CASE STUDY

Mobile Game Apps: An Opportunity?

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Background

Dr. Frank Ritter has the kind of background and experience that are conducive to conceptualizing useful mobile apps in various areas of application. He is a Professor at Penn State University holding joint appointments in the College of Information Sciences and Technology, Department of Psychology, and the Department of Computer Science and Engineering. In 2011, while working on a project for the U.S. Department of Defense, he conceived the idea of a "caffeine tracker" mobile app that would simulate the amount of caffeine in the bloodstream. The app monitors, predicts, and displays a user's caffeine level in real-time based on a pharmacokinetic model of caffeine and the user's inputs regarding when they consume caffeine (see Exhibit 1). Professor Ritter worked with several colleagues and students to develop the app and released Caffeine ZoneTM app for the iPhone/iPad in June 2011 in both priced and free versions. The free version included ads and the priced version could be downloaded for $0.99.

When his team released the app, it did not have a clear business plan to make money from the app. The team was motivated to develop the app by the scientific challenge associated with simulating caffeine levels accurately and by the realization that it could be a tool to educate consumers. For example, the app could be used as an educational tool to teach about caffeine's effects and how to use caffeine products more effectively (some people may be consuming too much caffeine).

Although the caffeine tracker app was only modestly successful (85,000 downloads), his experiences in developing the app, combined with exponential growth in the use of mobile devices, got Professor Ritter thinking about various other apps that he could develop with his students and colleagues. Development of new apps could provide a good hands-on learning context for the students while also allowing exploration of various issues at the frontiers of software and computer technologies. The commercialization of apps also seemed well-aligned with the increased emphasis at Penn State University on innovation and commercialization of university-related intellectual property.

Industry Background

An app refers to a self-contained computer program designed to fulfill a particular purpose and is typically downloaded by a consumer on to a mobile device such as a smartphone or tablet. An app is typically designed to deliver a single functionality, whereas computer applications are designed to offer multiple functions. Google Maps is an app and Microsoft Office is an application. Another characteristic of an app is that it is designed to deliver its functionality in a way that offers outstanding user experience.

The concept of an app emerged from the Personal Digital Assistants (PDA's) introduced in the early 1990's (e.g., the Apple Newton). The simple Snake game preloaded on the Nokia 6110 smartphone was the first app on a mobile phone. But the app market took off only with the launch of the Apple App store in July 2008, which initially offered 500 apps. As of June 2015, there were nearly 1.5 million apps in the Apple App store, with a cumulative of 100 billion app downloads since launch (Exhibit 2). In fact, US consumers now spend more time on mobile devices than on any other device (Exhibit 3). Most apps are downloaded for free, and the app publisher attempts to realize revenue through other means such as advertising, and In-app sales. Of the 102 billion downloads in 2013, only 9.2 billion were paid downloads (Exhibit 4).

Within the app market, Professor Ritter was particularly intrigued by the opportunities afforded by mobile games, which represents one of the leading categories within the app market (Exhibit 5). Gaming is growing rapidly in the mobile space and is beginning to account for a significant chunk of the total money spent on online games (Exhibit 6). Not surprisingly, sales of video game consoles have declined from 89 million units in 2008 to 45 million units in 2014. Smartphones and tablets are becoming acceptable alternative devices for game playing, especially for casual games and puzzles that can be played across many short game sessions. Mobile games such as Angry Birds (several episodes and more than 500 levels in total) and a puzzle game Candy Crush Saga (over 100 episodes, and nearly 2,000 levels) have been exceptionally successful. Although millions of people currently download these two games for free, a small percentage of players (3 – 5%) buy items within the games (in-app purchases) if they are stuck at a particular level or wish to unlock new levels or episodes. Because these popular games have millions of downloads (Angry Birds has over 2 billion downloads), their "freemium" pricing model turns out to be quite profitable. Other games that are not as popular may have to rely on advertising revenue or charge a modest price for the download to continue in business. Another growth opportunity is afforded by designing a game so that it has a social component (as in Candy Crush, for example), that leverages social networks to build its user base quickly and to maintain an active community of fans for the game.

What's Next?

Professor Ritter had a couple of ideas for developing "puzzle" type games that combine technology and psychology in a novel way. He estimated that to get an initial version of such a game to market would take about 6 months of effort and require about $80,000 in cash outlay in addition to any time devoted to this project by his students, colleagues and himself. What he had in mind was a "Hybrid-app", i.e., one that combines features of both a Web app (i.e. elements of the app are stored on a remote server and delivered over the Internet through a browser interface) and a Native app (i.e., an app that is developed for use on a particular device, in this case for the iOS operating system used by iPhone and iPad, and installed on the device).

Before taking his initial ideas any further, Professor Ritter was interested in exploring the games app market in a bit more detail to gain a better understanding of some key questions that he had regarding the development and launch of the new app.

Through his contacts in the industry, Professor Ritter has assembled the following data for 8 game apps that were sold in both free and priced versions.

a) Description of the 8 game apps (see Table 1).
b) Data on number of downloads, In-app revenue, etc. for the 8 games ("Panel data" data block pre-loaded in Enginius Mobile Games case).
c) User sentiments for the 8 games ("Sentiment data" data block pre-loaded in Enginius Mobile Games case).

Case Study Questions

This case requires using Excel Pivot Tables for the needed analysis. TIP: After opening the case in the Enginius Dashboard, use the "Save" option to download the Panel and Sentiment data as an Excel file.

If you are unfamiliar with the use of Pivot Tables, you will find several tutorials available on the internet.

Question 1
Would an exclusive focus on iOS have the potential to generate sufficient incremental revenue after paying for the development costs? [Use PivotTable in Excel to structure the data to address this question].

Question 2
Would the revenue realized by a new app vary significantly depending on whether it is offered with a one-time download price, or is sold under a "freemium" structure (free download but offering in-app purchases)? What types of games (puzzle or non-puzzle) realize higher revenue under each pricing scheme? [Explore performance of different types of apps using PivotTable in Excel to structure the data].

Question 3
If the new app is sold as a priced app, at what price range should it be offered? [Use Enginius to do panel data analysis to assess the effects of price].

Question 4
Based on your answers to questions (2) and (3), what are your recommendations to Professor Ritter in terms of whether he should develop and launch a new app, and if he launches a new app, should it be offered as a paid app and at what price, or as a freemium app?

Question 5 (Optional – Answer this question only if your instructor has specifically assigned it as part of the required analysis).
Assuming Professor Ritter will launch a new puzzle app (either free, paid or freemium) depending on your answer to question 4, what keywords might be used for developing a paid search campaign for his new game? Use sentiment analysis to identify suitable keywords that might resonate with potential users of the app.

Exhibits

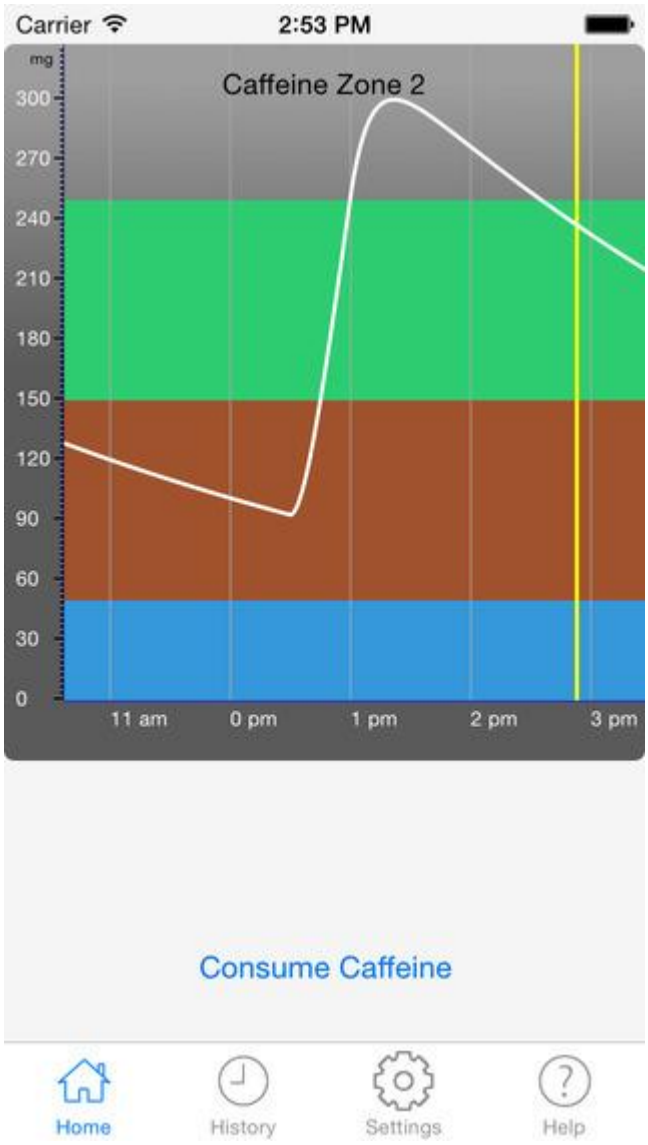

Exhibit 1: Illustrative mobile screen for Caffeine Zone app

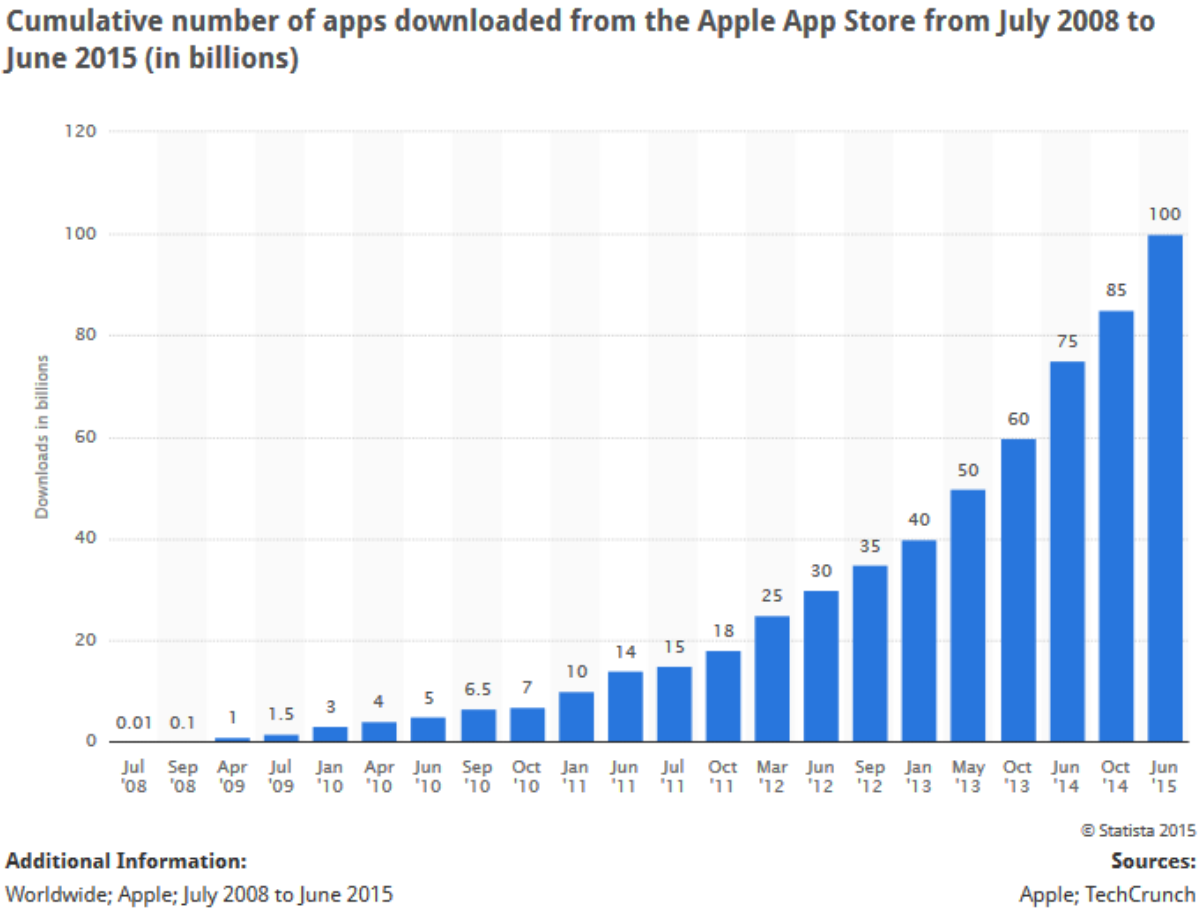

Exhibit 2: Downloads from Apple App Store are continuing to grow at a tremendous rate, growing about 33% in the last year (from 75 billion to 100 billion downloads).

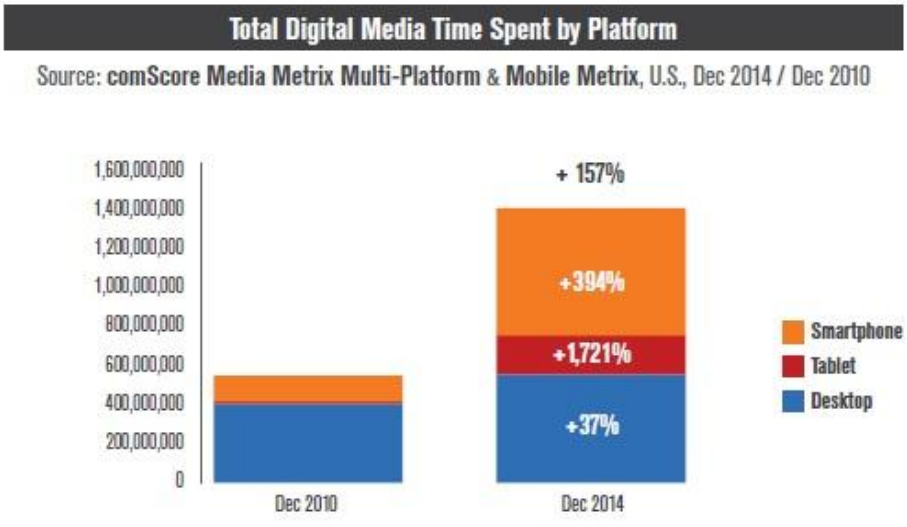

Exhibit 3: Time spent on mobile devices now represents the largest proportion of total time spent on digital media in the U.S.

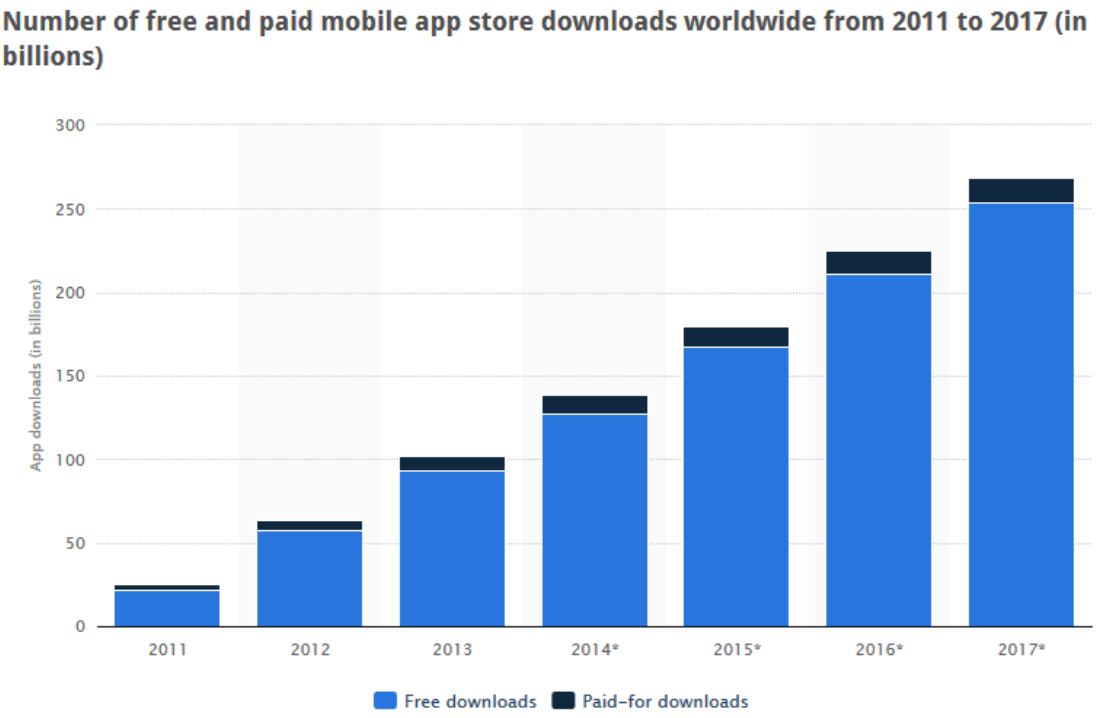

Exhibit 4: Paid downloads constitute less than 10% of total downloads, and the typical price is $0.99.

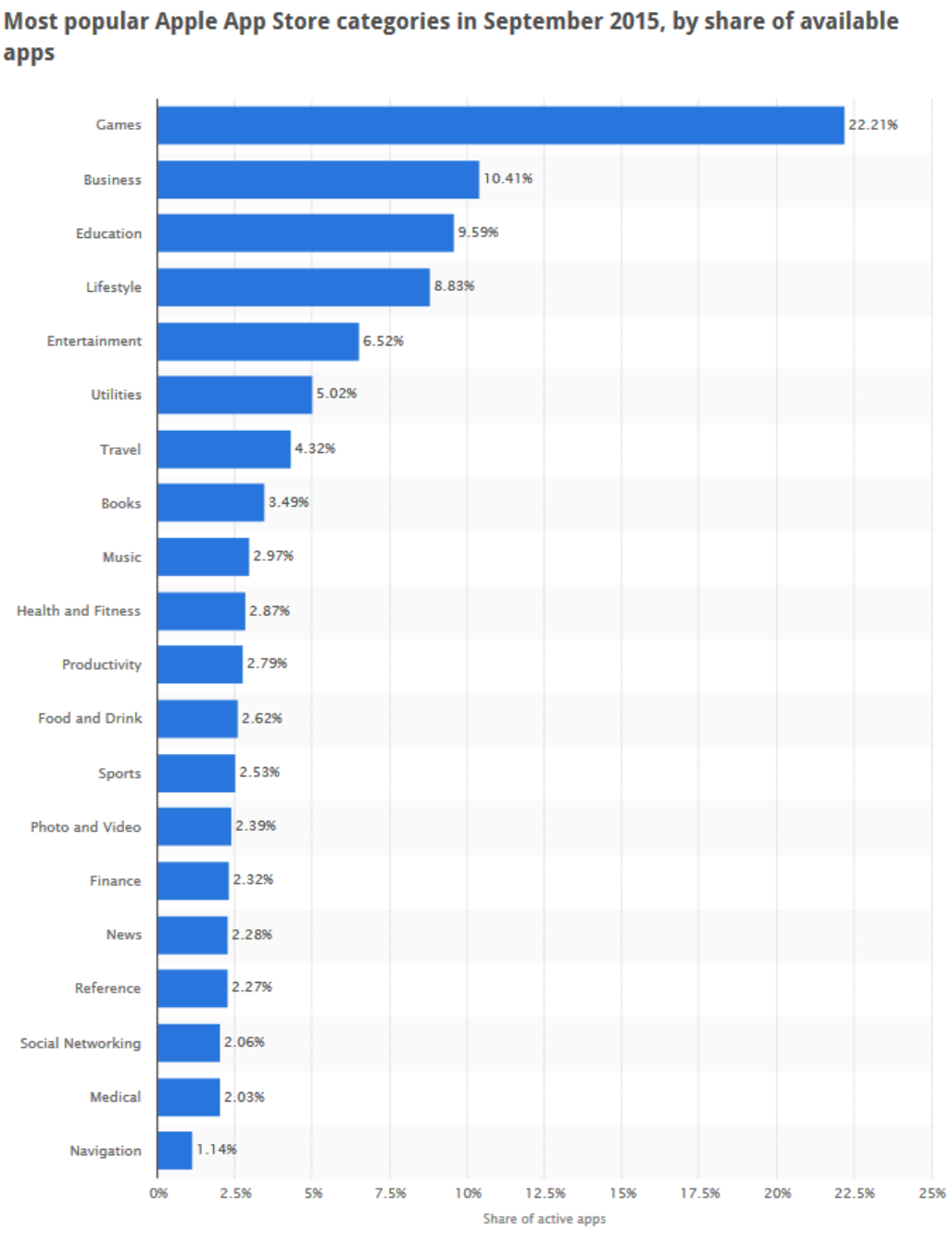

Exhibit 5: Games represent the dominant category in Apple's App store. In Google Play, about 40% of the device installs are for games.

Exhibit 6: Growth of mobile games relative to overall growth in the games market

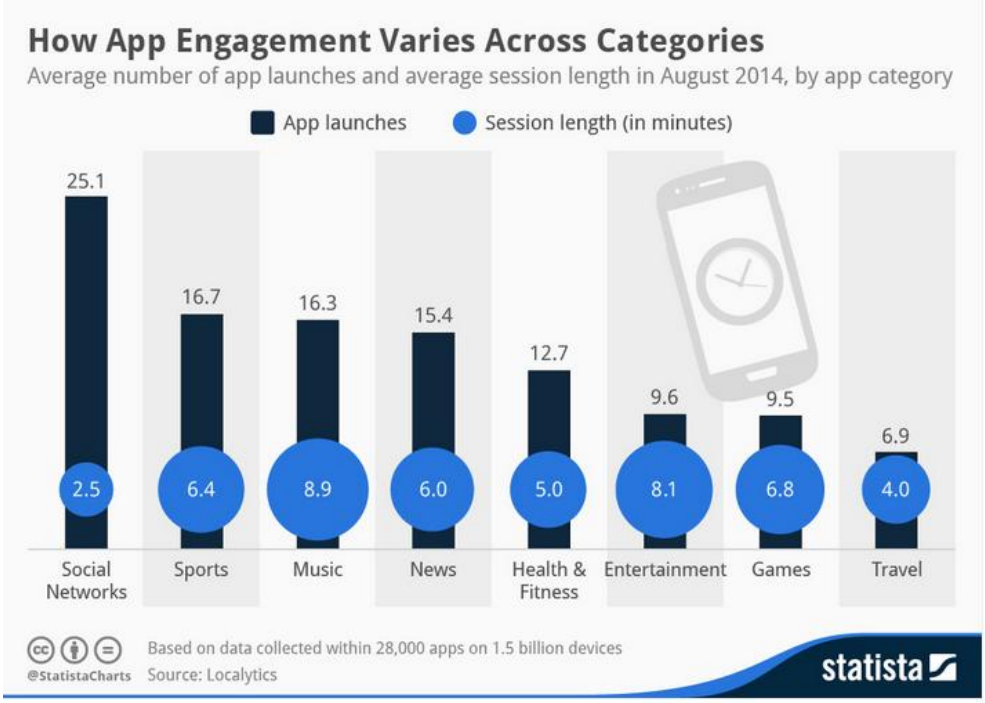

Exhibit 7: Game apps have good engagement potential.

Table 1: Description of the games included in the "Panel data" data block on Enginius – in the data the priced version is denoted by a suffix *p*, and in the free version by the suffix *f*.

No.	App ID	Description
1	117	Bridge Master: In this game one has to prove himself as an accomplished master bridge builder. There are 40 different levels, and the player builds bridges over deep valleys, canals, and rivers. Stress tests reveal whether the bridge built can withstand the daily stress of continual use from cars, trucks and, more recently, super-heavy tank trucks. The priced version includes more challenging options such as 24 "sloping" levels, and a few tricky "crazy" levels.
2	240	Domino Tiles: This is a game played with rectangular "domino" tiles. The gaming pieces make up a *domino set*, sometimes called a *deck* or *pack*. The traditional Sino-European domino set consists of 28 dominoes, colloquially nicknamed *bones*, *cards*, *tiles*, *tickets*, *stones*, or *spinners*. Each domino is a rectangular tile with a line dividing its *face* into two square *ends*. Each end is marked with a number of *spots* (also called *pips nips, or dobs*) or is *blank*. The backs of the dominoes in a set are indistinguishable, either blank or having some common design. A domino set is a generic gaming device, similar to playing cards or dice in that a variety of games can be played with a set. The priced version is ad free.
3	418	Jigsaw Puzzle: 135+ different jigsaw puzzles for iPad or iPhone! One can choose between 24-96 pieces with a variety of pictures and categories. The collection has 10 categories to choose from. One can also take pictures from an album to play jigsaw puzzles with images of family and friends. Fun for all ages! The priced version has more specific categories (e.g., cats, dogs, and horses), more and better-quality images, and help if you are stuck.
4	453	Leprechaun adventure: This is a classic platform game that combines old school game play with modern playability. A leprechaun has lost his gold, so to find it, he needs one to help him run and jump through the fantastical realms created in the game environment. Be careful, though because the environment is full of beastly monsters, and they'll do everything they can to stop the leprechaun. If one collects a cloverleaf, the leprechaun's health grows. Ah, but health alone won't keep him out of trouble. Even an angry bee could sting him! Use smooth, easy moves to guide the leprechaun on his adventure. There are 8 levels of fun in the free version, and 52 in the priced version. The priced version is in HD.
5	903	Defend tower: This game puts one's defense and strategic skills to the ultimate test in the Tournament Mode of this game. Put the towers into action and defend the base from the never-ending waves of enemies as one competes with his/her friends in weekly defense tournaments! Play for as long as one can survive! Give the foe no quarter. With the Cooperative Mode, create military alliances and join forces against

		a common enemy -- develop strategy and wage war together to achieve awesome results and banish one's enemies from the toy World! The priced version is Ad free.
6	905	This is the same as game 903, but in HD. The priced version is ad free.
7	907	Motorbike: A micro size motorbike trials game featuring full physics gameplay on an iPhone 3GS and above, iPod 3rd Gen and above. Perform massive stunts, race competitively and collect flags to unlock your way through ten highly-crafted levels and over 60 courses set in a variety of environments. Drive your bike, keep your balance and try to get to the finish line as fast as possible. This is not for iPad. The priced version is ad free.
8	992	Word game: Stack and match words that are associated to each other! Words can be synonyms. Words can be antonyms. Words can be compound. Words just have to be related! As stacks get harder, a word can be matched to multiple different words, so you'll have to get the right combination to complete the stack correctly. This game comes with 40 free stacks. With the priced version you have 280 stacks and the option to buy more stack packs or buying ALL the present and future stack packs for one low price. And the priced version is ad free.

Table 2: List of Variables in the "Panel data" data block on Enginius.
Data are for English-speaking countries combined (e.g., US, UK, Canada)

*Indicates time-invariant variables, all other variables are time-variant

Variable Name	Description
AppID*	ID of Game apps for Apple devices -- the priced version is denoted by a suffix *p*, and the free version by the suffix *f*.
Calendar Week	Calendar week index during years 2012 and 2013
Compatibility*	Categorical variable indicating whether an app is iPad only, iPhone only or for both.
Puzzle	Whether app is a Puzzle (Yes = 1, No = 0)
Free or Priced	Categorical variable indicating whether the app downloaded was free or purchased for a price (Free = 0, Priced = 1)
AppSize*	Size of the app in MB
AvgPrice	Average price of the app in a particular week
WeeklyAvgRating	Average rating score of the app (on a 5-point scale, 5 being the best) provided by reviewers. The average rating score for the app (based on all available reviews as of a given day) are aggregated for a week and averaged.
AvgRatingVol	The average rating volume for the week for an app. All available ratings on the seven days of the week are aggregated and averaged. (Note that this number is non-decreasing, because each new rating will increase the total number of available ratings).
AvgTotRating	= WeeklyAvgRating*AvgRatingVol
Update	Whether an app was updated sometime during the week (Yes = 1, No = 0)
AvgDownloads	Average of downloads of the app per day during a week
Avg-In-AppPurchase	Average daily dollar value of in-app purchases during a week, including any ad revenue (there was not much in-app advertising).
AvgTotRevenue	Daily average revenue from all sources (paid downloads + in-app purchase + ad revenue)
AvgTotRevPerDwnld	Average daily total revenue per download (during a week)

References

1. http://www.statista.com/statistics/276768/global-unit-sales-of-video-game-consoles/
2. http://publ.com/blog/2014/08/26/the-overview-of-mobile-apps-market-why-you-should-enter-now

This case describes a real business situation using a mix of real and hypothetical data, and is not intended to serve as endorsement, source of primary data, or illustration of effective or ineffective handling of a managerial situation.