

The Influence of the Red Queen Theory on Enterprise Survivability in a Dynamic Environment

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Abstract: With the intensification of environmental pollution, sustainable development has become a new direction advocated by the party and the country. Faced with the ever-increasing demand for green in the market, organizations need to find ways to maintain competitiveness in the changing logic of competition. The Red Queen theory emphasizes the importance of competition logic and competitive experience. How the industry can improve its survivability in a dynamic environment is the key issue studied in this article. This paper explores the impact of competitive experience on corporate performance, and uses environmental dynamics as a moderating variable, selecting 24 listed banks from 2016 to 2020 as the research objects, and draws the following conclusions: (1) Competitive experience can effectively improve corporate performance (2) Environmental dynamics positively regulate the relationship between competitive experience and corporate performance, and provide useful enlightenment for improving organizational viability.

1 INTRODUCTION

In the report of the 19th National Congress of the Communist Party of China, it is proposed that the development concept of innovation, coordination, greenness, openness, and sharing should be effectively implemented, taking into account economic and ecological benefits, and promoting sustainable development. For enterprises, from focusing on rapid economic growth to focusing on economic green development, how to maintain their competitiveness in the changing logic of competition has become an important issue.

The Red Queen theory believes that competition is a zero-sum game, where the profit of one party represents the loss of the other party. When two organizations are competitors to each other, the progress of the target organization triggers the learning behavior of the opponent organization, and the improvement of the opponent organization's ability in turn stimulates the problem search of the target organization (Deng, Guo 2020); the logic of competition is inherent, only when a company has accumulated a wealth of competitive experience in the fierce competition, can it glimpse the face of the competition logic and adapt it to it.

So how much impact does the environmental change have on the company? How does competitive experience affect enterprise viability? How can companies use competitive experience to better survive in a dynamic environment? From the perspective of the Red Queen theory, this article explores the impact of competitive experience on corporate viability by analyzing changes in the logic of competition, and provides suggestions for companies to improve their organizational viability.

2 THEORETICAL SUMMARY

The Red Queen theory is a hypothesis put forward by the biologist Leigh Van Valen in 1973, which vividly explains the evolutionary process of symbiosis between biological species. Apply the Red Queen Theory to Organizational Competition, the Red Queen theory includes two aspects:

Competitive experience: Barnett and Hansen (1996) introduced the Red Queen theory to organizational survival: the target organization learns in order to make itself stronger and gains a slight advantage in the competition, which in turn promotes the learning behavior of competitors; the competitiveness of competitors is enhanced,

Resulting in the target organization being at a disadvantage in the competition and the lack of resources, so that another round of problem search is carried out. The two compete with each other and influence each other, accumulating rich competitive experience. Deng Xinming, Guo Yanan (2020) proposed that the more recent competitive behaviors, the more advantageous the competitive experience it produces will be to the enterprise and the more it can improve the viability and competitiveness of the enterprise; the more long-term competitive experience the more adverse the impact on the enterprise. Will reduce the viability and competitiveness of enterprises. (Yu, Wang, Duan 2012, Zeng, Zhou, Chen 2004)

Competitive Logic: Competitive logic has evolved in the competition between enterprises again and again. It is the rules of competition, the way of competition, and the key to the success or failure of competition. Enterprises will discover the competition logic after gaining a wealth of competitive experience. This article discusses based on these two aspects.

3 MATERIALS AND METHODS

3.1 The Impact of Competitive Experience on Corporate Performance

The longer the organization exists, it means that the organization has withstood the test of the past, and the competition experience is relatively richer. Compared with the short-lived organization, they can use more successful experience, which is more conducive to the development of corporate performance.

In addition, companies with relatively rich competitive experience are more adaptable to the environment than those without competitive experience, and are more conducive to the survival of the company. According to the resource-based theory, the internal organizational capabilities, resources, and knowledge accumulation within an enterprise are the key to explaining that an enterprise obtains excess returns and maintains a competitive advantage.

According to the Queen of Hearts competition theory, the competition is a group of organizations capable of continuous learning. Learning in the competition can bring more knowledge to the enterprise. Like the external environment, the internal

resources of the company also play a major role and play a decisive role in creating a competitive advantage in the market. This shows the importance of the accumulation of corporate knowledge and historical competition experience for companies to face competition.

In summary, this article proposes: In summary, this article proposes:

H1: Competitive experience has a positive impact on corporate performance.

3.2 The Regulating Effect of Environmental Dynamics

The strategic choice theory believes that the enterprise is in an open system and interacts with the surrounding environment. When selecting strategic behaviors, managers need to consider the internal and external environments faced by the enterprise (Child 1997)

Environmental dynamics is the dynamic characteristics of the environment, which mainly refers to the fact that the external environment on which enterprises depend for survival and development is constantly updated and difficult to accurately predict. The dynamics of the environment in the Red Queen theory are manifested as changes in the logic of competition. Enterprises will learn independently to discover and adapt to the logic of competition; the logic of competition is the rules of competition, the way of competition, and the key to the success or failure of competition. Due to changes in the environment, market competition rules, competition methods, and corporate win-loss criteria have changed. The changes in these elements are in line with the definition of competition logic. Therefore, the Red Queen theory is suitable for studying the relationship between the environment, ecology, and individual companies.

Environmental dynamics, from a macro perspective, are reflected in a series of changes in policies and standards, and from a micro perspective, they are reflected in the emergence of new technologies, the rise of new competitors, changes in competitive concepts, and so on.

The original competitive environment is very different from before. According to the Red Queen theory, when the environment undergoes major changes, the above-mentioned series of changes all reflect that the logic of competition is also changing accordingly. At this time, the competitive experience derived from the fierce battle in the original competition logic will no longer apply.

In a dynamic environment, when the logic of competition changes, the company's original competitive experience may have a negative impact on the company because it does not adapt to the new competitive environment. Every competition has a subtle impact on the enterprise. Therefore, the closer the time of the competition, the closer the competitive experience will be to the changing logic of competition. The greater the impact of the competitive experience on the enterprise, the greater the company's ability to survive and improve. The more long-term competitive experience, the more suitable the original competition logic, the more unfavorable the impact on the enterprise, and the lower the survival and competitiveness of the enterprise. If you insist blindly, the company will fall into a competitive trap, and thus go into decline.

H2a: Environmental dynamics positively regulate the impact of competitive experience on corporate performance

H2b: Environmental dynamics negatively regulate the impact of competitive experience on corporate performance

Based on the above analysis, the research model of this paper is shown in Figure 1

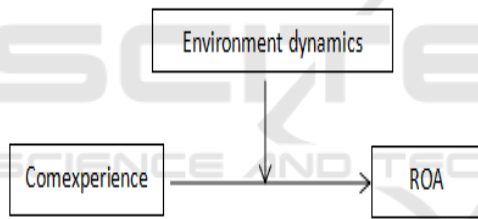


Figure 1: Theoretical model.

4 RESULTS & DISCUSSION

4.1 Data Source

This paper selects 24 listed banks from the wind database and the Guotaian database as the research sample, and eliminates the samples of ST and delisted companies and companies with missing important variables. This article is based on the scientific development concepts and development methods proposed by the Fifth Plenary Session of the Eighteenth Central Committee to guide my country's development during the 13th Five-Year Plan period and even more long-term development. Therefore, the period from 2016 to 2020 is selected as the research time.

4.2 Variable Measurement

4.2.1 Corporate Performance

This article selects ROA, the rate of return on assets, to reflect the performance level of an enterprise, and the measurement formula of competitive experience refers to Deng Xinming's measurement method (2020) (Deng, Guo, Long, Lin 2020):

$$Comexperience_{it0} = \frac{\sum_{t=1}^{t_0} (D_{it} \times \sum_{j \neq t} D_{jt})}{\sum_{j \neq t} D_{jt0}}$$

Among them, t_0 represents the year of the sample, that is, the age of the sample in the current year; D_{it} and D_{jt} are binary indicator variables. If the company $i(j)$ exists in the market in year t , it is 1, otherwise it is 0.

4.2.2 Environmental Dynamics

With reference to Zeng Deming's (Zeng, Zhou, Chen 2004) measurement method of environmental dynamics, the environmental dynamics is measured by the coefficient of variation of the operating income of the sample enterprises over 5 years. This paper calculates the ratio of the standard deviation of the main business income of the sample enterprises to the mean value in the past 5 years, and takes the logarithm to express.

4.2.3 Model Construction

$$ROA_{it0} = \beta_0 + \beta_1 Comexperience_{it0} + \beta_2 ED_{it0} + \beta_3 Comexperience_{it0} \times ED_{it0} + e_{it0}$$

Among them, t_0 represents the year of the sample, that is, the age of the sample in the current year; ROA represents the corporate performance of firm i in t_0 ; $Comexperience_{it0}$ represents the competitive experience, ED_{it0} represents the dynamics of the environment, and e_{it0} is the random disturbance item.

4.2.4 Descriptive Statistical Analysis

First of all, this article carried out a variable correlation analysis for each variable, and the test results are shown in Table 1. According to relevant test data, there is a significant positive correlation between competitive experience and corporate performance (0.440, $P < 0.05$); the correlation coefficient between the logarithm of environmental uncertainty and corporate performance is positive, but not significant (0.002, p -value) 0.979); there is a negative correlation between the logarithm of environmental uncertainty and competitive experience (-0.309, $p < 0.1$)

Table 1: Pairwise correlations.

Variables	(1)	(2)	(3)
(1) roa	1.000		
(2) exp	0.440*	1.000	
	(0.000)		
(3) lned	0.002	-0.309*	1.000
	(0.979)	(0.001)	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

From the results in Table2, it can be seen that the F value is 16.021, and $P < 0.01$ indicates that the overall model is at the 1% level. The competitive experience t value is 5.66, indicating that this variable is significant. It can be seen from the model that the regression coefficient between competitive experience and enterprise performance is 0.01, and it is significant at the level of 1%, indicating that if the competitive experience is added for one year; The logarithm of environmental dynamics is positively

correlated with corporate performance, but the significance is not obvious. The enterprise performance will increase by 0.01. Therefore, the more competitive experience of listed banks, the better the ROA performance level, and the better the follow-up performance level, because a good historical performance level can contribute to the company's business development and provide certain resource support.

Table 2: Linear regression.

roa	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
exp	.01	.002	5.66	0	.006	.013	***
lned	.276	.155	1.78	.078	-.031	.584	*
Constant	.143	.036	3.93	0	.071	.215	***
Mean dependent var		0.116	SD dependent var			0.042	
R-squared		0.215	Number of obs			120	
F-test		16.021	Prob > F			0.000	
Akaike crit. (AIC)		-441.699	Bayesian crit. (BIC)			-433.337	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table3 reports the test results of environmental dynamics. Competitive experience and corporate performance are significantly positively correlated at the level of 1%; after the introduction of environmental dynamics and interaction terms between environmental dynamics and competitive

experience, competitive experience and environmental dynamics And the interaction terms of the two are significantly positive at the 1% level, indicating that the impact of competitive experience on corporate performance increases with the increase of environmental dynamics.

Table 3. Linear regression.

roa	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
exp	.088	.016	5.45	0	.056	.12	***
lned	-1.116	.319	-3.50	.001	-1.749	-.484	***
explned	.327	.067	4.87	0	.194	.46	***
Constant	-.184	.075	-2.46	.016	-.333	-.036	**
Mean dependent var		0.116	SD dependent var			0.042	
R-squared		0.348	Number of obs			120	
F-test		20.665	Prob > F			0.000	
Akaike crit. (AIC)		-462.032	Bayesian crit. (BIC)			-450.882	

*** $p < .01$, ** $p < .05$, * $p < .1$

5 CONCLUSIONS

This paper selects 24 listed banks from 2016 to 2020 as the research objects, examines the impact of competitive experience on corporate performance, and analyzes the moderating role of environmental dynamics in this process. This article draws the following main conclusions: (1) Competitive experience can effectively improve corporate performance (2) Environmental dynamics positively regulate the relationship between competitive experience and corporate performance.

Enhancing corporate viability is the top priority of Chinese companies, and it is also a prerequisite for companies to maintain long-term growth and a source of competitive advantage. The dynamic environment has brought many uncertain influences to enterprises. If enterprises want to improve their survivability, both internal and external parties need to play a role. From the external environment, enterprises can only understand the logic of competition through continuous competition. The most urgent thing is to formulate policies to guide enterprises to change their original competition methods, and use new competition logic to guide enterprises to adapt to new competition.

From the internal point of view of the enterprise, the competitive logic of using competitive experience to adapt to changes is the key point, and actively participate in competition. Companies with rich competitive experience have a certain degree of sensitivity to environmental changes and can better adapt to changes in the logic of competition. Business managers should look at the changes in the market environment more rationally and avoid blind self-confidence, special attention is needed to understand the recent actions of competitors.

REFERENCES

- Deng Xinming, Guo Yanan, Long Xianyi, Lin Xiaozhen. The relationship between competitive experience and organizational survival based on the perspective of the Red Queen: an empirical study from my country's passenger car industry [J]. *Journal of Management Engineering*, 2020, 34(05): 86- 94.
- Deng Xinming, Guo Yanan. Competitive experience, multi-market exposure and corporate performance——Based on the perspective of Red Queen competition [J]. *Management World*, 2020, 36(11): 111-132.
- Ji Fang, Zhao Daozhi. The impact of low-carbon economy on corporate competitiveness based on the Red Queen theory [J]. *Journal of Beijing Institute of Technology (Social Science Edition)*, 2011, 13(05): 7-11.

Yu Ming, Wang Jinai, Duan Ye. Summary and Prospect of the Research on the Queen of Hearts Competition Theory[J]. *Foreign Economics and Management*, 2012, 34(05): 45-51.

Zeng Deming, Zhou Rong, Chen Liyong. Study on the relationship between environmental dynamics, capital structure and company performance[J]. *Financial and Economic Research*, 2004, 30(3): 67-7.