EVALUATION OF ENTERPRISE ANNEXATION
USING AN AHP HIERARCHICAL ANALYSIS

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Abstract: Recently, The reform of state-owned enterprises in China entered into a crucial stage. The annexations between different ownership enterprises, such as mergers, acquisitions, recapitalizations, restructurings and joint ventures occurred frequently. These enterprises can benefit from the effective annexations of the other enterprise(s), but the noneffective annexation may do great harm to enterprise's future development and capitalization. This article presents an approach to evaluate the various plans and methods of enterprise's annexation using AHP Hierarchical Analysis. The AHP Hierarchical Analysis applies the enterprises' indices to estimate the perspective benefits and risks of the different annexation plans. Also a case study is offered at the end of the paper.

Background

This paper summarizes the research and analysis used to determine the best solution for State-owned enterprises in China to implement the effective annexation. The enterprise annexation can be divided into the effective annexation and noneffective annexation considering its outcome. Many cases of bankruptcies during the Asian Economics Crisis have given us indoctrination of the damage of the noneffective annexation, so an approach to evaluate the enterprise annexation and its outcome must be introduced to estimate whether the enterprise annexation plan or solution is effective or not.

Concept of Effective Enterprise Annexation

Effective enterprise annexation means that the annexation between the enterprises brings the results of to regulate the macro-economy structure and industry structure. The stability of society, employment and social security system will benefit from the outcome of the enterprise annexation, either.   The enterprises both merged and being annexed will take the advantage of the enterprise annexation.

Effective annexation plays an important role in the construction of modern enterprise system and marketing economics in China. It is an operative way when state-owned enterprise implements such strategic initiative as equity and debt financing, mergers and acquisitions, joint ventures, restructurings and recapitalizations.

Purpose of Effective Enterprise Annexation

The effective enterprise annexation must meet the following requirements:

1.Stimulating the development and progress of society and economy.

The effective enterprise annexation must promote the reorganization and adjustment of the economic structure;

The effective enterprise annexation must promote the reorganization and adjustment of the industry structure;

The effective enterprise annexation must deploy the capital of the enterprise efficiently; The effective enterprise annexation must keep the society stable, secure the employment and social security system;

The effective enterprise annexation must develop and promote the competitive market against the monopoly of the market.

2.Promoting the enterprise ability and quality

It must help the annexed enterprise and being annexed enterprise to lower the cost and maximize the profit;

It must increase the market share of the enterprises;

It must promote CI (Company Identity) of the enterprises;

It must promote the R&D of the enterprises;

It must bring the important innovation of the industry.

The effective enterprise annexation is a changeable concept. It must adapt to the circumstance. When we make the judgement of the effective enterprise annexation, we must take the macroeconomics' status into the consideration.

Research

The research for this problem was completed by discussion with some experts of enterprise management and some professors in the university, some successful entrepreneurs also took part in the discussion of this research.

Two hierarchies were constructed in the AHP models: benefits and risks. Eight criteria were used in the hierarchies: Social Progress, Industry Priority, and Enterprise comprehensive competence, Ratio of output/input, Profitability, Anti-bankruptcy capability, Going concern capability and development capability. Key sub-criteria were identified with each criterion. They are employment ratio, wage increasing rate, modernization rate, industry priority rate, market share, profit rate, rate of employment, profit from principal operation ratio, current ratio, inventory turnover, rate of net asset, return on net assets, capitalization's ratio, net working capital ratio, long term liability ratio and capital added rate. Pairwise judgements between the criteria and sub-criteria were made based on the subjective conclusion inferred from the discussion with the various groups of experts, professors and entrepreneurs. The charts of hierarchies AHP are presented at the end of this paper.

Table 1 Pairwise Comparisons of the Criteria

Goal	B_1	B_2	B_3	B_4	B_5	B_6	B_7	B_8	Priorities
B_1	1	3	7	4.4	2.6	2.2	1	2.7	0.27
B_2	0.33	1	5	2.5	1.1	1	1	1	0.13
B_3	0.14	0.2	1	0.1	0.3	0.3	0.3	1	0.03
B_4	0.23	0.4	10	1	0.3	0.3	1	2	0.09
B_5	0.38	0.9	3.3	3.3	1	1.2	2	1	0.14
B_6	0.45	1	3.3	3.3	0.83	1	1	3	0.15
B_7	1	1	3.3	1	0.5	1	1	1	0.12
B_8	0.37	1	1	0.5	1	0.33	1	1	0.08

In table 1, B_1 denotes social progress, B_2 denotes industry priority, B_3 denotes enterprise comprehensive competence, B_4 denotes ratio of output/input, B_5 denotes profitability, B_6 denotes anti-bankruptcy capability, B_7 denotes going concern capability and B_8 denotes development capability.

λ max=8.93

C.I.=(8.93-8)$\div$7=0.1328

C.R.=0.1328$\div$1.41=0.094<0.1

Table 2 Pairwise of the sub-Criteria

B_1	C_1	C_2	P_1
C_1	1	3	0.75
C_2	0.33	1	0.25

λ max=2

C.R.=0<0.1

Table 3 Pairwise of the sub-Criteria

B_2	C_3	C_4	P_2
C_3	1	5	0.83
C_4	0.2	1	0.17

λ max=2

C.R.=0<0.1

Table 4 Pairwise of the sub-Criteria

B_3	C_5	C_6	P_3
C_5	1	2	0.67
C_6	0.5	1	0.33

λ max=2

C.R.=0<0.1

Table 5 Pairwise of the sub-Criteria

B_4	C_7	C_8	P_4
C_7	1	4	0.8
C_8	0.25	1	0.2

λ max=2

C.R.=0<0.1

Table 6 Pairwise of the sub-Criteria

B_5	C_9	C_{10}	P_5
C_9	1	0.33	0.25
C_{10}	3	1	0.75

λ max=2

C.R.=0<0.1

Table 7 Pairwise of the sub-Criteria

B_6	C_{11}	C_{12}	P_6
C_{11}	1	0.25	0.2
C_{12}	4	1	0.8

λ max=2

C.R.=0<0.1

Table 8 Pairwise of the sub-Criteria

B_7	C_{13}	C_{14}	P_7
C_{13}	1	0.5	0.33
C_{14}	2	1	0.67

λ max=2

C.R.=0<0.1

Table 9 Pairwise of the sub-Criteria

B_8	C_{15}	C_{16}	P_8
C_{15}	1	1	0.5
C_{16}	1	1	0.5

λ max=2

C.R.=0<0.1

In table 2 to table 5, C_1 denotes employment ratio, C_2 denotes wage-increasing rate, C_3 denotes

modernization rate, C_4 denotes industry priority rate, C_5 denotes market share, C_6 denotes profit rate, C_7 denotes rate of employment, and C8 denotes profit from principal operation ratio.

In table 6 to table 9, C_9 denotes current ratio, C_{10} denotes inventory turnover, C_{11} denotes rate of net asset, C_{12} denotes return on net assets, C_{13} denotes capitalization's ratio, C_{14} denotes net working capital ratio, C_{15} denotes long-term liability ratio and C_{16} denotes capital added rate.

After the calculation of the priorities of criteria and sub-criteria, the results are presented in table 10:

Table 10 Priorities of Sub-criteria C_1 to C_{16}

Sub-criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
Priorities	0.2	0.07	0.11	0.02	0.02	0.01	0.07	0.02
Sub-criteria	C_9	C_{10}	C_{11}	C_{12}	C_{13}	C_{14}	C_{15}	C_{16}
Priorities	0.04	0.10	0.03	0.12	0.04	0.08	0.04	0.04

Analysis and Conclusion

By using the hierarchical models, we had three plans for enterprise annexation with company A, company B and company C. After collecting the information of three companies, we standardized the indices of them and calculate the outcome, ranked the different plans to annex or merge each of the three companies. The risks and benefits' indices are as follows:

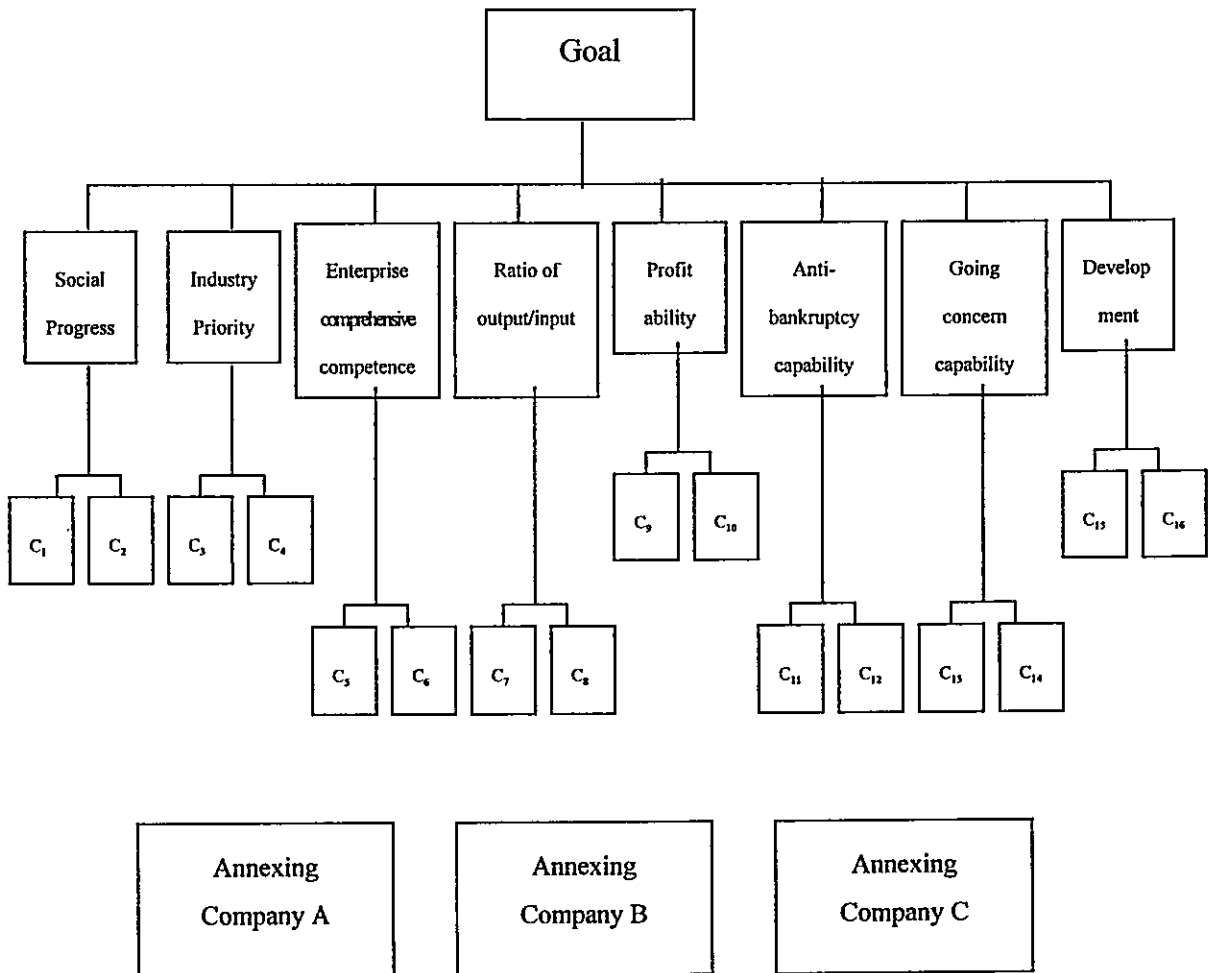### Table 11: Risks and Benefits of Annexation Plan

Solutions	Risks	Benefits	B/R
Annex Company A	0.51	0.69	1.35
Annex Company B	0.47	0.58	1.23
Annex Company C	0.83	0.69	0.81

According to the calculated result, we can infer that the best plan of annexing Company A is the most effective plan because its ratio of B/R is the largest. The conclusion is that the most effective enterprise annexation is solution annexing Company A.

Appendix

In Hierarchy AHP, C_1 denotes employment ratio, C_2 denotes wage increasing rate, C_3 denotes modernization rate, C_4 denotes industry priority rate, C_5 denotes market share, C_6 denotes profit rate, C_7 denotes rate of employment, C_8 denotes profit from principal operation ratio, C_9 denotes current ratio, C_{10} denotes inventory turnover, C_{11} denotes rate of net asset, C_{12} denotes return on net assets, C_{13} denotes capitalization's ratio, C_{14} denotes net working capital ratio, C_{15} denotes long term liability ratio and C_{16} denotes capital added rate.

Benefits and Risks

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                              │   Goal   │
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| Social Progress | Industry Priority | Enterprise comprehensive competence | Ratio of output/input | Profit ability | Anti-bankruptcy capability | Going concern capability | Develop ment |

C_1 C_2 C_3 C_4

C_5 C_6 C_7 C_8

C_9 C_{10}

C_{11} C_{12} C_{13} C_{14}

C_{15} C_{16}

| Annexing Company A | Annexing Company B | Annexing Company C |

Reference

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