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From Pocket to Purchase: How Mobile App Engagement Affects Malls

By Runzhe Cen, Yiling Feng, Katie More, Ashley Tomzik, and Jesse Zeng, Spiegel Research Center, Northwestern University; and Mototaka Sakashita, Keio University

Northwestern University's Spiegel Research Center conducts ongoing, multifaceted research into how consumers engage with brands and how that engagement shapes customer value. The Center analyzed data to investigate how mobile apps can drive in-store purchases.

The digitization of retail

Global e-commerce retail sales have continued to soar with a 23.7 percent year-over-year increase in 2016 to 1.915 trillion U.S. dollars.¹ As physical retail stores and malls face increasing competition from these e-commerce channels, many are upgrading their offerings to create a well-rounded and customized experience for their customers. Some of these enhancements include digital and mobile integrations to keep shoppers engaged during their visit, as many brick-and-mortar store visitors turn to their smartphones as a source of information and inspiration while shopping.

PARCO, a shopping mall chain in Japan, has integrated such digital and mobile capabilities for its visitors through its proprietary mobile app known as Pocket PARCO. The app, which doubles as a loyalty program, incentivizes users to check into the mall, favorite (follow) a store, like content within a store's feed, and make purchases. It also offers valuable information such as operating hours, promotions, and store locations, creating further opportunities for engagement while shopping.²

Personalized Feeds

Users get feeds from stores about products and campaigns.



Mall & Store Info

Users can access information about every PARCO mall and store.



Parco Member Card

Users can manage their membership and track point history on the app.



Promotion & Coupon

Users get notifications from mall and stores about promotions & coupons.



Check-in

Get 10 points for each GPS check-in in the mall (up to 100 points per day)



Like Feed Content

Get 10 points for each feed like on the app



Favorite a Store

Get 10 points for each store favorited on the app



Make a Transaction

When making a purchase at Parco, every yen spent translates to one coin

¹ eMarketer. (2017). Retail e-commerce sales worldwide from 2014 to 2020 (in billion U.S. dollars). In *Statista - The Statistics Portal*. Retrieved June 26, 2017, from <https://www-statista-com.turing.library.northwestern.edu/statistics/379046/worldwide-retail-e-commerce-sales>.

² Retail Touch Points. (2015). More than 90 percent of consumers use smartphones while shopping in stores. Retrieved June 26, 2017, from <http://www.retailtouchpoints.com/topics/mobile/more-than-90-of-consumers-use-smartphones-while-shopping-in-stores>.

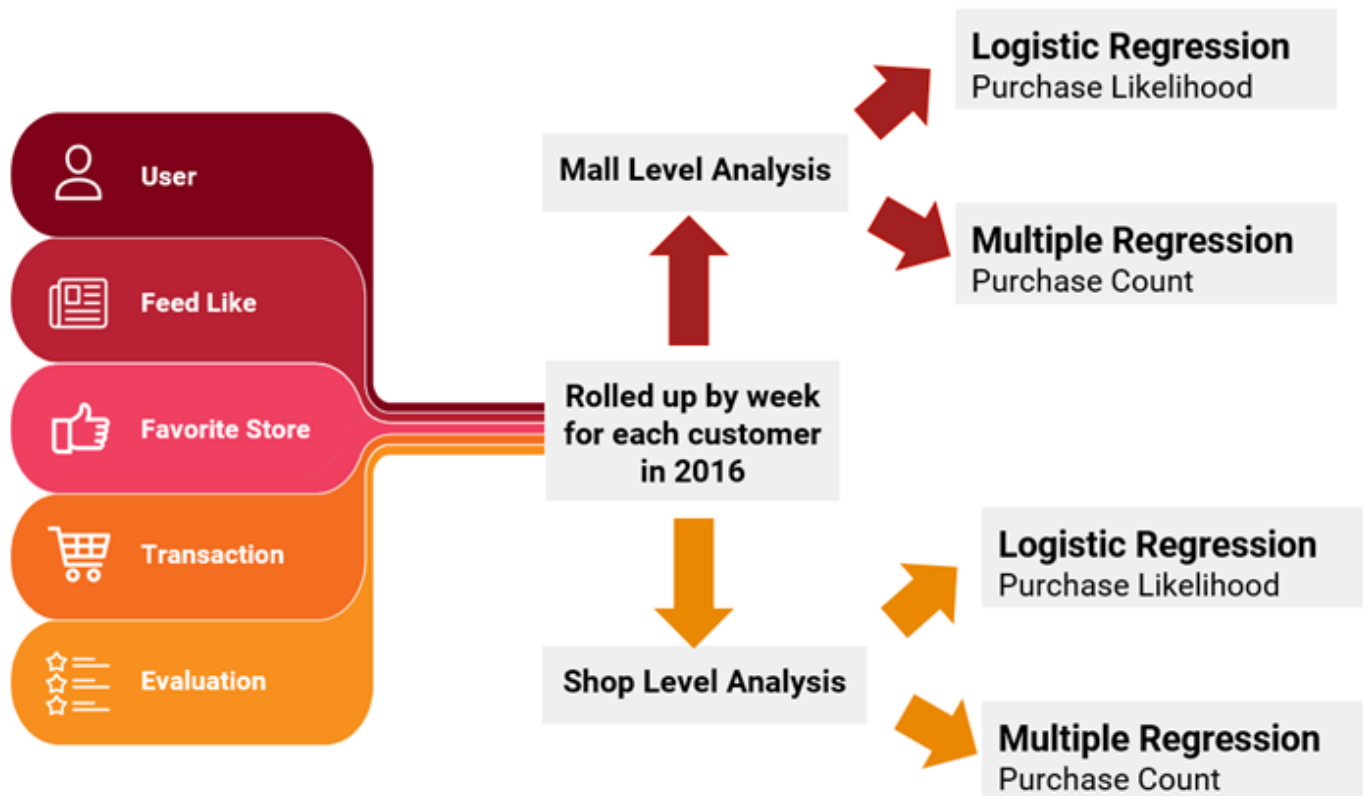
Given the extensive amount of customer data available from Pocket PARCO, we explored the relationship between app engagement and purchase behavior for the PARCO location based in Ikebukuro,³ a popular shopping and entertainment neighborhood in Tokyo. The study's objective is twofold. First, the authors examined how app engagement affects purchase behavior at the mall level; next, they analyzed this relationship at the store level.

Research methodology

To facilitate this study, PARCO provided data sets from five categories that contained information about Pocket PARCO mobile app usage from 2014-2017:

1. User information: the app users' demographic data and app registration data.
2. Feed likes: the promotional messages a customer has liked in the app.
3. Favorite store: a list of each user's favorite stores in the app.
4. Transactions: the app users' purchase data.
5. Evaluation: the rankings customers left after a purchase (scale of 1 to 5).

Given the massive size and detail of the data sets, we decided to focus on data from the most recent full year (2016). After we filtered to only include 2016 data for the Ikebukuro mall, we merged all of the data sets together and aggregated the data at the customer and week level. At this level of aggregation, there were a total of 812,964 observations for the mall. Since the study contains insights and analysis at both the mall level and the store level, we also had to filter the data to only include Store A, a cosmetics store at PARCO, for the store level analysis. For Store A,⁴ there were 72,622 observations when rolled up by customer and by week. As shown below, we performed logistic regression and multiple regression for each section of the study.



³ Throughout this paper, all findings and observations refer exclusively to data from the Ikebukuro mall location.

⁴ Due to privacy reasons, we have redacted the store's name in this paper.

What drives purchase behavior at the mall?

At the mall level, we first analyzed what factors influence whether a customer makes a purchase. We built a logistic regression model, the dependent variable being a binary variable indicating whether a customer purchased in a given week. The independent variables were grouped into categories for clearer understanding.

Engagement Variables

- Number of days since a customer's last like.
- Binary variable indicating whether the customer checked into the mall or liked a feed from any store in the mall in the previous week.
- Binary variable indicating whether the customer ranked his or her most recent purchase experience.

Demographic Variables

- Gender and age of customer.
- Squared age term (the relationship between age and purchase likelihood was not linear).

Control Variables

- Binary variable for February through December (to control for seasonality).
- Number of days since last purchase.
- Binary variable indicating whether the customer had made a prior purchase at the mall.



The model indicated that app engagement increases purchase likelihood at the mall. Most notably, customers who checked in or liked a feed in the prior week were 1.35 times more likely to make a purchase in the following week. In addition, longer time spent away from the app decreased purchase likelihood, and customers who ranked their last purchase were 1.1 times more likely to make a purchase in the following week. From this, we concluded that consumers need more incentive to remain engaged with the app outside of the mall to increase purchase likelihood.

Once we understood which factors drive purchase likelihood, we shifted focus to understand what drives the number of purchases a customer makes, given that he or she made a purchase in a given week. This model is a multiple regression model, and the variables are similar to the logistic regression referenced above. The dependent variable was purchase count, or the total number of transactions that a customer made in the mall in a given week. For example, if a customer bought two items at store A and three items at store B on the same day, this would equate to two purchases in that day.

Engagement Variables

- Binary variable indicating whether the customer checked into the mall or liked a feed from any store in the mall in the previous week.
- Binary variable indicating whether the customer ranked his or her most recent purchase experience.

- Binary variable indicating whether at that point in time, the customer had at least one store in his or her favorite stores on the app.
- Interaction between favorite store binary variable and checked in/liked last week binary variable (to determine whether engagement actions had more or less of an effect when the customer had at least one favorite store).

Demographic Variables

- Gender and age of customer.
- Squared age term.
- Customer tenure (number of days since the customer joined the app).

Control Variables

- Binary variable for February through December (to control for seasonality).
- Binary variable indicating whether the customer had made a prior purchase at the mall.

The major finding was that having a favorite store drives incremental purchases. While engagement actions increased weekly purchases by 4 percent, the effect was nearly doubled when customers also had a favorite store: customers who checked into the mall or liked a feed in the previous week and had at least one favorite store in the app made 7.4 percent more purchases the following week. When a customer adds a store to his or her favorites in the app, the content in the feed is more customized to that person's tastes. Rather than seeing feeds from random stores, customers receive feeds from stores that are in their favorites, resulting in more customized content. As a result, customers who like the more customized content make more purchases.



Case Study - What drives purchase behavior at a particular store?

After selecting Store A based on revenue and the Markov Chain model, we conducted an analysis similar to what we did at the mall level. The data set we prepared for this analysis resembled the mall level data in that it was aggregated by week for each customer. However, it differed slightly in several ways. First, this data set consisted of only potential Store A customers. We also added more store-related variables, such as number of feeds a customer liked from Store A versus other stores and whether a customer had Store A versus other stores in his or her favorites. Otherwise, we used the same control, demographic, and dependent variables.

Engagement Variables

- Number of days since a customer's last like from Store A's feed.
- Binary variable indicating whether the customer checked into the mall last week.
- Binary variable indicating whether the customer liked Store A's feed last week.
- Binary variable indicating whether the customer liked a feed from a store other than Store A last week.
- Binary variable indicating whether the customer ranked his or her most recent purchase experience.
- Binary variable indicating whether at that point in time, the customer had Store A in his or her favorite stores on the app.

- Binary variable indicating whether at that point in time, the customer had any store other than Store A in his or her favorite stores on the app.
- Interaction between binary variable for Store A in favorites and binary variable for any other store in favorites.

Demographic Variables

- Gender and age of customer.
- Squared age term.

Control Variables

- Binary variable for February through December (to control for seasonality).
- Binary variable indicating whether the customer made a purchase at Store A in the previous week.

On one hand, this model showed similar results for check-ins and time since last like: if a customer checked into the mall, they were 3.3 times more likely to make a purchase at Store A in the following week. In addition, the longer time spent away from Store A's feed on the app slightly decreased purchase likelihood. This indicates that engagement also drives purchase likelihood at the store level, so stores would benefit from providing more incentive for customers to remain engaged over time with them on the app.



We identified a major difference between the effect of engagement at the mall and store level: more focused engagement results in higher purchase likelihood. Although liking Store A feeds did not

have a significant effect on purchase likelihood, liking feeds from other stores significantly decreased the likelihood that customers purchased at Store A in the following week. Customers who have added only Store A to their favorite stores in the app are 2.1 times more likely to make a purchase than customers who have no favorite stores. However, customers who have other stores in their favorites in addition to Store A are only 1.7 times more likely to do so. This finding shows that purchase likelihood at the store level increases when consumers engage exclusively with that store in the app.

For the multiple regression model, we used the same predictor variables with two exceptions: the binary variable for GPS check-in was removed and the control variable was changed to a binary variable indicating whether a customer made a purchase before at Store A. In this model, the dependent variable was purchase count. The multiple regression model revealed similar findings to the store level logistic regression model. When customers engage exclusively with a store, it leads to more purchases at that store. The model indicated that liking Store A's feed increased the average number of Store A purchases in the following week by 18.8 percent, and customers who have added only Store A to their favorite stores in the app make 7.8 percent more purchases in the following week. Both findings support the theory that store operators should encourage more consistent and exclusive engagement with the customers.



Recommendations

Based on our findings and insights, we developed strategic recommendations for PARCO to better leverage its mobile app to increase customer engagement. These recommendations focus on three key moments in the customer journey: engagement while in the mall, engagement after making a purchase, and continued engagement over time.

We first recommended that PARCO utilize its recently implemented beacon technology to enhance customers' in-mall experience and extend their shopping journey. With this technology, PARCO can personalize promotions sent directly to customers' smartphones based on the purchases they have already made that day as well as their real-time location. By predicting customers' shopping patterns and preferences, the beacon technology can also influence customers to continue shopping at the mall by recommending stores and store categories that each customer is most likely to visit next.

In addition to keeping shoppers engaged during their mall visit, we suggest offering more incentives for customers to remain engaged after they have visited or have made a purchase at the mall. One approach could be having store employees promote the Pocket PARCO app to in-store customers to better inform them about the rewards that come with continuous app engagement, such as PARCO gift cards. It is possible that many customers are simply not aware of these added benefits and need further information in order to stay engaged after their mall visit. We also see an opportunity for further incentives within the rewards program itself. The app currently does not reward customers when they rank a store post-purchase, and the store rankings are not visible within the app. By encouraging customers to rank a store after a purchase by rewarding them with points and making the stores' ranking available to app users, PARCO could significantly increase its post-purchase app engagement.

Finally, we recommend that the app offer a more personalized experience to customers to maintain app engagement over time, even when they are not physically at the mall. The app generates customized feeds based on the stores the customers have favorited, and from our analysis, we saw that this personalization helped to drive engagement and purchase likelihood. Therefore, we recommend that the app take this level of customization even further by also taking into account customers' past purchases and mall visit history when generating feed content to maximize relevance over time. Additionally, providing more incentives for customers to like items in their feed could help to keep customers engaged in the long term. For example, stores could utilize the feed to offer valuable information like deals, promotions, coupons, and sales events to encourage customers to visit the mall again soon. [Watch the presentation](#) from Spiegel Research Center.

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About



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Platt Retail Institute (PRI) is an international consulting and research firm that focuses on the use of technology to impact the customer experience. PRI develops marketing and technology deployment strategies, supported by analytics, to build brands and increase sales. PRI clients include retailers, media companies, financial institutions, hardware and software companies, educational institutions, and other businesses. In addition to its global consulting expertise, PRI also publishes the quarterly Journal of Retail Analytics and other pioneering industry research.

To learn more about Platt Retail Institute, please visit www.plattretailinstitute.org.



The Retail Analytics Council (RAC) is the leading organization focused on the study of consumer shopping behavior across retail platforms to provide an understanding of how these impact retailers, particularly as new technologies are introduced. Established in August 2014, RAC is an initiative between Medill's Integrated Marketing Communications department, Northwestern University, and the Platt Retail Institute. The RAC unites industry, faculty, students, and its Advisory Board members for the study and exchange of ideas.

To learn more about the Retail Analytics Council, please visit <http://rac.medill.northwestern.edu>.

