



Research Article

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Competitive actions and performance of technological innovating firms: moderation of intellectual capital

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ABSTRACT

Market competition of Chinese pharmaceutical and chemical firms in Transition time is obviously interrupted by Chinese institutional context, market fragmentation. This damages the motivation of the technology and innovation of Chinese pharmaceutical and chemical firms. For helping these firms to find a suitable way to compete innovatively and differently, this paper attempted to discuss how Chinese innovating firms compete with different action while they facing two types of competitor at one time, and how the intellectual capital have influence to the process. This research not only enriched the theories of dynamic competition but also provide some theoretical advice for firms under the special institutional context to compete with innovative technology.

Keywords: Dynamic competition, Market fragmentation, Intellectual capital

INTRODUCTION

In times of knowledge economics, technology and innovation become important strategic resource. Thus firms are gathering and enhancing all information and knowledge capabilities, which means intellectual capital (IC)[1]. After China joining WTO, Chinese firms faced more international competition environment and also concerned IC as a strategic resource[2]. But the processes of acquiring IC and applying it into the competition are interrupted by the institutional context of Transition Economy. One character of Chinese economy is the separating and segmenting of provincial authorities, which is called market fragmentation(MF)[3]. MF is caused by the governmental over-authority and local protection[4]. Therefore, MF has at least two main influences to firms: one is that competing behavior can only have effects in different governmental fields; and the other is that cross-region firms are facing two main types of competitors, including regional firms in different provinces and multinational enterprises (MNEs). Chen[5] proposed resource similarity of focal firm and competitor as a key character of firm choosing competitive actions. The higher the resource similarity, the lower possibility of attack is taken. However, Chen only mention tangible capital could be applied in calculating the resource similarity, and following scholars didn't discuss whether intangible capital, such as IC, can also fit for this theory. This paper, through empirical analysis, tried to answer two questions: 1) what is the effecting mechanism of resource similarity on IC between Chinese firm and its competitor into competitive action; 2) under the MF, how can firm apply competitive action basing on IC to gain better performance.

IC and Resources Similarity

Since late 1990s professionals and researchers in management began to attempt to define the IC components, there has been no generally accepted definition or classification of IC[12]. Stewart (1997) defined IC simply as "packaged useful knowledge"[13]. Edvinsson and Malone (1997) enriched the definition to "knowledge that can be converted into value"[14]. Researchers, by case studies and empirical surveys, found out that acquiring IC can help to enhance capabilities of organizational learning and innovation. Reed et al. (2006)[15] developed an IC-based theory that IC is an effective and efficient way to help firm achieve value added, and have higher performance. Thus IC is viewed as a strategic resource, which is the basis of firm gaining competitive advantage and superior financial performance.

But, a series of competitive action can only make a firm build advantage. Chen[5] proposed two dimensions, market commonality and resource similarity, to explain the decision mechanism of competition action. Chen argued that resource similarity of strategic resources determines the competitive actions choosing. If the strategic resources between two rivalry firms are little, then they have larger possibilities to cooperate instead of competition. While the opposite, if strategic resources between two rivalry firms are big, they will have larger possibility to attach. Till now, however, little research have explored the effects of similarity of IC on competitive action, nor empirical study test whether the IC consist with the basic view of resource similarity.

MF and Its Influence on Competitive Action

The market fragment is sourced by over-powered of local government[3], and the regional markets of different provinces is over interrupted and local protected by the local government[4]. Therefore for a firm, Chinese domestic market is more like a bound of regional markets among which have policy differences. Therefore quite a lot of regional firms rely on regional policies and institutional barrier to build competitive advantage. Most of these regional firms choose diversification in a certain governmental authority field[11]. These local firms often control a certain market share with both market and non-market actions. Thus while a firm enter the regional market, they will become a stable threats to the cross-region firms. Therefore Chinese horizontal firms are facing a two-line competition, including MNEs and local firms. Nevertheless, the MF is dynamic. A specific province, with its own geographic character and social economic development stage, has a special problem in economy transition. Therefore they need different and flexible policies for the dynamic developmental issues. Also different provinces are various industrial structure, thus the industrial policies are also various. All these differences cause the development of market economy in each province are different, which eventually leads to two results: one is a single province have different content and extent of the local protection in different period, the other is the extent of variety of regional institutions around the whole nation are various in each period.

HYPOTHESIS

Competitive Actions and Performance of Chinese Firms

MF represents the policy differences between provinces and regions. Thus according to governmental hierarchy and authority, the market space of domestic market has been separated into one national market scope and a bound of provincial regional markets. Facing two types of competitors, horizontal firms and technology firms have to take competitive actions in different scopes of market. And this will damage the effects of market actions which based on technology and product innovation. While the influence of MF is little, regional firms which relying on regional institutional barrier will be damaged. So MNEs become the main competitors of Chinese chemical firms. MNEs have bigger advantages in technology innovation, therefore in national market scope. Firms with deviance competitive actions are easily get re-attacked by MNEs. Chinese firms have bigger regional flexibility than MNEs. Thus they should start deviance competitive actions in different regional market, which will build better innovative advantages while avoiding re-attack of MNEs. When the influence of MF is significant, MNEs have less competitiveness while regional firms have bigger threats to Chinese technology firms. Under the MF, if a Chinese firm applies deviance and innovative actions in various regional markets, it will definitely cause non-market re-attack in all regional markets. Regional firms can even copy the new technology under permission of local government, so innovating firms can't have "first-move" advantage. However, if a firm starts deviance actions in national scope, the market share may have little increase, but technology firm will have less re-attack by regional competitors.

H1a: When effect of MF is little, regional competitive deviance has positive influence on performance.

H1b: When effect of MF is significant, national competitive deviance has positive influence on performance.

Similarity of IC and Competitive Action

Technology innovation could help firm acquire market share rapidly, gaining "first-move" advantage. And market scale is one of the important move for firm to invest for high technology innovation[6]. However, MF strongly damages the revenue from technology innovation. Because on one hand MF cause firm to line out its new product or technology in a certain market scope, which provides the time and space of "second-move" advantage for other regional firms. On the other hand, MF help regional firms to build market barrier basing on regional policy, which makes firm with technology and innovative capability under a disadvantage status. Under such circumstance, the IC a firm acquires for innovation must be chosen and taken under a certain objective and perception. When the influence of MF is little, MNEs is the main competitor of Chinese technology firm, and under such context, Chinese firm can have better performance with higher regional competitive deviance. The similarity of IC could reveal the understanding of the firm about the specialty of Chinese market. The better understanding about Chinese market, the more beneficial when a firm applies regional actions. When the influence of MF is significant, regional firms are the main competitor for Chinese technology firms, and national competitive action should be helpful to gain higher performance. Thus the similarity of IC represents the capability of a firm in searching and analyzing information

about technological innovation. This capability can help to reduce the communication and management costs when firms turn new technology into market actions.

H2a: When effect of MF is little, IC has moderation effect between regional competitive deviance and performance.
H2b: When effect of MF is significant, IC has moderation effect between national competitive deviance and performance.

MATERIALS AND METHODS

Research Method and Sample

This paper chose firms listed in Shanghai or (and) Shenzhen stock market as sample. 26 firms from air-conditioner, pharmacy and automobile industries are chosen, with their annual reports and media reports since 2001 to 2012 gathered, coded, and analyzed. Competitive actions are usually categorized by scholar basing the industrial features. Basing on Miller and Chen(1996)[7], this paper categorized competitive actions into 8 types: investment or merger, cooperation and allies, proposing new products, proposing new technology, opening new store or entering new market, changing organizational structure or marketing system, changing prices, and taking public relationship activities.

Variable

Dependent Variable: Following Miller and Chen[7], this paper chose ROA as the index of dependent variable, the performance. To take over the industrial difference, this paper standardized the value of ROA.

Independent Variables: This paper followed the measurement of competitive deviance by Ndofor et al[8]. Where P_i refers to the proportion of frequency of i action to all actions, and $\overline{P_i}$ refers to the mean proportion of frequency of i action in the whole industry. This paper also calculated separately into national competitive deviance and regional competitive deviance, according to the scope of actions of sample firms.

$$deviance = \sum_i (p_i - \overline{p_i})^2 \quad (1)$$

Moderating Variables

1. Similarity of IC: Under "double-line" competition, Chinese firms are facing a group of competitors, thus the character of resources similarity should be measured as the comparison between strategic resources of the focal firm and the average level of the industry. As scholars are applying Tobin's Q as a representing variable of IC[16], this paper calculated the difference between Tobin's Q of focal firm and the average value of the industry, then calculate the squared differences.

2. MF: This paper adopted the NERI indexes of all provinces in China since 2001 to 2012 [11], to indicate that the essential of MF is the differences of regional institutional differences among provinces. However, just applying market indexes cannot represent the specific impacts of MF on firms. Moreover, firms are impact variously by the regional institutional differences because of the location of headquarter. Therefore the variable about influence of MF MF_t is measured as (2). Whereas refers to the market index in t year of the province where headquarter located, and m_{it} refers to the market index in t year of other provinces in China. All measurement of competitive complexity, coordination and MF are categorized according to the means (1 for lower than means, and 2 for higher) of the sample in each industry.

$$MF_t = \frac{\sum_{i=1}^{31} (m_{it} - m_{it})^2}{31} \quad (2)$$

Control Variables: Because competitive behavior has strong association with resources and previous growth of the firm [9], this paper chose the time of firm built, net-profit of last year, and resources slack as control variables, while resources slack majorly measured by size of firm[10] and the current ratio of (proportion of current assets to current debts) [9]. Also the three control variables are standardized to avoid the industrial differences.

RESULTS AND DISCUSSION

This paper use SPSS 16.0 to run a general leaner regression analysis as table 1. When the influence of MF is little, regional competitive deviance has comparatively significantly ($p < 0.1$) positive effect on performance; while when the influence of MF is significant, national competitive deviance has significantly ($p < 0.01$) positive effect on

performance. Thus H1a is partially accepted, H1b is accepted. When the influence of MF is little, the similarity of IC has partially significantly ($p < 0.1$) positive effect between regional competitive deviance and performance. And when the influence of MF is significant, the similarity of IC has significantly ($p < 0.01$) positive effect between national competitive deviance and performance. Thus H2a is partially accepted, H2b is accepted.

Table 1: Regression of competitive action, similarity of IC and performance

	Model 1: ROA (MF=1)	Model 2: ROA (MF=1)	Model 3: ROA (MF=2)	Model 4: ROA (MF=2)
(Constant)	(-0.957)	(-0.115)	(-1.820)	(-1.164)
size	-0.283*** (-3.759)	-0.308*** (-4.048)	0.008 (0.071)	0.02 (1.643)
pre-profit	0.345*** (4.716)	0.442*** (6.238)	0.179† (1.963)	0.123 (1.643)
current ratio	0.333*** (3.987)	0.405*** (6.153)	0.186 (1.651)	0.374*** (4.474)
time	-0.092 (-1.298)	0.207** (2.738)	0.029 (0.250)	0.165* (2.289)
National deviance (Nde)	0.079 (0.534)	-0.067 (-0.882)	0.407** (2.961)	-0.005 (-0.062)
Regional deviance (Nde)	0.140† (0.827)	-0.018 (-0.238)	-0.196 (-1.574)	-0.125† (-1.667)
Similarity of IC (SIC)		-0.066 (-0.953)		-0.325*** (-4.114)
SIC*Nde		0.096 (1.374)		0.212** (2.968)
SIC*Rde		0.128† (1.784)		-0.306*** (-4.139)
R ² adjusted	0.314	0.397	0.210	0.326
ΔR ² adjusted		0.083		0.116
F	8.167***	10.676***	3.633***	7.994***

***. Regression is significant at the 0.001 level (2-tailed).

**. Regression is significant at the 0.01 level (2-tailed).

*. Regression is significant at the 0.05 level (2-tailed)

†. Regression is significant at the 0.1 level (2-tailed)

¹ Data in brackets is the T value of each variable, data out of brackets is the coefficients.

DISCUSSION AND CONCLUSION

Generally speaking, the influence of MF on technological innovation and business mode of Chinese firm is huge. In different market scopes, a firm needs to apply its capability on knowledge and information with adoption to the institutional context. This paper found that, when the influence of MF is little, a firm needs to start its competitive action basing on technologic innovation in regional market scope, to avoid direct competition with MNEs, and to acquire market share rapidly. But when influence of MF is significant, a firm needs to take actions in national market with its technological innovation, to bring treats to all regional firms without getting any re-attack. This empirical result complimented the classical dynamic competition theory. While classical theories are focus on one focal firm facing on one competitor and developed a series of theories, this paper explored the basic logic into a more realistic pre-assumption, a focal firm facing multiple types of competitors. This paper found out that when a focal firm facing two types of competitors, the competitive deviance is also a effective character for competition action management, but firm needs to apply action in suitable market space according to institutional context.

If a firm wants to make its innovation and differentiation as major competing strategy, its IC will directly impact the capabilities and effectiveness of knowledge management. Empirical analysis showed that, the higher value of IC, the more perception for a firm to gain higher performance with competitive deviance. Firm with higher IC can choose better market scope to apply competitive actions. Especially when the influence of MF is significant, firm with higher value of IC will have less perception to use deviance competitive actions in regional market rather than in national market. This paper developed the idea of Chen: resources similarity is not only for tangible resource, but also for intangible resources such as IC, and under a certain institutional context, resource similarity is also one of the basic factors for a firm to decide its competitive actions.

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