

The net present value of the above six results over the years is listed as follows:

年	结果1	结果2	结果3	结果4	结果5	结果6
0	¥-182,264.83	¥-182,264.83	¥-182,264.83	¥-182,264.83	¥-182,264.83	¥-182,264.83
1	¥8,452.00	¥14,021.10	¥15,122.22	¥11,000.55	¥14,647.23	¥16,255.41
2	¥27,050.55	¥47,100.50	¥51,003.50	¥36,510.10	¥48,847.23	¥53,010.14
3	¥31,200.50	¥52,022.44	¥57,152.46	¥41,216.90	¥56,377.13	¥63,240.50
4	¥115,233.63	¥164,239.73	¥183,505.00	¥139,000.00	¥171,019.46	¥214,356.62
净现值（元）	¥-38,684.53	¥30,663.84	¥51,588.54	¥-5,452.92	¥40,402.26	¥79,624.99

Figure 21: Net present value sheet

The expected net present value obtained is as follows:

$$ENPV = -38684.53 * 0.12 + 30663.84 * 0.3 + 51588.54 * 0.18 + (-5452.92)$$

$$*0.08 + 40402.26 * 0.2 + 79624.99 * 0.12 = 31042.16$$

4.2 Breakeven method

The fixed cost is: 105,000 yuan/year and the unit variable cost is (calculated at the price of 98 yuan/piece·year)16 yuan/piece·year.

From this, we can calculate:

Breakeven point sales = 10500 ÷ (98-16) = 1281 pieces

breakeven point sales=98×1281=125538 yuan

The data can be drawn as follows:

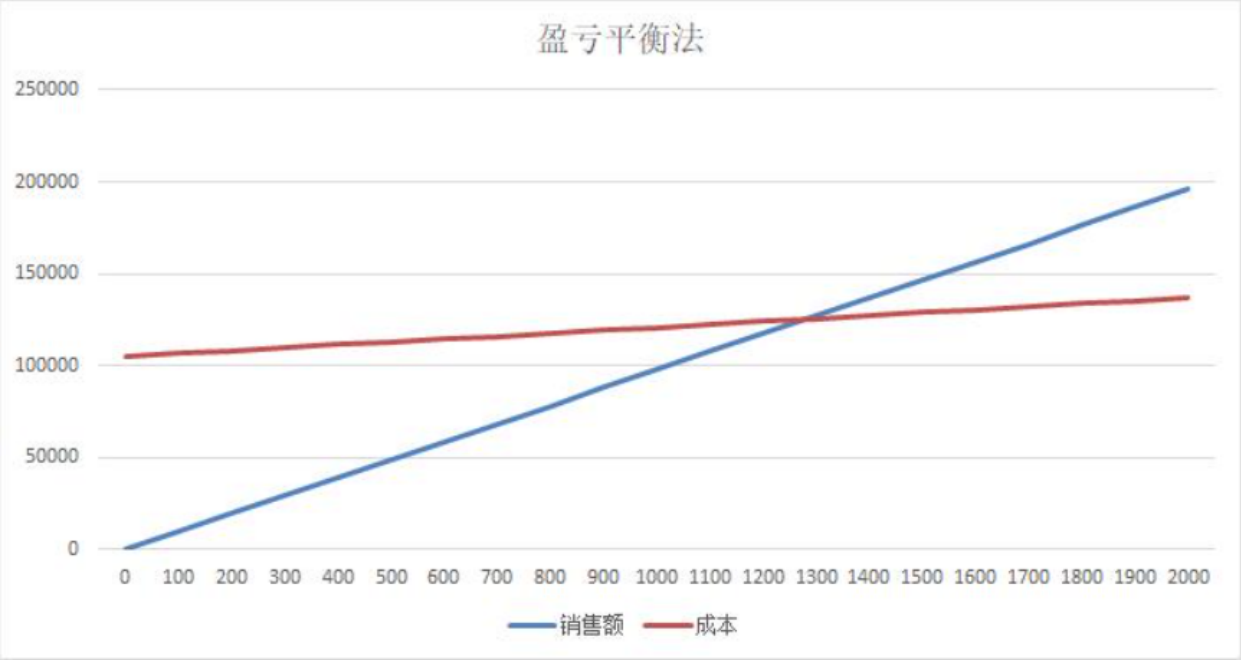

Figure 22: Breakeven method

According to the normal sales volume of 1734 pieces/year, we can get:

Breakeven point operating rate=1281÷1734=73%

Margin of safety rate=1-0.73=27%

4.3 Sensitivity Analysis Method

The following four uncertain factors are selected as the analysis variables:

1.Operating income

2.Construction investment

3.Operation and maintenance cost

4.Labor cost

We use internal rate of return as the object of sensitivity analysis

Assume that the variable range is -15% to 15%

Calculate the variation range of the analysis object due to the change of each variable, see the following table:

不确定因素\IRR\变化率（%）	-15%	-10%	-5%	-2%	基本方案	2%	5%	10%	15%
营业收入	-8.25	-2.60	8.46	14.32	17.00	18.20	24.60	31.20	37.30
建设投资	29.15	26.28	21.55	18.43	17.00	16.22	15.16	11.44	8.32
运维成本	24.17	21.55	18.69	17.56	17.00	16.56	16.01	15.33	11.81
人员成本	25.55	22.42	19.98	18.14	17.00	14.33	8.73	4.92	-1.12

Figure 23: the variation range of the analysis

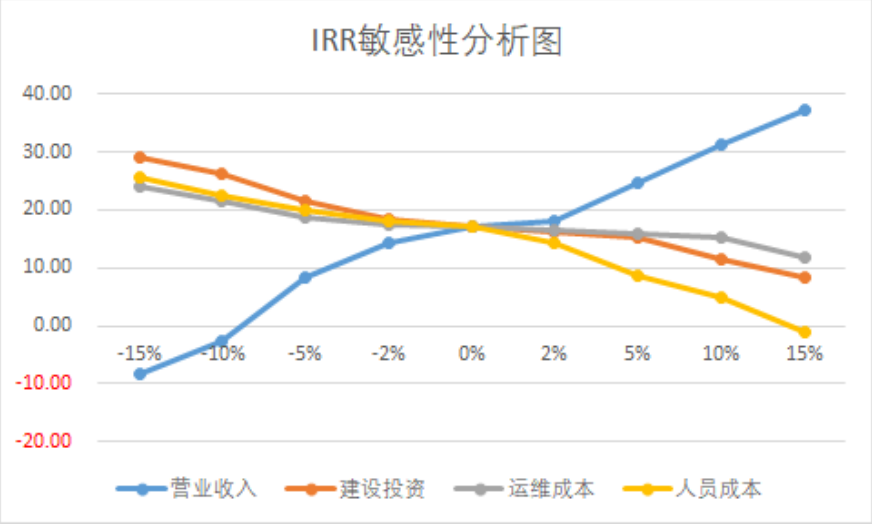

Figure 24: IRR sensitivity analysis chart

It can be seen from the above table that when operating income is reduced by 10% or labor costs are increased by 15%, the internal rate of return is lower than the lowest expected rate of return. Therefore, the sensitive factors of this project are operating income and labor costs.

5 Appendix

辅助报表一 项目建设投资估算表

序号	项目/年份	1（开发期）	2	3	4	5
1	**建设投资**	**¥152,264.83**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**
1.1	**软件开发与运维费**	**¥113,422.57**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**
1.1.1	软件平台与应用软件开发费	¥113,422.57	¥0.00	¥0.00	¥0.00	¥0.00
1.1.2	软件增强开发与运维费	¥0.00	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
1.2	**设备及工器具购置费**	**¥20,000.00**	**¥0.00**	**¥0.00**	**¥0.00**	**¥0.00**
1.3	**工程建设其他费用**	**¥5,000.00**	**¥0.00**	**¥0.00**	**¥0.00**	**¥0.00**
1.3.1	项目开办费	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.3.2	建设单位管理费	¥2,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.4	**基本预备费**	**¥13,842.26**	**¥0.00**	**¥0.00**	**¥0.00**	**¥0.00**
2	**项目建设投资合计**	**¥152,264.83**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**
注：	开发人员在岗人数	4	1	1	1	1
第1年综合人力成本，单位/人年	¥28,355.64					
第2-5年综合人力成本，单位/人年	¥21,895.22	单位：元				
	设备及工器具购置费	¥20,000.00				
	办公场地装修	¥1,000.00				
	计算机与网络设备（0.45万元/工位）	¥18,000.00				
	办公用具（250元/工位）	¥1,000.00				
注：	基本预备费=（软件开发与运维费+设备及工器具购置费+工程建设其他费用）*0.1					

项目财务分析计算所需基本参数

规划期：5年，开发1年，运维4年

税率：增值税6%，城市建设维护税7%，教育费附加3%，所得税25%

筹资：资本金122264.83元，银行贷款60000元

成本：设备及工器具的折旧年限为5年，残值率5%；软件运维费用21895.22一年；无形资产摊销期5年，无残值；运营期员工1人，薪资21895.22一年；

收入：四年依次为100000, 150000, 170000, 190000元

投资：流动资金30000元，基本预备费13842.26元，软件开发与运维费113422.57元，设备及工器具购置费20000元，工程建设其他费用5000元。

Figure 25: Project construction investment estimation table

辅助报表二 流动资金估算表

序号	项目/年份	1（开发期）	2	3	4	5
1.	**流动资产**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**
1.1	现金	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00
1.2	应收账款（销售保证金）	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2	**流动负债**	**¥0.00**	**¥0.00**	**¥0.00**	**¥0.00**	**¥0.00**
2.1	应付账款	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3	**流动资金**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**	**¥30,000.00**
4	流动资金年增加额	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
	流动资金=流动资产-流动负债					

Figure 26: Working capital estimation table

辅助报表三 资金使用计划与资金筹措表

序号	项目/年份	1（开发期）	2	3	4	5
1	**投资总额**	**¥182,264.83**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**
1.1	建设投资	¥152,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
1.2	流动资金	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2	**资金筹措来源**	**¥182,264.83**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**	**¥21,895.22**
2.1	资本金	¥122,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.1.1	资本金余额	¥122,264.83	¥144,160.05	¥166,055.27	¥187,950.49	¥209,845.71
2.2	贷款	¥60,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2.1	贷款余额	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00
2.3	短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.3.1	短期借款余额	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
	资金筹措=投资总额					
	资金筹措=资本金+贷款					
	贷款前几年只还息，最后一年还清本金					

Figure 27: Fund utilization plan and fund raising table

辅助报表四 固定资产折旧估算表

序号	项目/年份	1（开发期）	2	3	4	5
1	设备及工器具					
1.1	当年新增固定资产原值	¥20,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.2	当年折旧费	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00
1.3	固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00
2	年折旧费合计	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00
3	年末固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00
	设备及工器具的折旧年限为5年，残值率5%					
	设备及工器具购置费来自辅助一					

折旧率 19%

Figure 28: Depreciation estimate of fixed assets

辅助报表五 无形资产摊销估算表						
序号	项目/年份	1（开发期）	2	3	4	5
1.	软件平台与应用软件开发费					
1.1	当年新增无形资产原值	¥113,422.57	¥0.00	¥0.00	¥0.00	¥0.00
1.2	年摊销费	¥0.00	¥22,684.51	¥22,684.51	¥22,684.51	¥22,684.51
1.3	无形资产净值	¥113,422.57	¥90,738.06	¥68,053.54	¥45,369.03	¥22,684.51
2	软件增强开发与运维费					
2.1	当年新增无形资产原值	¥0.00	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2	年摊销费	¥0.00	¥4,379.04	¥8,758.09	¥13,137.13	¥17,516.18
2.3	无形资产净值	¥0.00	¥17,516.18	¥30,653.31	¥39,411.40	¥43,790.44
3	工程建设其他费用					
3.1	当年新增待摊销费用	¥5,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3.2	年摊销费	¥0.00	¥1,000.00	¥1,000.00	¥1,000.00	¥1,000.00
3.3	无形资产净值	¥5,000.00	¥4,000.00	¥3,000.00	¥2,000.00	¥1,000.00
4	年摊销费合计	¥0.00	¥28,063.56	¥32,442.60	¥36,821.65	¥41,200.69
5	年末无形资产净值	¥118,422.57	¥112,254.23	¥101,706.85	¥86,780.42	¥67,474.95
	均按照五年摊销，无残值					

Figure 29: Estimation of amortization of intangible assets

辅助报表六 总成本费用估算表						
序号	项目/年份	1（开发期）	2	3	4	5
1	外购原材料费	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2	外购燃料动力费	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3	工资及福利费	¥0.00	¥31,857.55	¥31,857.55	¥31,857.55	¥31,857.55
4	修理费	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
5	营销费用	¥0.00	¥25,000.00	¥37,500.00	¥42,500.00	¥47,500.00
6	经营成本（1+2+3+4+5）	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
7	折旧费	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00
8	摊销费	¥0.00	¥28,063.56	¥32,442.60	¥36,821.65	¥41,200.69
9	利息支出	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
10	总成本费用（经营成本+折旧费+摊销费+利息支出）	¥2,471.25	¥93,663.60	¥110,400.15	¥119,779.19	¥129,158.24
	工资及福利费/年份	1（开发期）	2	3	4	5
	年均员工数	0	1	1	1	1
	人均底薪21895.22元/年	¥0.00	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
	五险一金45.5%	¥0.00	¥9,962.33	¥9,962.33	¥9,962.33	¥9,962.33
	合计	¥0.00	¥31,857.55	¥31,857.55	¥31,857.55	¥31,857.55
	营销费用/年份	1（开发期）	2	3	4	5
	营业收入（辅助七）	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
	营销费用（营业收入的25%）	¥0.00	¥25,000.00	¥37,500.00	¥42,500.00	¥47,500.00
	行政办公费/年份	1（开发期）	2	3	4	5
	月度行政办公经费标准	¥700.00	¥800.00	¥900.00	¥1,000.00	¥1,100.00

Figure 30: Total cost estimation table

辅助报表七 营业收入、税金及附加估算表						
序号	项目/年份	1（开发期）	2	3	4	5
1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
2	税金及附加	¥0.00	¥6,600.00	¥9,900.00	¥11,220.00	¥12,540.00
2.1	增值税	¥0.00	¥6,000.00	¥9,000.00	¥10,200.00	¥11,400.00
2.1.1	增值税销项税额	¥0.00	¥6,000.00	¥9,000.00	¥10,200.00	¥11,400.00
2.1.2	增值税进项税额	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2	消费税	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2.3	城市维护建设税	¥0.00	¥420.00	¥630.00	¥714.00	¥798.00
2.4	教育费附加	¥0.00	¥180.00	¥270.00	¥306.00	¥342.00
	税率及计算税金的基数说明：					
	增值税：销售收入的6.00%					
	城市维护建设税：增值税的7.00%					
	教育费附加：增值税的3.00%					

Figure 31: Estimation table of business income, taxes and surcharges

辅助报表八 借款还本付息计划表						
序号	项目/年份	1（开发期）	2	3	4	5
1	借款					
1.1	年初贷款本金余额	¥0.00	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00
1.2	年初短期借款本金余额	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
1.3	当年贷款	¥60,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.4	当年短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
1.5	当年应计利息	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
1.6	当年贷款还本付息					
	其中： 还本	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
	付息	¥2,400.00	¥4,800.00	¥4,800.00	¥4,800.00	¥4,800.00
1.7	当年短期借款还本付息					
	其中： 还本	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
	付息	¥71.25	¥142.50	¥0.00	¥0.00	¥0.00
1.8	年末贷款本金余额	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00
1.9	年末短期借款本金余额	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2	还本资金					
2.1	利润	¥-2,471.25	¥5,736.40	¥38,699.85	¥49,200.81	¥59,701.76
2.2	折旧	¥0.00	¥3,800.00	¥3,800.00	¥3,800.00	¥3,800.00
2.3	摊销	¥0.00	¥28,063.56	¥32,442.60	¥36,821.65	¥41,200.69
2.4	短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3	还本资金合计	¥528.75	¥37,599.95	¥74,942.45	¥89,822.45	¥104,702.45
	贷款年利率说明：					
	五年贷款年利率8%					
	短期贷款年利率4.75%					

Figure 32: Loan repayment schedule

基本报表一 项目投资现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥292,274.95
1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.2	回收固定资产余值					¥4,800.00
1.3	回收无形资产余值					¥67,474.95
1.4	回收流动资金					¥30,000.00
2	现金流出	¥182,264.83	¥85,352.77	¥101,152.77	¥107,472.77	¥113,792.77
2.1	建设投资（不含建设期利息）	¥152,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2	流动资金	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.3	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
2.4	营业税金及附加	¥0.00	¥6,600.00	¥9,900.00	¥11,220.00	¥12,540.00
2.5	维持运营投资	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3	所得税前净现金流量	¥-182,264.83	¥14,647.23	¥48,847.23	¥62,527.23	¥178,482.19
4	累计所得税前净现金流量	¥-182,264.83	¥-167,617.59	¥-118,770.36	¥-56,243.12	¥122,239.07
5	调整所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
6	所得税后净现金流量	¥-182,264.83	¥14,647.23	¥48,847.23	¥56,377.13	¥171,019.47
7	累计所得税后净现金流量	¥-182,264.83	¥-167,617.59	¥-118,770.36	¥-62,393.22	¥108,626.24
	计算指标：					
所得税前	项目财务内部收益率	17%				
	项目财务净现值(i=8%)	¥50,001.79	元	>0		
	动态投资回收期(含建设期)	4.32	年			
所得税后	项目财务内部收益率	15%		>10%		
	项目财务净现值(i=8%)	¥40,402.28	元			
	动态投资回收期(含建设期)	4.36	年	<5年		

Figure 33: Project investment cash flow statement

基本报表二 项目资本金现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥292,274.95
1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.2	回收固定资产、无形资产余值	¥0.00	¥0.00	¥0.00	¥0.00	¥72,274.95
1.3	回收流动资金	¥0.00	¥0.00	¥0.00	¥0.00	¥30,000.00
2	现金流出	¥124,736.08	¥93,295.27	¥105,952.77	¥118,422.87	¥186,055.49
2.1	项目资本金	¥122,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2	借款本金偿还	¥0.00	¥3,000.00	¥0.00	¥0.00	¥60,000.00
2.2.1	流动资金贷款本金偿还	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
2.2.2	短期借款本金偿还	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
2.3	借款利息支付	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
2.4	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
2.5	税金及附加	¥0.00	¥6,600.00	¥9,900.00	¥11,220.00	¥12,540.00
2.6	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
3	净现金流量	¥-124,736.08	¥6,704.73	¥44,047.23	¥51,577.13	¥106,219.47
3.1	净现金流量累计	¥-124,736.08	¥-118,031.35	¥-73,984.11	¥-22,406.98	¥83,812.49
	计算指标：					
	项目资本金财务内部收益率	18%		>10%		
	项目资本金财务净现值(i=8%)	¥35,419.89	元	>0		

Figure 34: Cash flow statement of project capital

基本报表三 利润与利润分配表						
序号	项目/年份	1（开发期）	2	3	4	5
1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
2	税金及附加（扣除增值税）	¥0.00	¥600.00	¥900.00	¥1,020.00	¥1,140.00
3	总成本费用	¥2,471.25	¥93,663.60	¥110,400.15	¥119,779.19	¥129,158.24
4	补贴收入	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
5	利润总额（1-2-3+4）	¥-2,471.25	¥5,736.40	¥38,699.85	¥49,200.81	¥59,701.76
6	弥补以前年度亏损	¥0.00	¥2,471.25	¥0.00	¥0.00	¥0.00
7	应纳所得税额（5-6）	¥-2,471.25	¥3,265.15	¥38,699.85	¥49,200.81	¥59,701.76
8	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
9	净利润（5-8）	¥-2,471.25	¥5,736.40	¥38,699.85	¥43,050.71	¥52,239.04
10	期初未分配利润	¥0.00	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95
11	可供分配利润（9+10）	¥-2,471.25	¥3,265.15	¥41,475.23	¥78,304.65	¥118,798.00
12	提取法定盈余公积金	¥0.00	¥326.51	¥4,147.52	¥7,830.47	¥11,879.80
12.1	法定盈余公积金累计额	¥0.00	¥326.51	¥4,474.04	¥12,304.50	¥24,184.30
13	可供投资者分配利润（11-12）	¥-2,471.25	¥2,938.63	¥37,327.70	¥70,474.19	¥106,918.20
14	应付优先股股利	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
15	提取任意盈余公积金	¥0.00	¥163.26	¥2,073.76	¥3,915.23	¥5,939.90
15.1	任意盈余公积金累计额	¥0.00	¥163.26	¥2,237.02	¥6,152.25	¥12,092.15
16	应付普通股股利	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
17	各投资方利润分配	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
18	未分配利润（9-12-14-15-16-17）	¥-2,471.25	¥5,246.62	¥32,478.57	¥31,305.01	¥34,419.34
18.1	未分配利润累计额	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95	¥100,978.30
19	息税前利润（利润总额+利息支出）	¥0.00	¥10,678.90	¥43,499.85	¥54,000.81	¥64,501.76
20	息税折旧摊销前利润（息税前利润+折旧+摊销）	¥0.00	¥42,542.45	¥79,742.45	¥94,622.45	¥109,502.45
所得税：	获利年度起计算，第一年至第二年免征企业所得税，第三年至第五年按照25%税率减半征收					
	提取法定公积金比例	0.1				
	提取任意盈余公积金比例	0.05				
计算指标：	项目年平均利润率	55.91%				
	项目年平均利税率	70.83%				

Figure 35: Profit and profit distribution statement

基本报表四 财务计划现金流量表						
序号	项目/年份	1（开发期）	2	3	4	5
1	**经营活动净现金流量**	**¥0.00**	**¥42,542.45**	**¥79,742.45**	**¥88,472.35**	**¥102,039.73**
1.1	现金流入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.1.1	营业收入	¥0.00	¥100,000.00	¥150,000.00	¥170,000.00	¥190,000.00
1.1.2	补贴收入					
1.1.3	其他流入					
1.2	现金流出	¥0.00	¥57,457.55	¥70,257.55	¥81,527.65	¥87,960.27
1.2.1	经营成本	¥0.00	¥56,857.55	¥69,357.55	¥74,357.55	¥79,357.55
1.2.2	税金及附加（扣除增值税）	¥0.00	¥600.00	¥900.00	¥1,020.00	¥1,140.00
1.2.3	所得税	¥0.00	¥0.00	¥0.00	¥6,150.10	¥7,462.72
1.2.4	其他流出					
2	**投资活动净现金流量**	**¥-182,264.83**	**¥-21,895.22**	**¥-21,895.22**	**¥-21,895.22**	**¥-21,895.22**
2.1	现金流入	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2	现金流出	¥182,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2.1	建设投资	¥152,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
2.2.2	维持运营投资					
2.2.3	流动资金	¥30,000.00	¥0.00	¥0.00	¥0.00	¥0.00
2.2.4	其他流出					
3	**筹资活动净现金流量**	**¥182,793.58**	**¥13,952.72**	**¥17,095.22**	**¥17,095.22**	**¥-42,904.78**
3.1	现金流入	¥185,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
3.1.1	项目资本金	¥122,264.83	¥21,895.22	¥21,895.22	¥21,895.22	¥21,895.22
3.1.2	贷款	¥60,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3.1.3	债券					
3.1.4	短期借款	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00
3.1.5	其他流入					
3.2	现金流出	¥2,471.25	¥7,942.50	¥4,800.00	¥4,800.00	¥64,800.00
3.2.1	各种利息支出	¥2,471.25	¥4,942.50	¥4,800.00	¥4,800.00	¥4,800.00
3.2.2	偿还债务本金	¥0.00	¥3,000.00	¥0.00	¥0.00	¥60,000.00
3.2.2.1	偿还贷款本金	¥0.00	¥0.00	¥0.00	¥0.00	¥60,000.00
3.2.2.2	偿还短期借款本金	¥0.00	¥3,000.00	¥0.00	¥0.00	¥0.00
3.2.3	应付利润	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00
3.2.4	其他流出					
4	**净现金流量(1+2+3)**	**¥528.75**	**¥34,599.95**	**¥74,942.45**	**¥83,672.35**	**¥37,239.73**
5	**累计盈余资金**	**¥528.75**	**¥35,128.71**	**¥110,071.16**	**¥193,743.52**	**¥230,983.25**

Figure 36: Financial plan cash flow statement

基本报表五 资产负债表							
序号	项目/年份	1（开发期）	2	3	4	5	
1	**资产**	**¥182,793.58**	**¥207,425.20**	**¥268,020.27**	**¥332,966.20**	**¥347,100.46**	
1.1	流动资产	¥44,371.01	¥78,970.96	¥153,913.42	¥237,585.77	¥274,825.51	
1.1.1	现金	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00	¥30,000.00	
1.1.2	应收账款	¥0.00	¥0.00	¥0.00	¥0.00	¥0.00	
1.1.3	基本预备费	¥13,842.26	¥13,842.26	¥13,842.26	¥13,842.26	¥13,842.26	
1.1.4	累计盈余资金	¥528.75	¥35,128.71	¥110,071.16	¥193,743.52	¥230,983.25	
1.2	固定资产净值	¥20,000.00	¥16,200.00	¥12,400.00	¥8,600.00	¥4,800.00	
1.3	无形资产净值	¥118,422.57	¥112,254.23	¥101,706.85	¥86,780.42	¥67,474.95	
2	**负债及所有者权益**	**¥182,793.58**	**¥207,425.20**	**¥268,020.27**	**¥332,966.20**	**¥347,100.46**	
2.1	负债	¥63,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00	
2.1.1	短期借款余额	¥3,000.00	¥0.00	¥0.00	¥0.00	¥0.00	
2.1.2	贷款	¥60,000.00	¥60,000.00	¥60,000.00	¥60,000.00	¥0.00	
2.2	所有者权益	¥119,793.58	¥147,425.20	¥208,020.27	¥272,966.20	¥347,100.46	
2.2.1	资本金	¥122,264.83	¥144,160.05	¥166,055.27	¥187,950.49	¥209,845.71	
2.2.2	资本公积金						
2.2.3	法定盈余公积金累计额	¥0.00	¥326.51	¥4,474.04	¥12,304.50	¥24,184.30	
2.2.4	任意盈余公积金累计额	¥0.00	¥163.26	¥2,237.02	¥6,152.25	¥12,092.15	
2.2.5	未分配利润累计金额	¥-2,471.25	¥2,775.37	¥35,253.94	¥66,558.95	¥100,978.30	
	资产等于负债及所有者权益						
	计算指标：						平均值
	资产负债率（5年平均值）	34.47%	28.93%	22.39%	18.02%	0.00%	20.76%

Figure 37: Balance sheet

6 Reference

1. Benchmark data of China's software industry in 2020
   http://www.bscea.org/uploads/soft/201015/CSBMK-2020%E5%B9%B4%E4%B8%AD%E5%9B%BD%E8%BD%AF%E4%BB%B6%E8%A1%8C%E4%B8%9A%E5%9F%BA%E5%87%86%E6%95%B0%E6%8D%AE.pdf
2. Software engineer economy lesson by Huangjie in Tongji University
   https://studyh5.zhihuishu.com/videoStudy.html#/studyVideo?recruitAndCourseId=435a515d475242