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The Effectiveness of Two-Sided Users Activity for Sustainable Competitiveness: Findings from B2B Electronic Market

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Abstract: With the prosperity of worldwide B2B electronic market, it is necessary to explore the role of its users' behavior but not only the user base effect on their sustainable competitiveness. The quality of users' behavior, which is indicated by the activity of two-sided users, are critical important for B2B electronic market makers as there is "chicken and egg problem" between these two users. In the context of B2B electronic market, we examine the relationship of users' activity of two sides and platform longitudinal competitive ability with VAR model. Furthermore, we investigate how advertising strategies improve the active degree of different user behaviors. The results show that the sellers' activity will improve the platform sustainable competitiveness more effectively than buyers' activity. Moreover, the authors find that the external customers which attracted by adverting (search advertising and event marketing in this paper) can significantly influence the internal users' activity. These findings emphasize more exploration should be pay attention to the quality of users' behavior in two-sided markets, and provide guidance related to advertising strategy.

Keywords: advertising strategy; active degree of users' behavior; two-sided market; VAR; B2B electronic market

1. INTRODUCTION

Nowadays sixty of the world's hundred excellent companies are benefit from the economics of two-sided networks^[1], these markets consist of a market maker that manages the market and the participant firms—namely, buyers and sellers—that transact in it. Recent advances in electronic markets has made significant advances in the understanding of various marketing issues related to two-sided market, especially B2B electronic markets got substantial exploration as its prominent position in e-commerce. Most research dominantly focuses on the role of market makers^[2] and ownership structure. Moreover, how two-sided users' actions stimulate sustainable competitiveness is uncertain.

Large numbers of researches focus on the user networks in two-sided markets^{[3] [4] [5]}, these "quantity" emphasized literatures found that the network effect can contribute to the sizes of two-sided user bases. On the other hand, more recent researchers pointed out that we should pay more attentions to the role of the quality of two-sided users' behaviors^{[6] [7]}. Landsman and Stremersch(2011) examined the effect of seller-level multihoming and platform-level multihoming, but neglect the role of two-sided users' activities⁷. The active degree of users' behaviors is an important characteristic of behavior quality, which can influence sustainable competitiveness more directly. Firstly, the higher active degree of user behavior will enlarge their corresponding network effect^[8]. Secondly, active users can improve the performance of the platform and foster a stronger competitive capability than competitors^[9]. In this reason, we prefer to explore two research questions in this study: 1) The dynamic influence mechanism of two-sided customer activity on the performance of platform; 2) What will influence two-sided customer activity and their corresponding effect?

After collecting time series data from a B2B electronic platform lasting for a whole year, we used VAR model to explore prior two research questions. By analyzing the Impulse Response Functions (IRFs) results, the

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key results from our analysis for this B2B electronic platform are summarized below: (1) The active degree of sellers can enhance sustainable competitiveness more than the active degree of buyers, no matter short-term elasticity or long-term elasticity. (2) Advertising strategies (we use “AD strategy” as a shorter term, including search advertising and event marketing) would attract more potential users to stimulate the activities of two-sided users, and both AD strategies will motivate the buyers’ activities more than the sellers’ activities. (3) Search advertising can drive the active degree of buyers’ behavior more than event advertising, but event advertising has larger effect on the active degree of seller behavior than search advertising. (4) The role of AD strategies on sustainable competitiveness is not significant, their effectiveness are manifest through the role of active degree of two-sided users behaviors.

Our research tries to provide dynamic influence mechanism of two-sided user behavior, and discusses the relationship of AD strategies (try to attract potential users) and internal user behavior. This remainder of the paper is organized as follows. In section 2, we provide a brief review of the relevant literature on two-sided market, advertising strategies. In section 3, we present the detail of our VAR model including method and variables. In section 4, we present the data and discuss the analysis results we get. Finally, we conclude with an overview of findings, the managerial implications and theory contributions.

2. THEORETICAL BACKGROUND AND FRAMEWORK

This paper is related to two streams of literature: research on two-sided market and online advertising strategy.

2.1 Two-sided Market

Two-sided markets refer to the markets in which one or several platforms enable interactions between end-users, and try to get the two sides “on board” by effectively marketing and management strategies^[10]. Thus, the three main components in two-sided markets can be easily concluded as one platform and two user bases.

In a two-sided market, the financial success of any platform company critically depends on its ability to actively attract and grow two kinds of participants: buyers and sellers. The two groups are attracted to each other—a phenomenon that economists call the network effect, including cross-side network and same-side network effects¹. Cross-side network means through improving the scale of users on one side, the agents in the other side will be encouraged^{[11][12]}, while same-side network effect means when increasing the size of one user base, members of the same side may be positively or negatively affected^[13]. Prior literatures have already documented the significant effect of user networks as they can create a unique “start-up” difficulty and “winner-take-all” market outcome.

In order to facilitate the network effect, scholars have investigated some strategies to motivate the activities of both users. Tucker and Zhang (2010) indicate that the platform company often advertises their number of users, presumably to encourage further participation^[14]. Parker and Van Alstyne (2005) use network effect to explain many free pricing strategies where one user group gets free use of the platform in order to attract the other user group^[15]. Moreover, there is no consensus related to which side of the market can contribute to the sustainable competitiveness more effectively. Cross-side network externalities give rise to a “chicken & egg” problem^[16]. Fathand Sarvary (2003) find through analytical analysis that it is benefit to subsidize one group of users (i.e., buyers) to achieve critical mass so as to increase growth^[17]. But Bucklin and Simeiro (2003) and Ellison and Ellison (2005) find that the existence of many sellers is more likely to attract traffic of buyers¹¹². Actually, the behavior quality of both users should be get more attention⁷, like the active degree of existing users. As most strategies can only influence active users more directly other than all users, and active users can play more effect on sustainable competitiveness than inactive ones.

In order to find out the influence process of active sellers and active buyers, we incorporate this network

effect into our analysis and examine how active buyers and sellers as well as their dynamic interactions, contribute to sustainable competitiveness. To further investigate how to motivate the activities of both users, we incorporate advertising strategies to explore their roles on the active behaviors of sellers and buyers.

2.2 Advertising Strategies

The role of advertising strategies (AD strategies) have been acknowledged and research in depth, they have direct effect on sales^[18], and indirect effect on stock price^[19] and firm value^[20].

This paper proposes to explore the effectiveness of advertising strategies on the active degree of users' participation in B2B electronic market. AD strategies are valuable for existing buyers and sellers' activities, because they can attract more potential users which can increase both the communication and transaction. Considering their target audiences maybe potential buyers or sellers, it's still hard to distinguish how effective AD strategies can influence the behaviors of existing sellers/buyers, and eventually cause the fluctuations of sustainable competitiveness in B2B electronic market receptively. In this paper, we only pay attention to two typical AD strategies: search advertising and online event marketing.

Search advertising, event marketing are two primary categories of advertising^[21]. The former one aims to pull new customers who try to find some information related to target platform firms, while the later one aims to push potential users to pay attention to the platform firms with some external event stimulation (for example, training, information sharing, and excellent model stories). Search advertising allows companies to address potential users directly during their electronic search for products or services. Event marketing can attract more passers-by to have a deep knowledge of platform and specific service. But there is little research discussed their role on the sustainable competitiveness, whether they can play directly or indirectly through the active behaviors of existing users, especially it is still unclear their effectiveness on the users' behaviors in two-sided platforms. In summary, we conceptualize our research framework as Figure 1 and investigate their dynamic influence process.

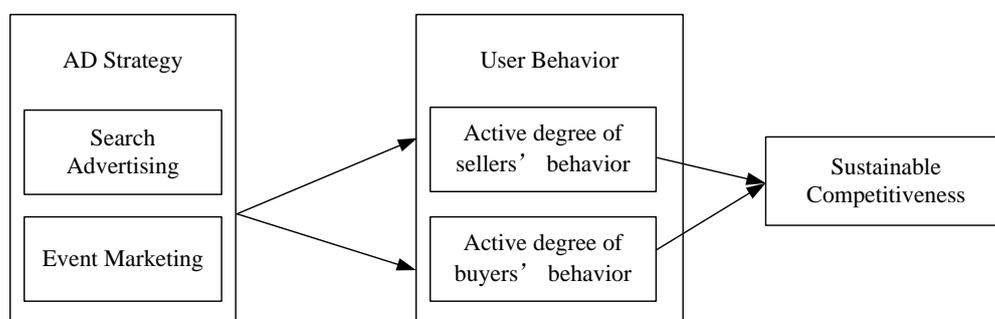


Figure 1. Research Model

3. HYPOTHESIS

In two-sided market, the success of a platform depends on whether it can attract the two-sided users of the platform, that is to say the sellers and the buyers. So from the perspective of sustainable competitiveness, it is necessary to distinguish the users' behavior to explore the effects of different active users' behavior on the platform. Sellers contribute to the income of platform directly, network effects suggest the two-sided users are attracted, the active degree of the buyers' behavior is influenced by the active degree of the sellers' behavior¹¹. As a result, when the active degree of the sellers' behavior increased, the effect will be more prominent, and it much more easy to improve the platform income; From the point of positive network effect, the sellers and the buyers are positive network effects, the sellers will further boost the active degree of the buyers' behavior, this positive effect will be accumulated further enlarge in the long-term, causing the increase of active degree of

sellers' behavior is more easily to improve the sustainable competitiveness of the platform. Therefore, the effect of the active degree of the sellers' and buyers' behavior on the sustainable competitiveness, we put forward the following hypotheses.

H1: In the two-sided market, the increase of active degree of the sellers' behavior has positive effect on the improvement of sustainable competitiveness.

H2: In the two-sided market, the increase of active degree of the buyers' behavior has positive effect on the improvement of sustainable competitiveness.

H3: In the two-sided market, the increase of active degree of the sellers' behavior can much more easily improve the sustainable competitiveness than active degree of the buyers' behavior.

Through the network, an event or a subject can be spread more easily and gain attention, and a large number of successful event marketing cases begin to appear. Sponsors of the event marketing are generally the sellers, the sellers initiative pull some information which is interesting to the buyers, which is a big attraction for seller behavior. In two-sided market, when the platform users use two or more search engines at the same time, it creates multi-attribute behavior. For any platform, both the sellers and the buyers have multi-attribute behavior. As the sellers, to dig more potential buyers, they will not only release its own search ads on a fixed search platform, so the effect of search advertising on improving the sellers' behavior is limited. Therefore, the effect on search advertising and event marketing on the active degree of sellers' behavior, we put forward the following hypothesis.

H4: In two-sided market, advertising strategy (a) (search advertising and event marketing) has a positive influence on improving the active degree of sellers' behavior. (b) From the perspective of improving the active degree of sellers' behavior, the effect of the event marketing is more obvious than search advertising.

At present, many basic search advertisements are free, in order to attract more buyers to earn clicks, the platform provide the users more convenient and accurate experience, from this perspective, search advertising increase the probability of using a search advertising; In addition, users of search advertising generally are the buyers which search habits more clearly, when they participate in the platform, they are easier to express and exchange opinions, and the join of new participants has a greater influence on buyers' behavior. Event marketing attracts buyers through the inspiring event, and the users' purpose is not clear. As a result, the buyers will enter the site to search more information they need, widely participate in various activities, and get information they need by more interactive, and the behavior process is jumped from the event marketing to search advertising. Therefore, the effect on search advertising and event marketing on the active degree of buyers' behavior, we put forward the following hypothesis.

H5: In two-sided market, advertising strategy (a) (search advertising and event marketing) has a positive influence on improving the active degree of buyers' behavior. (b) From the perspective of improving the active degree of buyers' behavior, the effect of the search advertising is more obvious than event marketing.

4. MODEL SPECIFICATION

We adopt a Vector Auto Regression (VAR) model to capture the interdependent evolution of the variables of sustainable competitiveness. The evolution of each variable (the exploitation and exploration buyer/seller) is explained by the lag of itself and other variables. By treating each variable as potentially endogenous, the VAR model is particularly suitable to capture the dynamic and complex interdependence between the performance variables without making stringent identification assumptions. Based on the estimated VAR parameters, simulation techniques can be applied to derive the long term impact of a shock in one variable on all the other variables.

Our analysis follows the standard procedure of VAR modeling, which consists of the following steps: (1)

we test for evolution or stationarity of all the variables in our study, perform unit-root tests, and conduct the Augmented-Dickey-Fuller (ADF) unit-root to test the null hypothesis of a unit root test by Ender (1995) and the Kwiatkowski-Phillips-Schmidt-Shin test (1992). (2) We found the variables to be stationary or evolving, in line with the empirical generalization described by Dekimpe and Hanssens (1995 “The persistence of marketing effects on sales”). We further test for the presence of cointegration, or long-term coevolution. (see Table 1) (3) Depending on the outcome of these tests, the model is estimated in first-order difference. We should control deterministic components such as a base level (constant), a deterministic (time) trend, week and lags of the dependent variable²¹. (4) The estimated VAR models, with the appropriate lags (1-lags) determined by the AIC and Schwarz BIC (AIC= 91.64254, SC= 92.22698), showed a good fit. The above procedures are discussed in detail in Dekimpe & Hanssens (1995)^[22]. Our final step (5) is deriving the Impulse Response Functions (IRFs). The IRFs trace the over-time impact of a unit shock in any endogenous variable on the other endogenous variables. Following Dekimpe and Hanssens (1999)^[23], we use generalized IRFs to ensure that the ordering of variables in the system does not affect the results and also to account for contemporaneous or same-period effects. In the context of our research questions, we use impulse response functions to disentangle the short and the long-run effects of exploitation and exploration sells/buyers on the performance of platform. Given a VAR model in differences, the total shock effect at lag k is obtained by accumulating the lower-order IRFs. Following Dekimpe and Hanssens (1999)²³, Nijs and colleagues (2001)^[24], Trusov, Bucklin, and Pauwels (2009)²¹ and Joshi and Hanssens(2010)²⁰, we determine the duration of the shock (maximum lag k) as the last period in which the IRF value has a $|t|$ -statistic greater than 1.

Table 1. Unit root test and model fit results

Variable	t-value
SEARCH	-2.53(in level)
	-4.76***(in change) a
EVENT	-1.38(in level)
	-9.14***(in change) a
SELLER	-6.32*** (in level)
BUYER	-5.34***(in level)
PERFORM	-1.08 (in level)
	-4.12***(in change) a

*p<0.1, **p<0.05, ***p<0.001; a: test for unit root in 1st difference

We propose a five-variable VAR system to capture the dynamic interaction between the sustainable competitiveness (PERFORM), the active degree of buyers (BUYER), the active degree of sellers (SELLER), the number of participators which are attracted by search advertising (SEARCH), and the number of participators which are attracted by event marketing (EVENT). The vectors of exogenous variables include for each endogenous variable (1) an intercept, C, and (2) a deterministic-trend variable, T, to capture the impact of omitted but gradually changing variables, and (3) indicators for days of the week, D. Instantaneous effects are captured by the variance–covariance matrix of the residuals, Σ . The VAR specification is given by

$$\begin{aligned}
 (1) \quad & \begin{bmatrix} \text{SEARCH}_t \\ \text{EVENT}_t \\ \text{SELLER}_t \\ \text{BUYER}_t \\ \text{PERFORM}_t \end{bmatrix} = \begin{bmatrix} C_{\text{SEARCH}} \\ C_{\text{EVENT}} \\ C_{\text{SELLER}} \\ C_{\text{BUYER}} \\ C_{\text{PERFORM}} \end{bmatrix} + \begin{bmatrix} \delta_{\text{SEARCH}} \\ \delta_{\text{EVENT}} \\ \delta_{\text{SELLER}} \\ \delta_{\text{BUYER}} \\ \delta_{\text{PERFORM}} \end{bmatrix} \times T + \begin{bmatrix} \gamma_{\text{SEARCH}} \\ \gamma_{\text{EVENT}} \\ \gamma_{\text{SELLER}} \\ \gamma_{\text{BUYER}} \\ \gamma_{\text{PERFORM}} \end{bmatrix} \times D \\
 & + \sum_{j=1}^J \begin{bmatrix} \phi_{11}^j & \phi_{12}^j & \phi_{13}^j & \phi_{14}^j & \phi_{15}^j \\ \phi_{21}^j & \phi_{22}^j & \phi_{23}^j & \phi_{24}^j & \phi_{25}^j \\ \phi_{31}^j & \phi_{32}^j & \phi_{33}^j & \phi_{34}^j & \phi_{35}^j \\ \phi_{41}^j & \phi_{42}^j & \phi_{43}^j & \phi_{44}^j & \phi_{45}^j \\ \phi_{51}^j & \phi_{52}^j & \phi_{53}^j & \phi_{54}^j & \phi_{55}^j \end{bmatrix} + \begin{bmatrix} \text{SEARCH}_{t-j} \\ \text{EVENT}_{t-j} \\ \text{SELLER}_{t-j} \\ \text{BUYER}_{t-j} \\ \text{PERFORM}_{t-j} \end{bmatrix} + \begin{bmatrix} \varepsilon_{\text{SEARCH},t} \\ \varepsilon_{\text{EVENT},t} \\ \varepsilon_{\text{SELLER},t} \\ \varepsilon_{\text{BUYER},t} \\ \varepsilon_{\text{PERFORCE},t} \end{bmatrix}
 \end{aligned}$$

where t indexes days, J equals the number of lags included (to be determined on the basis of the Akaike information criterion), D is the vector of day-of-week dummies, and ε are white-noise disturbances distributed as $N(0, \Sigma)$. The parameters δ , θ , γ , and ϕ are the ones to be estimated. Because VAR model parameters are not interpretable on their own (Sims 1980), effect sizes and significance are determined through the analysis of impulse response functions (IRFs) and elasticities computed on the basis of the model.

5. EMPIRICAL ANALYSIS

5.1 Sample

We collected data from a world famous electronic B2B platform, and it is the global leader in e-commerce for small business in various industries. This platform establishes offices in more than 70 cities across the United States, Europe, China, India, Japan, Korea, etc. As part of its strategy to transition into a holistic platform where small companies can find their potential traders more easily, it invests in advertising in many portals and engines (like Yahoo! and Google). Event marketing also have been taken since 2008, in which platform itself or cooperate with other complementary firms to attract potential users by establishing some conjoint marketing activities like charity or business knowledge training.

5.2 Data Description

By modeling the composite active buyers' and sellers' response towards ads, we aggregate (1) participators driven by search advertising as the number of participators who click ads due to the links of search engine outside the platform in the specific day; (2) participants driven by event marketing as the number of participators who come from the link of event ads in other cooperative website; (3) as the magnitude of the sellers who offer products on the platform; (4) active buyers exploitation as the magnitude of the buyers who give feedback via customer service without offering any trading goods. Finally, we aggregate sustainable competitiveness exploitation as amount number of CXT. Table 2 provides an overview of the operationalization of our variables.

In order to capture the long-term relationship between advertising and sustainable competitiveness and reduce the time-variant effect, we collected data from March 31st in 2008 to March 31st in 2009 on a daily basis, altogether 366 valid items. And their descriptive information is as follows, see in Table 3.

Table 2. Variable operationalization

Variable	Type	Operationalization
SEARCH (participants driven by search ads)	Endogenous	The daily number of new members who land website due to search engine advertising and click ads after they search in this website. Characteristics: (1) no existing user account, but his IP can be identified; (2) login this website due to search engine advertising; (3) click ads.
EVENT (event marketing)	Endogenous	The daily number of innocent participants who search and click ads due to the links of event ads in other website. Characteristics: (1) sharing user account with other firms and his IP can be identified; (2) login this website due to the cooperative firms or event pages; (3) click ads.
SELLER (active sellers)	Endogenous	The daily number of active sellers who participate in offering products in recent with transaction record. Characteristics: (1) own an existing seller account, register his account in the recording day; (2) participate actively in transaction according to transaction records.
BUYER (active buyers)	Endogenous	The daily number of active buyers who give feedback via platform system without any offers since registered. Characteristics: (1) own an existing buyer account, and his account was registered before the recording day; (2) participate actively in transaction according to the feedback records.
PERFORM	Endogenous	The revenue of the platform.
T	Exogenous	Time trend
D	Exogenous	Indicators fro days of the week (using Friday as the benchmark)

Table 3. Descriptive Statistics (Daily data)

	Num	Mean	Maximum	Minimum	Mdn	S.D.
SEARCH	366	2876.047	5021	506	2795.5	788.4644
EVENT	366	4629.349	9683	0	5149.5	2315.218
SELLER	366	419002.0	718264	36410	432685	150501.3
BUYER	366	23649.55	145278	1346	22278	17339.79
PERFORM	366	339447.8	393776	277546	345860	31048.68

6. RESULTS

To gauge both short-term and long-term interactive relationship among the active degree of user behavior, advertising and the sustainable competitiveness, we compute IRFs up to 4-week lags on the basis of the estimated VAR system parameters. First, the IRFs trace the incremental effect of a one-standard-deviation shock in active buyers and active sellers on the sustainable competitiveness. Second, we examine the carryover effects of search advertising and event marketing on active sellers and buyers respectively in a dynamic system. Finally, we measure the direct impact of advertising on the sustainable competitiveness, and collect the vital information of these IRFs in table 4 and 5.

6.1 Quality of User Bases Effect on the Sustainable competitiveness

The impact of the active degree of sellers on the sustainable competitiveness is found to be significant and

bigger than buyers' through all the period. In the short run, the active sellers have positive effect on the sustainable competitiveness, while in the long run it turns to be a negative one (since 7 days). On the contrary, the active degree of buyer behavior insignificantly affects the sustainable competitiveness in short-term, and then creates a positive effect after approximate 3 days. These differences show that, an activity degree of sellers change will firstly motivate users to get addition paid service from the platform which is the main component of performance. Later, the fierce competition brought by amount of sellers will do harm to the successful transaction rate and the confidence of users. However, the active degree of buyers would increase the transactional opportunities only after an observation period (about 3 day) instead of an immediate raise.

6.2 Advertising Effect on Quality of User Bases

Various advertising methods are documented to have different on quality of both side user behaviors. On the one hand, both search advertising and event marketing can significantly influence the active degree of seller behavior in long-term (after 14 day). Comparing the various kinds of advertising in the long run (14 day), the elasticity of event marketing (.01892) is 27 times higher than that of search advertising (.00705). But in short-term, search advertising has no significant effect at all. On the other hand, event marketing has a short-term effect on active buyers, but this short-term effect does not directly translate into long-term behavior, while the search advertising has both the short-term and long-term effect on the active degree of buyer behaviors.

These results indicate that advertising (search advertising and event marketing) can effectively motivate the active degree of two user bases. New comers from search adverting with more accurate objective can immediately incent buyers to consume on the platform, while sellers always need time to predict or make decisions. However, event marketing cause a simultaneously response by buyers, but such response to events does not last for a long time. Because compared with sellers, buyers do not need to operate their business and they only focus on the products or services they want for the period of making decision.

6.3 Advertising Effect on the Sustainable competitiveness

According to the result of IRFs, there is non-significant direct effect of advertising on the sustainable competitiveness, thus our empirical findings support the notion that advertising may affect the sustainable competitiveness in an indirect way though mediators such as active sellers and active buyers). The innocent participants from the advertising can not lead users to pursue the advanced service and information by paying for platform, but they can motivate the existing buyers or sellers to improve the sustainable competitiveness. We get the conclusion that advertising strategy affects sustainable competitiveness by incenting the user behaviors.

Table 4. Result of IRF to performance

Period		SELLER	BUYER
Short-term effect	elasticity	3.26305	0.01067
	t-value	-2.64578	-0.15329
Long-term effect	elasticity	1.325287	0.07641
	t-value	-1.074585	-1.09773
	duration	7	3

Table 5. Result of IRF to SELLER and BUYER

Period		SELLER		BUYER	
		SEARCH	EVENT	SEARCH	EVENT
Short-term effect	elasticity	0.003673	0.01314	0.3856	0.24013
	t-value	0.534059	-1.91018	-3.16492	-1.22541
Long-term effect	elasticity	0.00705	0.01892	0.35632	0.19618
	t-value	-1.02537	-1.71072	-2.92459	-0.95939
	duration	14	7	7	3

7. DISCUSSION

Despite of the high relevance of advertising strategy in two-sided market, the mechanism of the various advertising and its effect on the active users, the effect of active users on sustainable competitiveness have received little empirical attention from academics. In the current study, we address this gap theoretically and empirically. We adopt VAR model to capture the effects of the advertising on the two-sided market performance, including the active degree of user behavior as a mediator.

In this section, we summarize our main findings and then discuss our theoretical and practical contributions. We conclude with a discussion of the limitations of the current study and the directions for the further research.

7.1 Summary of Findings

We find that the active degree of user behaviors can directly affect sustainable competitiveness. In short run, the active sellers and buyers both have positive effect, while in long run active sellers turn to have negative one. However, thus far, prior researches on advertising in two-sided markets have focused exclusively on the direct effect on the sales or performance. We also find that that there is no direct relationship between them but advertising can improve the active degree of user behavior, then the active participants will enlarge the sustainable competitiveness.

Moreover, we find that different advertising strategies like search advertising (pull strategy) and event marketing (push strategy) we mentioned in this paper can influence users in different ways. On the one hand, search advertising drives the extent of active-level behavior in both sides for a long term, while is not significant in the short run for sellers. On the other hand, event marketing drives active-level behavior in both sides for a short term with larger elasticity compared with search advertising, while not significant in the long run to buyers.

7.2 Implication for Marketing Theory

Existing research have emphasized the user quantity in depth^{[25] [26]}⁵, while this paper investigates on the perspective of user quality (about user behavior). The first theoretical contribution of this study is that we document the two-sided user quality (like the active degree of two-sided customers in this paper) can significantly affect the sustainable competitiveness.

Secondly, the findings shed light on some documented ambiguities surrounding the advertising mechanism on performance in two-sided market, especially search advertising and event marketing, which is obviously different from the one in traditional market. Comparing with WOW which is more outstand used in the two-sided marketing²¹, the searching advertising and event marketing always proved as non-significant factors

to the performance. However, we find they can also influence sustainable competitiveness through the two-sided user behaviors.

Finally, the conclusions enrich the literatures on the relationship of advertising and user behaviors that also reflect the dynamic influence mechanism between the activity of external users and internal users. Advertising attracts innocent comers as external ones, which can offer both the competition and opportunities for transactions, can incite the existing users as internal ones in both sides.

7.3 Managerial Implications

Managers should be able to make use of our research in several ways. The active degree is an important indicator for market makers. As we noted previously, increase the activity of buyer can benefit the performance for a long term, while the activity of sellers would improve the performance in short run, and reduce it in long run. Thus, another practical benefit is how applying advertising strategies to incite the active degree, then increase the sustainable competitiveness finally. Search advertising and event marketing are both effective way. Event marketing is helpful for short-term performance via the way of increasing seller activity, while search advertising is suitable for long-term performance via the way of increasing buyer activity.

7.4 Limits and Further Direction

There are several ways to extend this research. In the market setting we study, we only focus on the active participants, but it would be very interesting to investigate the value of silence users. Meantime, the life time of consumers is worth to explore in the new context like two-sided market^[27]. Moreover, the advertising strategies effect on the silence one will also incite them to be active ones. However, the crucial role of active degree of user behavior can be an important topic and deserves full analytical exploration. It would also be useful to further explore the imputation under uncertainty effect. Finally, it would be interesting to document this advertising mechanism in a SNS context, in which the active degree is more important to the platform.

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