Lecture 2

Customer Analytics Frameworks and Different Business Models

Instructor: Ali Pilehvar, Ph.D.

GW | Business

9/9/2021

Agenda for today

▸ Discussions/questions from last week

▸ Predictive Customer Analytics

▸ Customer Analytics Framework:

- AARRR
- Eric's Rise's engines of growth
- Lean analytics stages

▸ Customer Analytics for Different Business Models

- E-commerce
- Software as a Service (SaaS)
- Two-sided Marketplace

▸ Hw2 and pre-read for next week

Discussion from last week
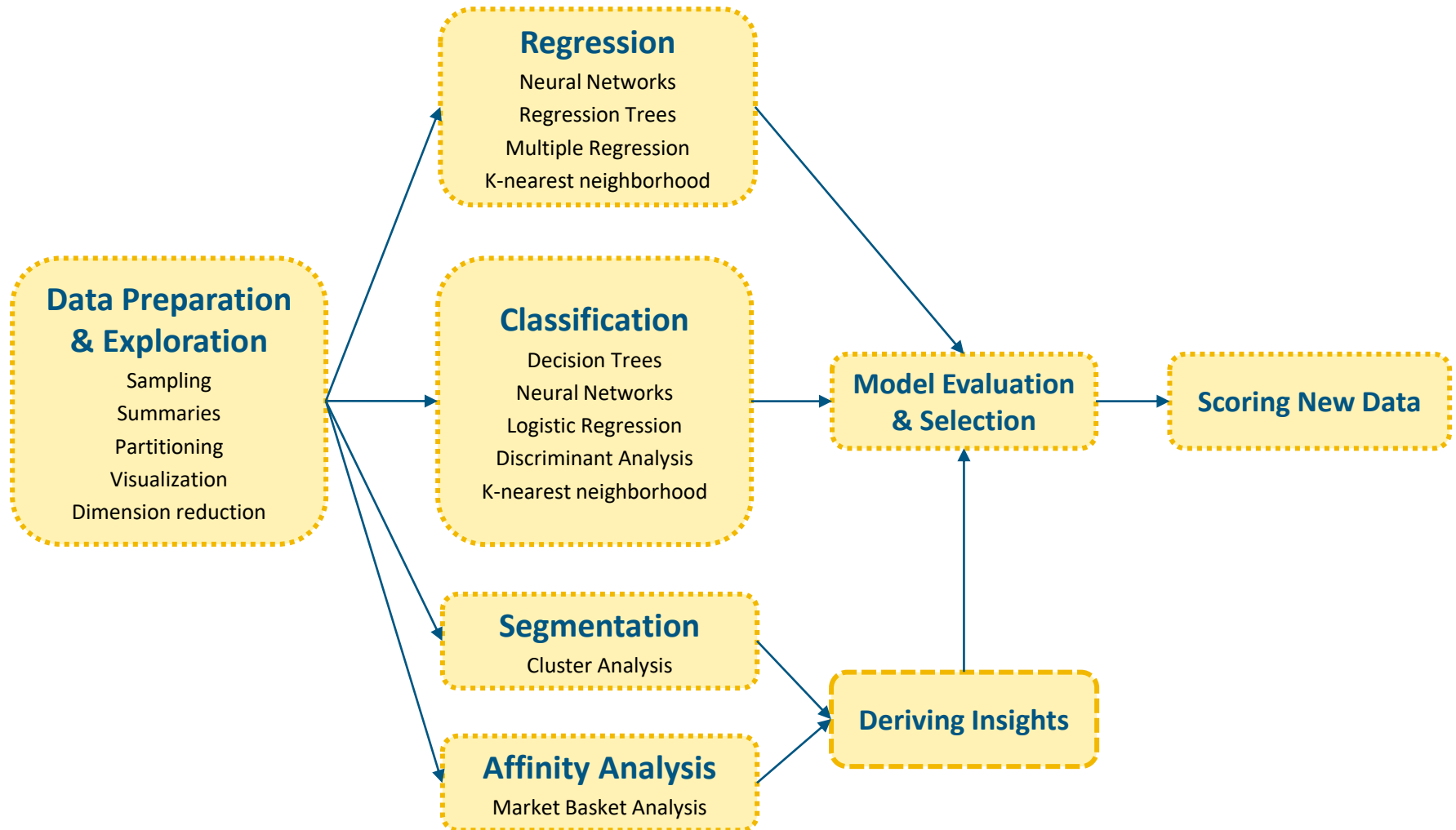
Learnings from last week

➢**Reading:** Lean Analytics – Use Data to Build a Better Startup Faster (Chapter 1-4)

➢**Reading**: Different type of Acquisition Channels

➢**Reading:** 10 Most Important Ecommerce Metrics To Track

➢**Reading:** Every product needs a north start metric

➢**Podcast:** What's the north star metric (minute 7 onward)

Predictive Customer Analytics

Predictive Customer Analytics

➢ In the age of AI and Machine Learning, we can dig deeper into our customers' data to predict how would they behave in the future.

➢ A solid predictive model can help us make a more informed data-driven decision.

➢ Supervised learning methods for:

- Predicting whether a customer would churn (Classification)

- Predicting whether a customer would use a received promotion to buy a product (Classification)

- Predicting product demand based on customer trends (Regression)

➢ Unsupervised learning methods for:

- Segmenting customers into clusters based on their past behavior (Cluster Analysis)

- Personalized recommendation for individuals/clusters (Market Basket Analysis)

- Analysis of customers' sentiments towards our brand/products (Natural Language Processing Models)
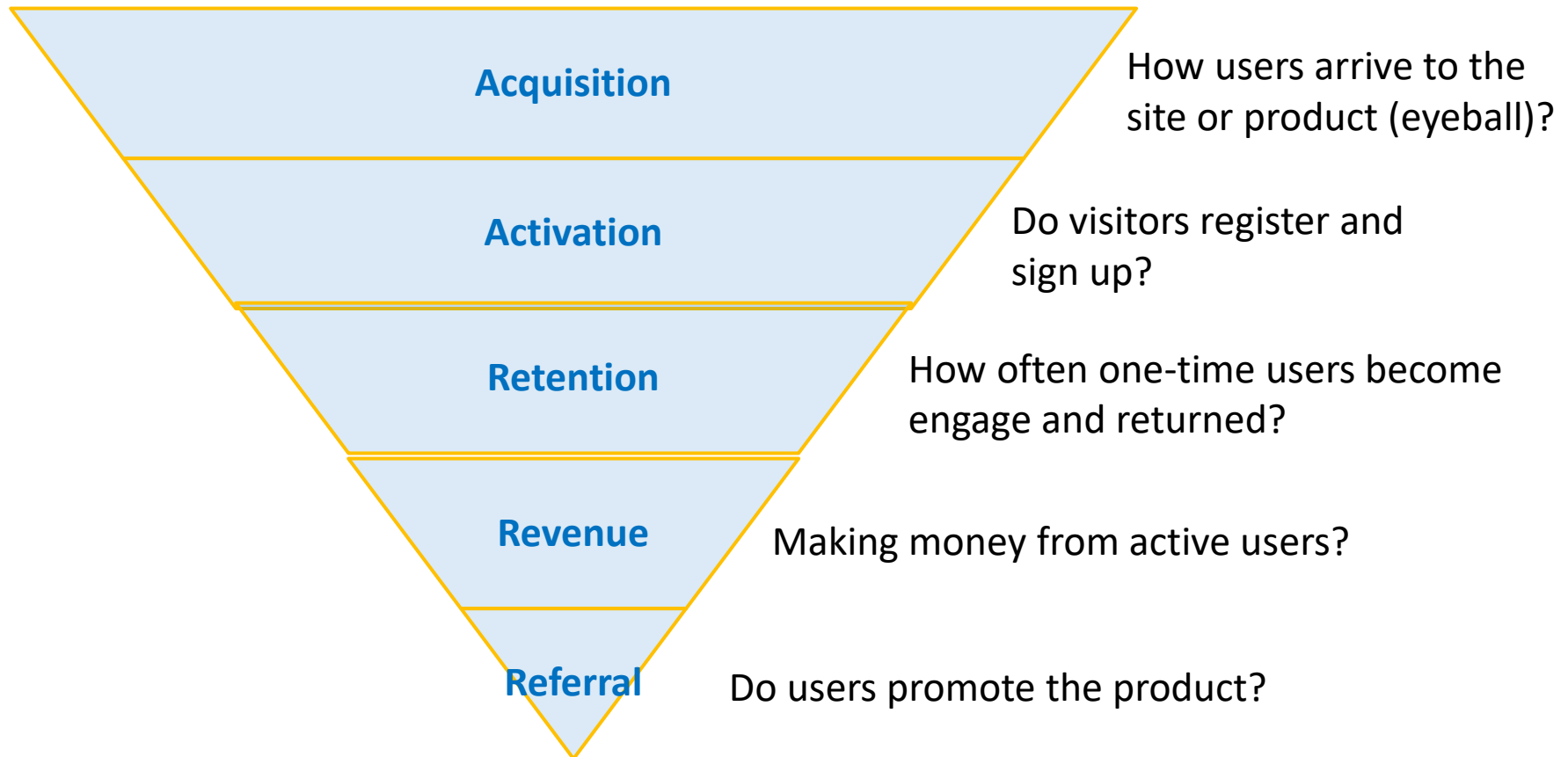
Data mining road map

Data Preparation & Exploration
- Sampling
- Summaries
- Partitioning
- Visualization
- Dimension reduction

Regression
- Neural Networks
- Regression Trees
- Multiple Regression
- K-nearest neighborhood

Classification
- Decision Trees
- Neural Networks
- Logistic Regression
- Discriminant Analysis
- K-nearest neighborhood

Segmentation
- Cluster Analysis

Affinity Analysis
- Market Basket Analysis

Model Evaluation & Selection

Scoring New Data

Deriving Insights

Customer Analytics Framework

Dave McClure's **Pirate metrics** cover Customer Analytics across different stages of customer journey

➤ A growth framework known as **AARRR** has five stages through which a company can extract all values from the customers.

Acquisition	How users arrive to the site or product (eyeball)?
Activation	Do visitors register and sign up?
Retention	How often one-time users become engage and returned?
Revenue	Making money from active users?
Referral	Do users promote the product?

Sample customer metrics across AARRR stages (ideally, they should all be connected at the customer-level)

Stage	Sample metrics
Acquisition	Traffic from different channels, cost per click, search results, cost per acquisition (CAC), App open rate
Activation	Enrollment, signups, completed onboarding, subscription, views, login, add to watch list
Retention	Time since last visit, daily/weekly/monthly active users, frequency of visits, L30*, churn rate
Revenue	Customer life-time value, purchase conversion, shopping cart size, avg order value
Referral	Invite sent, viral coefficients, NPS score**

* Facebook's user engagement metric which is % of customers were active in a month, from 1 day out of the month to all 30

** Net Promoter Score (NPS) measures the loyalty of customers to a company. NPS scores are measured with a single question survey and reported with a number from -100 to +100, a higher score is desirable.
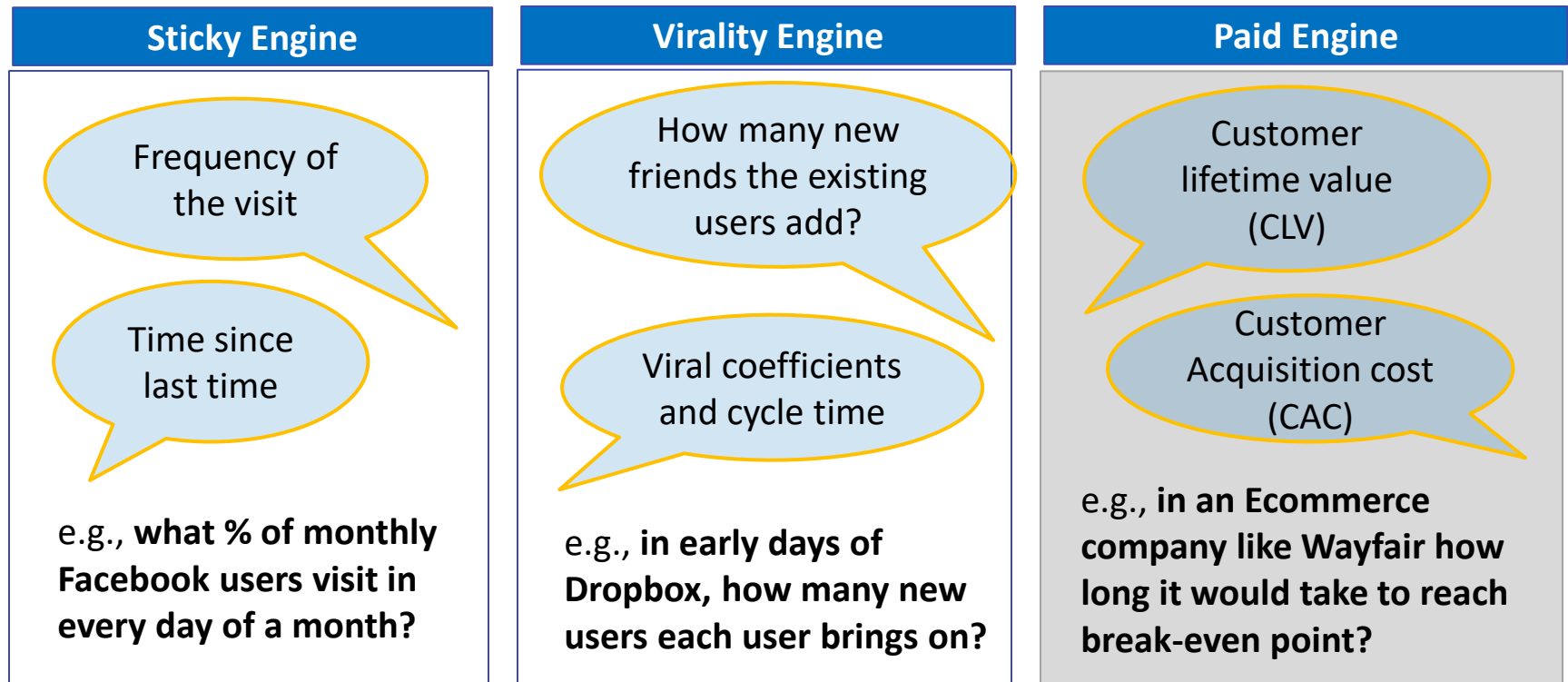
What metrics are relevant to each category will be unique to your business (example of pirate metrics for a music-streaming service)

Stage	Sample metrics
Acquisition	User sign-up rate, cost of acquisition
Activation	Conversion rate to paid accounts, songs played in first week
Retention	Monthly subscription renewal rate, churn rate
Revenue	Customer lifetime value, monthly recurring revenue
Referral	Percentage of customers sharing referral codes, successful referrals

Always avoid the vanity metric, rather focus on <u>actionable</u> metrics

Three engines that drive the growth and each has some associated Customer Analytics metrics
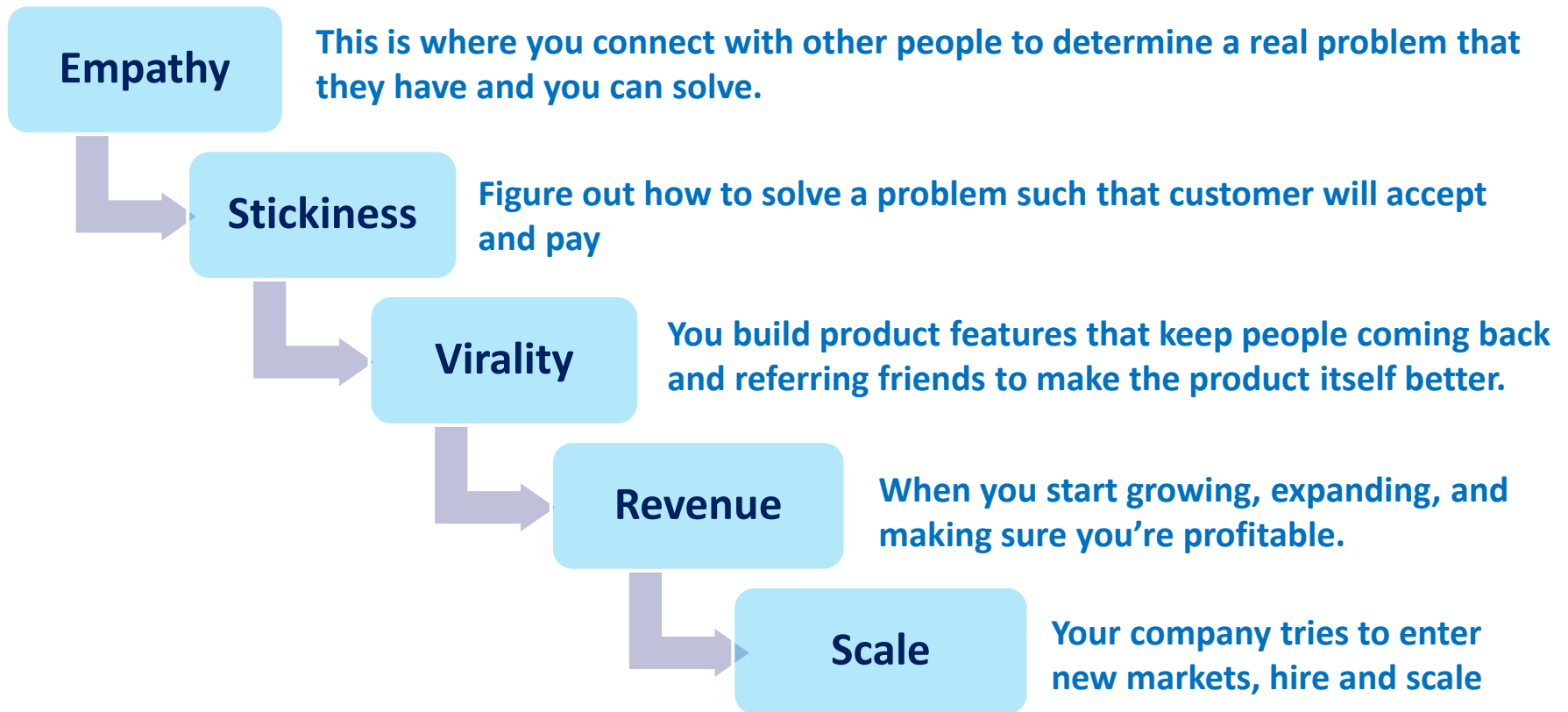
➢ Eric Rise's lean Startup focuses on three growth engines where customer analytics metrics should be impacted

Sticky Engine	Virality Engine	Paid Engine
Frequency of the visit	How many new friends the existing users add?	Customer lifetime value (CLV)
Time since last time	Viral coefficients and cycle time	Customer Acquisition cost (CAC)
e.g., **what % of monthly Facebook users visit in every day of a month?**	e.g., **in early days of Dropbox, how many new users each user brings on?**	e.g., **in an Ecommerce company like Wayfair how long it would take to reach break-even point?**

Ultimate metric for a sustainable business

The Lean Customer Analytics stages

➢ Five stages are**: Empathy, Stickiness, Virality, Revenue and Scale**

➢ Most startups go through these stages to find product-market fit and grow

Empathy — This is where you connect with other people to determine a real problem that they have and you can solve.

Stickiness — Figure out how to solve a problem such that customer will accept and pay

Virality — You build product features that keep people coming back and referring friends to make the product itself better.

Revenue — When you start growing, expanding, and making sure you're profitable.

Scale — Your company tries to enter new markets, hire and scale

Lean analytics Examples

➢ Find the one metric that matters most, depending on what stage the companies in and the business model

	Product stage	Sample metric
Empathy	Idea validation	Sign up for a website
Stickiness	You do have a product now and test it in market (search for product-market fit)	Engagement metric (# of active user)
Virality	Growth phase, at how to bring more people into the top of the funnel.	Churn rate, virality coefficient
Revenue	Become a profitable business	Conversion from free to paid users, life-time value of the customers
Scale	Looking for new market, channels, functionality, segments, geography	Market share, penetration

Standard metrics for a generic product (product analytics)
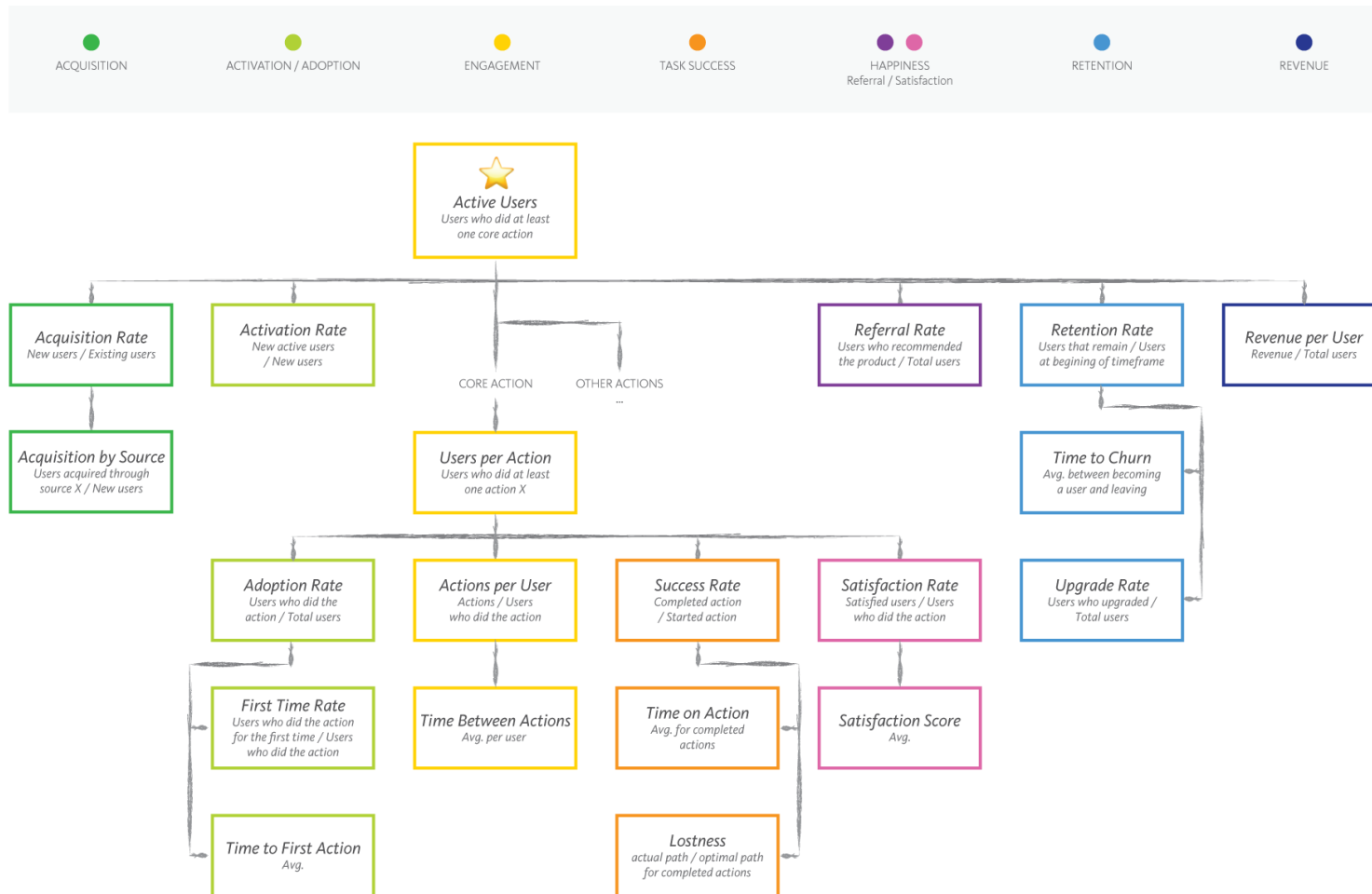
What Business you are in?

Business model is combinations of how to get customers, what/how to sell, how to make money and how to deliver value

➢ To identify the **right metrics**, we should be able to first **identify the business models** and customer value chain.

Business aspect	Flipbook page(s)	Dropbox example
Acquisition channel	Inherent virality. Artificial virality.	Sharing files with others. Free storage when others sign up.
Selling tactic	Freemium.	Limited-capacity accounts are free; subscribe when you need more.
Revenue model	Recurring subscription.	$99/year, monthly fees, enterprise tiers.
Product type	Platform.	Storage-as-a-service with APIs, collaboration, synchronization tools.
Delivery model	Hosted service. Digital delivery.	Cloud storage, web interface. Desktop client software.

Source: https://www.pinterest.com/pin/585186545305807561

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Building the Customer Analytics framework and metrics depends on the type of business models they are in

➢ Different business models search for different growth metrics at their cores and face different customer journey

➢ Some companies employ more than one business model at once

E-commence

Sell products to the customers online (e.g., Amazon)

Software as a Service (saas)

Offers software on an on-demand basis (e.g., HubSpot, Slack)

Free Mobile App

Having model app and using in-app purchase to generate revenue

Media Site

Creating content and making money from advertising (e.g., news site like CNN)

Two-side marketplaces

Buyers and sellers can interactive and transact (e.g., Uber, Airbnb)

User-generated content

Getting users to generate content on the platform (e.g., Facebook, reddit)

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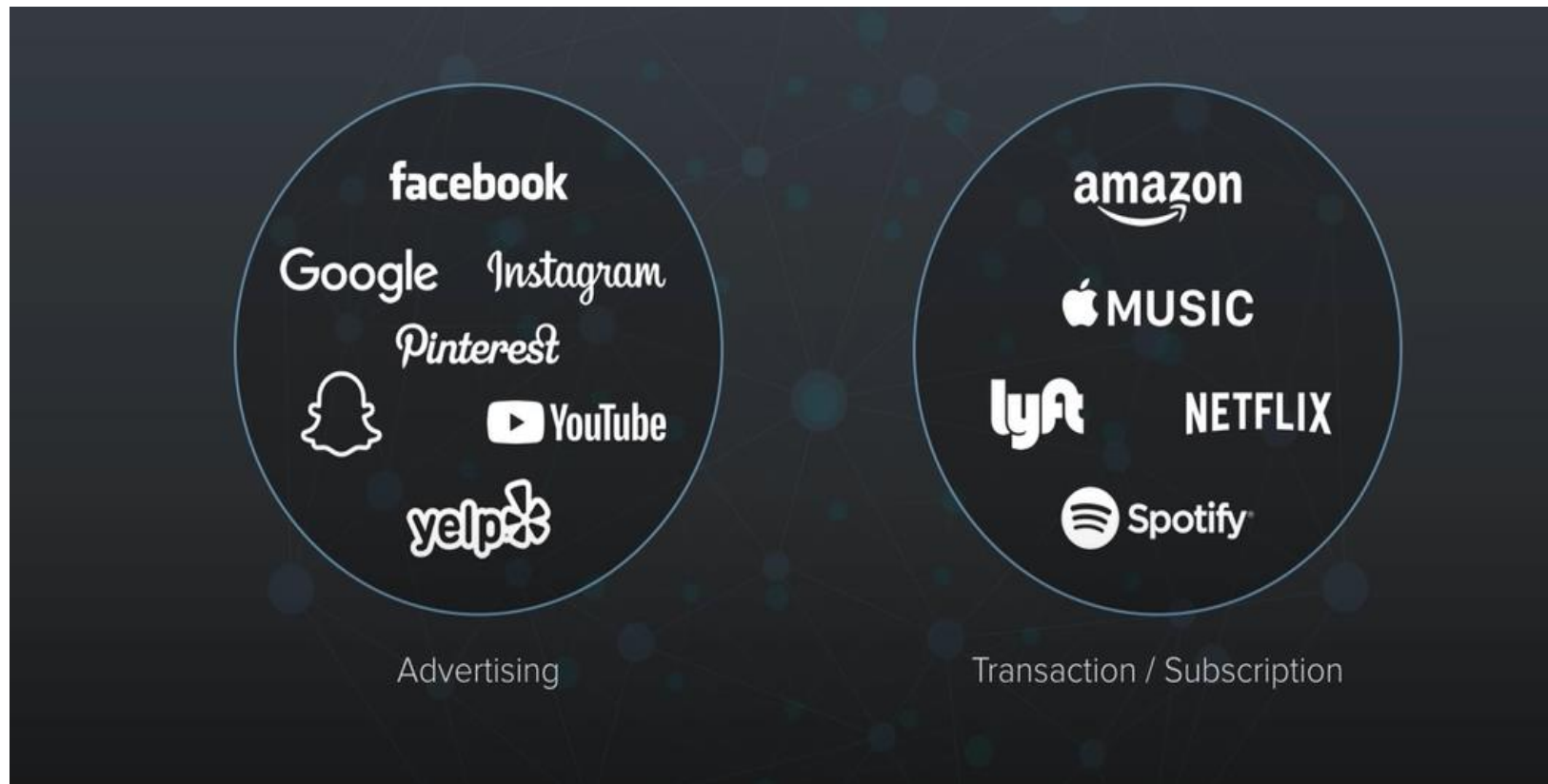
User-generated content

Getting users to generate content on the platform (e.g., Facebook, reddit)

Visiting the business model of biggest consumer internet companies in US

➢ They belong to either Advertising (Eyeball Economy) or Transaction/Subscription (Wallet Economy) Business models

Source: When Advertising Isn't Enough https://www.youtube.com/watch?v=78pLIj4xeVs

Visiting the business model of biggest consumer internet companies in US , *cont.*

➤ Revenues are highly concentrated on either Advertising or Transaction/Subscription in US

Source: When Advertising Isn't Enough https://www.youtube.com/watch?v=78pLIj4xeVs

Chinese Consumer Internet companies embrace different business models compared to US counterparts (min 9:40-12:20)

➤ **Advertising-based** business model for Podcast in US *versus* **Subscription-based** busines model for Podcast in China
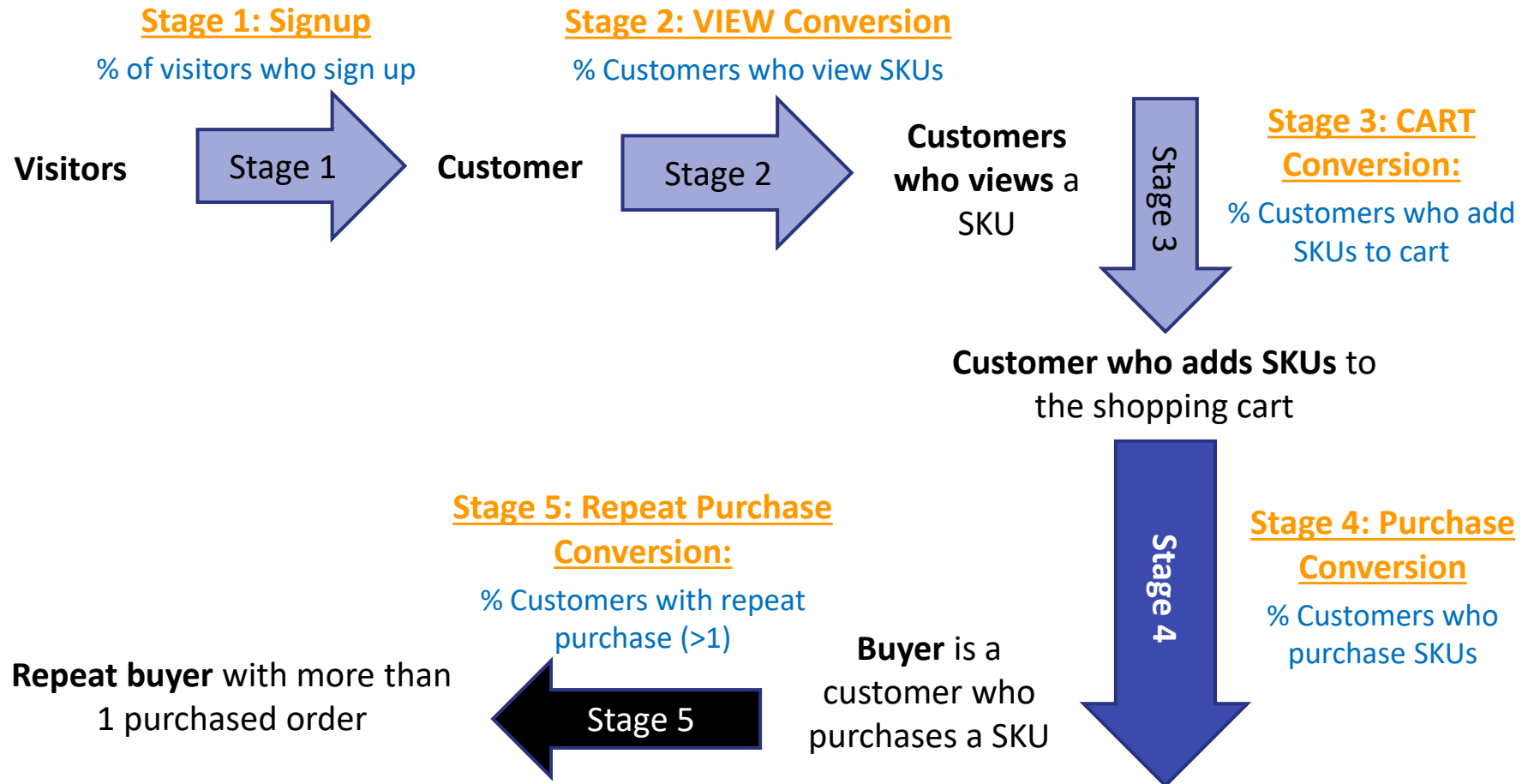

Source: When Advertising Isn't Enough https://www.youtube.com/watch?v=78pLIj4xeVs

Model 1: E-commerce Business Model

In an **e-commerce company,** a visitor buys something from a web-based retailer (e-tailer)

➤ **A 5-stage buyer journey in an E-commerce company.**

Stage 1: Signup

% of visitors who sign up

Stage 2: VIEW Conversion

% Customers who view SKUs

Visitors → Stage 1 → **Customer** → Stage 2 → **Customers who views** a SKU

Stage 3 ↓

Stage 3: CART Conversion:

% Customers who add SKUs to cart

Customer who adds SKUs to the shopping cart

Stage 4 ↓

Stage 4: Purchase Conversion

% Customers who purchase SKUs

Stage 5: Repeat Purchase Conversion:

% Customers with repeat purchase (>1)

Repeat buyer with more than 1 purchased order ← Stage 5 ← **Buyer** is a customer who purchases a SKU

9 important metrics which e-commerce companies should care the most

Conversion Rate

The number of visitors how buyer something

 # Purchase per year

Number of purchase make by each customer annually

Avg Shopping Cart Size

The amount of money spent on a purchase

Abonnement Rate

% of people who begin to make a purchase, and then don't

Customer Acquisition Cost (CAC)

The marketing spend to get one customer

Revenue per Customer

The lifetime value of each customer

 # Active Customers

Number of people who are engaged (e.g., bidder in eBay)
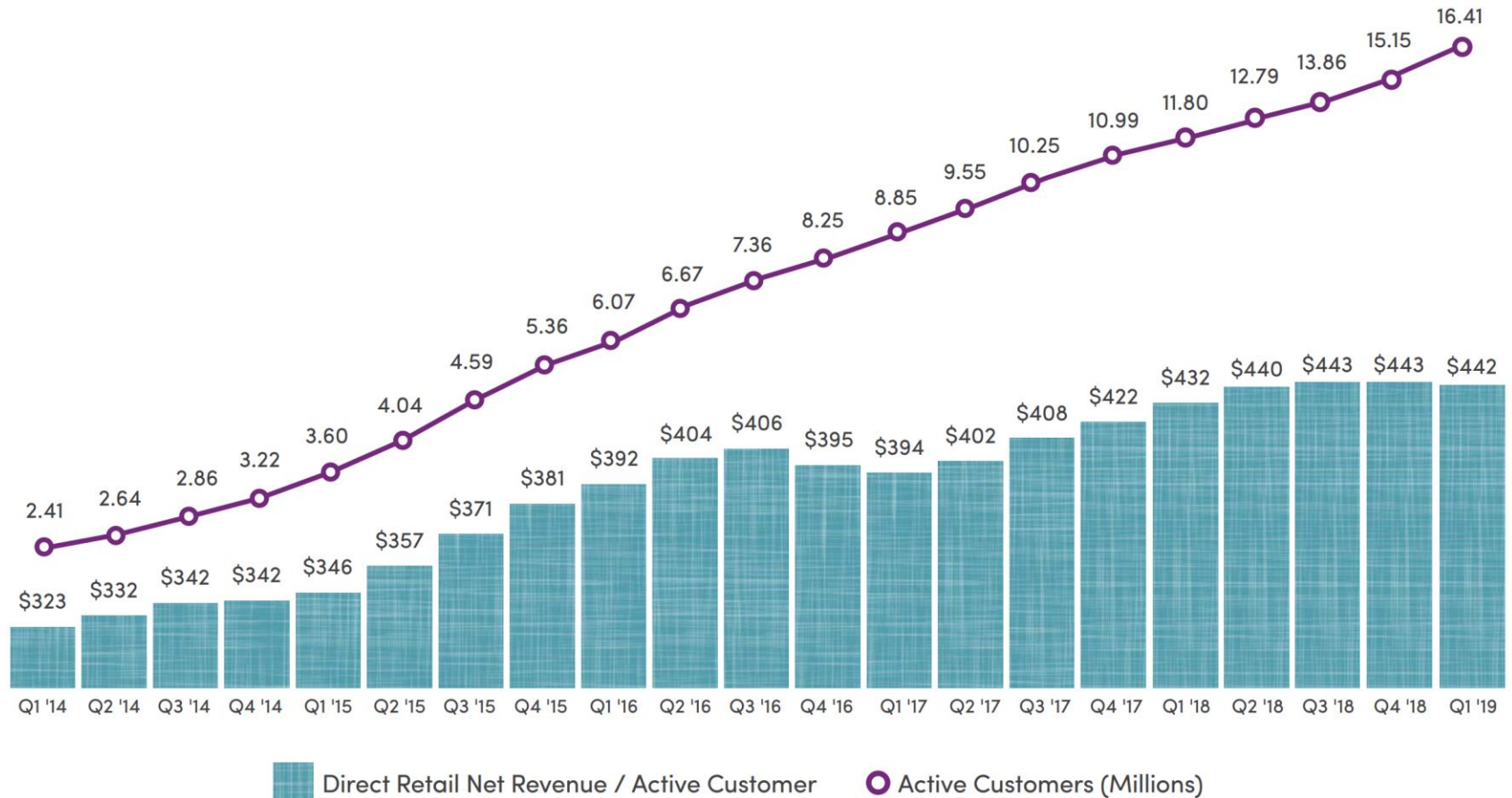
Effectiveness of Recommendations Services:

How likely a visitor is to add a recommended product to the shopping cart
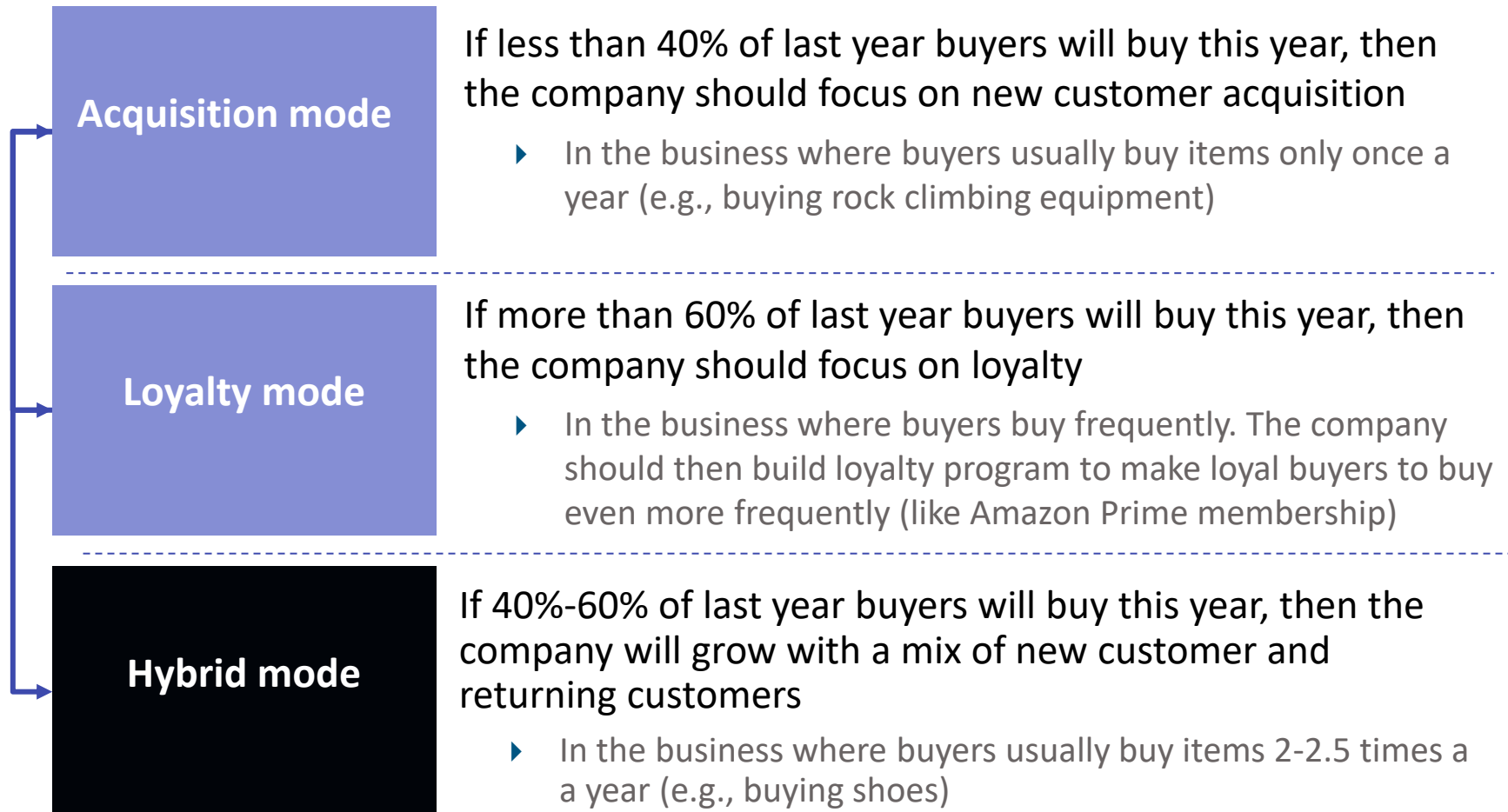
Repeat Buyers

% of customer who does more than one transaction in a month or quarter

Wayfair.com reports on # active customers as well as revenue per customer in quarterly earning call *(Q1 2019)*

Direct Retail Net Revenue / Active Customer | Active Customers (Millions)

Acquisition *versus* Retention E-commerce mode

Acquisition mode

If less than 40% of last year buyers will buy this year, then the company should focus on new customer acquisition

- ▸ In the business where buyers usually buy items only once a year (e.g., buying rock climbing equipment)

Loyalty mode

If more than 60% of last year buyers will buy this year, then the company should focus on loyalty

- ▸ In the business where buyers buy frequently. The company should then build loyalty program to make loyal buyers to buy even more frequently (like Amazon Prime membership)

Hybrid mode

If 40%-60% of last year buyers will buy this year, then the company will grow with a mix of new customer and returning customers

- ▸ In the business where buyers usually buy items 2-2.5 times a a year (e.g., buying shoes)

E-commerce example

	Acquisition Channel	
	Comparison site	Display ad
# of visits	100,000	80,000
Registration Conversion	3%	5%
% of registered customers add something to basket	20%	25%
% of purchase conversion	90%	50%
Avg value per order ($)	$150	$500
Number order per buyer	2	1

- **Which Channel is more valuable?**
- **Which one has a better unit of economics?**

Ecommerce example , Cont'd

	Acquisition Channel	
	Comparison site	Display ad
# of visits	100,000	80,000
Registration Conversion	3%	5%
% of registered customers add something to basket	20%	25%
% of purchase conversion	90%	50%
Avg value per order ($)	$150	$500
Number order per buyer	2	1
Display ad brings more revenue	$162,000 <	**$250,000**
Display ad brings more revenue/visit	$1.6	**$3.1**

This is not enough!

- To find out **MROI (Marketing Return of Investment)** we need to also have the marketing spend ($) for each channel.

Model 2: Software As a Service (SaaS)

A **SaaS (Software as a Service)** company offers software on an on-demand basis

➤ Most SaaS Companies make money from a monthly or annual subscription fee that users pay.

➤ Many SaaS companies use a **fermium model** of customer acquisition to scale up the growth.

➤ Optimizing the onboarding experience is critical to make relevant visitors enroll with the service fast enough and convert them to paid users after some time.

9 important metrics which **SaaS** companies should care the most

Attention

How effectively the business attracts visitors

Enrollment

How many visitors become free or subscribed members

Stickiness

How much time customers use the product

Conversion How many of the users become paying customers

Revenue per customer

How much money a customer brings within a given time

Customer Acquisition Cost (CAC)

How much it costs to get a paying customer

Virality How likely customers are to invite others and spread the words

Churn

How many users and customer leave during a certain time

Customer lifetime value (CLV)

How much customers are worth from cradle to grave

Visualizing the SaaS business model and buyer journey

➢ In a fermium or free-trail SaaS business model we have both users (not paid) and customers (paid).

➢ Pricing is a very important and should be very strategic in SaaS company.

➢ Value-based Pricing can create enough incentive for unpaid users to become paid users.

Source: https://www.pinterest.com/pin/581245895627571126
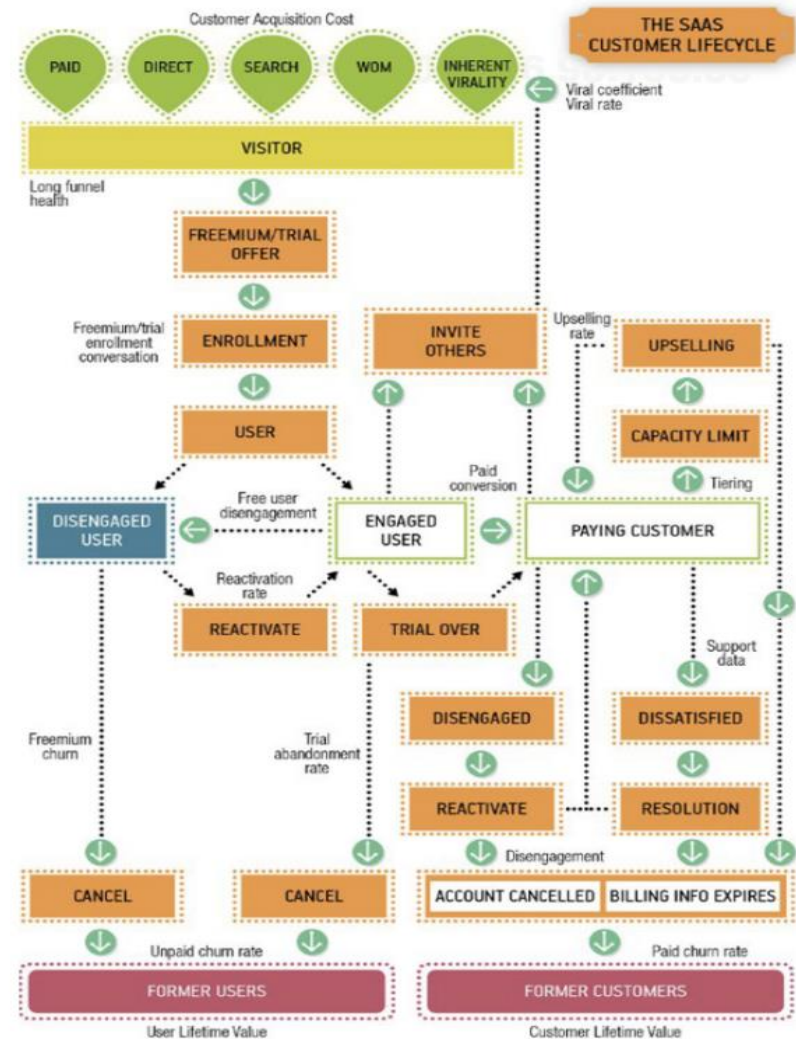
Ratio of CLV to CAC demonstrates the health of customer Economics in each SaaS company

> A SaaS company which provided cloud storage has the CAC (Customer Acquisition Cost) of $160 to attract every new customer

> Customer only pays $80 per year

Customer Economics does not look good

> A SaaS company now calculates the Customer Lifetime Value (CLV) for $200 *(around 2.5 year of tenure)*
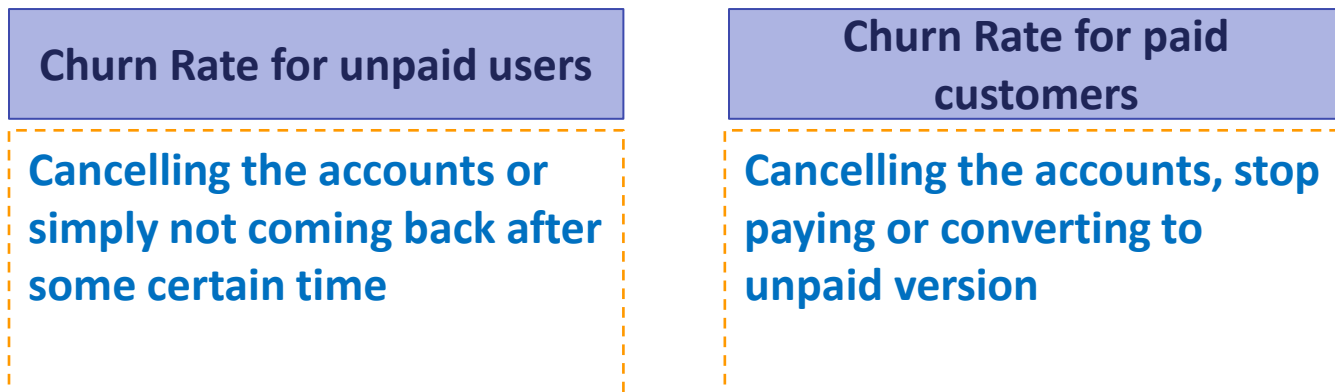
> Ratio of CLV to CAC is now ~100%, company is at the breakeven point

Sill far away from profitability

SaaS companies' objective is to have at least 300% CLV/CAC to manage a viable business with the growth potential.

Churn is one of the most important metrics for SaaS companies to predict the business growth rate

➢ Churn is the % of customers who abandon the service over time.

➢ Churned should be defined meaningfully and measured weekly, monthly or quarterly.

➢ Sometime companies use 90-days period in order to determine if customers are inactive *(e.g., not logged in within 90 days)*

Churn Rate for unpaid users	**Churn Rate for paid customers**
Cancelling the accounts or simply not coming back after some certain time	**Cancelling the accounts, stop paying or converting to unpaid version**

Churn rate: $\dfrac{\text{(Number of churns during period)}}{\text{(\# customers at the beginning of period)}}$

Churn Example in a fermium SaaS company

	Jan 2019	Feb 2019	March 2019	April 2019	May 2019
Users					
Starting with	20,000	23,000	27,000	32,000	38,000
Newly Acquired	3,000	4,000	5,000	6,000	6,500
Total	23,000	27,000	32,000	38,000	44,500
Active Users*					
Starting with	8000	8,900	10,100	11,600	13,400
Newly Active	900	1200	1500	1800	1950
Total	8,900	10,100	11,600	13,400	15,350
Paying users					
Starting with	600	610	620	630	640
Newly paid	90	120	150	180	195
Lost	-80	-110	-140	-170	-190
Total	610	620	630	640	645

*Active users are the ones who logged in *at least once* during that month

Churn Example in a fermium SaaS company, Cont'd

	Jan 2019	Feb 2019	March 2019	April 2019	May 2019
Paying users					
Starting with	600	610	620	630	640
Newly paid	90	120	150	180	195
Lost	-80	-110	-140	-170	-190
Total	610	620	630	640	645
Churn Rate	**13%**	**18%**	**23%**	**27%**	**30%**

(Number of churns during period)
_____
(# customers at the beginning of period)

➢ Average monthly churn of 21% means that an average paid customers stay around for around 5 months (100/21)

➢ This will show how to calculate the **lifetime value of a customer** as

[5 month × average monthly revenue per customer]

Churn Example in a fermium SaaS company, Cont'd

➢ Any other insights we can derive from observing churn rate over time?

Legend: Paying customer at the beginning | Paying user Churn Rate
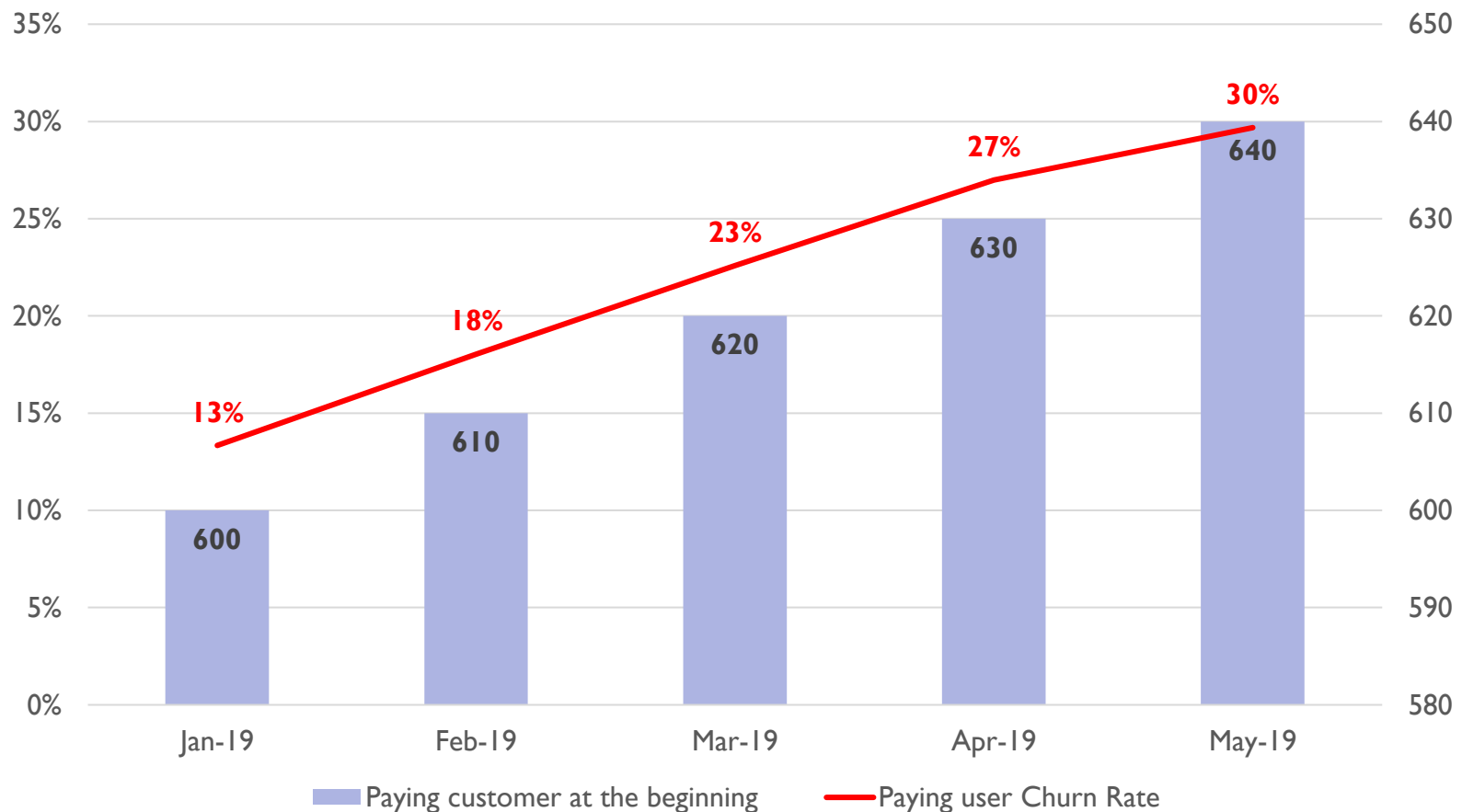
Model 3: Two-Sided Marketplace

Two-sided marketplaces have two side of **seller** and **buyer** who interacts and transacts with each other

➤ The objective of marketplaces is **to facilitate the interaction** between seller and buyer to complete a transaction.

➤ The seller is responsible for listing and promoting the product.

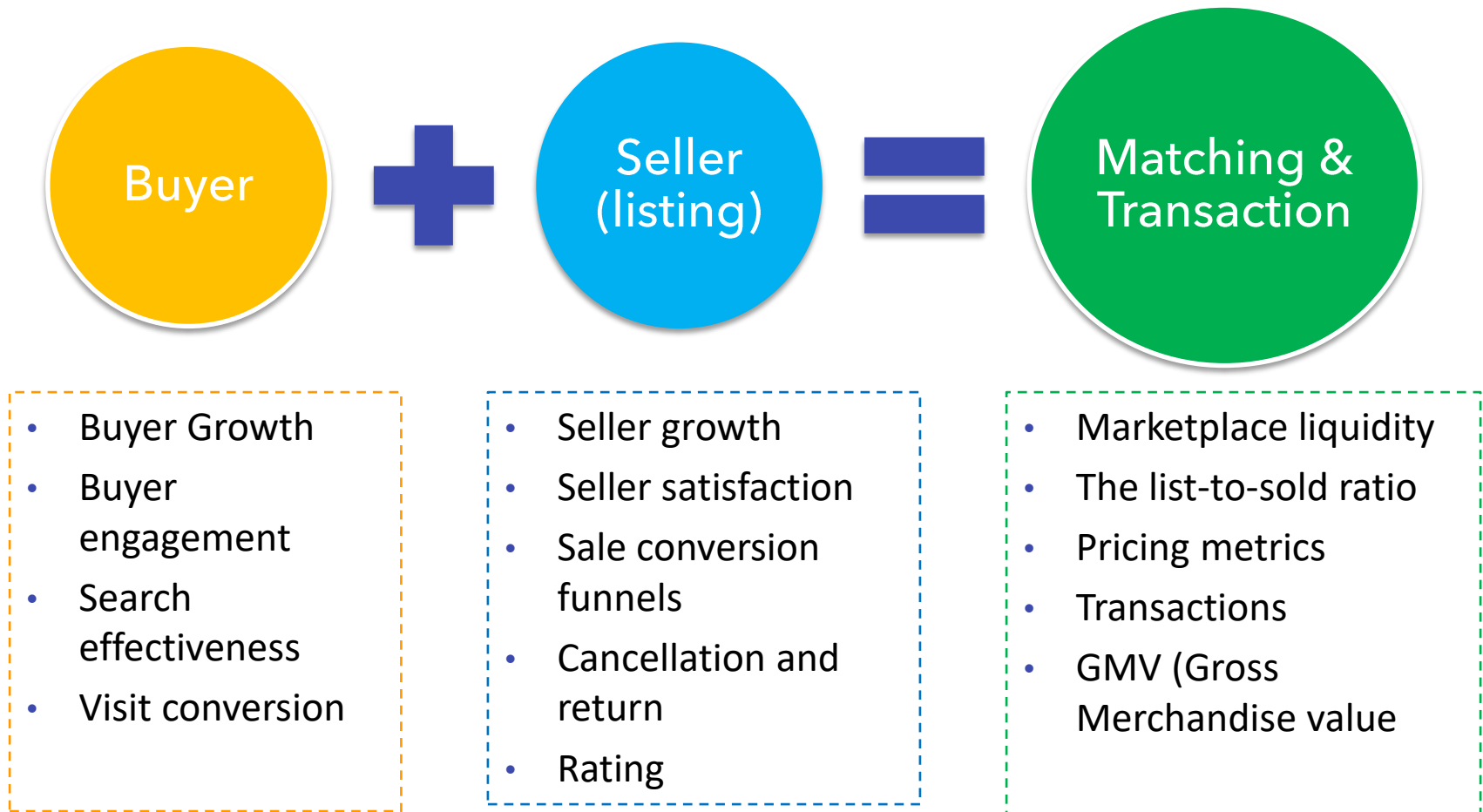➤ The biggest challenge is to attract enough number of buyers and sellers.

B2C (business to consumer)

C2C (consumer to consumer)

Metrics in two-sided marketplaces should capture the health of buyers+ sellers +matching quality (liquidity)

Buyer + **Seller (listing)** = **Matching & Transaction**

Buyer
- Buyer Growth
- Buyer engagement
- Search effectiveness
- Visit conversion

Seller (listing)
- Seller growth
- Seller satisfaction
- Sale conversion funnels
- Cancellation and return
- Rating

Matching & Transaction
- Marketplace liquidity
- The list-to-sold ratio
- Pricing metrics
- Transactions
- GMV (Gross Merchandise value

Two-sided marketplace metric examples

Unique visitors

Returning Visitors

Registered visitors

Visitor/seller ratio

Buyers (1+Purchase)

Engaged buyers last 30 days

Engaged buyers/active seller ratio

Engaged buyers/active listing ratio

Active sellers (listing last 30 days)

% active sellers

Active listing with more than 5 views

% active listing

Growth of buyers

- These could be VANITY metrics though!
- We should care more about visitors who would make purchase

Buyer engagement and activity

- More actionable and meaningful buyer metrics

Seller growth

- Not all the sellers have high-quality
- They might get onboarded and then only use the marketplace once to test the price

More Marketplace Metrics from [Andreessen Horowitz](#)
(one of biggest and well-known Venture Capitalists in the world)

Match rate (*aka utilization rate or success rate*)

- Driver utilization time for ridesharing — what % of the time are drivers driving around with a passenger, vs. empty?

- How often are employers filling their posted role in job marketplaces? And how often are job seekers finding jobs?

Market Depth (more supply)

- **Homogenous marketplaces** (Uber, Lime Scooter): When users open Lime, how many cars/scooters will they see near them? *(value to users eventually plateaus with greater market depth)*

- **Heterogenous marketplaces** (Airbnb): user's tastes may be quite specific, so every additional listing on the platform would bring more value.

Take rate

- In marketplace businesses, gross merchandise volume (GMV) and revenue are frequently used interchangeably. But GMV does not equal revenue.

- Gross merchandise volume is the total sales dollar volume of merchandise transacting through the marketplace in a specific period.

- Revenue is the portion of GMV that the marketplace "takes."

Power user curves

Are users becoming more engaged over time?

- Power user curves (commonly called L30 charts for 30 days of use, or L7 charts for 7 days of use) are histograms of users' engagement, showing the total number of days users were active in doing a particular action in a given timeframe

Source: https://a16z.com/2020/02/21/marketplace-metrics/

Homework + Reading/listening Pre-read

Due 9/16, 7pm EST

HW1 will be posted in the assignment section of BB, 9/9, 10pm EST

Relevant readings, articles, podcasts and videos

15-min round discussion for next week

➢ **Reading:** AARRR framework

➢ **Video:** How to Increase The Lifetime Value (LTV) of Your SaaS Customers

➢ **Video:** Nine Business Models and the Metrics Investors Want

➢ **Reading:** Metrics for a two-sided marketplace product

➢ **NFX Podcast:** How VCs See Your KPIs

Other interesting and relevant content

➢ **Reading**: The Power User Curve: The best way to understand your most engaged users

➢ **Reading:** Lean Analytics – Use Data to Build a Better Startup Faster (Chapter 5-13)

➢ **Reading:** Lean Analytics summary

▸ **Reading:** Make Your Pirate Metrics Actionable

➢ **Video:** When Advertising Isn't Enough

➢ **Reading**: 13 Metrics for Marketplace Companies

➢ **Reading:** 12 Things about Product-Market Fit

Questions

Email me @ Alipilehvarm@GWU.EDU