Study on Selection of Niche Competitive Strategy of Enterprises

Benyi Xie

Jiangnan University, Wuhan, China

This paper constructed a comprehensive enterprise niche overlap model by niche overlap model and features of relationships among enterprises, put forward a quantitative selection matrix of niche competitive strategy of enterprises by niche fitness model and comprehensive enterprise niche overlap, and finally made empirical study on Wuhan port, Jinzhou port, Huangshi port, and Yichang port. The conclusion is as follow: Wuhan port is whale type enterprise which should choose symbiosis development strategy, Yichang port is shark type enterprise which should choose symbiosis development strategy mainly and part of niche separation strategy secondary, Jinzhou port and Huangshi port are crab type enterprises the competitive strategy of which is: niche separation strategy and niche compression strategy mainly and supplemented by niche expansion strategy.

Keywords: niche theory, competitive strategy, selection matrix, niche fitness, niche overlap

Introduction

The enterprise competition strategy refers to both the goal of an enterprise for competition and the way to achieve that goal. The most classic theory of competition strategy presently is Potter's (2003) "competitive strategy" which is still widely used. However, with the development of economy, the competition theory of Potter is being questioned (Chen, 2011) for the unclear concept and problems of practical application. Therefore, scholars have been trying to find a new method to study the enterprise competition strategy from the other direction. Because of the similarity between the characteristics of the species in ecology and the competition of enterprises, the competition strategy of enterprises based on ecology has been paid much attention by scholars. But there is still a lack of quantitative analysis which causes a lack of credibility. Based on this, this paper introduced the ecological niche model in ecology, combined with ecological competitive strategy of enterprises, put forward a ecological competitive strategy for enterprises, trying to make up for gaps in relative researching field and provide the reference for the enterprise competition strategy.

Enterprises Competitive Strategy

Enterprise Niche Competitive Strategies

Niche theory is an important theory in ecology which represents the generalized resources occupied by a species in its habitat. In ecology, a niche not only represents the status of a creature in its habitat, but also reflects the interaction with other species in the ecological environment. Hutchinson described niches in math, he deemed that a niche is a n-dimensional hyper volume space composed of the generalized resources occupied by the specie, every dimension represents a kind of resource occupied by the specie, as shown in the following table.

Benyi Xie, doctor, Institute of Commercial of Jiangnan University, Wuhan, China.

Correspondence concerning this article should be addressed to Benyi Xie, Institute of Commercial of Jiangnan University, No. 8 Sanjiaohu Road, Caidian District, Wuhan, China.

Table 1

N-dimensional Hyper Volume Space of a Niche

Species	The dimension of resources			
1	X_{11}	...	X_{1n}	Y_1
...	...	...	X_{2n}	Y_2
i	X_{i1}	...	X_{in}	...
	...	...	...	...
m	X_{m1}	...	X_{mn}	Y_m
	X_1	...	X_n	

X_i represents the total number of i resources in the environment, X_{ij} indicates the amount of j resource occupied by specie i , Y_i represents the total amount of resources occupied by specie i . For enterprises, the enterprise niche can be regarded as an n -dimensional hyper volume space composed of the general resources occupied by the enterprise in market competition, and it reflects the competitiveness of the enterprise and the competitive relationship of it with other enterprises.

According to the Gauss principle “Two competing species cannot coexist for a long time in the same niche (Hutchinson, 1957)”, and interpretation of niche fitness “less gap between realistic niche and ideal niche of a specie, more easily for it to survive”. A conclusion can be obtained that, the higher the niche overlap degree between a species and other species around, the competition between them becomes more intense. The higher the niche fitness of a species, the easier for it to win in the competition. Based on relationship between enterprise niche and biological niche, niche competition strategies could be proposed as follows: (1) the niche separation strategy, a strategy that the enterprise separates its niche from the niche of other enterprises by changing the dislocation of the regional division of labor, thereby reducing the resources competition; (2) niche compression strategy: an enterprise gives up part of its niche, focuses on the development of the existing or potential niche part so as to survive and develop better in market competition; (3) the niche expansion strategy: an enterprise explores the potential niche or consolidates existing niche competitiveness, so as to improve the ecological niche suitability; (4) symbiosis strategy: an enterprise promotes cooperation with other enterprises, establishes strategic alliances, and seeks common development.

Model Construction of Competitive Strategy Selection of Enterprises

Combined with features of enterprise competition and niche competition strategies, the paper constructed a model of competitive strategy selection of enterprises which is similar to Boston model. The abscissa is niche fitness which represents the competitive power of the enterprise in competition environment. Ordinate is the comprehensive niche overlap, which indicates the degree of enterprise's competition threat. The matrix divides enterprises by niche fitness and comprehensive niche overlap into four categories: shark type enterprise, whale type enterprise, crab type enterprise, and shellfish type enterprise, each enterprise has its own suitable niche competition strategy, as shown in Figure 1.

Figure 1. Niche competitive strategy matrix of enterprises.

Whale type enterprise. A whale is strong in the sea, rarely has food competition since its foods are small fishes, shrimps, and other creatures, one of the safest species in the sea. Whale type enterprise represents enterprises which have high niche fitness and low niche overlap are very safe in competition environment. The suitable niche competitive strategy of this kind of enterprise should be symbiosis development strategy.

Shark type enterprise. Sharks are the beasts in the sea. They often fight for food with other animals and always win. Shark type enterprise refers to enterprises with high niche fitness and high niche overlap, their threatened degree is high which causes strong competition, but because of their strong competitiveness they always win, this kind of enterprise in the competitive environment is also very safe, only needs to be careful with whale type enterprises and other shark type enterprises, the niche competition strategy should be symbiotic development strategy mainly, supplemented by niche separation strategy.

Crab type enterprise. Crabs are very aggressive creatures in the sea, but because of their poor strength, they often lose fights. Crab type enterprise refers to a kind of enterprise which has low niche fitness but high niche overlap. Due to their high niche overlap, this kind of enterprises competes a lot but always loses the competition because of their low niche fitness, and is most insecure kind of enterprises. The niche competitive strategy of this kind of enterprises should be niche dislocation separation strategy and niche compression strategy mainly, and niche expansion strategy is secondary.

Shellfish type enterprise. Shellfishes are weak in the sea, but they seldom encounter fights with other creatures in the sea because their food is different from other carnivores. Shellfish type enterprise refers to enterprises with low niche fitness and low niche overlap. Although the strength of this kind of enterprise is weak, the niche overlap with other enterprises is also low, so the competition is not fierce, safer than crab type enterprises, it will be no longer safe when other types of business enterprises start to have niche overlap with it because of niche expansion. The niche competitive strategy of such enterprises should be niche compression strategy mainly and niche expansion strategy is secondary.

In order to determine the category of an enterprise, we need to quantify the niche overlap and niche fitness of an enterprise.

The niche fitness model is used to quantify the niche fitness of an enterprise:

$$p_i = \frac{1}{n} \sum_{j=1}^n \frac{\min\{|y'_{ij} - y_{aj}|\} + \varepsilon \max\{|y'_{ij} - y_{aj}|\}}{|y'_{ij} - y_{aj}| + \varepsilon \max\{|y'_{ij} - y_{aj}|\}} \quad (1)$$

In this formula, P_i represents the niche fitness of an enterprise, y'_{ij} represents the utilization degree of resource j by enterprise i , y_{aj} represents the optimum level of j resource, ε represents the model parameter.

As for the quantification of comprehensive niche overlap, there is no model that can be directly represented. Based on niche overlap formula “ α method” and features of niche competition, we indicate a formula to calculate the comprehensive niche overlap as shown in formula (2):

$$A_i = \sum_{j \neq i}^n \sum_{a=1}^R \frac{p_{ia} p_{ja}}{\sqrt{(\sum_{a=1}^R p_{ia}^2)(\sum_{a=1}^R p_{ja}^2)}} * \frac{(p_j - p_i)}{\sum_{i=1}^n (p_j - p_i)} \quad (2)$$

Among them, A_i is the comprehensive niche overlap which represents risky degree of an enterprise in environment, and the higher the A_i , the more risky will be the enterprise. p_{ia} and p_{ja} refer to the status of the utilization of resource a by enterprise i and enterprise j . p_i , p_j indicate the niche fitness of enterprise i and enterprise j . n is the total number of enterprises, and when $n = 2$, A_i indicates the niche overlap between enterprise i and enterprise j . Different from quadrant division method of Boston matrix, because the selection of a competitive strategy of an enterprise is referred to its relative position in market environment. Since $0 \leq p_i \leq 1$, $0 \leq A_i \leq 1$, we use $p_i = A_i = 0.5$ to divide the four quadrants of the enterprise competitive strategy selection matrix.

Empirical Analysis

Construction of Niche Index System

As the main part of midstream Yangtze river shipping center, the relationship among Hubei province port group is a valuable research issue for enterprise competition. Since that, Wuhan port, Huangshi port, Yichang port, and Jinzhou port are chosen as research objects. According to data of 2016 port statistical yearbook and 2016 Hubei province statistical yearbook, combined with general conceptions of niche and port features, the n -dimensional niche hypo space of Hubei province port group was constructed with five dimensions: Resource dimension, market dimension, economy dimension, society dimension, and environment dimension which composed of 21 indexes as shown in Table 2.

Table 2

N-dimensional Niche Hypo Space of Four Port Enterprises

	Resource niche			Market niche			Economy niche			Society niche			Environment niche		
	Berth length/meter	...		Cargo throughput/ten thousand tons	...		Port city GDP/0.1 billion	...		Number of employees in the city/ten thousand people	...		Air environment rate/%	...	
Wuhan port	21,013	...		7,701	...		9,057.21	...		198.5	...		45.6	...	
Jingzhou port	33,889	...		2,618.82	...		1,334.93	...		41.6	...		68.5	...	
Yichang port	71,200	...		6,169.14	...		2,818.07	...		85	...		85.2	...	
Huangshi port	7,588	...		2,098.2	...		1,142.03	...		33.4	...		87.5	...	

Model Calculation

According to data in Table 2 with formula (1) and (2), niche fitness and comprehensive niche overlap could be calculated as shown in Table 3 and Table 4:

Table 3

The Calculation Result of Niche Fitness of Four Port Enterprises

	Resource niche		Market niche		Economy niche		Society niche		Environment niche		Resource niche	
Wuhan port	0.5425	1	0.6342	1	1.0000	1	1.0000	1	0.4337	3	0.7894	1
Jingzhou port	0.0999	3	0.0693	3	0.0702	4	0.0743	3	0.1473	4	0.0904	4
Yichang port	0.5367	2	0.4806	2	0.0862	2	0.0937	2	0.7029	1	0.3581	2
Huangshi port	0.0685	4	0.0607	4	0.0758	3	0.0704	4	0.5099	2	0.1349	3

Table 4

Calculation Result of Niche Overlap Between Two Port Enterprises and Comprehensive Niche Overlap of Four Port Enterprises

	Wuhan port	Jingzhou port	Yichang port	Huangshi port	Comprehensive niche overlap
Wuhan port	1	0.7282	0.6968	0.6901	0.2975
Jingzhou port		1	0.9130	0.8247	0.7379
Yichang port			1	0.8112	0.5405
Huangshi port				1	0.6627

Combined the data of Table 3 and Table 4 with Figure 1, the category division of four port enterprises is shown in Figure 2:

Figure 2. Selection result of four port enterprises.

Selection of Competitive Strategy of Four Port Enterprises

According to the competitive strategy selection matrix, Wuhan port is whale type enterprise which should choose symbiosis development strategy, Yichang port is shark type enterprise which should choose symbiosis

development strategy mainly and part of niche separation strategy secondary, Jinzhou port and Huangshi port are crab type enterprises the competitive strategy of which is: niche separation strategy and niche compression strategy mainly and supplemented by niche expansion strategy.

Therefore, Hubei port group should be closely linked with the midstream Yangtze river shipping center and form a stable port alliance. First of all, Wuhan port and Yichang port, as the core port and secondary core port, should do the leading role by actively promoting the cooperation among ports and the resources integration. Secondly, Yichang port should choose part of the niche separation strategy, and promote the development of the climbing over Three Gorges transit logistics business and Western Hubei tourism passenger services. Finally, Jingzhou port and Huangshi port, as the crab type enterprises, the competitive strategy should change their positions to be feeder ports of Wuhan port and develop synergistically with Wuhan port and Yichang port.

Conclusion

At present, the application of ecology theory in social science field is still in the initial stage, this paper used niche theory in ecology to study competitive strategy of enterprises, constructed a niche competitive strategy selection matrix, and used four port enterprises of Hubei province as empirical objects, putting forward a new method of competitive strategy selection method of enterprises.

References

- Chen, Y. (2011). Logical reconstruction of the foundation of the general competitive strategy. *Chinese Journal of Management*, 8, 1146-1155.
- Hutchinson, G. E. (1957). Concluding remarks—Cold spring harbor symposia on quantitative biology. *Quant*, 22, 66-77.
- Kasimoglu, M., & Hamarat, B. (2003). Niche overlap-competition and homogeneity in the organizational clusters of hotel population. *Management Research News*, 26(8), 60-77.
- Porter, M. (2003). *Competition theory* (pp. 1-15) (M. X. Li Trans.). Beijing: CITIC Press.
- Yan, Q. (2007). *Study on the optimization of inter firm relations based on Niche Theory*. Shanghai: Tongji University.