Competitive Action in Diffusing of Internet Technology: Implications for Local Vendors Defending their Turf against Multinational Incursion

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Competitive Action in Diffusing of Internet Technology: Implications for Local Vendors Defending their Turf against Multinational Incursion

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Abstract
This paper explores the extent to which diffusing Internet technology products is a function of the competitive actions of local online vendors and their respective multinational challengers in emerging electronic markets. Drawing on the perspectives of competitive technology diffusion and Austrian firms’ market process, we developed a set of hypothesis concerning the characteristics of competitive actions that local vendors implemented and the impact of these actions on the dominance of Internet technology products in electronic markets. We then validate the model with longitudinal field data from two pairs of Internet technology products in the search engine and consumer-to-consumer (C2C) electronic market. Our findings suggest that diffusing Internet products can be predicted by the dynamics of specific market-oriented actions. Such a pattern supports the conclusion that local online vendors have significant local advantage in fast-growing emerging markets. We also examine the policy implications of our results, especially with respect to how competitive action can help local online vendors defend their turf against multinational incursion.

Keywords
Competitive Action, Technology Diffusion, Internet Technology, MNCs

1. Introduction
Competition is keen among online product and service providers due to low entry barriers, easy imitation of offerings, and low search costs for consumers to find information (Porter, 2001). Online multinational companies (MNCs) are rushing to enter emerging regional markets to find new opportunities for growth after achieving success in home market, but they face intense competition from local firms. For example, eBay has fought against Asia firms like Taobao and lost high-profile bids to dominate the Internet auction markets in China. Similar incidents occurred to Google when attempting to enter the Chinese markets, except that the competitors’ name was Baidu (Thompson, 2006). It is clear that the commercial success or failure of a product does not rely solely on technological features, but may rest more in finding the right combination of product and marketing strategies (Calantone et al., 2006; Henard et al., 2001). As competitive action is a fundamental element in describing the character of the market process, however, it poses a critical question: How can we assess the role of competitive action in diffusing Internet technology products in the context of competition between local and multinational corporations?
Following Rogers (2003)’s definition of innovation diffusion, Internet technology product diffusion can be defined as the process by which an Internet technology product is communicated through certain channels over time among members of a social system. Understanding the dynamics of competitive Internet technology diffusion in global electronic markets is important for both information technology (IT) scholars and practitioners (Porter, 2001). Although many literatures have explored multi-technology diffusion across product generations (Kim et al., 2000) and product categories (Bucklin and Sengupta, 1993; Chu and Pan, 2008; Dewan et al., 2010), researchers have placed little emphasis on the dynamics of specific market-oriented actions that local online vendors and MNCs have carried out as determinants of Internet technology diffusion. Substantial theory posits that market process factors or the competitive moves among firms might be important in predicting the product diffusion and commercial success of technology product innovation (Souder and Song, 1997; Henard and Szymanski, 2001; Rogers, 2003). The current study, therefore, aims to explore the extent to which Internet technology product diffusion is a function of the competitive behaviors or actions of local online vendors and their respective multinational challengers. More specifically, we develop and test a set of hypotheses concerning the characteristics of competitive actions that both local online vendors and MNCs carried out and the impact these competitive behaviors had on the diffusion of Internet technology products.

2. Theoretical Foundation

2.1 Austrian Perspective on the Market Process

Austrian economists view the market as a mechanism that allows firms to experiment by taking specific actions; indeed, some firms undertake actions in an attempt to lead, while others follow and imitate (Ferrier et al. 1999). According to Austrian economics, organizational action (1) constitutes the critical market process; (2) can disrupt links between competitive conduct and performance found in the routine or ordinary status of the marketplace; and (3) can convert neglected opportunities to the advantage of the acting organization (Young et al., 1996). Firms successful in acting as leaders or seizing opportunities reap profits because they occupy a monopolistic position until they are imitated (Nelson and Winter, 1992; Smith et al., 1991). A long-term equilibrium, however, is never reached. The excess profits of the acting firms and the losses and lost opportunities that non-responders experience motivate the latter to respond and imitate actions. Competitive advantage, therefore, is short-lived because frequent and aggressive firm-level actions disrupt the causal links between competitive conduct and performance outcomes established in the market. Firms must thus undertake a series of actions to recreate competitive advantage continuously.

Following Smith et al. (1991), we define competitive action as a newly developed and specific competitive move, such as a price cut or new product introduction, initiated by a firm to defend or improve its competitive position. From the Austrian perspective on the market process, studying competitive action is important because the newly-created actions carried out aggressive firms affect and threaten rivals. These threats force new actions on the rivals’ part, which further disturbs routine competitive behavior (Smith et al., 1991). Firms are also motivated to take new competitive actions as they realize that routine past actions have become ineffective (Miller, 1990; Kirzner, 1997). A new competitive action might include introducing a new promotional campaign that disrupts a market by stealing market share from a rival. Or, it may include a series or simultaneous thrust of new actions implemented in a short timeframe to disturb and paralyze a rival (D’Aveni, 1994). Or, a manager could carefully time new actions to disrupt a challenger’s intentions.
2.2 Competitions between Local and Multinational Corporations

Literature in international business management has long studied multinationals’ strategies and performance in overseas markets. It has examined firms’ entry mode decisions (Chang, 1995); their interactions with other multinationals (Chang and Park, 2005; Miller and Eden, 2006; Yu and Cannella, 2007); and their ability to cope with the socioeconomic environments of the host countries they enter (Kostova and Zaheer, 1999). Durand and Coeurderoy (2001) found, for example, that moving first into an emerging foreign market helps MNCs maintain their advantage more than if moving first into established markets. Lavie and Fiegenbaum (2000) found that when the Israeli market opened, MNCs were able to push domestic competitors quickly aside, eliminating many marginal players and market consolidators in several sectors.

While the existing literature has focused on these phenomena primarily from the perspective of multinational firms, recent studies have gradually focused on local firms, which compete with multinationals in local markets (Dawar and Frost, 1999; Meyer, 2004; Wu and Pangarkar, 2006; Chang and Xu, 2008). This body of work, however, has focused little attention on the influence of competitive action between local and MNCs on the popularity of their technology products.

3. Research Hypotheses

3.1 Total Competitive Activity

Total competitive activity is defined as the total number of new competitive moves a firm carried out in a given time (Ferrier et al., 1999). The Austrian view suggests that all action is undertaken to pursue competitive advantage and discover profit opportunities (D’Aveni, 1994; Kirzner, 1997). Although local firms lack the transferable assets that MNCs possess, some local firms have developed transferable assets by restructuring, innovating, and internationalizing, and they employ these assets to compete with foreign entrants (Dawar and Frost, 1999). A local online vendor, therefore, that is more aggressive in carrying out more newly created actions than MNCs will exploit more opportunities and gain competitive advantages. Conversely, MNCs sometimes decline when they rest on their laurels and become complacent, which renders them vulnerable to competitive challengers (D’Aveni, 1994). Such MNCs may head toward failure when they reduce their level of activity in a particular foreign market, until all new activity ceases entirely. In support of this idea, Chen and Miller (1995) found that organization size contributed to competitive inertia and a lack of aggressive actions.

In general, the greater the number of a firm’s new competitive actions, the greater their competitive aggressiveness is considered (Young et al., 1996). Some researchers have suggested that firms that remain competitively aggressive have a better chance of gaining and maintaining their competitive advantage. For example, Ferrier and colleagues (1999) found that leaders are more likely to experience market share erosion and dethronement when they are less competitively aggressive relative to industry challengers. These results indicate that as a local online vendor’s cumulative competitive activity increases, the firm creates internal organizational assets in the form of action repertoires and knowledge about how to take action. The competitive effect of a local vendor’s product on an MNCs’ product, therefore, will be strong. According to the competitive diffusion model, as the competitive effect increases, the adoption rate for the local vendor’s product will benefit, while the adoption rate for MNCs product would be harmed. We therefore predict that local online vendors’ levels of total competitive activity will be related to the adoption rate gap between local and MNCs’
technology products.

\textbf{H1a:} The number of competitive actions carried out by local online vendors will have a positive impact on the adoption rate gap for local-MNC technology products.

\textbf{H1b:} The number of competitive actions carried out by MNC online vendors will have a negative impact on the adoption rate gap for local-MNC technology products.

3.2 Action Timing

Action timing is the time that elapses between the actions carried out by a firm and those carried out by a rival. A key principle in dynamic competition is to move quickly and find new competitive moves that will slow rivals’ competitive activity (Smith et al., 1992). According to the Austrian perspective on the market process, the dynamic market process is a race in which the payoff is high for the speed of action (Smith et al., 2001). The faster a firm acts with regard to its rival’s actions, the more aggressive are its intentions. Aggressive firms can use the rapid timing of new actions to outmaneuver competitors, which in turn causes rivals to carry out actions more slowly (Chen and MacMillan, 1992).

In the context of competition between local and MNC online vendors, multinationals typically optimize their operations on a global level by standardizing product characteristics, administrative practices, and even pricing, all of which can hamper their flexibility (Dawar and Frost, 1999). Companies based in emerging local markets do not have to contend with such constraints arising from established positions in affluent markets. Not only are local vendors closer to their own market, but they are also free to let the market define them (Ger, 1999). Besides, local vendors own knowledge of the local economy, politics, culture, and business customs of a region; information on local demands and tastes; and information on how to access the materials required for conducting business in a region (Makino and Delios, 1996). Hence, when local online vendors carry out newly-created competitive actions more quickly than MNCs, the competitive effect of the local vendors’ products on the MNCs’ products will be strong, and the adoption rate gap between local and MNCs’ technology products will increase. Although they facing some location-based disadvantages arising in host countries, some multinational firms have acquired host-country-specific assets because they are culturally and ethnically proximate to a host country; have prior operational experience; or have internalized certain local knowledge through joint venture partners (Luo, 1997, Chang and Xu, 2008). MNCs, therefore, can also seize the opportunity to guarantee the prevalence of their Internet technology product by carrying out competitive actions more quickly. Drawing on this argument, we propose the following hypotheses:

\textbf{H2a:} The timing of local online vendors’ newly-created competitive actions will have a negative impact on the adoption rate gap for local-MNC technology products.

\textbf{H2b:} The timing of MNC online vendors’ newly-created competitive actions will have a positive impact on the adoption rate gap for local-MNC technology products.

3.3 Action Repertoire Simplicity

Local and multinational vendors can choose different type of actions they undertake. Some vendors carry out a narrow range of actions, while others undertake a broader range of actions. As opposed to a broad range of action types, action repertoire simplicity is usually defined as a firm’s propensity to concentrate on carrying out a narrow range of action types in a given period of time (Miller and Chen, 1996). The Austrian view suggests that competitiveness is the ability to carry out a range of competitive actions to gain and maintain competitive advantage, and the breadth of a firm’s repertoire of competitive actions has a
broad influence on competitive advantage (Ferrier et al. 1999).

Action simplicity is particularly important in high-velocity markets. Theory of dynamic capabilities argues that for firms to successfully compete in high-velocity environment it is important that they select a few key strategic processes (Eisenhardt and Sull 2001). Often these processes consist of a few simple and innovative actions so that managers can quickly respond in a fast changing situation (Eisenhardt and Martin 2000). Another reason action simplicity is important in fast-moving markets is that audience’s attention span is usually short. For example, Eisenhardt and Sull (2000) argued that firms should select a few key strategic processes with a handful of simple rules instead of complicated strategies, in high-velocity markets. This analysis results in the following hypotheses:

**H3a:** The simplicity of the action repertoire carried out by local online vendors will have a positive impact on the adoption rate gap for local-MNC technology products.

**H3b:** The simplicity of the action repertoire carried out by MNC online vendors will have a negative impact on the adoption rate gap for local-MNC technology products.

### 3.4 Local - MNCs Action Dissimilarity

The dissimilarity in actions between local firms and MNCs is defined as the degree to which local and multinational vendors differ in the actions they carry out. While action similarity refers to a firm’s range of actions, local-MNC action dissimilarity is relative to rivals and refers to the extent to which the actions of local vendors differ from those of multinational corporations. Newly-created actions that differ from those of rivals will reflect an organization’s aggressive attempt to break from the norms of competition. Some researchers have studied the consequences of strategic dissimilarity among rivals (Gimeno and Woo 1996).

In the context of local-MNC competition, MNCs can gain an advantage over local vendors by taking actions similar to the local vendors’, but by being more aggressive in doing so. Carrying out actions that different from those of the competition, therefore, may be most important for local vendors. Local vendors must continuously seek to take new actions that are different from MNCs in order to create a moving target. According to the competitive diffusion model, the competitive effect of local vendor’s product on the MNCs’ product, therefore, will be strong, and the diffusion rate for the local vendor’s product will benefit. Hence, we can hypothesize as follows:

**H4:** The levels of Local-MNCs action dissimilarity will have a negative impact on the adoption rate gap for local-MNC technology products.

### 4. Research Methodology

#### 4.1 Data Collection

Important competitive events in two pairs of segmented electronic markets provided data for the current research. One pair of data included the competitive events and technology diffusion rate of Google (China) and Baidu.com in Chinese search engine market from 2004 to 2008, while the other pair is that of eBay (China) and Taobao.com in Chinese C2C market from 2003 to 2006. Two sources of diffusion data were selected. The data source of Google-Baidu pair’s market diffusion extent is Google Trends, which provided search volume indices (SVI) to assist in objectively measuring the extent of users’ interests in a particular technology. The data source of eBay-Taobao pair’s market diffusion was collected from Alexa.com, one of the largest third-party data companies tracking online traffic. We captured
the competitive behaviors of local and multinational vendors according to the appearance of certain key words in the headlines and abstracts of published news report searched in two dominate search engine in China (Baidu and Google). To make sure the accuracy of reports, we cross search both search engines to validate the source of reports. A total of 2009 unduplicated news records were identified over the five-year period.

4.2 Measures
According to the definition of newly created competitive action described above, we content-analyzed these 2009 headlines and articles and coded them into the following competitive action types: marketing actions, new product R&D, pricing and earnings actions, legal actions, signal actions, capacity actions, and service actions. Following measures in Ferrier et al. (1999), total competitive activity was defined as the total number of newly created competitive actions, carried out by each vendor in a given time. Then a measure of total competitive activity for local vendor was calculated as the number of total actions for the local vendor in each quarter. Action timing was measured by the time elapsed, measured in days, between the date of a competitive action carried out the local vendor and the date of a preceding competitive action carried out by multinational vendor. Action repertoire simplicity was measure by the Herfindahl index, commonly used to measure the level of diversification across industry categories in the diversification literature. A firm with high Herfindahl index indicates low action simplicity. Conversely, a firm with a low Herfindahl index employed a broad range of action types. Local–MNC action dissimilarity was calculated as the sum of the squared differences in the proportions of competitive actions carried out across all action categories for each quarter. High dissimilarity scores suggest that local and multinational vendor are different from one another in the competitive actions.

5. Data Analysis and Results
Table 1 shows the correlations of independent variables. According to Judge et al. (1988), multi-collinearity is typically considered to be a serious problem only “if the correlation coefficient between the values of two regressors is greater than 0.8 or 0.9.” All correlation coefficients in this study were less than 0.8. Another indicator of multi-collinearity — collinearity tolerance — was checked in this study. The test outcomes in Table 2 showed that the collinearity tolerance of all regression models were between 0.262 and 0.905, which suggested no potential problem with multi-collinearity.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>1. Market Size</td>
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<tr>
<td>2. Local Market Advantage</td>
<td>-.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>3. Local total competitive activity</td>
<td>-.13</td>
<td>.32*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. MNC total competitive activity</td>
<td>.08</td>
<td>.69***</td>
<td>.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Local action simplicity</td>
<td>-.09</td>
<td>-.23</td>
<td>-.27</td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. MNC action simplicity</td>
<td>-.08</td>
<td>-.42**</td>
<td>-.07</td>
<td>-.37**</td>
<td>-.15</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7. Local action timing</td>
<td>-.15</td>
<td>.24</td>
<td>-.30*</td>
<td>.35**</td>
<td>.29*</td>
<td>-.11</td>
<td></td>
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<tr>
<td>8. MNC action timing</td>
<td>-.06</td>
<td>-.42**</td>
<td>.20</td>
<td>-.57***</td>
<td>-.03</td>
<td>.39**</td>
<td>-.20</td>
<td></td>
</tr>
<tr>
<td>9. Local-MNC action dissimilarity</td>
<td>-.14</td>
<td>-.05</td>
<td>-.15</td>
<td>-.13</td>
<td>.05</td>
<td>.54***</td>
<td>.08</td>
<td>.31*</td>
</tr>
</tbody>
</table>

*: p < 0.1, **: p < 0.05, ***: p < 0.01
Regression results predict adoption gap from both individual local and MNC action variables and difference score action variables for local-MNC. In our conceptual model, we explicitly predicted that the individual local competitive activity would be related to adoption gap between the local and MNC. However, to provide assurance that our difference scores could be meaningfully interpreted, we ran one additional model containing the difference between local and MNC competitive action as the independent variables (M2). Market size and local market advantage, measured by dividing each previous year's market share gap between local corporate and MNC by their combined market shares for the same year, are defined as control variables.

We employed several estimation methods in the empirical analysis. Because Ordinary Least Squares (OLS) estimates often perform well in practical research situations, we first ran OLS in the analysis. Moreover our dataset has the characteristics of time series-cross sectional data (Stimson 1985), that is, there are repeated observations on the two pairs of competitors, and there are many more temporal units than spatial units (i.e., T > N). Therefore following common practice, we further employed feasible generalized least squares (FGLS) and panel corrected standard error (PCSE) in the estimation to correct potential group-wise heteroskedasticity and serial correlation (Beck and Katz 1995; 1996). Both FGLS and PCSE estimation generated consistent estimation with the results using OLS. Therefore we focus our discussion below using the OLS estimation results.

The coefficient for local total competitive activity in the adoption gap for local-MNC technology products model (model 1) is positive and significant (b = 0.304, p < 0.01). Therefore, hypothesis 1a is supported. The coefficient for MNC total competitive activity in model 1 is not significant, so H1b is not supported. The coefficient for local vendor action timing in model 1 is not significant, so H2a is not supported. However, the negative and significant (b = -0.204, p < 0.10) coefficient for MNC action timing in model 1 indicates that MNC that are faster in the timing of newly created competitive actions are less likely to experience diffusion rate erosion. Therefore, H2b is supported.

Hypothesis 3a predicts that local vendors with more straightforward action repertoire are likely to have higher diffusion rate. H3a is supported, as the coefficient of local action simplicity in model 1 is positive and significant (b = 0.225, p < 0.05). The negative and significant (b =-0.185, p < 0.05) coefficient of MNC action simplicity in model 1 indicates that MNC with more concentrated action repertoire are less likely to experience diffusion rate erosion. Therefore, H3b is supported. Hypothesis 4, which predicts that higher levels of local-MNC action dissimilarity will be negatively related to diffusion rate gap, is also supported. The coefficient for local-MNC action dissimilarity in the adoption gap for local-MNC technology products model (model 2) is negative and significant (b = -0.277, p < 0.05).

<table>
<thead>
<tr>
<th>Table 2 Regression Model (DV=Adoption Rate Gap)</th>
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<tbody>
<tr>
<td>Variable</td>
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<tr>
<td>Market Size</td>
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<td>Local Market Advantage</td>
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<td>Local total competitive activity</td>
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<td>MNC total competitive activity</td>
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<td>Local action simplicity</td>
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</table>
6. Implications and Conclusions

The theoretical implications of this study are multifaceted. First, this study opens the door to a wealth of knowledge in the field of IT diffusion, showing that the competitive actions one’s competitors employ can influence IT diffusion. Technology diffusion in markets is not an independent diffusion process; instead, it is intertwined with that of competing products. The current study, therefore, complements the existing literature by examining, both theoretically and empirically, the role of competitive action in Internet technology product diffusion within the context of competing local and multinational corporations. Second, this research explains the competition effects among local vendors and MNCs from the competitive action perspective. Competition effects are the negative influences caused by the presence of a group of firms on members of another group, which decrease the latter’s chances of survival. Some researchers have used the dimensions of market commonality and resource similarity to gauge the relative size of competition effects (Chang and Xu, 2008). Our results indicate that local vendors’ taking more actions or carrying out a broader range of actions can enlarge the adoption gap for local-MNC technology products. The dynamics of specific market-oriented actions that local vendors and MNCs carry out, therefore, can also influence the relative size of competition effects. Consequently, local and MNC vendors can use competitive action to increase or decrease the relative size of competition effects.

Our study also has several managerial implications. First, surviving in the global business arena and competing effectively with multinational giants have become major concerns for senior executives in local firms (Boudreau et al., 1998). Our findings have direct implications for local Internet technology product managers indicating that they can gain product popularity in several ways: (1) taking more new actions, (2) carrying out a simple range of actions, and (3) taking new actions that differ from those the MNCs implement. Second, for local Internet technology vendors facing multinational incursion, our study reinforces the importance of staying flexible. MNCs bring enormous advantages when they enter emerging markets, but they are also subject to important constraints. When entering emerging markets, the structural complexity of the MNC will increase. Local companies based in emerging markets do not have to contend with such constraints arising from established positions in affluent markets. Flexibility is thus one of several advantages that local managers may overlook when they face the prospect of multinationals entering their own market.

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