

Association for Information Systems AIS Electronic Library (AISeL)

PACIS 2012 Proceedings

Pacific Asia Conference on Information Systems
(PACIS)

7-15-2012

Platform-Based Online Services, Competitive Actions, And E-Marketplace Seller Performance

Huifang Li

USTC-CityU Joint Advanced Research Center, University of Science and Technology of China, City University of Hong Kong, China, luckstar@mail.ustc.edu.cn

Yulin Fang

Information Systems Department, City University of Hong Kong, Hong Kong, ylfang@gapps.cityu.edu.hk

Youwei Wang

School of Management, Fudan University, China, ywwang@fudan.edu.cn

Kai H. Lim

Information Systems Department, City University of Hong Kong, Hong Kong, iskl@cityu.edu.hk

Liang Liang

School of Management, University of Science and Technology of China, China, lliang@ustc.edu.cn

Follow this and additional works at: <http://aisel.aisnet.org/pacis2012>

Recommended Citation

Li, Huifang; Fang, Yulin; Wang, Youwei; H. Lim, Kai; and Liang, Liang, "Platform-Based Online Services, Competitive Actions, And E-Marketplace Seller Performance" (2012). *PACIS 2012 Proceedings*. 127.

<http://aisel.aisnet.org/pacis2012/127>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2012 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

PLATFORM-BASED ONLINE SERVICES, COMPETITIVE ACTIONS, AND E-MARKETPLACE SELLER PERFORMANCE

Huifang Li, USTC-CityU Joint Advanced Research Center, University of Science and Technology of China, City University of Hong Kong, China, luckstar@mail.ustc.edu.cn

Yulin Fang, Information Systems Department, City University of Hong Kong, Hong Kong, ylfang@gapps.cityu.edu.hk

Youwei Wang, School of Management, Fudan University, China, ywwang@fudan.edu.cn

Kai H. Lim, Information Systems Department, City University of Hong Kong, Hong Kong, iskl@cityu.edu.hk

Liang Liang, School of Management, University of Science and Technology of China, China, lliang@ustc.edu.cn

Abstract

Platform-based services are online services provided by e-marketplace operators to online sellers for them to compete and enhance performance. This paper aims at examining two important questions in the context of e-marketplace: (1) what kind of platform-based services can be used by online retail sellers as competitive moves? and (2) to what extent does the usage of these platform-based services impact online seller's performance? Drawing on competitive dynamics theory, we argue that sellers that undertake a larger number of, more complex and heterogeneous platform-based services achieve better performance in e-marketplace. Using data of 1046 sellers, who open online retail stores and sell cosmetics on Taobao, a Chinese e-marketplace, we found that while undertaking more complex platform-based services is important by itself, it is more important to be strategic by undertaking a large number of platform-based services and these services had better be different from its competitors and the industry. Implications for practice and research and suggestions for future research on improving sellers' competitiveness are discussed. This research was supported in part by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (No. CityU 141809).

Keywords: competitive action, strategic management, seller performance, e-marketplace, platform-based online services

1 INTRODUCTION

Electronic marketplace, as a platform for online transactions between sellers and buyers, are playing an important role in the internet economy with the promise to greatly improve market efficiency, reduce transaction cost and generate new revenue(Jiang et al. 2011; Wang et al. 2008). For instance, in China more than seventy per cent online retailing (about \$7.3 billion) happens in e-marketplaces in Q1 of 2011(Mackie 2011). As more and more offline retailers anticipate the huge potential benefits of e-marketplace and spill into it, the competition between online sellers becomes increasingly fierce. For example, by the end of 2011 there are more than 6 million sellers competing on Taobao, which is an online marketplace owned by Chinese e-commerce giant Alibaba and has some 800 million product lines from food to clothes to technology(Mackie 2011). Therefore, a big problem that online sellers are facing now is how to compete and enhance performance in the hypercompetitive e-marketplace.

At the same time, the e-marketplace platform providers, Taobao.com, Amazon.com and similar websites have launched online services that would help online sellers enhance their performance. Taobao, for example, has launched many optional services to sellers on their transaction platform, such as pay for performance- paid advertising provided by the transaction platform and charging according to advertising effectiveness, and purchasing agency community - a bridge between Taobao.com and buyers, whereby buyers can purchase goods from brick-and-mortar store Taobao authorized. These services are available to all sellers on the platform. Sellers can select from these services and use them to facilitate their online businesses. For the e-marketplace platform providers, these services may bring themselves a potential value-adding opportunity, in other words, they may get revenue from these services in future.

Facing increasing fierce competition, online sellers have to take actions to attract and retain customers, and one of their options is to use these platform-based services. Some sellers undertake a narrow range of services, while others may undertake a broader range of services. But which kinds of platform-based services to take and whether it is true that the more kinds of services they take the better their performance are still not clear. Given that sellers face realistic concerns, we seek in this paper to explain the relationship between platform-based services usage and seller performance. Specifically, this paper aims at examining two questions: (1) what kind of platform-based services can be used by online retail sellers as competitive moves? and (2) to what extent do the usage of these platform-based services impact online seller's performance?

To answer these questions, this study draws on competitive dynamics theory to investigate the impact of online sellers' usage of platform-based services on seller performance. Explaining performance differences among competing firms is a fundamental issue in strategic management, and there are several perspectives to answer this complex question (Derfus et al. 2008), such as industry structure viewpoint(Caves et al. 1977), resource-based view (Barney 1986; Ndofor et al. 2011; Yang 2011), evolutionary theory (Derfus et al. 2008; Nelson et al. 1982), competitive dynamics(Danny et al. 1994; Gnyawali et al. 2010; Ndofor et al. 2011; Smith et al. 2001) and so on. Among these theoretical perspectives focusing on understanding drivers of superior performance, competitive dynamics are highly influential(Ndofor et al. 2011). This study extends this theory to the context of e-marketplace, with a basic premise that competitive dynamics should be as important in e-marketplaces as they have been in traditional offline business environments, albeit with some notable differences given the unique nature of e-marketplaces.

The other parts of the paper are organized as follows. We first review the literature on e-marketplace and online seller performance, and give a brief description of platform-based services taken by online sellers in the e-marketplace. Then, we do a systematic review of competitive dynamics theory and the categories of competitive action in traditional industries. Next, we develop hypotheses and test them using a sample of 11506 seller-month observations for 1046 sellers on Taobao over 11 months. Finally, we discuss our findings, implications for research and practice, and avenues for future research.

2 THEORETICAL BACKGROUND

2.1 Electronic Marketplace

Electronic marketplace, originally known as electronic market system, is defined as “an interorganizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings”, and the firm operating the system, referred to as intermediary, may be a market participant, such as a seller, an independent third party or a multi-firm consortium (Bakos 1991). In addition, according to the kinds of buyers and sellers, electronic marketplace can be separated into two categories (Pavlou et al. 2004): business-to-business marketplaces that facilitate exchange relationships among organizations, such as Alibaba (china.alibaba.com), and business-to-consumer marketplaces that facilitate transactions involving consumers, such as Amazon.com and Taobao.com. In this study, we focus on the one operated by an independent third party and facilitating transactions involving consumers, i.e. B2C e-marketplace like Amazon.com and Taobao.com.

2.2 Seller Performance and Platform-based Online Services

As one of the key components of e-marketplace, online sellers' survival and superior business performance is always an important issue for practitioners and scholars. Recently, as the competition between sellers is becoming increasingly fierce, there is an urgent demand in understanding the drivers of online sellers' superior performance to help them compete with competitors and survive in the e-marketplace environment. Prior scholars have tried to address this issue from different aspects, including sellers' price strategy (Ghose et al. 2011; Kamins et al. 2004; Kocas 2002; Soh et al. 2006), usage of reputation systems (Clemons 2007; Dellarocas 2006) and differentiation strategy (Bockstedt et al. 2011). However, none of them have considered a set of emerging online services that the platform provider is offering, which sellers may voluntarily use to facilitate their online business. They are the focus of this study.

E-marketplace operators attract and retain online sellers by providing online services, such as information service and transaction-related service (Kollmann et al. 2009; Wang et al. 2008). Taobao, for example, provides the sellers on its platform with a variety of services. These online services include information services, such as product promotion based on collaborative filtering techniques, and transaction-related services, such as store VIP discount and escrow service. The main characteristic of these online services is that all of them rely on the transaction platform to function. For instance, sellers can attract buyers by selecting and subscribing time-limited discount in their user account, and then some related discount information will appear on their shop interface. For the ease of understanding and exposition, we refer to this kind of services provided by platform operators to the sellers as platform-based services.

Despite the fact that some sellers have already begun to use platform-based services as e-marketplace providers hope, there are still some issues to be understood and resolved. For instance, what kinds of platform-based services should sellers use? Is it true that the more platform-based services sellers use the better their business performance will be? Should they use a large scope of services or a small one? Usage of these services is the actions that online sellers take to compete in the e-marketplace, thus, we draw on competitive dynamics theory, which explains firm performance through the lens of competitive actions, to understand the effects of these online service usages on seller performance. In this study, seller performance refers to the final financial performance of a seller.

2.3 Competitive Dynamics Theory

Competitive dynamics, rooted in the Schumpeter's theory of “creative destruction”, focus on a series of actions and reactions among firms in an industry that reflect the normal and innovative movement of firms in pursuit of profits (Ndofor et al. 2011; Smith et al. 2001). This theory posits that a firm's

performance outcomes are determined by competitive actions (Ndofor et al. 2011; Smith et al. 2001). In the literature of competitive dynamics, competitive action is defined as “any externally oriented, specific, observable, market-oriented competitive move that a firm undertakes to improve its market position, such as new product introduction, creative advertising, new market entry, price cuts, and sale promotions(Smith et al. 2001)”. Although the particular types of actions carried out by firms of different industries is likely to vary, the vast majority of actions taken by offline firms can be represented by the following general categories (Smith et al. 2001): pricing actions, marketing actions, new product actions, capacity- and scale-related actions, service and operations actions, signalling actions etc. as shown in Table 1.

Categories	Descriptions	Examples
Pricing action	Announcement of price cuts and sales incentives (Chi et al. 2010; Yu et al. 2007).	Price cuts, rebates, discounts etc.
Marketing action	Moves focusing on advertising and promotion activities (Gnyawali et al. 2010; Yu et al. 2007).	Marketing campaigns, advertisement investments etc.
New product actions	Moves focusing on launching new productions and production innovation.	Launching new version of a product etc.
Capacity- and scale-related actions	Changes in company’s capacity or output (Yu et al. 2007).	Buying production equipment etc.
Service and operations actions	Changes in company’s distribution systems and aftersales service (Yu et al. 2007).	Setting up online distribution channel etc.
Signalling actions	Moves to alter the perception of the focal firm (Gnyawali et al. 2010).	Donation, charity activities etc.
Legal action	Moves to alter the political and legal environment, either as an offensive or defensive action (Gnyawali et al. 2010).	Political lobbying, lawsuits against competitors etc.

Table 1 Definitions and description of categories of competitive actions.

The effects of competitive actions on performance have been examined at three levels of analysis(Rindova et al. 2010), action-reaction dyads (Derfus et al. 2008), action repertoires(Gnyawali et al. 2010) and uninterrupted sequences of actions(Ferrier 2001). For instance, focusing on the timing and consequences of competitive responses, Boyd et al. (Boyd et al. 2008) suggested that response delay has a curvilinear relationship with responder performance, and a linear relationship with first mover performance. More recently, an empirical study of firms in the nascent social networking industry confirmed that firms that undertake complex action repertoires achieve better performance (Gnyawali et al. 2010). A review of competitive dynamics literature reveals a set of factors that are considered important in measuring the impact of competitive action on seller performance, including action volume(Chi et al. 2010; Gnyawali et al. 2010; Zhang et al. 2010), action complexity(Chi et al. 2010; Ndofor et al. 2011; Zhang et al. 2010), and action heterogeneity(Chi et al. 2010; Ndofor et al. 2011). Therefore, we conduct action repertoires level analysis.

In this analysis level, there are three important factors measuring the impact of competitive action on seller performance. First, action volume is the total number of actions carried out by a firm in a given period (Smith et al. 2001), and is an essential characteristic of a firm’s competitive repertoire (Danny et al. 1994). Existing researches suggest that action volume has the strongest and most consistent impact on firm performance(Chen et al. 1995; Ferrier 2001; Ferrier et al. 2002; Ferrier et al. 1999; Hambrick et al. 1996; Smith et al. 1991; Young et al. 1996). For example, both the Austrian view and resource advantage theory suggest firms take a large number of competitive moves to pursue competitive advantage and to discover profit opportunities(Zhang et al. 2011). Second, action complexity refers to competitive complexity or “the extent to which a given uninterrupted series of competitive action carried out by a firm is comprised of a wide (versus narrow) range of actions of different types(Smith et al. 2001)”. It’s one of the most commonly studied aspects of competitive behaviour (Ferrier et al. 1999; Gnyawali et al. 2006; Gnyawali et al. 2010). Finally, action heterogeneity denotes competitive deviance or “the extent to which a given uninterrupted series of

competitive action carried out by a firm deviates from that of a matched rival(Ndofor et al. 2011)”. It also has a strong influence on changing market shares and shifting rules of competition (Chi et al. 2007; Ferrier et al. 1999).

In the past decades prior researches have broadly attempted to explain performance as consequences of actions and reactions in many industries, including single traditional industries such as airlines(Yang 2011), in-vitro diagnostics (Ndofor et al. 2011), retail industry (Boyd et al. 2008) and emerging social networking industry (Gnyawali et al. 2010), and multi-industry (Derfus et al. 2008; Ferrier 2001; Vannoy et al. 2010). However, the effects of competitive actions on firm performance vary by type of industry environment(Smith et al. 2002), and is contingent on a firm’s market position(Derfus et al. 2008). This study aims addressing the aforementioned issues by extending the competitive dynamics theory to a different context, i.e. the e-marketplace, where a gap lies in.

3 HYPOTHESES DEVELOPMENT

The proposed theoretical model is shown in Figure 1, in which seller performance is the dependent variable, and three characteristics of platform-based services usage (volume, complexity and heterogeneity) are independent variables.

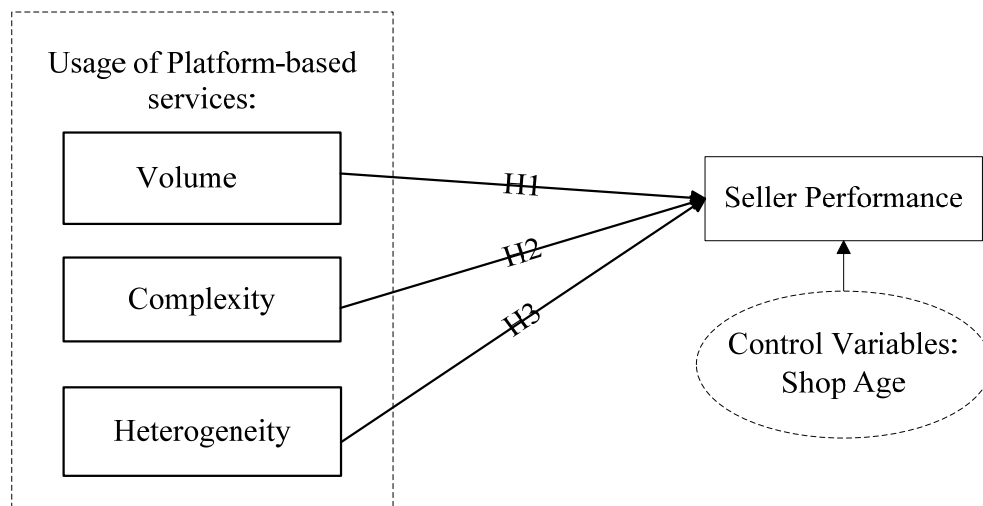


Figure 1 Research Model.

3.1 Platform-based Services Usage Volume and Seller Performance

Building upon the definition of action volume(Chen et al. 1995), we define platform-based services usage volume as the total number of platform-based services undertaken by a seller in a given period. In traditional industry, prior scholars have confirmed the existence of Red Queen competition (Derfus et al. 2008), whereby a firm’s actions increase performance but also increase the number and speed of rivals’ actions, which in turn negatively affect the initial firm’s performance, so the initial firm has to undertake more actions to keep up with the competition and enhance performance. Similar to the condition firms face in traditional industry (Chen et al. 2010; D'Aveni 1994), in the hypercompetitive e-marketplace environment, a seller is also compelled to take platform-based services with the hope of creating a series of advantages to ensure survival and prosperity. Hence, we expect a positive relationship between platform-based services usage volume and seller performance.

H1: Platform-based services usage volume has a positive impact on seller performance.

3.2 Platform-based Services Usage Complexity and Seller Performance

Like firms in traditional industry where firms can decide the scope of their competitive actions (Ferrier 2001), sellers can also choose the types of platform-based services they undertake, so some sellers undertake a narrow range of services, while others may undertake a broader range of services. Based on the definition of action complexity (Ferrier 2001), we define platform-based services usage complexity as the extent to which a series of platform-based services undertaken by a seller in a given period encompasses a wide range of different action types. According to the definition of competitiveness by Schumpeter- “the ability to carry out a range of competitive actions to capture and sustain a lead (Schumpeter 1934; Schumpeter 1950)”, sellers that undertake a broad set of service types can affect competitors in multiple ways, thereby making it difficult for competitors to understand the complex set of services and respond to them (Gnyawali et al. 2006). Therefore these sellers will be perceived as more capable (D’Aveni 1994) and gain temporary advantage, which in turn enhance their business performance. Hence, we hypothesize the following.

H2: Platform-based services usage complexity has a positive impact on seller performance.

3.3 Platform-based Services Usage Heterogeneity and Seller Performance

Based on the definition of action heterogeneity (Miller et al. 1996), we define platform-based services usage heterogeneity as the extent to which the entire set of platform-based services undertaken by a seller in a given period deviate from those of its competitors in a given period. Given that it has been found that action heterogeneity has a strong influence on changing market shares and shifting rules of competition in traditional offline context (Chi et al. 2007; Ferrier et al. 1999), we propose that this relationship exist in the e-marketplace, to be specific, when a seller undertake deviant platform-based services from rivals, he or she may improve relative performance. According to the view of Austrian economists (D’Aveni 1994; Ferrier et al. 1999), a seller’s set of new actions will not only deviate from its own past actions but also its rivals’, and moreover action heterogeneity may be a signal that indicate an aggressive attempt to break away from the norms of everyday competition and shift the rules of competition. In addition, based on the research of Ndofor et al. (2011), sellers that undertake deviant actions may create aforementioned ‘gales of creative destruction’ to diminish their rivals’ advantage and meanwhile increase their own which will in turn maintain or improve relative performance. Thus, we hypothesize as follows.

H3: Platform-based services usage heterogeneity has a positive impact on seller performance.

4 RESEARCH METHODOLOGY

4.1 Sample

Taobao is the biggest online B2C e-marketplace in China and giant of retail platform in Asia that connects more than 170 million registered users and having some 800 million product lines from food to clothes to technology (Mackie 2011), and it has provided sellers on its platform with a variety of online services. The research model was tested with balanced panel data of 1046 sellers, who operate online stores and sell cosmetics on Taobao, over a eleven-month time period. The cosmetics industry is chosen for it has clearly identifiable boundaries that provide an adequate setting both for comparable examination of the competitive activity of sellers. Two criteria were used for sample selection. First, we focused on sellers who ever used the platform-based services at least once in the given period. This criterion rules out sellers that never used this kind of services. Second, we only targeted sellers who operated business continually in the given period. Finally, 1046 sellers met our criteria, so we got a sample of 11506 seller-month observations for 1046 sellers over 11 months from November 2010 to September 2011.

4.2 Measurement

4.2.1 Dependent Variable

In the strategy literature, there are three types of performance measures to be used regularly: objective financial performance, subjective financial performance, and subjective nonfinancial performance (Newbert 2008). In this study, we used objective financial performance, which is considered as an ideal measurement of business performance (Gnyawali et al. 2010), and is operationalized by average transaction amount per day within the past 28 days.

4.2.2 Independent Variable

Building upon previous research in the area of competitive dynamics and the characteristics of services taken by sellers in the e-marketplace, we found 21 types of platform-based services on Taobao and categorize them into 4 categories as described in Table 2. Albeit not exhaustive, those are the major services on our experimental platform. This table also provides a brief description of each service category. For instance, the pricing category includes all the services that focus on price cuts and sales incentives, such as cumulative quantity discount and time-limited discount. The definition of each type of service is included in Table 5 in the Appendix. The classification scheme based on service characteristics can help analyse the significance of each category of platform-based services on the performance of online seller.

Categories	Descriptions	Examples
Pricing	Services focused on price cuts and sales incentives in the e-marketplace.	1.1 Time-Limited Discount 1.2 Bidding In Seconds 1.3 Cumulative Quantity Discount With Price Cuts 1.4 Cumulative Quantity Discount With Free Postage 1.5 Cumulative Quantity Discount With Integral 1.6 Cumulative Quantity Discount With Gift 1.7 Shop VIP 1.8 Platform VIP 1.9 Tie-in-sale 1.10 Coupons
Marketing	Services focused on advertising and promotion activities in the e-marketplace.	2.1 Pay For Performance 2.2 Hyperlink Advertisement 2.3 Purchasing Agency Community 2.4 Luxurious Shop Interface
Service and operation	Services focused on distribution systems and aftersales services in the e-marketplace.	3.1 Money-back Guarantee within 7 Days 3.2 Three Times Compensation For Fake Products 3.3 Consumer Protection Services 3.4 Free Repairment Within 30 Days 3.5 Lightning Shipping
Payment	Payment system in the e-marketplace.	4.1 Credit Card Service 4.2 Cash On Delivery

Table 2 Definitions and Description of Categories of Platform-based Services in E-marketplace.

Platform-based services usage volume denotes the total number of platform-based services undertaken by a seller in a given month (28 days) (Chen et al. 1995). We calculated platform-based services usage volume by summing the number of all twenty-one services for a seller in a given month (Chi et al. 2010). Twenty one types of platform-based services were measured: price cuts, time-limited discount, second kill etc. (see Table 2 for a description of the categories of platform-based services)

Platform-based services usage complexity measures the extent to which a series of platform-based services undertaken by a seller in a given month encompasses a wide range of different service types (Ferrier 2001). Following Chi et al (2010), we used a Blau's index (Blau 1977) to measure platform-based services usage complexity:

$$1 - \sum_{\alpha} \left(\frac{N_{\alpha}}{NT} \right)^2,$$

where N_{α} represents the number of platform-based services in the α th service category, NT is the total number of platform-based services across all service categories discussed above, and N_{α}/NT represents the proportion of platform-based services in the α th service category. High scores indicate that a seller carries out a complex repertoire of platform-based services, whereas low scores indicate that a seller carries out a simple service repertoire.

Platform-based services usage heterogeneity reflects the extent to which the entire set of platform-based services undertaken by a seller in a given month deviate from those of its competitors in a given month (Miller et al. 1996). This variable measured between-seller platform-based services usage differentiation, or the extent to which sellers differed in the platform-based services each carried out (Ferrier et al. 1999). Following Ferrier et al. (1999) and Chi et al. (2007; 2010), we used Euclidean distance to calculate service usage heterogeneity:

$$S_t(x_i, \bar{x}) = \sqrt{\frac{(x_{i1} - \bar{x}_1)^2 + (x_{i2} - \bar{x}_2)^2 + \dots + (x_{ij} - \bar{x}_j)^2}{j}},$$

where x_{ij} represents the number of services in each service type j that were undertaken by a seller i in each month, $i=1,2,3,\dots,1046$, $j=1,2,3,4$, $\bar{x}_j = [x_{1j}, x_{2j}, \dots, x_{1046,j}]'$. The mean scores were calculated by taking the average of the 1046 seller's usage of platform-based services across all four services categories in service repertoire, represent the industry norm of services taken in each month. A high score of platform-based services usage heterogeneity indicates a highly distinct service pattern that deviates from the month industry norm in a seller's repertoire of services.

4.2.3 Control Variable

To rule out possible alternative explanations, we used *shop age* (Baum et al. 1996; Baum et al. 1999; Chen et al. 2007) as control variable, which affect seller performance. We counted the number of months since the month when a seller open its store in Taobao to measure age.

4.3 Data Analysis and Results

Variable	Mean	S. D	1	2	3	4	5
1. Average Daily Revenues	2317.17	9198.87	1				
2. Platform-based Service Usage Volume	5.02	3.24	.238**	1			
3. Platform-based Service Usage Complexity	0.52	0.24	.118**	.650**	1		
4. Platform-based Service Usage Heterogeneity	1.02	0.50	.204**	.615**	.001	1	
5. Shop Age	32.31	21.07	.224**	.356**	.246**	.193**	1

Notes. Units of average daily revenues and shop age are China Yuan (CNY) and month, respectively. ** $p < .01$.

Table 4. Descriptive Statistics and Pearson Correlation Coefficients^a

Table 4 reports the means, standard deviations, and correlations for all variables in this study. The highest correlation is the effects of platform-based service usage complexity on platform-based service usage volume 0.65, which is below the critical value 0.7 (Gnyawali et al. 2010), and the highest variance inflation factors (VIFs) for all variables in the analysis is 5, which is below the critical value of 10 (Chi et al. 2010), suggesting no major multicollinearity issues.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Shop Age	.224*** (24.692)	.173*** (18.411)	.163*** (17.057)	.161*** (16.829)	.163*** (17.057)
Platform-based Service Usage Volume			.118*** (9.955)	.225*** (18.416)	.117*** (5.749)
Platform-based Service Usage Complexity		.075*** (8.116)		-.068*** (-5.785)	.002 (.101)
Platform-based Service Usage Heterogeneity		.171*** (18.725)	.100*** (8.823)		.101*** (6.652)
(Constant)	(-5.543)	(-18.310)	(-16.929)	(-8.382)	(-10.443)
R ²	0.050	0.082	0.085	0.082	0.085

Notes. N = 11506. Values in parentheses are t-values. The dependent variable in these regressions is average daily revenues. Shop age, three times compensation for a fake, and cumulative quantity discount with free postage represent control variable. Platform-based service usage volume, complexity and heterogeneity represent independent variables. R² is the proportion of variance in the dependent variable which can be predicted from the independent variables. * p < .05, ** p < .01, *** p < .001.

Table 5 Regression Results for All Variables.

We used the ordinary least squares (OLS) to test our hypotheses. First, we added control variable to the model, and got Model 1. Second, we added two independent variables to Model 1, and got Model 2, 3 and 4, respectively. Third, to compare with Model 2, 3 and 4, we added all the variables to the model, and got all variables model (Model 5). Table 5 presents the regression results for all the variables, and the dependent variable is average daily revenues.

The first model shows the influence of control variable shop age. The results show that shop age is significant (p < 0.001), suggesting that shop age impacts seller performance. In terms of the proportion of variance in the dependent variable which can be predicted from the independent variables, Model 1 (control only model) has a R² value of 0.050, which means that 5% of variance in average daily revenues can be predicted from shop age. The prediction strength was improved by adding different combination of dependent variables with Model 3 and 5 having the highest R² value of 0.085. We discuss the results pertaining to each hypothesis in the following.

Hypothesis 1 predicts a positive relationship between platform-based service usage volume and seller performance. Our analysis shows that the impact of platform-based service usage volume is positively significant for two reasons: (1) the coefficients in Table 5 are significant (p < 0.001) in Models 3, 4 and 5, and (2) the R² of Model 5, which includes all the variables, is higher than Model 2, which includes all the variables except for platform-based service usage volume. Thus Hypothesis 1 is supported, suggesting that platform-based service usage volume is critical for enhancing seller performance.

Hypothesis 2 predicts a positive relationship between platform-based service usage complexity and seller performance. The relationships between platform-based service usage complexity and seller performance show mixed results, which depends on the number of variables entered in the model. Platform-based service usage complexity is significant (p < 0.001) and positive in Model 2 and Model 4 when tested with another one dependent variable- platform-based service usage volume or platform-based service usage heterogeneity, respectively. But when it was tested with all the variables as shown in Model 5, the impact of platform-based service usage complexity is insignificant. Besides, the comparison of R² of Model 3 and Model 5 suggest that adding platform-based service usage complexity to the model doesn't improve the predicting strength a bit. Thus Hypothesis 2 is not supported.

Hypothesis 3 predicts that the more heterogeneous of platform-based services undertaken by a seller, the better the performance of the seller will be. Similarly to the result of Hypothesis 1, this hypothesis is supported. Specifically, the coefficients of platform-based service usage heterogeneity on seller performance are significant (p < 0.001) in Models 2, 3 and 5, and the R² of all variable Model 5 is

higher than Model 4, which includes all the variables except for platform-based service usage heterogeneity. Hence, Hypothesis 3 is supported.

5 DISCUSSION

In this study, to answer our research question - (1) what kind platform-based services can be used by online retail sellers as competitive moves and (2) to what extent do the usage of these platform-based services impact online seller's performance, we made a categories of services provided by the e-marketplace platform and examined the relationship between online sellers' usage of platform-based services and their performance by drawing on competitive dynamics theory. We hypothesize those sellers that undertake a larger number of (H1), more complex (H2) and heterogeneous (H3) platform-based services achieve better performance in the environment of e-marketplace. H1 and H3 are supported, while H2 is not. The results of this study indicate that while undertaking more complex platform-based services is important by itself, it is more important to be strategic by undertaking a large number of platform-based services and these services had better be different from its competitors and the industry.

5.1 Implications for Practice and Research

Our findings have important implications for both practice and research. Firstly, our research shows that sellers undertake a large number of heterogeneous platform-based services from the industry achieve better performance. On one hand, sellers do enhance performance when utilizing platform-based services properly, i.e. sellers should undertake more platform-based services and make sure that these services be different from those undertaken by their competitors. On the other hand, the platform-based services provider can launch more services to be chosen by sellers, and meanwhile their potential profit opportunities may increase. Secondly, as for research implication, this study contributed to the literature in understanding the effects of using services provided by transaction platform. To our knowledge best, this is the first study to consider the relationship between platform-based services and seller performance from the angle of competitive dynamics. Given the uniqueness of e-marketplace, although some conclusions are in line with those in offline context, their function mechanisms may be different, and further research is needed.

5.2 Limitations and Future Research

The present study has limitations that should be considered, as is common in research articles. First, as aforementioned we only focus on examining the impact of platform-based services on seller performance, but didn't explain how these services function. Therefore, future research should draw on their function mechanisms. Second, the results show low explanation power, and using page views in the future may result in better prediction. Third, the present study investigated one particular industry only (cosmetics) in one specific e-marketplace (Taobao), and this may limit the findings of our research. Future research should use different industries and e-marketplaces. Moreover, future research can consider geographical factor, definition of rivals, and seller size in e-marketplace. In sum, we hope to entice future researches to focus on (a) deepening in the current direction, explaining the function mechanisms between platform-based services and seller performance, and (b) exploring in horizontal direction, considering some uniqueness of e-marketplace, such as geographical factor and defining of rivals.

6 CONCLUSION

In conclusion, this study draws on competitive dynamics theory to investigate the impact online sellers' usage of platform-based services on seller performance from three dimensions- platform-based services' usage volume, complexity and heterogeneity. We find that competitive dynamics are as important in e-marketplaces as they have been in traditional offline business environments, but there

are also some differences between the findings with some notable differences given the unique nature of e-marketplaces. Despite these limitations, we believe that the present study contributes to a better understanding of the impact of platform-based services on seller performance. Future research is discussed.

Appendix

	Platform-based Services	Definitions
Pricing	Time-Limited Discount	An online function available through the transaction platform that sellers can use to display information about price reduction within a given limited time.
	Bidding In Seconds	An online function available through the transaction platform that sellers can use to display information about price reductions within extremely short periods.
	Cumulative Quantity Discount With Price Cuts	An online function available through the transaction platform that sellers can use to display information about price reductions based on the quantity purchased, whereby buyers can get discount when their purchasing amount reaches a certain value.
	Cumulative Quantity Discount With Free Postage	An online function available through the transaction platform that sellers can use to display information about free postage based on the quantity purchased, whereby buyers can get free postage when their purchasing amount reaches a certain value.
	Cumulative Quantity Discount With Integral	An online function available through the transaction platform that sellers can use to display information about integral sending based on the quantity purchased, whereby buyers can receive integral when their purchasing amount reaches a certain value.
	Cumulative Quantity Discount With Gift	An online function available through the transaction platform that sellers can use to display information about gift sending based on the quantity purchased, whereby buyers can receive a gift when their purchasing amount reaches a certain value.
	Shop VIP	An online function available through the transaction platform that sellers can use to display information about very important person of a shop, who can receive some special privileges from the shop, mainly referring to price discount.
	Platform VIP	An online function available through the transaction platform that sellers can use to display information about very important person of the platform, who can receive some special privileges (mainly referring to price discount) from all the shops that support the services.
	Tie-in-sale	An online function available through the transaction platform that sellers can use to display information about gift sending based on the quantity purchased, whereby buyers may get certain price discount if they buy one good and another good as well.
	Coupons	An online function available through the transaction platform that sellers can use to display information about a discount, either of a certain specified amount or a percentage to the holder of a virtual voucher.
Marketing	Pay For Performance	Paid advertising provided by the transaction platform, and charging according to advertising effectiveness.
	Hyperlink Advertisement	Spreaders of products, who help the sellers promote their products and charge according to promoting effectiveness.
	Purchasing Agency Community	It's a bridge between the e-marketplace and buyers, whereby buyers can buy goods from brick-and-mortar store shop the platform authorized.
	Luxurious Shop Interface	Personalized online shop interface provided by Taobao.
Service and operation	Money-back Guarantee within 7 Days	An online function available through the transaction platform that sellers can use to display information about aftersales services, whereby buyers can retreat and exchange goods within 7 days after purchasing without reason.
	Three Times Compensation For	An online function available through the transaction platform that sellers can use to display information about aftersales services, whereby buyers can receive three

	Fake Products	times indemnity for fake.
	Consumer Protection Services	An online function available through the transaction platform that sellers can use to display information about aftersales services, and sellers carry out obligations to buyers according to consumer protection service agreement.
	Free Repairment Within 30 Days	An online function available through the transaction platform that sellers can use to display information about aftersales services, whereby buyers can enjoy maintenance service within 30 days after purchasing.
	Lightning Shipping	An online function available through the transaction platform that sellers can use to display information about distribution service, whereby buyers can enjoy fast shipping.
Payment	Credit Card Service	An online function available through the transaction platform that sellers can use to display information about payment system service, whereby buyers can pay for goods through credit cards.
	Cash On Delivery	An online function available through the transaction platform that sellers can use to display information about payment system service, whereby buyers can pay for goods when they receive goods.

Table 3 Descriptions of Platform-based Services.

References

- Bakos, J. Y. (1991). A Strategic Analysis of Electronic Marketplaces. *MIS Quarterly*, 15(3), 295-310.
- Barney, J. B. (1986). Types of Competition and the Theory of Strategy: Toward an Integrative Framework. *The Academy of Management Review*, 11(4), 791-800.
- Baum, J. A. C., and Korn, H. J. (1996). Competitive Dynamics of Interfirm Rivalry. *Academy of Management Journal*, 39(2), 255-255.
- Baum, J. A. C., and Korn, H. J. (1999). Dynamics of dyadic competitive interaction. *Strategic Management Journal*, 20(3), 251.
- Blau, P. M. (1977). *Inequality and Heterogeneity*. Free Press, New York.
- Bockstedt, J., and Goh, K. H. (2011). Seller Strategies for Differentiation in Highly Competitive Online Auction Markets. *Journal of Management Information Systems*, 28(3), 235-268.
- Boyd, J. L., and Bresser, R. K. F. (2008). Performance implications of delayed competitive responses: evidence from the U.S. retail industry. *Strategic Management Journal*, 29(10), 1077-1096.
- Caves, R. E., and Porter, M. E. (1977). From Entry Barriers to Mobility Barriers: Conjectural Decisions and Contrived Deterrence to New Competition. *The Quarterly Journal of Economics*, 91(2), 241-261.
- Chen, M.-J., and Hambrick, D. C. (1995). Speed, Stealth, And Selective Attack: How Small Firms Differ From Large Firms In Competitive Behavior. *Academy of Management Journal*, 38(2), 453-482.
- Chen, M.-J., Lin, H.-C., and Michel, J. G. (2010). Navigating in a hypercompetitive environment: the roles of action aggressiveness and TMT integration. *Strategic Management Journal*, 31(13), 1410-1430.
- Chen, M.-J., Su, K.-H., and Tsai, W. (2007). Competitive Tension: The Awareness-Motivation-Capability Perspective. *The Academy of Management Journal ARCHIVE*, 50(1), 101-118.
- Chi, L., Holsapple, C., and Srinivasan, C. (2007). The linkage between IOS use and competitive action: a competitive dynamics perspective. *Information Systems & e-Business Management*, 5(4), 319-356.
- Chi, L., Ravichandran, T., and Andreovski, G. (2010). Information Technology, Network Structure, and Competitive Action. *Information Systems Research*, 21(3), 543-570.
- Clemons, E. K. (2007). An Empirical Investigation of Third-Party Seller Rating Systems in E-Commerce: The Case of buySAFE. *Journal of Management Information Systems*, 24(2), 43-71.
- D'Aveni, R. (1994). *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*. Free Press, New York.

- Danny, M., and Chen, M.-J. (1994). Sources and Consequences of Competitive Inertia: A Study of the U.S. Airline Industry. *Administrative Science Quarterly*, 39(1), 1-23.
- Dellarocas, C. (2006). How Often Should Reputation Mechanisms Update a Trader's Reputation Profile? *Information Systems Research*, 17(3), 271-285.
- Derfus, P. J., Maggitti, P. G., Grimm, C. M., and Smith, K. G. (2008). The Red Queen Effect: Competitive Actions And Firm Performance. *Academy of Management Journal*, 51(1), 61-80.
- Ferrier, W. J. (2001). Navigating the Competitive Landscape: The Drivers And Consequences Of Competitive Aggressiveness. *Academy of Management Journal*, 44(4), 858-877.
- Ferrier, W. J., Mac Fhionnlaioich, C., Smith, K. G., and Grimm, C. M. (2002). The Impact of Performance Distress on Aggressive Competitive Behavior: A Reconciliation of Conflicting Views. *Managerial & Decision Economics*, 23(4/5), 301-316.
- Ferrier, W. J., Smith, K. G., and Grimm, C. M. (1999). The Role Of Competitive Action In Market Share Erosion And Industry Dethronement: A Study Of Industry Leaders And Challengers. *Academy of Management Journal*, 42(4), 372-388.
- Ghose, A., and Yuliang, Y. (2011). Using Transaction Prices to Re-Examine Price Dispersion in Electronic Markets. *Information Systems Research*, 22(2), 269-288.
- Gnyawali, D. R., He, J., and Madhavan, R. (2006). Impact of Co-Opetition on Firm Competitive Behavior: An Empirical Examination. *Journal of Management*, 32(4), 507-530.
- Gnyawali, D. R., Weiguo, F., and Penner, J. (2010). Competitive Actions and Dynamics in the Digital Age: An Empirical Investigation of Social Networking Firms. *Information Systems Research*, 21(3), 594-613.
- Hambrick, D. C., Cho, T. S., and Ming-Jer, C. (1996). The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves. *Administrative Science Quarterly*, 41(4), 659-684.
- Jiang, B., Jerath, K., and Srinivasan, K. (2011). Firm Strategies in the 'Mid Tail' of Platform-Based Retailing. *Marketing Science*, 30(5), 757-775.
- Kamins, M. A., Drèze, X., and Folkes, V. S. (2004). Effects of Seller-Supplied Prices on Buyers' Product Evaluations: Reference Prices in an Internet Auction Context. *Journal of Consumer Research*, 30(4), 622-628.
- Kocas, C. (2002). Evolution of Prices in Electronic Markets Under Diffusion of Price-Comparison Shopping. *Journal of Management Information Systems*, 19(3), 99-119.
- Kollmann, T., Häsel, M., and Breugst, N. (2009). Competence of IT Professionals in E-Business Venture Teams: The Effect of Experience and Expertise on Preference Structure. *Journal of Management Information Systems*, 25(4), 51-79.
- Mackie, N. (2011). Online shopping is growing rapidly in China. *BBC News*. <http://www.bbc.co.uk/news/business-14679595>.
- Miller, D., and Chen, M.-J. (1996). Nonconformity in Competitive Repertoires: A Sociological View of Markets. *Social Forces*, 74(4), 1209-1234.
- Ndofor, H. A., Sirmon, D. G., and He, X. (2011). Firm resources, competitive actions and performance: investigating a mediated model with evidence from the in-vitro diagnostics industry. *Strategic Management Journal*, 32(6), 640-657.
- Nelson, R. R., and Winter, S. G. (1982). *An evolutionary theory of economic change*. Harvard University Press, Cambridge, MA Belknap, p.437.
- Newbert, S. L. (2008). Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm. *Strategic Management Journal*, 29(7), 745-768.
- Pavlou, P. A., and Gefen, D. (2004). Building Effective Online Marketplaces with Institution-Based Trust. *Information Systems Research*, 15(1), 37-59.
- Rindova, V., Ferrier, W. J., and Wiltbank, R. (2010). Value from gestalt: how sequences of competitive actions create advantage for firms in nascent markets. *Strategic Management Journal*, 31(13), 1474-1497.
- Schumpeter, J. (1934). *The Theory of Economic Development*. Harvard Press, Cambridge, MA.
- Schumpeter, J. (1950). *Capitalism, socialism and democracy*. Harper, New York.

- Smith, K., and DiGregorio, D. (2002). Bisociation, discovery and the role of entrepreneurial action. in: *Strategic Entrepreneurship: Creating a New Mindset*. H. M. I. RD and S.D. (eds), Blackwell Publishers, Malden, MA, p.129–149.
- Smith, K. G., Ferrier, W. J., and Ndofor, H. (2001). Competitive dynamics research: Critique and future directions. in: *The Blackwell Handbook of Strategic Management* R.E.F. M. Hitt, & J. Harrison (eds.), Blackwell Publishers, London, p.315–361.
- Smith, K. G., Grimm, C. M., Gannon, M. J., and Chen, M.-J. (1991). Organizational Information Processing, Competitive Responses, And Performance In The U.S. Domestic Airline Industry. *Academy of Management Journal*, 34(1), 60-85.
- Soh, C., Markus, M. L., and Kim Huat, G. (2006). Electronic Marketplaces and Price Transparency: Strategy, Information Technology, and Success. *MIS Quarterly*, 30(3), 705-723.
- Vannoy, S. A., and Salam, A. F. (2010). Managerial Interpretations of the Role of Information Systems in Competitive Actions and Firm Performance: A Grounded Theory Investigation. *Information Systems Research*, 21(3), 496-515.
- Wang, S., Zheng, S., Xu, L., Li, D., and Meng, H. (2008). A literature review of electronic marketplace research: Themes, theories and an integrative framework. *Information Systems Frontiers*, 10(5), 555-571.
- Yang, X. U. (2011). Competitive Network And Competitive Behavior: A Study Of The U.S. Airline Industry. *Academy of Strategic Management Journal*, 10(1), 45-63.
- Young, G., Smith, K. G., and Grimm, C. M. (1996). "Austrian" and Industrial Organization Perspectives on Firm-Level Competitive Activity and Performance. *Organization Science*, 7(3), 243-254.
- Yu, T., and Cannella, A. (2007). Rivalry Between Multinational Enterprises: An Event History Approach. *The Academy of Management Journal ARCHIVE*, 50(3), 665-686.
- Zhang, C., Song, P., and Qu, Z. (2011). Competitive Action in the Diffusion of Internet Technology Products in Emerging Markets: Implications for Global Marketing Managers. *Journal of International Marketing*, 19(4), 40-60.
- Zhang, Y. U., and Gimeno, J. (2010). Earnings Pressure And Competitive Behavior: Evidence From The U.S. Electricity Industry. *Academy of Management Journal*, 53(4), 743-768.