

# A Data-driven Digital Analytics Framework for Mobile App Analytics

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## ABSTRACT

Mobile App has constantly evolved to become the most critical asset of every organization. As much as Mobile App has evolved technically, it is also highly important to continuously measure the App in order to make better Business Decisions. This paper has laid out a basic framework of Mobile App Analytics by defining some Key Performance Indicators and explaining their importance in deriving actionable insights to help Product Managers and Business owners make data-driven decisions.

## Keywords

Mobile App Analytics, Digital Analytics, Product Managers.

## 1. INTRODUCTION

Digital analytics has driven much of the marketing decisions over the past decade. Companies have mastered the art of analyzing vanity metrics like number of visits, page views, time on page, and so on. But, turning the same conversation to mobile app analytics, the mood changes. What should be measured? How should some metrics be prioritized over others? [1] While the App ecosystem has grown rapidly, App Product Managers who are primarily owners of the App have not been equipped with enough tools to assess key things about the App and also to come up with improvement plans. Even though App is just another digital asset, extending existing Web Analytics Metrics to App isn't a very straightforward process for a variety of reasons including how different user acquisition, usage and churn is.

## 2. SOLUTION DESIGN

### 2.1 Acquisition Analysis

One of the key issues with Native App is that the Customer Acquisition Cost (CAC) is relatively higher than other conventional digital asset like a Website or a Mobile Website and the reason being Native Apps are installed through the respective App Stores – Apple iTunes Store in case of iOS and Google Play Store in case of Android, hence the campaigning costs are comparatively higher for these platforms. While CAC is high for Mobile App, It's also important for an organization to port their existing customers on Desktop or any other traditional digital asset to Mobile App, to improve their user experience, support mobility and also from an organization perspective - justify App Development cost, since this is substantial in overall development cost.

#### 2.1.1 App Penetration %

Hence it becomes important to include this part of our App Analytics Framework and thereby introducing a, KPI App Penetration %. which is to help the Product Managers understand the amount of Active App Users from the existing base. Measuring App Penetration % over a period of time 1-Monthly and 3-Monthly helps them get a view of how the

Marketing team is performing in getting customers into Mobile App. Since App Penetration % is a direct measure of Unique Visitors from Analytics Tool – like Adobe Analytics or Google Analytics, the 1-Monthly view and 3-Monthly view makes it easy to understand how new users and returning users are contributing to the overall App Penetration and this in turn could be correlated with the CVM Campaigns executed in those time period to measure their effectiveness.

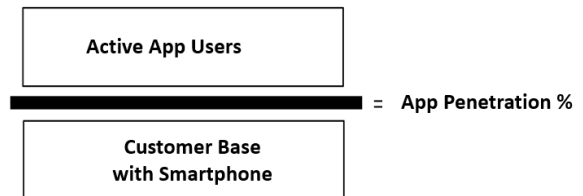


Fig. 1 App Penetration

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### 2.2 Usage Analysis

Mobile App doesn't come with luxury of real-estate since its upper bound is Phone's screen size. Hence it's a real challenge for Mobile App Product Managers to incorporate Business cases into the App, given its limited size and weight. And that's one area where Usage Analytics could help Product Managers to constantly rethink certain App Features, if it's being consumed as expected or if it's just another dead zone with no user interest. While traditional digital metrics like Average Time Spent on Page could help us understand this on Website, these metrics hold no value on App because the more time one spends on an App Screen, the higher the likelihood that the person is stuck there rather than enjoying the user interface of it. That's why such metrics have been ignored and a new set of metrics have been adopted to understand how the app is being used by the users.

#### 2.2.1 Screen Launches

Screen Launches translated in Adobe Analytics lingo – Launches by Screens/Pages – can help Product Managers understand the most frequently and least frequently launched screens on the app. This is one of the most important lists for a Product Manager to look into to see how certain features and functionalities on the App are performing on an absolute scale and also on a relative scale against other Screens on a similar range.

### 2.2.2 Menu Items

Burger Menu, as in Android, App Menu plays a gateway for almost all important functionalities on the App, hence understanding what are those Menu Items that are most used and least used and correlating them with the Screen Launches should help the Product Manager understand the necessity of putting a different Menu item that users most want on top or in fact, create a new Menu Item that did not exist before. e been ignored and a new set of metrics have been adopted to understand how the app is being used by the users.

### 2.2.3 In-App Journey

While Screen Launches and Menu Items can give Product Managers an understanding of what on App is doing well and what's not, those numbers are highly abstracted. That is when it becomes essential to jump a bit deeper in understanding things beneath those numbers and In-app Journey Analysis will help do that. Every App is designed in such a way to lead users from point A to point B to point C. While this is how design thinking goes, Users are not obliged to follow the same. In order to define Key In-App Journeys, we need to define key goals/features/functionality that users are expected to achieve or use. Sample Key Goals and its Journeys:

- Usage - Checking Daily Usage
- Latest Bill - Viewing latest Bill and its Breakdown
- Bill Payment - Paying Monthly Bill
- Out of Bundle - Buying Add-on Bundles
- Top up - Topping up the balance
- Customer Service - Contacting Customer Service for a query

Thus, defining Goals enable Product Managers lay out Journeys and thereby tracking them to see the path users take to reach those goals and then breaking down those paths to see if there's any pitfalls or where a specific has or could've occurred that disables user from reaching those goals. e been ignored and a new set of metrics have been adopted to understand how the app is being used by the users.

### 2.2.4 Conversion Funnels

Like any Digital Asset, Mobile App has a few journeys/instances where one action/task has to be completed successfully in order to perform the next one in the stack. A very well-known example of this could be Authentication & Login – the user has to successfully complete the process of authentication to Login and access Logged-in part of the digital asset. These kind of cases are best represented with a new calculated metric that is, Conversion %. Most of the Apps have certain restricted areas in the app that are shown only to the authenticated users. A few of them:

- Latest Bill Conversion %
- Plan Upgrade Conversion %

Technically, these conversion % help Product Managers understand how successfully users have completed a staged-task, like, how successfully authentication overall was? Had it been not very good, What's the stage and touchpoint where the fallout is more? These things help Developers prioritizing their Backlogs in a RAPID development environment.

## 2.3 Retention Analysis

Acquisition Analysis and Usage Analysis are really good in understanding the Early and In-Life of App users but one of

the biggest disadvantages of Native Mobile App is how easy it is for a user to simply uninstall the app and churn out of the system and never return back and that's where measuring those becomes very important in Retention Analysis.

### 2.3.1 Cohort Analysis

To get started with Retention Analysis, we have to define the list of actions and the usage frequency that the Product Manager expect. This is to help us understand why and how retention analysis should be performed with different cohort period for different sections/actions of the website. Like this:

- Checking Usage Bill -> Daily
- Bill Payment -> Monthly

While an App-level Cohort analysis can help in understanding Churn Rate / Lapse Rate and how effective Retention campaigns are performing, Screen/Section-level Cohort analysis would give an idea of how one section is performing better in retaining app users against other similar section – as It's been mentioned in the previous example, Checking Bill vs Bill Payment.

	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Oct-15	100%	87%	81%	76%	72%	69%	66%	63%	60%	57%	54%	51%	48%	45%	42%
Nov-15		100%	85%	80%	76%	73%	70%	67%	64%	61%	58%	55%	52%	49%	46%
Dec-15			100%	83%	79%	76%	73%	70%	67%	64%	61%	58%	55%	52%	49%
Jan-16				100%	81%	78%	75%	72%	69%	66%	63%	60%	57%	54%	51%
Feb-16					100%	79%	76%	73%	70%	67%	64%	61%	58%	55%	52%
Mar-16						100%	77%	74%	71%	68%	65%	62%	59%	56%	53%
Apr-16							100%	75%	72%	69%	66%	63%	60%	57%	54%
May-16								100%	73%	70%	67%	64%	61%	58%	55%
Jun-16									100%	71%	68%	65%	62%	59%	56%
Jul-16										100%	69%	66%	63%	60%	57%
Aug-16											100%	67%	64%	61%	58%
Sep-16												100%	65%	62%	59%
Oct-16													100%	63%	60%
Nov-16														100%	61%

Fig. 2 Sample Cohort Analysis

### 2.3.2 App Store Ratings and Reviews Analysis

Numbers don't lie; But Numbers are just quantitative measure of what's happening or what's supposed to happen. But Analytics is all about helping Business make better decisions which wouldn't happen without Qualitative information. Any Market Research company would agree this better, since Focus Groups play a vital role from Ideation to Problem Identification of a Product/Service and that's what App Store Reviews Analysis gives. Any App user has been given this ability to Rate and Review the app on respective stores – Google Play Store and Apple iTunes Store. This, inherently represents the brand image in a social forum that's visible for everyone – like, how effective this brand is in handling Customer Service, How easy the user experience of the app is and so on. Average App Rating on both the stores plays a vital role in App Visibility on Search Results and persuading new users installing the app. Hence, this becomes an important area to track, consume the data from and also to communicate back to the users.

App Store Ratings are on a Five-star scale where one-star being the worst and five-star being the best and every user has this option of just giving the Rating or also add Review along with Ratings submission. Daily Average Rating Trend and Ratings Split Percentage are very handy measure of understanding the app and how user perception of the app is changing over a period of time. Since Rating is a numeric variable, it's easy to use it just as it is, with some Arithmetic operation on top of it.

Reviews are just Natural Language Text that hold high qualitative value and also are usually associated with a Rating value. The conventional way of extracting information from

these kind of data is for an analyst to read through the comment and summarize it. As the volume of Reviews grows over time, it would become a very tedious task for an Analyst to sit and go through all these reviews and make some sense out of it and then get back to Product Managers with the summary of what's been expressed. In order to remove this manual effort and also to improve the efficiency by standardizing the process, we have designed a novel method of Categorizing each and every review into one of the predefined categories. With these Categories, We've now created a Quantitative measure that represents those Text Corpus of Reviews. Business Knowledge, Topic Prioritization, Word Frequencies have been considered while coming up with the Categories and its dictionary of Keywords. Thus, Automating this process of Categorization helps Product managers to understand how every category is moving over a period of Time. For example:

- What % of Reviews are about Stability (as a category) related on an average week as opposed to a week with new App Version Release.
- Has the % of App Payment Failure related Reviews dropped after its bug fix went live?

**Table 1. Summary**

Type	KPIs & Insights
Acquisition	App Penetration % (1-Monthly), App Penetration % (3-Monthly)
Usage	Launches, First Launches, Conversion Funnels
Retention	Cohort Analysis, App Store Reviews and Ratings Analysis

### 3. FURTHER DEVELOPMENT

Most of the analysis that has been discussed above are purely based on the Digital Data, but the true potential of Digital Data can be unlocked when Digital Data is complemented along with Offline Data. A customer is just another unknown data point with some ID until that Customer ID from the Digital Data is joined along with the Customer Attributes to make the existing digital data a better representative. For this to be done, the primary requirement is to have a 360-degree view of Customer, i.e., Customer information acquired from different touch points like Online, Contact Center, Retail and so on. With this Data Architecture in place, Mobile App Analytics can leverage Machine Learning and Artificial Intelligence concepts for producing better results and insights that were not possible before [2]. Few such use-cases of combining Mobile App Analytics and Advanced Analytics listed below.

#### 3.1.1 App Customer Segmentation

An unsupervised Machine Learning Technique to cluster existing App users on a multi-dimensional space to better understand who our customers are and thereby offer them customized services based on their need.

#### 3.1.2 Dynamic App Dashboard

Dashboard – the first landing screen of the App is a very important space since a major chunk of App users hardly go beyond it and hence this space plays a vital role in improving Cross-selling and Up-selling options. Hence Dynamic App Dashboards with relevant options – technically widgets - to potential users could be one of the useful outcomes of microservices based techstack with Data Science layer on top of it.

#### 3.1.3 AI-Powered Personal Assistant Service

Customer Service is one the biggest pains of any consumer company in the world and AI has been a boon for them, since AI Agents or Bots could be trained precisely for a specific purpose and address customers 24x7. The problem in the model of Digital Service is Users who are not very tech savvy are left out of the equation and hence they end up visiting Retail Stores or contacting Contact Centers where the cost of a resolution is more than Digital platform. Hence the ideal solution that's being more inclusive is an AI-powered Personal Assistant included in the app, that's not just intelligent but also proactive in knowing when a user is in trouble and helping him/her out instead waiting for them to get in touch with customer service.

### 4. CONCLUSION

Mobile App Analytics is no more an option but an essential analytical practice for any organization possessing mobile digital assets, irrespective of whether it is a Native app or a Hybrid app. Getting started with Mobile App Analytics might not seem to be straightforward process considering this to be a fast-moving constantly evolving space and that is exactly what this paper has tried to address with the framework that's been presented above, making it fairly easier for any new organization to kick start their Mobile App Analytics Practice.

### 5. ACKNOWLEDGEMENTS

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### 6. REFERENCES

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