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Predicting success of mobile game after market launch using app downloads and sales revenues as performance indicators.

Kyungjin Nam¹, Hyejin Kim²

Abstract

The world game industry, especially the mobile game market, has grown rapidly in recent years. One of the interesting characteristics of mobile game performance is that its lifetime is remarkably short compared to that of online games and most downloads are peaked in the early period of the service. Since the success of the game is largely dependent of this early performance, this study aims to predict the performance of mobile games right after launch and identify the factors which have influences on the success of the game. Using a multiple regression analysis with mobile game application downloads and sales revenue as performance indicators, this paper investigates the impacts of five main categories of independent variables; brand-related (awareness of IP and name value of publishers), information sources (platform rating and official domestic forum), media and promotion factors (TV commercials, pre-registration, press releases, YouTube videos), objective features (genre and payment type), and distribution-related variables (platform's market power and seasonal issues). TV commercial and pre-registration are significantly strong factors for both revenue and downloads. Google Play's featured banner and media and promotion factors such as press releases and YouTube videos are also important in revenue increase. Regarding the number of downloads, the use of IP (intellectual property) is a significant factor and puzzle games have relatively positive relationship than other genres. Surprisingly, however, the publishing firm (or rather the name value of the firm) didn't have significant impact on performance, and this might imply that there could be an opportunity for small and medium sized companies by investing in media and obtaining mobile platform advantages.

Keywords: Mobile game industry; Game revenue; Game downloads; Regression analysis;

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1. Introduction

The game industry, especially the mobile game market, has grown rapidly around the world in recent years. According to Appannie (2018), a trusted data source in the global application market and industry, the amount of spending on mobile games outpaced console games and PC games for the first time in 2014. In 2017, its annual growth rate was higher than PC games by 2.3 times and consoles games by 3.6 times (Appannie & IDC, 2018).

Among other countries, Korea is one of the leading markets of mobile games, where people can play mobile games wherever and whenever they want to do due to the well-supported mobile infrastructure system (Dal Yong Jin, & Chee, F., 2005). They spend more time in using smart phone applications including mobile games. About 60% of Koreans whose ages were between 10 and 65 were found to play mobile games (KOCCA, 2017). While average universal usage time of smartphone applications is about 2 hours a day in case of Android phone in 2017, Korean people use applications over 3 hours a day, and 25% of the usage time is accounted for playing games (Appannie, 2017). Furthermore, the high-end MMORPG (Massively Multiplayer Online Role-Playing Game) genre such as “Lineage 2 Revolution” and “Lineage M” is dominant in Korea, which drives top revenues in the worldwide mobile application gross, according to Appannie’s 2017 Retrospective report. As such, Korean mobile game industry has been showing striking achievements and it is the focus of the public attention.

Generally, the lifetime of mobile games is remarkably short compared to that of online games (Song, et al., 2013) and most of downloads are peaked in the early period of the service. It is very important to acquire as many users as possible around the launch and continue to keep the users by preventing them from leaving the game because it could be directly related to making profit, which should be the ultimate goal of success of the game. According to Mobile Index, top 100 grossing games account for about 94% of the total

Google Play game market revenue. Furthermore, among top 100 grossing games, top 10 holds 70% and top 3 takes 40% of the total market share. In other words, the mobile game market is seriously polarized and survival rate is remarkably low. In fact, the mobile game market is fiercely competitive; only top 10 mobile games on the Google Play grossing chart account for about 70% of the total revenue, however, over ten thousands of new mobile games are launching every year (Mobile Index, 2017).

Nevertheless, there is no empirical research specific to the analysis of mobile game performance yet. Since the success of game is largely dependent on the performance of user acquisition and revenue, it should be worthwhile to investigate which factors are important in successful performance of mobile games. And therefore, this paper tries to analyze the performance of mobile games for a week after the launch using app downloads and sales revenues as performance indicators, by investigating the factors which might have influences on the successful performance of the mobile game.

The remaining part of this paper is organized as follows. Section 2 discusses review of literature to develop research questions. Section 3 explains the research methodology, and results are in section 4. Finally, conclusions are in section 5.

2. Literature review

2.1 Previous researches on movie box office prediction

Since there are little attempts to predict the performance of mobile games, it is very difficult to find precedent research cases in the same field. In the movie industry, however, many models for success prediction have been studied. Because mobile game is also an experience good, similar to the characteristics of a movie, examining the case of movie box office performance might provide an insight in developing the prediction model of mobile game.

According to Shapiro & Varian (1998), an experience good is a good that individuals can't know perceived value before they experience it. The experience good is usually chosen and used solely for leisure and enjoyment like theater (Reddy, et al., 1998). Similarly, game also has the same property as an experience good. Because the information that a user can obtain is very limited until the game is released and downloaded, simple information source and objective characteristics will greatly affect the performance. Moreover, people consume games only for fun and enjoyment. Therefore, this study first reviews the prediction model of the box office performance which has similar characteristics with game as an experience good.

Although there are several studies that propose box office performance prediction models, the model suggested by Chang, et al. (2005) can be applied to mobile game industry with some proper revisions, because it utilized independent variables based on the concept of experience good. The reference model uses box office performance as a dependent variable and has four categorizations for independent variables: brand-related variables, objective features, information sources, and distribution-related factors. The first three variables are related to the audience's information seeking behavior. On the other hand, the last variable shows the effect of market power and release strategies. To be more specific, sequel, director and actor are representative brand-related variable. Objective features include production budget, genre and Motion Picture Association of America film (MPAA) rating. Critics' rating and audience rating are classified as information sources and distribution-related variables are consisted of distributor's market power and release period.

2.2 Conceptual model for mobile game performance prediction

Games are made by developers and distributed through publishers to the mobile app platforms like Google and Apple. In addition, there are some indications such as genre preference and the rating system. This kind of industry ecosystem might be similar to that of

movie industry. If this is the case, analyzing the performance of the mobile game industry should also consider awareness related to game titles, other objective characteristics, and distribution-related factors.

However, couple of significant difference between movies and mobile games should be addressed. Firstly, unlike movies that audiences watch in the movie theater passively until the movie ends, a game is based on players' direct intervention of physical activity and thus the playtime depends on the user. This activity aims for accomplishing goals by overcoming challenges. Since there are diverse strategies to get over difficulties, players naturally forms a forum where they can exchange information and communicate each other. Especially nowadays in Korea, there is a community called "Naver Café" where most of the mobile games designate as their official user forum. In addition, people share their game plays via YouTube so that people can easily find how other people are playing.

Secondly, "pre-registration" is another important event before launching a mobile game in Korea. Pre-registration is to register the mobile phone number of the user in advance so that the registered user can receive additional compensation when the game is actually launched. The compensation is generally composed of in-game items and the items become more valuable as the number of pre-registered users increase. This campaign is widely used to estimate the number of users preliminarily in order to prepare a game environment such as a server capacity, but in fact, the main purpose is rather to inform and promote the game. Likewise, the pre-registration system is a unique promotion method of mobile game.

Lastly, the business model is quite different from each other. Movie audiences must pay for the movie ticket when they go to the theater, however, most of the mobile games are released and downloaded freely and revenues are generated by an in-app purchase (IAP) or advertisements, although there are still a little paid mobile games. IAP is a part of a freemium model which a user can download a game for free and then should pay for additional contents

or valuable items inside of the applications. Because of IAP, every user's payment range is different. A user can purchase virtual goods (or services) as much as one can afford up to his/her willingness to pay. Because most of free games use IAP and these distinct features of mobile games play critical roles for analyzing mobile application performance and customer behavior, these will be considered to the variable construction in the next section.

3. Methodology

3.1 Variable construction

A multiple regression analysis is applied to predict the performance of mobile games during the first week right after the launch. As the dependent variable, both weekly downloads and the weekly revenues of each mobile game title are used to the measure of performance of the games.

Revising the conceptual model of Chang et al, (2005), we first consider the concept of experience good to construct independent variables that could play important role in the mobile game environment. Basically, the independent variables include the recognition of mobile game titles as a brand-related factor (awareness of intellectual property (IP), name value of publishers), information sources (platform rating), media and promotion factors (TV commercials), objective features (genre), and distribution-related factor (platform's market power and seasonal issues). Since there is no public announced budget data, marketing or development budget are excluded. Instead, advertising activity is measured by executing TV commercials.

In addition, considering the unique characteristics of mobile games, we add press releases, YouTube videos and progression of pre-registration to media and promotion factors expecting that they should possess great portion of information diffusion. Also, in terms of communication activity, the existence of official domestic forum is measured for information

sources. Moreover, four types of payment – In-App Purchase (free), Advertisement (free), In-App Purchase & Advertisement (free), Paid - are included to the objective features. Overall, the independent variables are constructed as shown in <Table 1>.

<Table 1> Construction of independent variables for mobile game prediction

Brand-related	Information Sources	Media and Promotion Factors	Objective Features	Distribution-related
Awareness of IP	Platform rating	TV commercials	Genre	Platform's market power
Name value of publishers	Official domestic forum	Pre-registration	Payment type	Seasonal issues
		Press releases		
		YouTube videos		

3.2 Operational definition of independent variables

The operational definitions of the above variables are summarized in <Table 2>. To begin with, regarding brand-related variables, IP represents borrowing a popular brand like Marvel or Harry Potter into the game, or remaking original PC/console game into a mobile circumstance. Ultimately, brand awareness exploits the familiarity of these IPs. In addition, considering that all developers should enter the market through publishers, the name value of the publishers is expected to have an impact. For instance, several large publishers such as Nexon Company, NCSoft, and Netmarble, generally known as “3Ns” dominate the Korean mobile game market, and there could be structural difference in users perception toward choosing and paying for games because they might have valuable reputations.

Among the information sources categories, the platform rating is estimated by Google Play rating, and is divided into two variables: rating score and the number of participants. As for the domestic forum variable, weather there is an official community exists or not is

examined.

Regarding objective features, all variables are defined by the eight largest genres of the games (Role-Playing Game, Action, Casual, Simulation, Arcade, Strategy, Puzzle, Others) and four payment types (IAP, Advertisement, IAP and Advertisement, Paid).

Media and promotion factors represents marketing activities. As a mass marketing activity, we expect that TV commercials and pre-registration will have a critical influence to performance. Specifically, we examine if TV commercial is progressed around the launch date and pre-registration website is constructed before launching. It also represents a word-of-mouth implying how much the game is disclosed by press releases or YouTube video. In order to separate the pre and post effects, each factor is estimated for a week before and after the launch respectively.

Finally, related to distribution, whether it is featured by Google Play is used as an indicator of platform's market power. Because all mobile games must be distributed on platforms such as Google and Apple for application downloads, in order to be noticed among the numerous applications, featuring the game titles is an important indicator of platform's market power. Therefore, we expect that the platform itself could have an influence on promoting new games by the advertising banner and recommendation. The seasonal issue consists of three main periods; summer and winter vacation seasons when new games are launched the most, and others.

3.3 Data collection

Data of Google Play is gathered from Mobile Index, which is the largest mobile market data analysis service in Korea. Although there are thousands of new mobile games newly launched every year, due to the high polarization and low survival rate, it is difficult to track the poor performed game titles that cannot enter top 200 of grossing chart. Therefore, we

gathered a data of top 201 mobile games that launched in 2017.

<Table 2> Operational definition of independent variables

Category	Variable		Operational definition (Measurement)
Performance	Revenues	$RV_{i,t}$	Weekly revenues for a game i in day t
	Downloads	$DL_{i,t}$	Weekly downloads for a game i in day t
Brand-related	Awareness of IP	IP_i	Weather there is previous/original IP or not for a game i (0=No, 1=Yes)
	Name value of publishers	$PUBLISHER_i$	Weather the publisher is renowned company or not for a game i (0=No, 1=Yes)
Information sources	Platform Rating	$SCORE_{i,t}$	Weekly rating score of the game i after the launch
		$PART_{i,t}$	The number of weekly users participated on rating for a game i
	Official domestic forum	$FORUM_i$	Weather the official community exists for a game i (0=No, 1=Yes)
Media and Promotion	TV commercials	$TVCF_i$	Weather TV commercial was progressed within a week before and after the launching period for a game i (0=No, 1=Yes)
	Pre-registration	$PREREG_i$	Weather the pre-registration event was progressed for a game i (0=No, 1=Yes)
	Press releases	$PREPRESS_i$	The number of press release for a week before a launch for a game i
		$POSTPRESS_i$	The number of press release for a week after a launch for a game i
	YouTube videos	$PREYT_i$	The number of YouTube videos for a week before a launch for a game i
		$POSTYT_i$	The number of YouTube videos for a week after a launch for a game i
Objective features	Genre	$GENRE_i$	Genre of for a game i
	Payment type	$PAYMENT_i$	Payment type of a game i
Distribution-related	Platform's market power	$FEATURED_{i,t}$	Weather the game was featured in the platform (Google Play) within a week after a launch for a game i (0=No, 1=Yes)
	Seasonal issues	$SEASON_i$	Classification of launching period of a game i

Note: For weekly performance analysis, daily revenue and downloads, and the number of daily rating participants are summed up. On the other hand, weekly rating score is an average of daily rating scores.

We collected weekly revenue and downloads, weekly rating score and participants, and information of publisher, genre, payment type, featured period for each game title. Also, we searched Google for use of IP, pre-registration, the number of YouTube videos.

Information of domestic forum, press releases, and launching dates are collected from Naver.com which is the largest portal site in Korea that provides well organized domestic data. Lastly, progression of TV commercial is gathered through Advertising Information Center, which was funded by Korea Communications Commission (KCC). In case of featured information, the game is assumed to be featured if it was featured at least once within a week after the launch.

<Table 3> presents the summary of descriptive statistics for our sample except dummy variables. Among 201 mobile games, 18 games miss some download values, consequentially resulting in 183 mobile games available with download data. As we can find the large variance of revenue, downloads and the number of rating participants, the market is highly polarized. We took logarithm transformation of revenue, downloads, and rating participants for the stable linear relationship between dependent variable and predictors.

We also provide pairwise correlations for variables in <Table 4>. Because there seems to be high significant correlation between *PREPRESS* and *POSTPRESS*, *PREYT*, and *POSTYT*, we checked if there are any multicollinearity by calculating the centered variance inflation factors (VIFs) for the independent variables. The results show that all VIFs are under 10 and 1/VIFs are over 0.1 as depicted in <Table 5> which implies that there is no multicollinearity issue.

<Table 3> Summary of descriptive statistic

Variable	Observations	Mean	Std. Dev.	Min.	Max.
<i>LNRV</i>	201	18.12	1.25	15.91	24.67
<i>LNDL</i>	183	11.48	1.15	7.56	13.53
<i>LNPART</i>	201	7.25	1.77	0.69	13.2
<i>SCORE</i>	201	4.01	0.51	2.08	4.84
<i>PREPRESS</i>	201	13.19	32.33	0	291
<i>POSTPRESS</i>	201	21.59	45.16	0	388
<i>PREYT</i>	201	49.23	402.96	0	5,450.00
<i>POSTYT</i>	201	8.45	250.62	0	1,620.00

<Table 4> Correlation matrix of variables

	LNRV	LNDL	IP	PUBLISHER	TVCF	PREREG	GENRE	PAYMENT	SCORE	LNPART	FORUM	PREPRESS	POSTPRESS	PREYT	POSTYT	FEATURED	SEASON
LNRV	1.000																
LNDL	0.500	1.000															
	(0.000)																
IP	0.237	0.256	1.000														
	(0.000)	(0.000)															
PUBLISHER	0.469	0.296	0.178	1.000													
	(0.000)	(0.000)	(0.000)														
TVCF	0.476	0.448	0.218	0.333	1.000												
	(0.000)	(0.000)	(0.000)	(0.000)													
PREREG	0.317	0.293	0.099	0.199	0.269	1.000											
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)												
GENRE	0.078	-0.051	-0.040	-0.078	0.051	0.050	1.000										
	(0.004)	(0.077)	(0.138)	(0.004)	(0.056)	(0.060)											
PAYMENT	-0.010	-0.008	0.135	0.063	-0.063	-0.167	-0.110	1.000									
	(0.709)	(0.784)	(0.000)	(0.019)	(0.019)	(0.000)	(0.000)										
SCORE	0.017	-0.054	0.039	0.063	0.008	0.045	-0.078	0.193	1.000								
	(0.515)	(0.060)	(0.148)	(0.017)	(0.765)	(0.092)	(0.003)	(0.000)									
LNPART	0.365	0.408	0.298	0.321	0.254	0.172	-0.249	0.151	0.325	1.000							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
FORUM	0.098	0.030	-0.072	-0.010	0.111	0.234	-0.004	-0.137	0.043	-0.047	1.000						
	(0.000)	(0.305)	(0.007)	(0.711)	(0.000)	(0.000)	(0.874)	(0.000)	(0.109)	(0.081)							
PREPRESS	0.611	0.302	0.188	0.562	0.442	0.251	0.010	0.100	0.029	0.343	0.052	1.000					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.718)	(0.000)	(0.282)	(0.000)	(0.051)						
POSTPRESS	0.658	0.354	0.233	0.629	0.481	0.256	0.018	0.149	0.074	0.394	0.088	0.766	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.503)	(0.000)	(0.005)	(0.000)	(0.001)	(0.000)					
PREYT	0.426	0.175	0.116	0.328	0.188	0.083	0.036	-0.011	-0.047	0.160	-0.049	0.707	0.298	1.000			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.179)	(0.678)	(0.080)	(0.000)	(0.065)	(0.000)	(0.000)				
POSTYT	0.574	0.287	0.157	0.429	0.325	0.169	0.017	0.071	0.076	0.317	0.087	0.689	0.617	0.607	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.536)	(0.008)	(0.004)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)			
FEATURED	0.397	0.316	0.267	0.447	0.354	0.199	-0.116	0.013	0.106	0.415	-0.087	0.406	0.432	0.189	0.263	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.623)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)		
SEASON	-0.010	-0.048	0.041	0.030	0.038	-0.026	0.043	-0.062	-0.025	-0.052	-0.052	-0.044	-0.064	0.010	-0.094	-0.077	1.000
	(0.701)	(0.100)	(0.127)	(0.261)	(0.157)	(0.333)	(0.105)	(0.020)	(0.350)	(0.051)	(0.053)	(0.101)	(0.017)	(0.700)	(0.000)	(0.004)	

<Table 5> VIFs of highly correlated independent variables

Variable	VIF		1/VIF	
	LNRV	LNDL	LNRV	LNDL
<i>PREPRESS</i>	6.69	6.65	0.15	0.15
<i>POSTPRESS</i>	4.91	4.89	0.20	0.20
<i>PREYT</i>	3.72	3.77	0.27	0.27
<i>POSTYT</i>	2.52	2.53	0.40	0.39

3.4 Empirical model specification

To find the interdependence between mobile game performance and the independent variables that could affect market success for a week after a game launch, two regression models are developed. In the first model the dependent variable is weekly revenues as shown in equation (1) and in the second model, it is weekly downloads as shown in equation (2).

$$\begin{aligned}
 LNRV_i = & \theta_t + \alpha_1 IP_i + \alpha_2 PUBLISHER_i + \alpha_3 SCORE_i + \alpha_4 LNPART_i + \alpha_5 FORUM_i + \\
 & \alpha_6 TVCF_i + \alpha_7 PREREG_i + \alpha_8 PREPRESS_i + \alpha_9 POSTPRESS_i + \alpha_{10} PREYT_i + \\
 & \alpha_{11} POSTYT_i + \sum_{i=12}^{18} \alpha_i GENRE_i + \sum_{i=19}^{20} \alpha_i PAYMENT_i + \alpha_{21} FEATURED_i + \\
 & \sum_{i=22}^{23} \alpha_i SEASON_i + \varepsilon_{i,t} \quad (1)
 \end{aligned}$$

$$\begin{aligned}
 LNDL_i = & \rho_t + \beta_1 IP_i + \beta_2 PUBLISHER_i + \beta_3 SCORE_i + \beta_4 LNPART_i + \beta_5 FORUM_i + \\
 & \beta_6 TVCF_i + \beta_7 PREREG_i + \beta_8 PREPRESS_i + \beta_9 POSTPRESS_i + \beta_{10} PREYT_i + \\
 & \beta_{11} POSTYT_i + \sum_{i=12}^{18} \beta_i GENRE_i + \sum_{i=19}^{20} \beta_i PAYMENT_i + \beta_{21} FEATURED_{i,t} + \\
 & \sum_{i=22}^{23} \beta_i SEASON_i + \sigma_{i,t} \quad (2)
 \end{aligned}$$

where $i = 1 \dots N$, indicating each mobile game title

$LNRV_{i,t}$, $LNDL_{i,t}$, $LNPART_{i,t}$ are log transformed values.

4. Results and discussions

The results of multiple regression analysis for both revenue and downloads are summarized in <Table 6>. In this analysis, each mobile game title has a single observation resulting in total sample size of 201 mobile game titles. However, in the case of download sample only 183 samples are available due to lack of observations on some variables.

First, the results show that TV commercial and pre-registration have a great influence on revenues and downloads, with positively significant coefficients but the effect is stronger on downloads compared to revenues. As expected, RPG genre has a positive relationship with revenues, which seems to reflect the characteristics of RPG game structure, and the puzzle genre has positive relationship with downloads. Also, the greater the number of rating participants, the more positive the revenues and downloads are, and this implies that attracting active users who willingly participate rating activities and keeping their interests on mobile genre are very important factors for the success of mobile game business.

Despite of majority games use In-App Purchases or In-App Purchases mixed with advertisements payment type turns out to be insignificant, along with the same situation to the launching season with means that mobile game players are not affected by seasonal issue at least in launching period.

However, an impressive finding is that IP and publishers do not appear to be critical factor towards revenues, whereas only IP is found to have significant impact on downloads and that Google Play rating score had a strong negative relationship with downloads. This interesting result could be interpreted by the fact that the games have been massively produced by renowned publishers, as a result, the user's satisfaction on the quality of the game is not high enough. This also has implication that there might have opportunities for small or middle companies like indie game makers as well if they utilize familiar IP which

can lower the entry barriers to new users. Another interesting result is that the official forums and pre-launch press releases are insignificant to both revenues and downloads. Because most of the games have taken the official forum in recent years, whether to have official forum or not may not be much discernible. Furthermore, people might be ignorant to the the articles being distributed in advance.

Interestingly, the number of press releases after launch, the number of YouTube videos uploaded before and after launch, and whether or not the game title is featured are significantly related to revenues instead of downloads. These factors are likely to affect downloads, however, their impact on revenues means that these factors are important for raising players' engagement and involvement which leads to a purchase rather than acquiring new users. Possible interpretation is firstly that it stimulates the competitiveness and accomplishment desire of paying users by forming a sense of popularity. Secondly, because the game itself has in-depth contents to enjoy so that various strategical YouTube videos are uploaded and consequently leads to other users paying for enjoying another level.

In addition, the power of the platform provider can not be ignored. Because featured means that the game is recommended by Google Play and guaranteed to be of a minimum quality it could be relatively easy to be involved into the game. In sum, the higher value of these factors, including post-launch press releases, post and pre-launch YouTube videos and featured effects, implies that people are more interested and engaged in games and it would be a key to find a point that lead to increase in revenues.

In sum, the overall results with the weekly performance after launch tells that it is desirable to invest in TV commercials and pre-registration to increase revenues as well as downloads. It shows that traditional advertising methods are still effective. In addition to TV commercials and pre-reservations, it is also important to use familiar IPs, aim at Google

Play's featured banners, to promote press releases after launch, to cast some of YouTube streamers and let them spread the fun points of the game so that eventually to gain popularity and user involvement.

In general, the results show different explanation powers and influential variables between two models. This is because the characteristic of revenues and downloads are different, for instance, revenues are more related to customer engagement or satisfaction whereas downloads are connected to increasing interests and gaining new users. Therefore, compared to revenues, there could be other marketing factors which might affect downloads.

<Table 6> Estimation Results

Variables	LNRV		LN DL	
	$R^2 = 0.73, N=201$		$R^2 = 0.49, N=183$	
	Coef.	t	Coef.	t
IP	0.176	(1.31)	0.287	(2.12)**
PUBLISHER	-0.102	-(0.38)	0.242	(1.08)
TVCF	0.448	(2.93)***	0.699	(4.29)***
PREREG	0.255	(2.1)**	0.529	(2.91)***
GENRE				
Casual	-0.193	-(0.60)	0.418	(1.27)
Arcade	0.030	(0.07)	0.149	(0.24)
Simulation	0.204	(0.75)	0.159	(0.50)
Others	-0.223	-(0.95)	0.092	(0.27)
Puzzle	-0.504	-(1.12)	1.279	(5.59)**
RPG	0.300	(1.95)*	-0.005	-(0.03)
Strategy	-0.189	-(0.83)	-0.305	-(0.84)
PAYMENT				
IAP	-0.932	-(1.20)	-0.329	-(0.84)
IAP&Ad.	-1.228	-(1.59)	-0.579	-(1.60)
Paid	0.082	(0.10)		
SCORE	0.011	(0.10)	-0.378	-(2.65)**
LNPART	0.079	(2.1)**	0.324	(5.83)***
FORUM	0.081	(0.69)	0.251	(1.44)
PREPRESS	-0.006	-(1.60)	-0.004	-(1.26)
POSTPRESS	0.014	(5.58)***	0.000	-(0.09)
PREYT	0.001	(3.41)***	0.000	(0.37)
POSTYT	0.001	(2.06)**	0.000	(1.00)
FEATURED	0.359	(2.5)**	-0.003	-(0.02)
SEASON				
Summer	0.095	(0.72)	0.267	(1.40)
Winter	0.038	(0.31)	-0.207	-(1.23)
_cons	17.590	(18.87)***	10.183	(11.99)***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

5. Conclusion

The game industry, especially the mobile game market, has grown rapidly around the world in recent years, and one of the interesting characteristics of mobile game performance is that its lifetime is remarkably short compared to that of online games and most of downloads are peaked in the early period of the service. Since the success of the game is largely dependent of this early performance, this research tries to find out and predict success factors of mobile game after market launch using app downloads and sales revenues as performance indicators. Independent variables are categorized into five factors that could affect performance; brand-related, information sources, media and promotion factors, objective features and distribution-related variables. We develop multiple regression models for analyzing a weekly performance after launch for 201 Google Play games launched in 2017.

Overall, the results suggest that TV commercial and pre-registration have strong impacts on both revenue and downloads. In addition, the number of press releases after launch, the number of YouTube videos, irrespective of periods, and feature of Google Play are important factors to generating revenues. In other words, media and promotion factors and market power of platform provider is very effective. In the case of downloads, IP appears to be an important factor, however, it is found that large publishers do not play a big role for the successful performance. Therefore, small and medium sized companies might also have opportunities if they utilize familiar IP which can lower the entry barriers to new users.

This research is one of the first attempt to predict mobile game performance, despite the recent proliferation of the industry. In this sense, this study could have a contribution in presenting a prediction for a mobile game performance after a market launch by identifying important indicators which determine successful performances of mobile games. The results of the research might help managers in the mobile game industry decide where and how to

invest strategically for a successful launch of mobile games.

However, this paper is not free from some limitations. First, there might be some other influential factors such as the marketing costs which are not available in this study because they might be treated as confidential data within a company. Next, the study is only based on the Google Play market in Korea. If the market is extended by including Apple Appstore in the future research, it might provide the results which can be more generalized to some extent. Finally, content updates and events of the games might be included as independent variables in the future research in order to analyze the long-term performance. In any cases, our research could be a foundation for further related study.

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