ANALYSIS OF COMPETITIVE POWER OF EXPORTING MECHANICAL AND ELECTRONIC PRODUCTS-THE AHP MODEL

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ABSTRACT

Only by enchancing our research work on the competitive power of exporting the mechanical and electronic products can we make equivalent sales policy, have a definite object in view, increasingly promote the export of our mechanical and electornic products and succeed in keen competition in the world market. This article put forward a target system to evaluate the competitive power of exporting the mechanical and electronic products, establish the competitive power analysis AHP model, and analyz-synthetically the various main factors which shall influence the competitive power and find out the method to strengthen competitive power.

The results of the article show: in order to strengthen the competitive power of exporting the mechanical and electronic products, we should pay more attention to the occupancy factor and clients keeping factor in the market. We should increase the quantity of products and improve the quality and strengthen the services after sales. We should improve the structure and quality of our products, fix resonable prices and satisfy the special requests from the customers, etc. These results are of great importance and practical value.

I. Model Formulation

The trend for promoting the foreign trade of China is to increase the export of machinery and eletrical products. What is the competitive position of our machinery and electrical products exported in the world markets? How can we strengthen the competitive strength of these products? These are important problems worthy of continuous study. Only by strengthening the study of our competitive positions for these products can we adopt a sales policy which will help us win the highly competitive international markets.

What is the "competitive power"? It is a quite vague concept. By adopting the AHP (Analytical Hierarchical Process) method and setting up systemtic indices to evaluate our competitive position for the exported machineries and electricals, we can analyze the main factors influencing the competitive power, and thereby adopt the policy which will best lead to strenthening the competitive powers.

(1). Hierarchical Structure and Element Definitions.

1. Hierarchical Structure

This paper presents a duplicate AHP model for competitive powers analysis. It consists of two-models with six hierarchies as follows:
A: Decision-Making objective for Competitive Powers Analysis.
B_1-B_2: three criteria
C_1-C_8: eight sub-criteria
D_1-D_6: six development strategies
E_1-E_7: seven constraints
F_1-F_{12}: twelve particular improvement measures

(Submodel 1)---- Evaluation Indices System.
Adopting the Market-Products--Management synthetic Indices System is better than adopting the general Price-Competition/Non-price-Competitive Indices System in terms of consistency with reality in the present international marketing and competition and quantitative analysis (see Figure 1).
A--- Decision-Making Objective:
Strenthening the competitive powers for our machinery and electrical products in the international market.

B_1---- The market indices
B_2---- The Product Indices
B_3---- The Management Indices
C_1---- The Market Share
C_2---- The Reservation Rate of Old Clients
C_3---- the Increasing Rate of Clients
C_4---- The Prices
C_5---- the Current State of the Products
C_6---- The Convenience of Trade Measures
C_7---- The Promotion Activities Prior to Sales.
C_8---- the Services after Sales.

(Submodel 2)---- The Analysis of Competitive powers in the world's machinery and electrical market, seven major contraints, which are blocking and reducing the export of our machinery and electrical products, are found, and 12 detailed improvement measures are introduced (see Fig.2)

D_1---- Increasing the Sales
D_2---- Improving the Products Qualities
D_3---- Closing Business Transaction (Deals) Easily.
D_4---- Promoting Sales
D_5---- Better After-sale Services
D_6---- Volatile Trade Patterns.
E_1---- Seller's Production Capacity
E_2---- The Differences (Gaps) in Sciences and Technology Between Buyers and Sellers.
E_3---- Buyers' Convenience
E_4---- Government Intervention
E_5---- The Conditions of Communication and transportation.
E_7---- Product Cost
F_1---- Regulating the Prices
F_2---- Improving Products Qualities
F_3---- Developing Famous-Brand Products.
F_4---- Satisfying the Client's Special Requirements.
F_5---- Strictly Obeying the Terms of Contracts.
F_6---- Promoting the Push-Sales Powers.

F_7---- Making the After-Sales Services Better.
F_8---- Establishing More Permanent Overseas Organization.
F_9---- Establishing More Agent Organization.
F_{10}---- Using More Trade Patterns.
F_{11}---- Making Business Easy.
F_{12}---- Accepting a small Number of Orders.

(II) The Hierarchical Structure Diagram of AHP

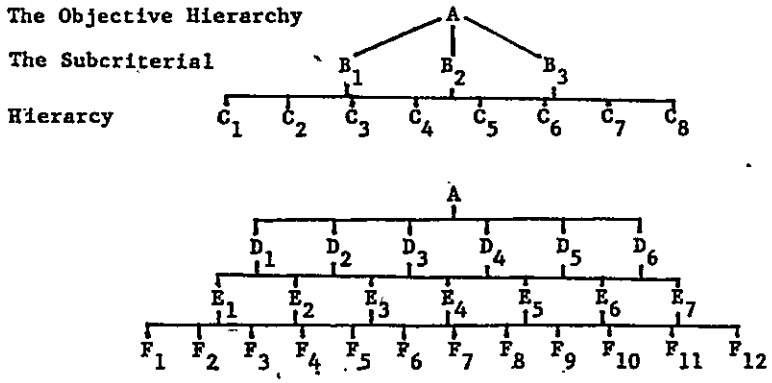

Fig. Competitive Power Analysis of AHP

II. Computation and Solution

(I) Construction of Judgemental Matrices
In accordance with the elementary definitions of AHP Hierarchical Structure Diagram and by using the Delphi Method, 18 judgemental matrices all together are constructed, including:

Hierarchy	A--B:	there is one judgemental matrix
Hierarchies	B--C:	3 judgemental matrices established
Hierarcyies	A--D:	1 judgemental matrices established
Hierarchies	D--E:	6 judgemental matrices established
Hierarchies	E--F:	7 judgemental matrices established

(II) Computation and Solution Procedure

1. After the consistency tests to the 18 judgemental matrices, the single sort for those hierarchies undertaken.
2. Solve the total sorted order for each hierarchical element and their relative weights from top to bottom, from the largest to the least, the solution result is presented in Table 1.

Table 1. The Total Elemental Sorting for Hierarchy B

Element	B_1	B_2	B_3
Weight	0.5	0.3	0.2
Order	1	2	3

Total elemental Sorting for Hierarchy C

Element	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
Weight	0.233	0.156	0.109	0.05	0.067	0.043	0.094	0.075
Order	1	2	3	7	6	8	4	5

Table 3. The Total Elemental Sorting for Hierarchy D

Element	D_1	D_2	D_3	D_4	D_5	D_6
Weight	0.328	0.250	0.043	0.101	0.160	0.064
Order	1	2	6	4	3	5

Table 4. The Total Elemntal Sorting for Hierarchy E

Element	E_1	E_2	E_3	E_4	E_5	E_6	E_7
Weight	0.246	0.120	0.175	0.260	0.019	0.059	0.121
Order	2	5	3	1	7	6	4

Table 5. The Total Elemental Sorting for Hierarchy F

Element	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8	F_9	F_{10}
Weight	0.18	0.26	0.09	0.13	0.07	0.03	0.04	0.06	0.05	0.04
Order	2	1	4	3	5	10	8	6	7	9

III. Analysis and Conclusions

(I) The total elemental sorts for Hierarchy A and B indicate that in order to strengthen the competitive powers of our exproting machinery and electrical products, which is our decision-making objective, the Market Index (B_1) is the most important index; the next most important index is the Product Index (B_2); the least important is the Management Index (B_3).

2. Hierarchies B and C are used as subcreterial hierarchies which evaluate the Competitive-Marketing-Powers Index-System, where C_1 is the biggest, indicating that market share plays the most important role in evaluating the competitive powers; the second most important one is the reservation rate of the old clients.

3. The result of the total elemental sorting for Hierarchy D can be utilized in making marketing polices, where D_1 is the largest in number, indicating that increasing sales should be the top strategy, and improving the Porducts Qualities (D_2) is the next. Making the after-sale services better (D_3) is the third most important. All the facts show that, besides the amount of sales and the level of quality, improving service and electrical products.

4. The elements in level E represent the constrains (as blocks) encountered in exporting our machinery and electrical products to the highly competitive world's market, where E_4 is the largest, indicating that the buyer's government intervention is the greatest restriction on trade. It indicates that this is the most important trade block to be overcome.

E_4 is the second largest, showing that it is our production capacity which greatly confines our exporting of machinery and electrical products and inhabits the growth of our competitive powers. Therefore, in order to raise our competitive position in the world's market we must focus on the production capacities and technology level for our machinery and electrical products, realizing the so-called "Three Increase's and One Better", that is, increase the number of product types, increase their production levels and increase their quality levels, and thereby better the economic benefits. E_5 is the least important one, pointing out that the physical distance between the trading countries is the weakest effect on the import and export trade. That result (finding) is a breakthrough for expanding our machinery and electrical exports. We should not limit our trade to nearby countries as in south eastern Asia. Rather, we should work but a globe strategy for expanding our machinery and electrical exports. We should begin to be active in pushing our machineries and electricals into the North and South Americas and the Oceania markets. Recently our prducts have been successfully sold in the US and Australia markets, which is one of the best testimonials.

5. The elements in Hierarchy F represent 12 measures in detail in raising our products competitive position in the international market. F_2 is the largest, indicating that strengthening the competitive powers must be based on improving product qualities. The fact coincides with the internationly well-known principle, "Quality first". F_1 is next; i.e. a rational price is the second most important measure in raising our products competitive position. In the intense competition in the world market, competition is still prominent and we must emphasize pricing. Somebody at present, thinks that the price competition in international trade is down graded so that it can be ignored. Of course this opinion is wrong. We must pay much more attention to price competition reinforce the rational pricing study, and so strengthen our products' competitive powers. The third substantial measure is to satisfy the clients' special requirements with our products (F_4); this is consistent with the theme, "Customers are king", currently worldwide. Among the F measures from 4th to 6th places in terms of important are: developing famous-brand products (F_3); strict adherence to contracts (F_5); and much increasing of the number of oversea's permanent organizations (F_8), respectively. Those analyses and results provide us with much worthy ground for decision-making.

(II) The conclusion

The results of this study that have proved, without any doubt, that it is not only feasible but also effective to apply the AHP method to foreign trade study for industrial goods. As long as we explore it objectively, the AHP method will certainly play a more positive role in expanding the exports of our machinery and electrical products while AHP will certainly be developed further.

This paper is a part of a Hunan Provincial Science and Technology Committee's research project of 1988, "The Strategy and Policies for Expanding the Exports of Hunan Machinery and Electrical Products".