User Growth and Revenue Measurement Fundamentals for a Global Consumer Internet Business

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Abstract

Any consumer-facing business today typically uses the internet as part of its core strategy of acquiring and retaining users, and thereby generating revenue. Industries that have been traditionally "offline", i.e. transportation have also been deeply disrupted and transformed by the evolution of consumer-facing internet services, be it incumbents or be it beginners/new entrants. The following paper outlines the most fundamental growth concepts governing the development of a successful consumer internet business. The objective of the paper is to touch upon two most important pillars of building a successful consumer internet business - User Acquisition and Retention (monetization strategy) and Accounting (measurement strategy). Platformization - which is crucial for a company to scale, is outside the scope of this paper. Each of these pillars are crucial as the business evolves through different growth stages. Risk exposure concepts such as Diversification are outside the scope of this paper.

Keywords: B2B, advertising, ads, growth accounting, revenue accounting, AAARRR, consumer internet, growth, growth hacking, monetization, user acquisition, growth funnel

1. Introduction (Growth Concepts)

Growth accounting and Revenue accounting uncover different underlying dynamics for a growing user base in any consumer internet company. This paper lays out a few fundamental guiding principles that consumer internet companies can use as part of their standard rhythm of business processes to keep a tab on their growth as well as constantly evolving product-market fit. The simple set of computations illustrated in this paper, can enable a consumer internet company to decompose top-line growth into standardized, tangible components that can be used to understand the growth of their users and thereby, revenue.

An early stage company has three broad primary business objectives - User Acquisition and Retention (monetization strategy), Accounting (measurement strategy) and Platformization (Scaling strategy). Platformization is outside the scope of this paper. At the platformization stage, the company seeks to address the following two key questions: How to effectively use relevant technology platforms to help scale the business? How to be a platform that addresses a business opportunity?

Let us dive deeper into the first two business objectives i.e. User Acquisition and Retention (monetization strategy) and Accounting (measurement strategy).

2. Theoretical Concepts

2.1 Growth Funnel

Any organization providing consumer-facing services can be evaluated against the six components of the 'AAARRR' funnel (also called the Pirate Funnel) during its various growth stages. The Pirate Funnel comprises of:

- Awareness – How many people do you reach?

- Acquisition – How many people visit your site/app/product?

- Activation – How many people take the first important step that is optimal to your business? (E.g. Sign-up, App Installation or Checkout)

- Retention – How many people visit your site/app/product again? How to minimize churn?

- Revenue – How many people start paying? And how much do they pay?

- Referral – How many people refer other users to your business?

2.2 Revenue Models

Following are the examples of a few revenue models that established consumer internet companies have typically adopted (please note that there are many more):

i.   Advertising Driven: Generate revenue by showing ads to users
ii. Commerce Driven: Generate revenue by getting users to buy products and/or services
iii. SaaS: Generate revenue by hosting a software product on a cloud infrastructure (i.e., operated through a web browser), and have users pay a monthly subscription fee to get access to this product.

3. Research Method

3.1 Advertising Business Model

I. In an Advertising Driven business model, a simple view of "exchange of value" is outlined as below:
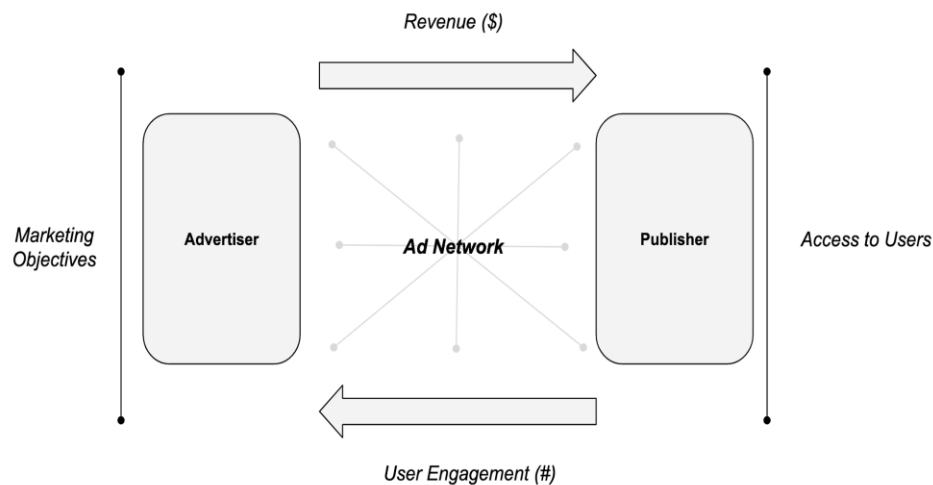
To develop a successful ad campaign, advertisers need to optimize their spend to reach their target audience. A very common use case is to choose a mixture of ads for the same campaign. In addition to choosing the most appropriate ad mix, advertisers also need to select the most effective pricing model to achieve their ad objectives. In the space of Mobile advertising, there are two primary marketing bid types:

- CPM (cost per mille)
- CPA (cost per action)

By choosing a CPM campaign, an advertiser will pay for every thousand views (also termed impressions) of your ad. An advertiser pays for this whether or not a user clicks on the ad. With CPA, an advertiser only pays when a user performs a specific action which could be an app install or submitting a registration form or so (specific ad outcome). Either of the above two ad types then translate to a key metric that an advertiser cares about i.e. Cost per install (CPI) - the price to acquire a new customer from paid advertisements. This metric refers to paid installs in contrast to organic installs.

3.2 SaaS Business Model

II. On the other hand, a simple SaaS Driven business model can be illustrated as:
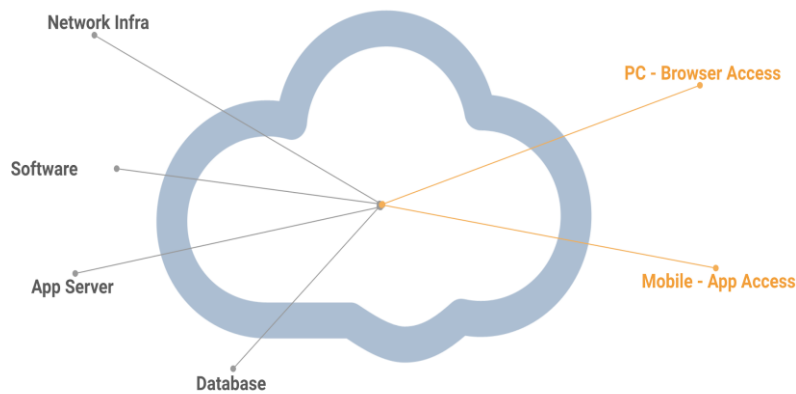
3.3 CLV

B2C SaaS companies care the most about Customer Lifetime Value CLV; a measurement of how valuable a customer is to your company, not just on a purchase-by-purchase basis but across the whole relationship. CLV is the net present value of all future streams of profits that a customer generates over the life of their business relationship with the firm.

$$CLV = \sum_{t=1}^{N} \frac{(m_t) \cdot r^{t-1}}{(1+i)^t} - AC$$

N: Number of years over which the relationship is calculated

m: Profit Margin the customer generates in a year

r: Retention Rate

I: interest rate

AC: Customer Acquisition Cost

4. Finding and Discussion (Measurement)

4.1 Accounting Measurement Strategy

In a consumer internet business, Accounting for User Growth is as important as Accounting for Revenue. The sections below dive deeper into both.

4.2 Growth Accounting

"Growth Accounting" provides a framework for understanding the underlying components that drive net user growth. To dig into the dynamics that underlie changes in growth rate, we break down overall growth in some activity across specific customer segments. Let us assume Number of Users as the activity metric here.

4.3 Ads User Growth

For a typical consumer internet company, the most common graph that we see in pitches is a graph of users 'going up and to the right'. Sometimes companies show a "vanity" metric i.e. "cumulative registered users". A registered user who is not actively using a product is probably not getting much value and is not a good indicator of product to market fit. In the current era we see a graph of monthly active users (MAU).
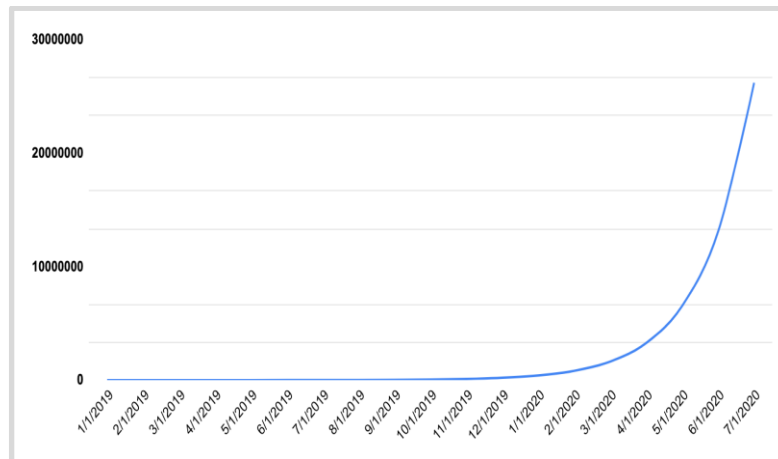
Below are a few fundamental user metrics that consumer internet companies measure, when it comes to Growth Accounting:

- New Users (NU): Gained on top of customers that were first active in the present period
- Lapsed Users (LU) / Inactive Users: Lost when a customer who was active in the previous period has no revenue in the present one
- Resurrected / Revived Users (RU): Gained from customers who had churned at some point in the past (and thus generated no revenue in the previous time period) but resumed in the present
- Active Users (AU) / Retained: Carried over by customers from the previous period to the present one

4.4 Growth Accounting Detailed Implementation Guide

Let us start with the preparation of a list of user activity. Activity could be any user interaction relevant to one's product/business. Activity could be something like sign-up/registration, or app usage or transactions or more.

In order to prepare this list, one should be able to define precisely what an activity is. Let us take an example of a specific activity for an app-based product - 'viewed a blog post'. Notably, any app user who has not created an account does not view the blog post. Let us consider the input dataset for our process to be a list of these user activities with key fields (UserID, EventTimeStamp, Duration, Active).

- UserID is a unique identifier
- EventTimeStamp is the exact date / time / both of the account creation
- Active is a flag that determines the status of the user - new, resurrected etc. - more details explained below.

In the intermediate step, one of the first outputs is to generate a table that can tell us if any given user is active on that specific day. Such an indication will be used to begin rolling up the counts / # of activity events (per the definition established above). The first step one must take to create a data set is to normalize each EventTimeStamp into a format most meaningful for the business - date, time, datetime or so.

To generate the next output, one should create a table in which one can assign every user to a specific EventTimeStamp and their Active status. We can use the user's account creation date and this flag to understand whether they were active 'n' days ago.

With that information, the "Active" flag can be defined as:

- New User (NU): If the account creation date of the user is within the past 'n' days - the value of 'n' is specific to each individual business based on the cycle/pace of the business.
- Active User (AU) / Retained: If a user was ACTIVE 'n' days ago and IS also active currently.
- Lapsed User (LU) / Inactive Users: If a user was ACTIVE 'n' days ago and IS NOT active currently.
- Resurrected / Revived User (RU): If a user turned INACTIVE 'n' days ago and IS active currently.

A lot of business track one more user metric i.e. Stale User (SU) - If a user turned INACTIVE 'n' days ago and IS NOT active currently. An example of such data could look like:

| UserID	EventTimeStamp	Active	Comments
abc123	2018-07-05*13:22:51	Lapsed User	User account is active
def456	2020-05-06*02:33:14	Lapsed User	User account was active 'n' i.e. 90 days ago, but turned inactive on August 6th (based on growth accounting for the past 'n' days)
ghi789	2020-08-24*11:05:22	New User	The value of 'n' for this business is 90 days. Assuming today is September 21st 2020, this user is New.
jkl012	2017-05-22*09:45:01	Stale User	User went inactive and hasn't resurrected

Now that we have a table, we can create the summary view we were aiming to do. The summary view will contain an overall count of the number of users with a specific active status on a specific date. So, we can do a bunch of aggregations as below:

- Number of users in a specific active status
- Number of users churned over a specific quarter
- Number of users created in a specific quarter
- Retention Rate

Next step is Visualization:

One of the most basic visualizations that companies typically adopt is user status over a time dimension. Such a graph can almost immediately help provide an explanation for the changes/deltas in user behavior over a period of time.

AU (t) = AU (t-1) + NU (t) + RU (t) - LU(t); where (t) is the current time period and (t-1) is the previous time period. 't' could be a day, week, month, quarter, year or any time frame meaningful to the business. Depending on the timeframe, active users could translate to DAU (Daily Active Users), MAU (Monthly Active Users) and so on. A typical visual for measuring Active v/s Inactive (Lapsed) Users could look like:
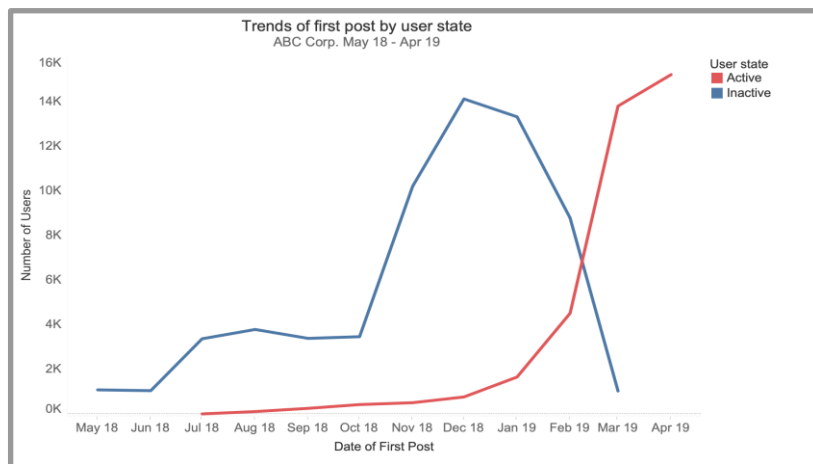

4.5 Revenue Accounting

In addition to users and ad expenditure, advertisers heavily focus on "Revenue Accounting"; a framework for understanding the underlying components that drive net revenue growth. Revenue Accounting is anchored on two broad KPIs:

- Expansion: Gained from customers increasing revenue relative to the previous time period
- Contraction: Lost from customers decreasing (but not to zero, otherwise they would be churned) revenue relative to the previous period

4.6 SaaS Revenue Growth

Consider a B2B SaaS based consumer internet company that makes revenue via monthly subscriptions. For such a company, in addition to understanding MAU growth we will also want to understand the growth of monthly recurring revenue (MRR). Let us focus on the MRR growth. In this case, the most common figure we see is a cumulative MRR chart going up and to the right.
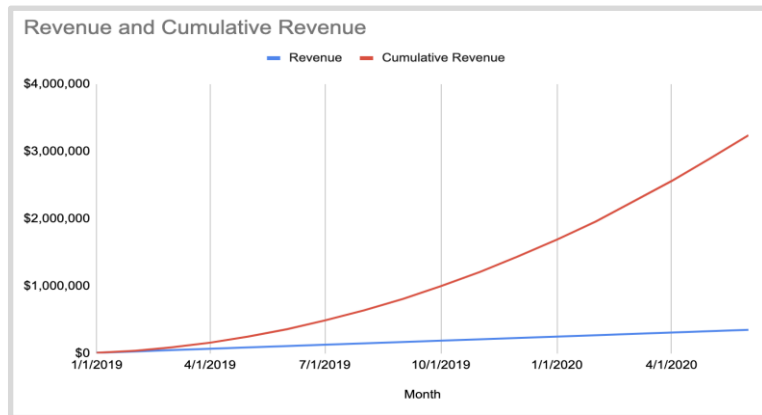
Referring to the user metrics defined above, we define fundamental revenue metrics as:

- Revenue from New Users (RNU): Gained on top of customers that were first active in the present period
- Revenue from Lapsed Users (RLU) / Inactive Users: Lost when a customer who was active in the previous period has no revenue in the present one
- Revenue from Resurrected / Revived Users (RRU): Gained from customers who had churned at some point in the past (and thus generated no revenue in the previous time period) but resumed in the present
- Revenue from Active Users (RAU) / Retained: Carried over by customers from the previous period to the present one
- Expansion Revenue (ER): Retained as a customer by spending MORE in the second period relative to the first
- Contraction Revenue (CR): Retained as a customer by spending LESS in the second period relative to the first

Recurring Revenue can be computed as:

$$RR(t) = RNU(t) + RAU(t\text{-}1) + RRU(t) - RLU(t) \ OR \ RR(t) = RNU(t) + RAU(t\text{-}1) + RRU(t) + ER(t) \quad (1)$$

Where (t) is the current time period and (t-1) is the previous time period. 't' could be a day, week, month, quarter, year or any time frame meaningful to the business.

Recurring Revenue for the previous period can be computed as:

$$RR(t\text{-}1) = RAU(t) + RLU(t) + CR(t) \quad (2)$$

Hence

$$RR(t) - RR(t\text{-}1) = RNU(t) + RRU(t) + ER(t) - RLU(t) - CR(t) \quad (3)$$

Depending on the timeframe, Recurring Revenue could translate to MRR (Monthly Recurring Revenue), ARR (Annual Recurring Revenue) and so on.

5. Virality

One of the primary reasons, that companies can leverage their products to continue growth at approximately the same Quarter over Quarter / Month over Month rate (i.e., exponential) while not spending a lot more on new customer acquisition is by leveraging the effect called "Virality" to maintain (or even reduce) acquisition costs while scaling.

Let us look at how these companies do that. These organizations build a product with what we call as "inherent virality". A large active base of customers shares a version of the product or strong positive feedback on the product with potential customers (non customer) and in turn, this population turns into new customers / users of the product. With the saturation of traditional acquisition channels (e.g. SEO, SEM), viral SaaS / Ads companies can largely reap the benefits of such an incredibly efficient way to grow. Viral growth is firstly free and has a compounding network effect. More the number of customers, more the exposure, bringing in more customers and so on.

Virality can be measured in two forms:

- K-factor - $c*i$ (where i is the number of invitations sent by each customer, c is the % conversion of each invitation)
- Z-factor - $x*y*z$ (where x is the % of users who sent the invitation out, y is the average number of potential users they invited and z is the % of these potential users who accepted an invitation)

To gauge the power of Virality, let us assume a k-factor of 1.4, i.e. one customer fetches 1.4 new users in each business cycle. After just 10 cycles, we will have $1.4^{10}=\sim29$ users; after 20 cycles, 836.68 users; after 50 cycles, you have 20.24 Million users.

6. Conclusion

The aforementioned elementary Growth accounting and Revenue accounting concepts can be applied to any emerging or mid-sized growing organization in the Ads and SaaS businesses respectively to measure user/revenue growth based as applicable. Organizations can adopt the framework, apply different measurement strategies to evaluate growth at various stages of the funnel and eventually identify the path to profitability.

Growth and Revenue accounting have a tremendous potential in helping any organization understanding the answers to the following questions (below is not an exhaustive list, possibilities are endless):

i. If our retention rates are sub optimal and the number of new registrations are the only indicators of growth - when will our growth rate have a flat line?
ii. Are our new user registrations going down? Is there an indication of our growth lines going flat? Should we act now?
iii. Is our growth line on an upward trend solely due to a one-time increase in new registrations? Do we expect this trend to continue?
iv. Is our growth line on an upward trend solely due to a resurrection of users (lapsed users getting back)? Should we target lapsed users in our GTM model / marketing investment?
v. Is our growth line on a downward trend solely due to a drop in resurrected users or drop in new registrations or an increase in lapsed users? Are there specific products/features that contributed to such a trend? Was there a specific product feature update after we saw a dramatic shift in trend?
vi. Which user segment should be targeted for soliciting feedback on product usage? Should we design specific outreach programs to get a set of users back on our platform/app/product?

Lastly, organizations can leverage the power of Virality as a great way to increase the exposure of their product by building collaboration features (existing customers invite their colleagues/friends/network during the creation phase). Virality can result in net negative churn.

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