Economic Development Strategy based on AHP-SWOT on the Background of Trade War

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Abstract. Nowadays, the trade war started by USA is becoming the high topic in the world, and it is all clear that USA wants to depress the economy of China by it. It is great useful for making decision or making a choice to analyze economic development strategy based on SWOT, which means analyzing the strength, the weakness, the opportunity, and the threat. AHP is also used by building analysis matrix model to qualitatively estimate and quantitatively evaluate the influent factors and strategy measures. The aim is to make some good choices and decisions, which can provide some reference for China's economic development hopefully.

Keywords: trade war, economic development strategy, AHP, SWOT.

1. Introduction

In recent years, the United States has been hyping up the so-called "Thucydides Trap", making public opinion guidance for inevitable conflicts between established powers and emergent great powers, with the intention to delay China's economy development and disrupt China's economic development strategy, although President Xi's repeatedly announced "peaceful rise" and "never seek hegemony" on several important occasions. The United States does not understand the spirit of China's extensive and profound traditional Confucian culture. In the "National Strategy of the United States", China is called a "revisionist country". And the United States still goes its own way by starting the trade war. It is particularly important to scientifically analyze the international economic environment and formulate reasonable development strategies as a basis for the unified planning and guidance of national economic construction, technological development and resource development, to effectively respond to the unbridled and irrational behavior of the United States. SWOT analysis is a mature method of strategic analysis in strategic management. Combined with AHP, it can effectively study the economic development strategy by give better play to the characteristic advantages of qualitative analysis and quantitative analysis [1].

2. AHP-SWOT Method

The theory of SWOT originated from the 1960s, and was put forward by E. P. Learned, the management professor of Harvard University. It has been gradually popularized and widely used in making enterprise strategic plans, by systematically evaluating various factors of internal and external environment, so as to facilitate the selection of the best business strategy. As to the China's economic development strategy, we can obtain the four sets of strategy matrix including the external and internal factors of economic development as well as its own strengths and weaknesses. See Table 1.

Table 1. SWOT Composite Matrix

External conditions	Internal conditions	
	Strengths (S)	*weaknesses (W)*
Opportunity (O)	SO strategy (growth strategy) play to its own advantages and use external opportunities	WO strategy (reverse strategy) to take advantage of external opportunities and overcome its own disadvantages
Threat (T)	ST strategy (diversification strategy) utilizes its own advantages to avoid external threats	WT strategy (defensive strategy) overcomes its own disadvantages and avoids external threats

We need to construct the hierarchical structure model and use AHP to judge the relative importance of each factor at each level when establishing the SWOT analysis model of China's economic development strategy. Through professional questionnaires and interviews, we can get the judgment value of the importance of each factor at each level, and then form a judgment matrix, A, S, W, O, T, and then calculate the feature vector W corresponding to the maximum eigenvalue n. After normalization, the sorting weight of the factors at the same level for the relative importance of a factor at the previous level is obtained, which is the single hierarchical ordering. And then the consistency test is conducted to determine whether to accept or not. After a consistency check, a four and a half d coordinate system are constituted with four variables as half shaft, advantage value S, disadvantage value W, opportunity value O and threat value T, according to the calculated values of variables, tracing and wiring on the corresponding half axis in the coordinate system, the strategic quadrilateral is obtained. At last, quadrant two Angle area is needed to be calculated to determine the strategic position, to put forward the strategic options.

3. Economic Development Strategy Analysis based on AHP-SWOT

3.1 Establish the SWOT Analysis Model of Economic Development Strategy

In view of the internal and external environment of economy development, we are focusing on the following aspects, the economic development situation, scientific and technological innovation, domestic market development, financial system improvement and legal system, etc., through interviews and surveys of experts in the economic field, combined with academic research, to list the SWOT analysis model of China's economic development strategy.

3.2 Quantitative Analysis of the Key Factors in SWOT Model

The relative importance of each factor was compared between any two by the decision makers participating in the evaluation, and the judgment matrix A was obtained by AHP method, as shown in table 3.The maximum Characteristic root value λ_{max} of the judgment matrix A is calculated, and tested for consistency. Similarly, the relative importance of internal strengths S, weaknesses W, external opportunities O and threats T was compared between any two, and the judgment matrix S, W, O, T are obtained in turn.

Table 2. Economic Development Strategy SWOT Matrix [2-5]

	Strengths (S)	Weaknesses (W)
Internal condition	**S1.** The domestic economy has entered into the new normal stage, and the transformation of old and new drivers of growth has been constantly promoted, which makes the economic develops with high quality. **S2.** A new round of technological and industrial revolution with Internet as the core is started. New technologies such as artificial intelligence and virtual reality are changing with each passing day. The virtual economy and real economy are developed together. **S3**. The industrial system is integrity, the technological level is continuously improved, and the number of economic talents is growing. These all provide strong support for the economy and development. **S4.** China has the huge domestic market, and there is still a large potential for the consumption of residents. **S5**. The financial system is on track, and the financial industry is playing a huge role in supporting economic growth and serving the individuals and enterprises.	**W1**. The top-level design of the economy still needs to be strengthened. There are shortcomings in economic construction, such as imbalance of regional development and imbalance of urban and rural economy. **W2**. There is a lack of core key technologies. The innovation capacity in the economic field needs to be strengthened, including technological innovation and management innovation. **W3**. The proportion of the working population decreases, which leads to the weakening of the energy to make economy grow. **W4**. The system of laws and regulations is not sound, and the supporting laws and regulations need to be strengthened. **W5**. Potential systemic financial risks are also accumulating, and China's financial industry still has many deficiencies.
	opportunity (O)	threat (T)
External condition	**O1.** Peaceful development has become an important consensus of the world. **O2.**The coordinated development of "One Belt And One Road" and "BRICS" provides a bright prospect for economic development. **O3.** There is a clear willingness of major western countries for economic cooperation, and the cooperation is deepening. **O4.** The major western economies, out of their own considerations, do not want the economy to deteriorate and are willing to safeguard it.	**T1**. The external environment of economy is becoming increasingly sluggish and economic growth is under threat. **T2**. Bulk commodity prices, which affect the national economy and people's livelihood, are still largely subject to the control of other countries. **T3**. Domestic industrial upgrading is in a critical period, which coincides with the peripheral environment of international economic decline. **T4**. The Trump administration is pursuing a so-called "America first" strategy, under which the economic risks can not to be underestimated. **T5**. In order to maintain economic hegemony, the United States exerts strong intervention in other countries by means of economy and military, which challenges the steady economic development seriously.

Table 3. Judgment Matrix of Economic Eevelopment Strategy

A	S	W	O	T
Strenghts S	1	4	3	2
Weaknesses W	1/4	1	1/3	4
Opportunities O	3	3	1	3
Threats T	1/2	1/4	1/3	1

Table 4. Judgment Matrix S of Economic Development Strategy

Strenghts S	S1	S2	S3	S4	S5
S1	1	5	1/3	6	7
S2	1/5	1	1/5	1/3	1/5
S3	3	5	1	1/3	5
S4	1/6	3	3	1	5
S5	1/7	5	1/5	1/5	1

Table 5. Judgment Matrix W of Economic Development Strategy

Weakness w	w	w2	w3	w4	w5
w1	1	3	3	1/3	5
w2	1/3	1	1/3	1/5	7
w3	1/3	3	1	1/5	5
w4	3	5	5	1	5
w5	1/5	1/7	1/5	1/5	1

Table 6. Judgment Matrix 0 of Economic Development Strategy

Opportunities O	O1	O2	O3	O4
O1	1	1/3	3	1/5
O2	3	1	5	1/3
O3	1/3	1/5	1	1/3
O4	5	3	3	1

Table 7. Judgment Matrix T of Economic Development Strategy

Threats T	T1	T2	T3	T4	T5
T1	1	1/5	1/3	3	1/3
T2	5	1	3	7	3
T3	3	1/3	1	3	5
T4	1/3	1/7	1/3	1	3
T5	3	1/3	1/5	1/3	1

Passing the consistency test of CI, RI and CR indicators, the eigenvalues and eigenvectors of the judgment matrix mentioned above can be used as the basis for weight calculation.

Table 8. Total hierarchical order of total target by internal and external factors

	X1	X2	X3	X4	X5
S	0.1310	0.0148	0.1120	0.0946	0.0321
W	0.0373	0.0192	0.0239	0.0738	0.0071
O	0.0515	0.1013	0.0335	0.1910	
T	0.0075	0.0346	0.0189	0.0074	0.0085

Then, the intensity of the factors summarized above was graded. Referring to the relevant literature study, we divided the intensity into 10 levels, where the factor intensity strength (S) and opportunity (O) are expressed by positive values, taking 1~10. The factor intensity of weakness (W) and threat

(T) are expressed in negative values, taking -10~-1. The bigger the absolute value, the bigger the factor intensity. 10 experts were asked to grade various factors, and the DeIphi method was applied. After three rounds of collection of opinions and information feedback, the consistent results were obtained, as shown in table 9.

Table 9. Intensity rating scale of internal and external factors

S₁	S₂	S₃	S₄	S₅
8	7	6	4	4
W₁	**W₂**	**W₃**	**W₄**	**W₅**
-7	-5	-5	-8	-4
O₁	**O₂**	**O₃**	**O₄**	
7	6	6	5	
T₁	**T₂**	**T₃**	**T₄**	**T₅**
-6	-7	-7	-5	-8

3.3 Construction of Strategic Quadrilateral

According to the calculation formula of total intensity, the total intensity of S, W, O, and T are calculated as follows:

$$FS = \sum_i^5 S_i \bullet X_i = 2.3306; \quad FW = \sum_j^5 W_j \bullet X_j = -1.0955; \quad FO = \sum_k^4 W_k \bullet X_k = 2.1248; \quad FT = \sum_h^5 T_h \bullet X_h = -0.5236$$

After determining the total order of each influencing factor of SWOT for strategic selection, the SWOT quadrilateral can be used for strategic selection. Use the four variables, S, W, O and T,, as semi-axes to form a four-half-dimensional coordinate system Corresponding points S_1, W_1, O_1 and T_1 of FS, FW, FO, FT are found respectively in the four-half-dimensional coordinate system. The strategic quadrilateral can be obtained by connecting four points in sequence with line segments, as shown in figure 1.
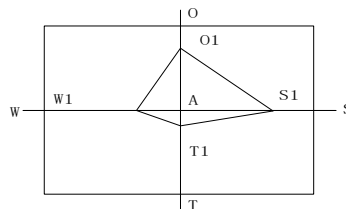

Figure 1. Strategic quadrilateral

Then the following calculation can be obtained:

$$S_{SAT} = \frac{1}{2}\overline{S_1A}.\overline{T_1A} = \frac{1}{2} \times 2.3306 \times 0.5236 = 0.6101$$
$$S_{SAO} = \frac{1}{2}\overline{S_1A}.\overline{O_1A} = \frac{1}{2} \times 2.3306 \times 2.1248 = 2.4760$$
$$S_{OAW} = \frac{1}{2}\overline{O_1A}.\overline{W_1A} = \frac{1}{2} \times 2.1248 \times 1.0955 = 1.1639$$
$$S_{WAT} = \frac{1}{2}\overline{W_1A}.\overline{T_1A} = \frac{1}{2} \times 1.0955 \times 0.5236 = 0.2868$$

Therefore, the order of strategic choices can be obtained as follows: $SO > WO > ST > WT$.

At the same time, the barycenter coordinate P (X, Y) of strategic quadrilateral was calculated:

$$P(X, Y) = \left(\frac{\sum x}{4}, \frac{\sum y}{4}\right) = (0.6175, -0.8006)$$

3.4 Determination of Specific Strategies

For the same type of strategy, we can either adopt a proactive attitude or a stable and conservative attitude. Therefore, for the same type of strategy, the strategic intensity should also be determined. The positive strategic intensity is defined as: $U = O_1 . S_1$, that is, the positive strategic intensity is the result of the interaction of external opportunities and internal strengths. The negative strategic intensity is the result of the interaction of external threats and internal weaknesses. The formula is $V = T_1 . W_1$.

What kind of intensity should be adopted should be considered comprehensively positive strategic intensity and negative strategic intensity. For that, we can judge by calculating the strategic intensity coefficient. The strategic intensity coefficient ρ is defined as $\rho = U/(U+V)$, and the magnitude of ρ reflects the implementation intensity of the strategic type, $\rho \in [0, 1]$. With the increase of U value, the strategic intensity coefficient increases, indicating that the strategic intensity increases. When V value increases, the strategic intensity coefficient decreases, indicating that the strategic intensity decreases. Generally, 0.5 is used as the critical point. The exploiting strategy is adopted when $\rho > 0.5$. When $\rho < 0.5$, the conservative strategy is adopted. When analyzing SWOT model, strategic type is identified by strategic azimuth θ, and strategic intensity is judged by strategic strength coefficient ρ. Then the schematic diagram of strategic type and strategic intensity is made (see figure 2).

According to the coordinates of the barycenter, calculate θ, U, V and ρ respectively. The results are as follows:

$$\theta = arc \tan\left(\frac{Y}{X}\right) = 52.3559° \qquad U = O_1 \cdot S_1 = 4.9520$$

$$V = T_1 \cdot W_1 = 0.5736, \qquad \rho = \frac{U}{U+V} = 0.8962$$
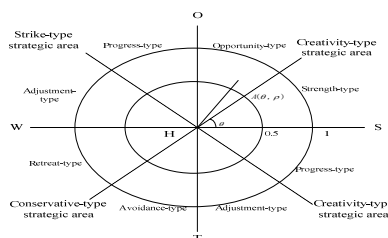

Figure 2. Schematic diagram of strategic type and strategic intensity

4. Conclusion

According to the calculation, the strategy should be selected, and it is an opportunistic strategy. The SWOT analysis matrix of economic development is shown in table 2. On the occasion of the overall industrial upgrading of the national economy and the world's major countries desire of steady economic development, we should promote the open development of our national economy actively through "One Belt and One Road" strategy and the overall cooperation among "BRICS". We should strengthen the scientific and technological innovation and make use of the full industrial system to promote economic upgrading and transformation. We should improve the overall ability and quality of economic talents by cooperation, communication and the cultivation of internationalized economic talents. We also should improve the financial system and relevant laws and regulations, and deepen the reform of the country's economic policy system.

5. Epilogue

In this paper, AHP-SWOT method is used to analyze the economic development strategy, which is only one of many methods to study the development strategy. It is proved that AHP-SWOT analysis

method can well combine qualitative analysis with quantitative analysis, it can help make relatively scientific, accurate and reliable development strategies. However, it must be pointed out that the correlation between various factors still needs to be further considered. And the economic development strategy is complex and systematic, which is limited by many realistic factors. Therefore, how to ensure the comprehensiveness of strategic analysis and the accuracy of calculation remains to be further studied.

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