

RATING DECISION ANALYSIS BASED ON IOS APP STORE DATA

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1 INTRODUCTION

There are several options for monetizing an app, including in-app advertising, sponsorships and in-app purchases. But for many developers, the most obvious option is simply to charge users to download their apps. Having great app ratings and user reviews is the goal of every developer of mobile applications.

This paper explores impact of pricing strategy of the applications to user evaluations. In general, ICTs play significant role to improve marketing and customer satisfaction processes (Dorcak and Delina, 2011; Gavurová, et al., 2014). Mobile services and platforms have indisputably achieved critical mass in the information and communications technology industry (Kim, et al., 2010; Kim, et al., 2012). Especially, mobile service business has moved into a new epoch due to the emergence of new mobile devices and the explosive growth in mobile application services available at "App Stores". New smart computing devices such as smartphones and tablet PCs offering traditional wireless voice services and Internet access have recently gained prominence by replacing traditional PCs. The interest in smartphone industry is understandable, mobile app stores will see annual downloads reach 102 billion in 2013, up from 64 billion in 2012, according to Gartner, Inc. (2014). Total revenue in 2013 will reach \$26 billion, up from \$18 billion in 2012. Free apps will account for 91 percent of total downloads in 2013 (see Table 1). Gartner, Inc. (2014) said that in-app purchases will account for 48 percent of app store revenue by 2017, up from 11 percent in 2012. In-app purchase was one of the more exciting and highly anticipated features introduces in iPhone SDK 3.0.

The option to integrate e-commerce within both free and paid iOS apps opened up a new frontier for developers to create additional revenue opportunities beyond just traditional app sales (Wooldridge and Schneider, 2011). The key to their success has been mobile app services, including native software or content and primary channels for connecting to Internet-based services that offer good

smartphone user experiences (Kenney and Pon, 2011). In contrast to standard mobile phones, “smartphones” are powerful computing devices offering traditional wireless voice service as well as native software applications and, perhaps most importantly, the ability to connect to and run a myriad of Internet-based services including email, geo-location, streaming video, and social networking, while providing a good user experience.

Worldwide combined shipments of devices (PCs, tablets, ultramobiles and mobile phones) are projected to reach 2.5 billion units in 2014, a 6.9 percent increase from 2013, according to Gartner, Inc. (2014a). Device shipments grew 4.8 percent in 2013. Sales of traditional PCs will continue to hamper the overall growth of devices, and substitution from PC to tablet will decline. To complicate the landscape, the smartphone is not the only device at stake, tablets and ebook readers are emerging as key components of the mobile universe. Across all devices, total mobile revenues—including advertising, subscriptions, handsets, applications, and so on—are forecast to surpass \$1 trillion by 2014. Given the rate at which smartphone are penetrating the market and component prices are declining by 2015 there will be, at least, 2 billion smart mobile devices in use globally (Kenney and Pon, 2011).

Consumer software applications that run on smartphones (popularly known as mobile apps) represent the fastest growing consumer product segment in the annals of human merchandising (Ben, 2011; Bilton, 2011). Mobile app services as its distribution channel have proliferated since the Apple App Store launched on July 10, 2008. Due to the store's open concept, any developer with expertise can freely create a mobile app service (Laudon and Traver, 2010; Suh, et al., 2012). Thus, full-scale innovation has occurred in various mobile service sectors, such as content services (e.g., e-book, news) and traditional offline services (e.g., banking, healthcare) (Murray, et al., 2010), as indicated by the many categories used in App Stores. Companies can now deliver a wide range of businesses and services (including e-mail, streaming video, social networking, and location-based services) through mobile app services and this strive for competitive edges in the mobile service marketplace (Wang, et al., 2006; Murray, et al., 2010). The huge number of apps and their increasing growth rate has created number of problems for the key constituents of app ecosystem.

For consumers, there are simply too many apps and far too much fragmentation in these apps (e.g. a large number of categories). The analogy we often use to describe the confusion faced by a mobile app consumer is to imagine a customer walking into a grocery store, needing only a few items, and finding that all aisles and category labels have been eliminated, and every product has been thrown into a pile on the floor (Datta, et al., 2013). In the same way it is a daunting task for a consumer to navigate through the native app stores (Google 2014; Apple 2014) and discover apps they need and like.

This issue has raised concerns in the recent media forums (Bowman, 2011; Agarwal, 2011). Its current importance has prompted various discussions in the literature on App Store issues, such as its market outlook and possible strategies

(Kimbley, 2010; White, 2010; Kim et al., 2014), changes in the mobile ecosystem and in the industry-level business model driven by the App Store (Holzer and Ondrus, 2011; Müller, et al., 2011), and the diffusion and adoption of user-level mobile innovations (Verkasalo, et al., 2011). However, empirical investigations of the structures and contents of mobile app services, especially those focusing on mobile apps as such, are few (Szabo, et al., 2013; Šoltés and Gavurová, 2013; Gavurová, 2011; 2012). The open platform structure of mobile app service development allows services to be indiscriminately and instantaneously created by third parties (Danado, et al., 2010; Kim, et al., 2014). Within whole mobile applications environment, user ratings play a significant role of user satisfaction and decision support building a trust into respective e-service (Užík and Šoltés, 2009).

2 METHODOLOGY

iOS (previously iPhone OS) is a mobile operating system developed by Apple Inc. and distributed exclusively for Apple hardware. In-App Purchase lets developers sell a variety of items directly within free or paid app, including premium content, virtual goods, and subscriptions. The analysis deals with user reviews of mobile applications for the iOS mobile platform. Article specifically focuses on the comparison of the price impact and factor in-app purchase for its user evaluation.

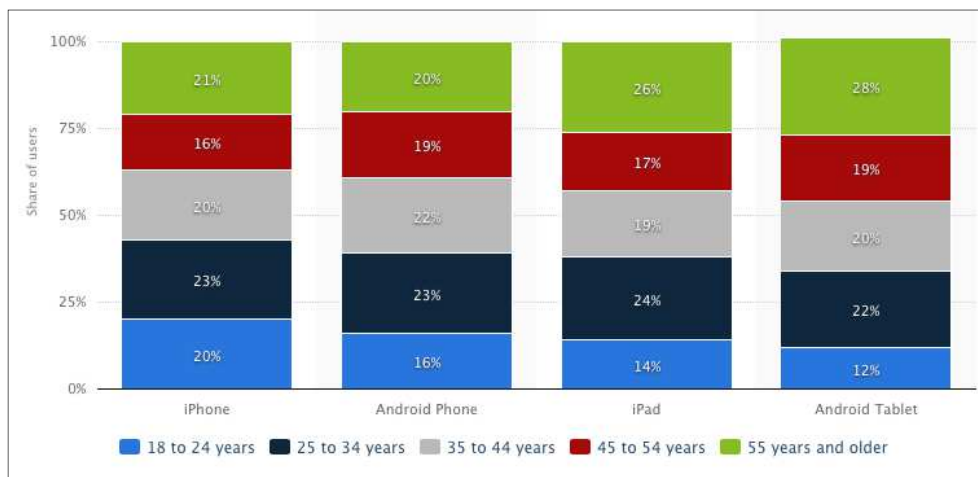


Figure 1 – Distribution of mobile app platform audiences in the United States as of June 2014, by age group (ComScore, 2014)

For this study, we primarily focus on the United States, since this country is the biggest country in terms of revenue. The reporting period covers May 2014, unless otherwise stated. In general, two kinds of categories can be identified in the Apple App Store: free apps and paid apps. The research consisted of 969 apps from App Store Top Chart rankings. Two main factors impacted App Store rank:

download volume and velocity of those downloads. In order to rise up the ranks, app needed lots of downloads in a short amount of time. Position changes also correlated with the apps ratings (Cummings, 2013). And to maintain that rank, app needed to continue acquiring new downloads.

To identify watched subjects – mobile applications from website <https://itunes.apple.com/us>, we used method of automatic data collection which was used by a script of programming language PHP 5.4.25, MySQL 5.5.36 databases and web server Apache 2.4.7. In addition, two individual scripts, adapted to source code of the selected online portals, were created for the identification and database recording of the variables, such as app name and url linked to an app subpage (profile) containing customers' evaluations, free/paid status and use of in-app factor. There were 969 apps identified as follows: free: 483 (49.79%), paid: 487 (50.21%). Overall, we evaluated 48,374,030 user ratings. We used the SPSS Statistics software for statistical evaluation.

Table 1 – Overview of analysed applications

Price	Number of apps		Number of ratings	
	N	%	N	%
Free apps	483	49.85	39,690,485	82.05
Paid apps	486	50.15	8,683,545	17.95
Overall	968	100.00	48,374,030	100.00

Source: own elaboration

Table 2 – Overview of analysed apps with in-app purchase factor

Price	Number of apps		Number of ratings	
	N	%	N	%
Free apps	243	54.85	20,703,843	75.81
Paid apps	200	45.15	6,605,193	24.19
Overall	443	100.00	27,309,036	100.00

Source: own elaboration

3 RESULTS

Taking a detailed look at the individual applications reviews (Table 3), we see that the vast majority of them evaluates the sample of mobile applications positively. Users can evaluate the application used by them on a 5-point scale assessments in accordance with their satisfaction level of the application. In both categories they are in first place of the most positive assessment - a free

downloadable applications at a rate of 63.50% and paid apps at a rate of 73.44%. More dissatisfied users in percentage terms can be found in free applications where this indicator has a value of 9.91% of the total 39,690,485 user reviews.

Table 3 – Total number of customers evaluating apps

Rating	Free apps		Paid apps	
	N	%	N	%
5 *****	25,205,040	63.50	6,377,401	73.44
4 ****	5,764,119	14.52	1,081,548	12.46
3 ***	3,016,538	7.60	467,726	5.39
2 **	1,771,568	4.46	257,807	2.97
1 *	3,933,211	9.91	499,063	5.75
Overall	39,690,485	100.00	8,683,545	100.00

Source: own elaboration

Similar values of user reviews can be seen in Table 4, which deals with the applications evaluation with a possibility of in-app purchase. According to free apps, users were most satisfied with the number of 14,016,862 (67.70%) of the total set of 20,703,843 ratings. Paid apps again recorded a slightly higher support rate expressed at a rate of 75.50% of the total 6,605,193 user ratings.

Table 4 – Total number of customers evaluating apps with in-app purchase factor

Rating	Free apps		Paid apps	
	N	%	N	%
5 *****	14,016,862	67.70	4,986,730	75.50
4 ****	3,003,989	14.51	787,722	11.93
3 ***	1,397,806	6.75	334,972	5.07
2 **	746,460	0.36	176,110	0.27
1 *	1,538,717	7.43	319,659	4.84
Overall	20,703,843	100.00	6,605,193	100.00

Source: own elaboration

Look at these statistics suggests that paid applications are evaluated more positively. From the results we have achieved in research we assume that paid apps are users rated more positively, than a free application. For statistical evaluation we decided to use a two-dimensional inductive statistics tool – two-

sampled Student's t-test, which is mostly used to check whether the samples observed difference in diameter can only be random or statistically significant. Significant difference means there is a relationship between the interval a binary variable.

Therefore, we have the following hypotheses as follows:

H0: Average review of free and paid apps are the same and therefore we expect equity of averages of two basic groups.

Ha: Average review of paid apps is higher than free apps and thus averages of essential files are not equal.

Level of statistical significance was determined at $\alpha = 0.05$. P value of the test of statistical significance amounted to 0.006 (see Table 6), the null hypothesis is rejected, there is a relationship between variables. P-value <0.01 means statistically highly significant relationship. The research results indicate that the average review of paid apps is higher than free apps.

Table 5 – Group statistics

APPs status	N	Mean	Std. Deviation	Std. Error Mean
free	483	4.03334585	.657011044	.029895038
paid	486	4.14393751	.584816766	.026527827

Source: own elaboration

Table 6 – Independent Samples Test

Levene's test for Equality of Variances		t-test for Equality of Means							
F	Sig.	t	df	p-val. 2-tailed	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference		
							Lower	Upper	
Equal variances assumed	8.093	.005	-2.768	967	.006	-.1105917	.03995362	-.1889975	-.0321859
Equal variances not assumed			-2.767	952.81	.006	-.1105917	.03996797	-.1890271	-.0321562

Source: own elaboration

Apart from the overall applications evaluation we have in research also focused on the factor of in-app purchase and its impact on the applications evaluation. From previous research, we assume that the average factor applications with in-app purchase is higher than without it

Therefore, we have the following hypotheses as follows:

H0: Average applications review with in-app purchase factor is the same as the evaluation of the classical applications and therefore we expect equity averages of two basic groups.

Ha: Average applications review with in-app purchase factor is higher than the rating of the classic applications and therefore averages of essential files are not equal.

The results of the 2-Tail T-Test indicate that the p-value is .000. This means that there is so little chance (less than 1 in 1000) that the difference in the sample is due to sampling error that it has been rounded to zero. We reject the null hypothesis and we can conclude, that according to user applications review there is a difference between traditional applications and applications by a factor of in-app purchase.

Table 7 – Group Statistics

APPs status	N	Mean	Std. Deviation	Std. Error Mean
classic	525	3.95678992	.707928320	.030867142
in-app purchase	443	4.24557152	.460511479	.021879561

Source: own elaboration

Table 8 – Independent Samples Test

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	t	df	p-val. 2-tailed	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference		
							Lower	Upper	
Equal variances assumed	76.62	0.05	-7.372	967	.000	-.2887816	.03917366	-.3656568	-.2119064
Equal variances not assumed			-7.633	911.7	.000	-.2887816	.03783511	-.3630356	-.2145276

Source: own elaboration

4 CONCLUSION

Article summarizes the evaluation of mobile applications for iOS devices in the U.S. market. The analysis shows that user applications reviews tend towards a positive evaluation. Collecting data from a total of 968 mobile applications and 48,374,030 user reviews we found statistically significant differences in

assessments of different categories of mobile applications and highlighted the positive impact of factors of in-app purchase for the applications evaluations.

One of the largest parts of iPhone app marketing is the pricing strategy. Business owners should not underestimate the power of positive reviews. Reviews shows people that the app is credible and makes them more likely to engage and that usually means more in-app purchasing. User reviews are an important indicator of quality applications and probably the biggest benefit of going with a paid application is the income potential. The way an application looks and operates is imperative to its success. When an application is downloaded, a user is going to open that app and will instantly form an impression which has a large impact on his assessment of app. Money can be made from free applications primarily by using a pay-per-click advertising model, which is very similar to Google AdSense. There are other methods such as in-app purchases or using a free app as a preview or “teaser” app for a paid version.

With an exponential growth in smartphone dispersion and app releases, the future of the app industry seems bright. At the same time, the fragmentation on the mobile market makes it hard for app developers to ensure a consistent experience across all devices and operating systems. Apple has enormous advantages in the sense that Apple’s iPhone set the standard for the new generation of smartphones when it was first released in June 2007 with its touchscreen, direct manipulation interface and has continually been the innovator moving from the iPod to the iPhone and now the iPad using an almost seamless user experience. The popularity and elegance of Apple’s product offer ample opportunity to application providers.

Paper presents position of iOS mobile applications business in the biggest country in terms of revenue – United States. We sketch possible measure of customer satisfaction measurement using software automatic identification and data capture and propose preliminary study of state of evaluating apps in iOS mobile operating system. Our challenge for the future is in depth analysis and examination of other performance attributes applications evaluation of and their impact on the actual sale at different times.

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