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Roles of Online Ratings for Multihoming on O2O Platforms

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Abstract: This paper studies the role of online ratings for the choice of multihoming on third-party O2O platforms. Specifically, the work investigates the main effect of online ratings and its interaction with operation duration and the number of screens. An ordered logit model is employed with a sample of 1902 cinemas multihoming on O2O platforms. The findings show that online ratings have significantly positive impact on platform multihoming. A cinema's operation duration negatively moderates the relationship between online ratings and platform multihoming, while its number of screens positively moderates the relationship. Implications of the findings are discussed.

Keywords: online rating, O2O platform, multihoming, ordered logit model

1. INTRODUCTION

Online-to-offline (O2O) commerce has become a booming business in China[1]. Local service firms (LSFs) regard it as an opportunity to improve their performance by leveraging Internet and information technologies[2]. LSFs can choose to establish its own online platform or to join a third-party platform. The "Death List" of O2O firms circulated in Wechat demonstrated great risks of establishing a platform by LSFs themselves. It can be a better choice for small and medium-sized LSFs to join a third-party platform. Nevertheless, it is a double-edged sword for LSFs. On the one hand, the cross-side network effects can bring them a large number of potential customers[3], and the platform offers them the information and commercial infrastructures[4]-[5]. On the other hand, LSFs may face fierce competition against similar LSFs on a third-party platform, which would have the crowding-out effects on them[6]. Further, LSFs have to adapt to governance by the platform[7]. Hence, participating in third-party platforms is a significant but difficulty decision for LSFs.

So far, two research streams regarding the supply side of digital platforms have developed in a parallel way. One is the work about the problems of platform selection. Literature studies whether supply-side companies will join a platform[8], or which platforms the companies will join[9], based on the characteristics of platforms or of supply-side companies[8]-[12]. The other is the study about electronic word-of-mouth (EWOM) and its impact on the performance or the brand building of the supply side companies[13]-[14]. In the digital era, EWOM is an important factor determining decisions by firms and individuals[15]. Thus, this article attempts to bridge the research of EWOM and of platform selection, from the perspective of the supply-side firms on a platform. This paper tries to answer the questions below: what is the impact of online ratings on platform multihoming, and how internal attributes of a supplier moderate the relationship between online ratings and platform multihoming?

This paper has two major contributions. First, it bridges two streams of research on EWOM and platform selection. Specifically, the paper empirically studies how EWOM can influence platform selection by LSFs. Extant literature about platform selection focuses impact factors on internal features of platforms or supply-side agents. This paper incorporates EWOM and investigates its impact on platform selection. Second, this paper examines rising e-commerce phenomena, i.e. O2O business model. So far there have been few empirical papers studying O2O and related phenomena although it has increasing role in the digital economy. O2O business model has some distinctive features, among others, location-based service and mobile computing, which makes

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it different from B2C or C2C. This paper investigates platform selection in the context of China's O2O platforms. The research and its results will have implications for emerging O2O research.

It is both practically and theoretically significant to study LSFs' participation in O2O platforms. Practically, it is not only related to platform selection by supply-side firms, but also inspires platform owners to treat LSFs differently based on EWOM, which help platform owners to better manage the platform ecosystem. Theoretically, the study contributes to our understanding on supply-side agents in a specific context.

2.   THEORETICAL FRAMEWORK AND HYPOTHESS

This paper selects the motion picture industry as the context for the following two reasons. First, since group purchase of tickets was launched in 2010, O2O platforms have accounted for an increasing share of the industry. According to Quarterly Report on China's Film Online Ticket Market by International Analysis, online ticket sales accounted for more than 78% of total box office in the second quarter of 2016. Second, investigating O2O platform multihoming in the context of the motion picture industry can inspire platform strategies in other local service sectors. O2O platforms feature a closed loop. In the case of the film industry, the feature is outstanding: local cinemas display information online, and viewers make choices and payments online, and watch films offline, and finally give their comments online.

A cinema provides exhibition service, which is naturally local entertainment. In recent years, the cinema market has maintained rapid expansion. In 2015, China witnessed an increase of 1,200 new cinemas and 8,035 screens, up 20% and 23.43% year on year respectively. Besides the soaring of the number of cinemas, multiple screens have become the trend of cinemas. According to statistics by HIS Screen Digest, multi-screen cinemas had accounted for 81% screens in the U.S. by the end of December 31 2012. Multi-screen cinemas have become the mainstream in newly-established cinemas. The operation duration and number of screens both have significant impact on the box office of a cinema[16]-[17]. The paper will investigate the role of online rating for platform multihoming in light of the two prominent features of cinemas. In detail, we will examine the impact of the interaction terms between online rating and operation duration and the number of screens on cinema performance.

2.1   Online rating

Platform participation can provide a large potential installed base of end users for suppliers[18]. O2O platforms vary in their components and sizes of installed bases of end users[19]. When participating in more than one platform, suppliers may increase their potential installed bases of end users. Cinemas with a higher online rating have a better competitive position in comparison with those with a lower online rating. All else being equal, customers tend to choose high-rating cinemas for film watching. So cinemas will higher online ratings have more opportunities to turn the potential installed base into their customers. In sum, we posit the following hypothesis:

H1 The higher online rating of a cinema is positively correlated with its higher degree of platform multihoming.

2.2   Interaction effects

First, online and offline channels may have potential conflicts. In China, online ticket prices are usually lower than offline ones, and online sales can provide convenience and save time for consumers. Then some offline consumers will turn to online channels, which will result in a substitution effect[20]. The substitution effect may have negative effects on cinemas' motivation of platform multihoming due to its impact on customer loyalty and non-ticket expenses. Customers who buy tickets on O2O platforms will be less loyal to cinemas than those buy tickets through traditional offline channels. Further, revenues from related consumption and derivatives will decrease as consumers who buy and pay tickets online will reduce their time staying at cinemas.

The longer a cinema's operation duration, the better its traditional sales channels. Incumbent cinemas have established sales channels and accumulated loyal customers in such traditional ways as word of mouth. In comparison with new entrants, established cinemas are less dependent on online channels. Further, film consumption is typically local service. Customers influenced by online ratings may partially overlap with those subject to traditional word of mouth. It means that all else being equal, a cinema with longer operation duration is subject to a larger substitution effect. When two cinemas have equal online ratings, a cinema with long operation duration are less willing to participate in more platforms. In sum, we present the following hypothesis:

H2 The longer a cinema's operation duration, the weaker the relationship between its online rating and platform multihoming.

Online ratings and screens are complementary resources of cinema operation. Online ratings represent reputation of a cinema, which have significant impact on customers' choice. A cinema with a higher online rating can attract more audience, which to some extent requires more screens for better satisfying audience's demand.

LSFs have some ordinary resources in their routine operation. Platforms that possess a large installed base can help LSFs harness the hidden value of ordinary resources[21]. Further, platforms can be regarded as evolving organizations storing resources and capabilities[22]. Beyond sizable potential customers, O2O platforms can provide software as a service (SaaS) for participating cinemas, among others, film scheduling, customer portraying, sales of drinks and snacks. In this line, participating platforms can improve operation of a cinema. Actually, the resources of LSFs and platforms are complementary. It is the combination of platform resources and ordinary resources that results in efficient value creation [21]. All else being equal, firms with more screens can benefit more from platform multihoming by potentially attracting more audience. Thus, we present the following hypothesis:

H3 The larger number of a cinema's screens, the stronger the relationship between its online rating and platform multihoming.

3. METHODOLOGY

3.1 Data

This paper treats cinemas as the unit of analysis. The samples of this paper are selected based on the following two requirements. First, a sample cinema must adopt computer-aided ticket system (CTS), which is connected to the computer terminal of SARFT and required to upload data to SARFT every day. The rule objectively increases data availability and guarantees data quality for research. Secondly, the cinema must have viewer rating on Maoyan, Gewara and Mtime, three typical O2O platforms in China. The sampling period of this paper is January 2015. A total of 1902 cinemas meet the above-mentioned two requirements during that period.

The data of this paper have three sources. Firstly, data about the box office, business duration, average price and screens of a cinema are from Entgroup Company. Secondly, data about cinema rating and the degree of cinemas' participation on third-party platforms are snatched from the websites of the three O2O platforms. Data about vertical integration of an exhibition chain is crawled from websites of exhibition chains. Thirdly, data about consumption expenditure of urban residents are from 2016 annual statistics of corresponding provinces, municipalities or autonomous regions.

3.2 Variables

(1) Dependent variable. The dependent variable is a cinemas' platform multihoming, which is measured by the number of third-party O2O platforms that a cinema participates in. Participation herein means that a cinema allows customers to select seats and make the payment on a platform. Specifically, $Multihoming_i$ equals 0 if

cinemas don't choose any platform among Maoyan, Gewara and Mtime, 1 if cinemas participate in only one of them, 2 if cinemas participate in any two of them and 3 if select all of them. Therefore, *Multihoming$_i$* is an ordinal categorical variable.

(2) Independent variable. The independent variable *Rating$_i$* is measured by the average rating score of a cinema on the three online platforms. It captures the online reputation of a cinema.

(3) Moderating variables. There are two moderating variables, *Duration$_i$* and *Screen$_i$*. *Duration$_i$* represents operation duration of a cinema, measured by the number of business days from a cinema's establishment by the sample period. *Screen$_i$* represents the capacity of a cinema to exhibit films simultaneously, measured by the total number of screens of a cinema.

(4) Control variables. This paper includes four control variables, i.e. *Exp$_i$*, *Integration$_i$*, *Price$_i$* and *Mposition$_i$*. *Exp$_i$* represents consumption capability of local customers, measured by consumption expenditures of urban residents per capita. The variable *Integration$_i$* captures the partnerships between a cinema and its exhibition chain. The partnerships have two categories: equity investment or cooperation contracts. The former represents a strong tie, while the latter represents a weak tie. *Integration$_i$* is a dummy variable, being 1 in the case of equity investment, and 0 in the case of cooperation contracts. The variable *Price$_i$* captures the market power of a cinema, measured by the average price of a cinema in the sample period. The variable *Mposition$_i$* represents the market share of a cinema, measured by the proportion of the total box office of a cinema in that of all cinemas in the same city.

3.3   Model specification

Generally, the appropriate model is the ordered logit or probit model when the dependent variable is an ordinal categorical variable, which takes the ceiling and floor effects into account and avoids the use of a subjectively chosen score assigned to the categories[23]. And multinomial logit or probit models are inappropriate as they fail to account for the ordinal nature of the outcomes. For mathematical simplicity, this paper uses the ordered logit model.

4.   RESULTS

4.1   Descriptive statistics

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	1	2	3	4	5	6	7
1. *Duration$_i$*	7.108	0.943	1.000						
2. *Screen$_i$*	1.727	0.430	-0.191[***]	1.000					
3. *Rating$_i$*	2.071	0.081	-0.234[***]	0.166[***]	1.000				
4. *Exp$_i$*	9.937	0.285	0.073[***]	0.253[***]	-0.037	1.000			
5. *Integration$_i$*	0.467	0.499	-0.176[***]	0.154[***]	0.073[***]	0.005	1.000		
6. *Price$_i$*	3.465	0.192	0.061[***]	0.284[***]	-0.015	0.406[***]	0.059[**]	1.000	
7. *Mposition$_i$*	5.569	1.645	-0.094[***]	0.277[***]	0.156[***]	-0.502[***]	0.143[***]	-0.027	1.000

Notes：[***] represents 1% significance, and [**] represents 5% significance.

Table 1 gives descriptive statistics of variables. We can find that only the standard deviation value of *Integration$_i$* is slightly larger than its mean value, the standard deviations of the rest variables are all smaller than its mean value. Also, we checked for potential problems of multicollinearity by calculating variance inflation factors (VIF). The mean value of VIF is 1.42 and the maximum value of VIF is 2.02. Consequently, no problems of multicollinearity exist.

4.2　Regression results

Table 2 gives regression results. Model 1 is a baseline model, including control variables. Model 2 adds the independent variables $Rating_i$, based on the Model 1. Model 3 includes moderators $Duration_i$ and $Screen_i$. Model 4 and 5 include interactions terms between the independent variable and moderators.

The result of Model 2 reveals that $Rating_i$ has a significant and positive impact on the choice of platform multihoming, thus supporting H1. The coefficient of the interaction term $Rating_i*Duration_i$ is negative and significant, thus supporting H2. It demonstrates that all else being equal, new cinemas tend to have stronger relationships between online ratings and platform multihoming than established ones. The coefficient of the interaction term $Rating_i*Screen_i$ is positive and significant, thus supporting H3. It demonstrates that cinemas with more screens tend to have stronger relationships between online ratings and platform multihoming than cinemas with fewer screens.

Table 2. Regression results

	Model 1	Model 2	Model 3	Model 4	Model 5
Exp_i	2.470***	2.422***	1.742***	1.736***	1.736***
	(0.211)	(0.212)	(0.227)	(0.227)	(0.227)
$Integration_i$	1.127***	1.113***	1.063***	1.069***	1.070***
	(0.095)	(0.095)	(0.097)	(0.097)	(0.097)
$Price_i$	1.124***	1.202***	0.953***	0.988***	0.943***
	(0.287)	(0.290)	(0.288)	(0.288)	(0.288)
$Mposition_i$	0.351***	0.329**	0.195***	0.200***	0.197***
	(0.033)	(0.034)	(0.037)	(0.037)	(0.37)
$Rating_i$		2.377***	1.758***	1.896***	2.010***
		(0.570)	(0.589)	(0.593)	(0.597)
$Duration_i$			-0.026	-0.048	-0.026
			(0.049)	(0.050)	(0.049)
$Screen_i$			1.091***	1.082***	1.101***
			(0.132)	(0.132)	(0.132)
$Rating_i*Duration_i$				-1.304**	
				(0.554)	
$Rating_i*Screen_i$					3.075**
					(1.304)
LR chi2(n)	458.57	475.98	552.33	557.90	557.85
Pseudo R2	0.099	0.103	0.119	0.121	0.121
Log likelihood	-2083.35	-2074.65	-2036.47	-2033.69	-2033.72

Notes：Values in parentheses are standard errors. *** represents 1% significance, and ** represents 5% significance.

5.　CONCLUSIONS

This paper examines the role of online ratings on cinemas' choices of platform multihoming in the context of China's O2O platforms. The findings confirm the positive impact of online ratings on platform multihoming. Further, we find that operation duration of a cinema negatively moderates the relationship between online ratings and platform multihoming, while the number of a cinema's screen positively moderates the relationship. Therefore, the choices of platform multihoming by LSFs are not only affected by the online evaluation of a supply side, but also influenced by its internal features.

Our findings inspire LSFs to make appropriate decisions on multihoming on third-party platforms. LSFs

must realize that participating in the third-party platform may allow them to take advantage of platform resources and capabilities, but also can bring conflicts with their existing channels. Although cooperating with multiple third-party platforms can increase LSFs' potential customers and enhance its digital capabilities, it may be incompatible with existing resources and capabilities. The resources not only refer to the material resources but also include intangible resources, such as reputation, customer loyalty and so on. Hence, before making the decision of platform multihoming, the LSFs must identify the key tradeoffs of platform multihoming, and contemplate possible impacts of platform multihoming on their own resources and capabilities, as well as the platform resources and capabilities.

The conclusions of this paper may have implications for the operation of O2O platforms. According to the results of the paper, suppliers with higher ratings are more likely to join a platform. It implies that when starting platforms, platform owners can design their pricing policies in favor of lower-rating suppliers, who are less motivated to join a platform. Further, among high-rating suppliers, platform owners may have bargaining power with new suppliers or suppliers with larger capabilities.

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